# Process Automation

## Field Instruments for Process Automation

**Catalog FI 01 · 2010 US Edition**

---

**Overview**

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P measuring instruments for pressure</td>
</tr>
<tr>
<td>SITRANS T measuring instruments for temperature</td>
</tr>
<tr>
<td>SITRANS F flowmeters</td>
</tr>
<tr>
<td>SITRANS L level instruments</td>
</tr>
<tr>
<td>SIPART PS2 electropneumatic positioners</td>
</tr>
<tr>
<td>SITRANS I isolating power supplies and output isolators</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process protection</td>
</tr>
<tr>
<td>Communication and software</td>
</tr>
<tr>
<td>Appendix</td>
</tr>
</tbody>
</table>

---

The products and systems listed in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001.

Supersedes:
Catalog FI 01 · 2009 US Edition

Refer to the Industry Mall for current updates of this catalog:
www.siemens.com/industrymall
and as PDF at the following address:
www.siemens.com/fi01

The products contained in this catalog can also be found in the e-Catalog CA 01.
Order No.:
E86060-D4001-A510-C8-7600 (DVD)

Please contact your local Siemens branch.

© Siemens AG 2010
Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60%.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.
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
- 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 Instruments

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 the modular system as well as the perfect safety concept. We have a proven range of products for all pressure applications.

Overview of the SITRANS P range:

- **SITRANS P MPS**
  Convenient hydrostatic level measurement.
  SITRANS P transmitter, MPS series, is used for hydrostatic level measurements. It is immersed in the measured medium connected by a cable. The sensor has a stainless steel enclosure and is suitable for applications ranging from drinking water to corrosive liquids.

- **SITRANS P Z**
  The single-range transmitter for gauge and absolute pressures.
  Two types of pressure sensor are used in the Z Series: a stainless steel sensor and a sensor with ceramic diaphragm. An option for the Z Series meets the requirements of the compressor and pump industry by using a brass enclosure.

- **SITRANS P250**
  Single-range transmitter for differential pressure.
  The differential pressure will be detected with a ceramics sensor and transformed into an output signal of 4 – 20 mA, 0 – 5 V resp. 0 – 10 V. The version with 0 – 10 V output signal can be connected directly to the LOGO!24 process controller.

- **SITRANS P ZD**
  Transmitter with digital display and stainless steel enclosure.
  The SITRANS P ZD digital pressure transmitter is provided with a display and a 10:1 turndown. The enclosure and the process connection are stainless steel. The digital display is available either radially or axially to the process connection.

- **SITRANS P Compact**
  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.

- **SITRANS P300**
  The SITRANS P300 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 lasered rating plate, 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. The range of process connections are available for the food and beverage, pharmaceutical, and paper industries, including threaded and flanged versions.
**SITRANS P DS III**
Digital transmitters with integral diagnostics function, HART, PROFIBUS PA or Fieldbus Foundation communication, and convenient key operation. Within a range from 1 mbar to 400 bar, the SITRANS P DS III works well even with extreme chemical and mechanical loads or electromagnetic influences. 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. 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. Many different versions of remote seals are available.

Adjust the zero, span, damping and other functions using three pushbuttons and the large, freely-programmable display. The versatility required for every application is integral in the SITRANS P. Whether manual or HART operation, or operation via SIMATIC Process Device Manager (PDM), everything is possible.

**Remote seals**
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.

Hastelloy® is a registered trademark of Haynes International. Monel® is a registered trademark of Special Metals Corporation.
Temperature Measurement Instruments

The instruments in the SITRANS T line are true temperature measurements, even under extreme conditions. Whether high or low temperatures or hazardous areas, the SITRANS T with communications capability can meet all demands in a wide variety of industries.

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
  Pt100 transmitter. Low-cost and compact, configurable using PC (SIPROM T).
- SITRANS TH200
  Universal transmitter, configurable using PC (SIPROM T). Cost-saving service features.
- SITRANS TH300
  HART universal transmitter, configurable using SIMATIC PDM or HART protocol. Cost-saving service features. Diagnostics and simulation functions, remotely or locally.
- SITRANS TH400
  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.

Transmitters for rail-mounting
- SITRANS TR200
  Universal transmitter programmable via PC (SIPROM T). Cost-saving operational functions and diagnostics LED.
- SITRANS TR300
  HART universal transmitter configurable via SIMATIC PDM or HART protocol. Cost-saving operational functions and diagnostics LED. Remote or local diagnostics and simulation.
- SITRANS TW
  Universal transmitter for rail-mounting with HART communication, comprehensive diagnostics and simulation functions, configurable using SIMATIC PDM, optional limit value relay.

Transmitter for field-mounting
- SITRANS TF
  Transmitter for mounting in the field where excessive heat or vibrations are present at the measuring point; IP68 degree of protection, programmable, HART, optional programmable digital display. Can also be used as remote display without transmitter for any 4 to 20 mA signal.
- SITRANS TF2
  Digital display thermometer
  Combines a Pt100 sensor with a 4 to 20 mA transmitter and digital display. Stainless steel enclosure with IP65 degree of protection includes simple configuration using three pushbuttons with no additional software required.

All transmitters are also available in intrinsically safe versions; the SITRANS TF is Ex d certified.
Temperature sensors

Selection of the correct temperature sensor.

Many resistance thermometer and thermocouple designs are available for use in the process industry. The materials, process connections, construction and accessories are appropriate for a wide range of process applications. Furthermore, our process engineers can help you select appropriate materials for protective/neck tubes or mounting types.

- For piping and tanks.
  Resistance thermometers for threaded, welded, or flange connection. Available with various protective tubes and solid barstock for maximum stress conditions.

- For combustion plants and furnaces.
  Straight thermocouples and flue gas resistance thermometers.

- For applications with high sanitary requirements according to EHEDG recommendations.
  - Resistance thermometers for installation in pipelines with hygienic process connections.
  - Clamp-on resistance thermometers can be retrofitted without interfering with process operation, no dead volume.

- For rooms with high humidity.
  Room temperature sensor of Pt100 design.

- For limited installation conditions.
  Jacket thermocouples with attached cable, plug or connection head.

- Accessories.
  Measuring inserts and connection heads for your spare parts strategy.

Do you have a specialized application?

In the industrial temperature measuring sector, applications exist which require adapted devices. We will be pleased to help you with individual solutions.
Flow Measurement Instruments

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

- **SITRANS F M** – Electromagnetic flowmeters
  SITRANS F M flowmeters measure the volume flow of electrically-conductive fluids. Water, chemicals, food and beverage, slurries, sludge, paper stock, and mining slurries with magnetic particles are measured using SITRANS F M. The product range is divided into three types of electromagnetic meter:

  **Standard pulsed DC magnetic flowmeter, SITRANS F M DN 2 to DN 2000 (1/12” to 78”).**
  - Full transmitter program MAG 5000/MAG 6000/MAG 6000 I Ex compact or remote mounting.
  - Variety of inputs and outputs and bus communication modules; PROFIBUS PA/DP, FOUNDATION Fieldbus, HART and Modbus® RTU.
  - MAG 1100/1100 HT sensor for general process industries.
  - MAG 1100 F sensor for food and beverage and pharmaceutical industries.
  - MAG 3100/MAG 3100 HT sensor for general process industry.
  - MAG 3100P designed for process industry and the harsh requirements in the chemical industry.
  - MAG 5100 W sensor designed for water and wastewater applications.

  **Battery-powered electromagnetic water meter, MAG 8000 DN 25 to DN 1200 (1” to 48”).**

  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.

  - Drinking water approvals.
  - MI 001 EU Approval.
  - OIML R49 type approval.
  - 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.

  **High power electromagnetic alternating field flowmeter, TRANS MAG 2 DN 15 to DN 1000 (1/12” to 40”).**

  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.

**Modbus®** is a registered trademark of Schneider Electric.
■ SITRANS F C – Coriolis mass flowmeters

The SITRANS F C coriolis mass flowmeters measure the direct mass flow rate of liquids and gases in almost any application without special calibration.

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 Coriolis transmitter

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

■ Variety of transmitter enclosures.
■ Multiple I/O as standard and communication modules PROFIBUS PA/DP, FOUNDATION Fieldbus, MODBUS RTU and HART.
■ SENSOPROM facilitating true plug and play.
■ Advanced diagnostics for easy service.
■ Fast signal processing enabling high speed batching.

Seamless integration with the SIFLOW FC070 Coriolis transmitter

SIFLOW FC070 is a true multi-parameter coriolis transmitter ready for quick installation and system integration. SIFLOW FC070 is the most compact, space-saving and versatile transmitter available.

■ Direct integration into SIMATIC S7 automation system.
■ Standardized user interface – SIMATIC Manager, PCS7 and SIMATIC PDM.
■ Compatible with the complete range of SITRANS F C coriolis sensor.
■ Stand-alone functionality or third party PLC integration.
■ Ultra compact space saving design in SIMATIC 40 mm standard module.

Sensors meeting the toughest challenges

Optimum meter 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 range. Sensor capacity ranges from few g/h to 510,000 kg/h (few lb/h to 1,124,300 lb/h), covering applications ranging from mini-plants to bulk loading.

The SITRANS F C sensors offer:
■ Multi-plug connector for plug and play installation.
■ Wide choice of process connections.
■ Wetted parts available in stainless steel or Hastelloy.

MASS 2100 DI 1.5

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 integration.

MASS 2100 DI 3 – DI 40
0 to 52,000 kg/h (0 to 114,600 lb/h):
Medium range sensors for general purpose applications.

Standard MC2 DN 50 – 150 and Hygienic version DN 20 – 80
0 to 510,000 kg/h (0 to 1,124,300 lb/h):
Large sensors offering ideal fit between size and maximum flow capacity.
Flow Measurement Instruments

- **SITRANS F US – ultrasonic flowmeters**
  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**
  Ultrasonic in-line flowmeters are suitable for industrial applications with pipe sizes ranging from DN 50 to DN 1200 (2” to 48”). Full 2 and 4-track sensors are available in combination with the SITRANS FUS060 transmitter.
  - Option between mild and stainless steel sensors.
  - Transducers can be exchanged without interrupting operation.

**Retrofit flowmeter type, SONOKIT**

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.

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 is 6+ years.

- **Clamp-On ultrasonic flowmeters**
  Ultrasonic clamp-on flowmeters provide highly accurate liquid and gas flow measurement. The external transducers can quickly and easily be installed on the outside of the pipes ranging from DN 6 to DN 9140 (0.25” to 360”) in size.

Clamp-on ultrasonic flowmeters are available in six different families dedicated to each of their main industry:
  - SITRANS FUS1010 for general applications
  - SITRANS FUP1010 for portable meter
  - SITRANS FUE1010 for energy
  - SITRANS FUH1010 for hydrocarbon
  - SITRANS FUG1010 for gas
  - SITRANS FUS1020 for water and wastewater

In addition, the SITRANS FUE1010 and SITRANS FUP1010 are available as kits that come in a sturdy suitcase, containing all equipment necessary for performing flow measurement tasks. These kits are ideal for check metering of existing applications regardless of measurement technology or applications with no metering.

All clamp-on meters are characterized by easy installation with no need to cut pipe or stop the flow, minimal maintenance thanks to external transducers that do not require periodic cleaning, excellent accuracy and repeatability, no moving parts to wear or foul, and no pressure drop or energy loss.
Siemens focuses on a number of key industries such as:

- HVAC & power, food & beverage, and density. This makes SITRANS FX300 dual converter ideal for applications that require reliable flow measuring independent of pressure, temperature, viscosity and density. 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 FX300 Vortex flowmeter is available as flanged or sandwich version in the following configurations:

- **SITRANS FX300 single converter** is available as a volumetric and mass flowmeter:
  - Volumetric flowmeter. Measurement of steam, gases and conductive and non-conductive liquids.
  - Mass flowmeter. Measurement with temperature sensor for saturated steam compensation as standard feature. Option with a pressure and integrated temperature sensors for compensation of gases, wet gases, mixtures or steam.
  - Option within pressure sensor is the 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.

- **SITRANS FX300** is available as a volumetric and mass flowmeter:
  - Dual measurement for twofold reliability.
  - Redundant system with two independent sensors and two converters.
  - Optimally suited for measurements in multi product pipelines.
  - Each converter can be individually programmed for the given product.
  - Measurement with temperature sensor for saturated steam compensation as standard feature.

- **OCM III – ultrasonic flow controller**
  - High accuracy 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**
  - Used to measure the volume flow of conductive and non-conductive liquids. High viscosity media, acids and alcohol-based 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**
  - Universal flow measurement for liquids, gases and vapors. Always provide accurate results even with large bores, high temperature and extreme pressure.
Level Measurement Instruments

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.

POINT LEVEL DETECTION

- Electromechanical
  Siemens rotating or vibrating point level switches are a cost-effective solution for solids and liquids applications. Their robust design lasts in harsh and abrasive environments. They detect high, low, and demand levels in solids and liquids applications, specializing in low bulk density applications. Standard aluminum enclosures and stainless steel process connections provide exceptional resistance to mechanical forces, long service life, and low cost of ownership.
  - SITRANS LP5200 rotary paddle switch detects solids with densities as low as 15 g/l (0.94 lb/ft³).
  - SITRANS LVL100 and LVL200 vibrating liquid level switches for high, low, and demand level alarms and pump protection.
  - LVS100 and LVS200 vibratory switch detects solids with densities as low as 5 g/l (0.3 lb/ft³).

- Ultrasonic
  Pointek® UL5200 is an 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 even in tough bulk solids applications.
  - Pointek CLS100 – compact 2-wire switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam.
  - Pointek CLS200 – versatile switch for detection of liquids, solids, slurries, foam, and interfaces.
  - Pointek CLS300 – level switch for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present.
  - Pointek CLS500 – level switch for critical conditions of more extreme temperatures and pressures.
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 SIMATIC PDM.

- SITRANS Probe LR – 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 – 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).
- SITRANS LR250 – 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). Ideal for small vessels and low dielectric media.
- Sitrans LR260 – 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).
- SITRANS LR400 – 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft). Ideal for low dielectric media.
- SITRANS LR460 – 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).

Sonic Intelligence® is a registered trademark of Siemens Milltronics Process Instruments Inc.
Level Measurement Instruments

Ultrasound
Siemens is the world leader in ultrasonic level technology. The SITRANS Probe LU is a reliable compact transmitter solution offering a level or flow output. For advanced control solutions integrators 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 – 2-wire, loop powered ultrasonic transmitter for level/volume/flow monitoring of liquids in storage vessels, simple process vessels, and open channels.
- MultiRanger® – Versatile short- to medium-range single- and multi-vessel controller for applications up to 15 m (50ft).
- HydroRanger 200 – Level controller for up to 6 pumps including pump control, differential control, and open channel flow monitoring.
- SITRANS LUC500 – High-end duplex lift station controller for the water/waste-water industry.
- SITRANS LU series – Long range level monitoring of liquids and solids, measuring up to 10 points to a range of 60 m (200ft).

Rugged Echomax® transducers 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.

Guided Wave Radar
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 cable) 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 medium-range measurements.

- SITRANS LG200 – Advanced loop-powered, guided wave radar level transmitter for liquids, slurries, interface and bulk solids with a dielectric of 1.4 and higher. The wide selection of models and echo-processing software ensure reliable measurement in liquids with corrosive vapors, foam, saturated steam, high viscosity, surface agitation, high fill/empty rates and varying dielectric or density.

MultiRanger® and Echomax® are registered trademarks of Siemens Milltronics Process Instruments Inc.
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 tip-sensitive probes, Active-Shield technology, and modular probe options available on various models, they offer practical solutions to a wide variety of point level, continuous level, and interface applications.

- SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. It is ideal for standard and 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 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, 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 P MPS and SITRANS P DS III 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 weighing technology offers highly precise measurement without material contact independent of medium temperature, tank shape, built-in parts and material characteristics.
Positioner

Positioners from Siemens have been guaranteeing safe and trouble-free operation around the globe for more than 15 years. They accurately control every valve type and process, while handling special tasks with perfect reliability. We continually develop our product range to satisfy your exacting specifications and demands that your process requirements place on positioners.

Our range of intelligent electropneumatic positioners for linear and part-turn actuators is represented by the names SITRANS VP300 and SIPART PS2. These two product models optimally cover every application. Regardless of application; safe control of valves in chemicals and oil & gas, or precise control in pharmaceuticals or food; we offer the positioner solution for every valve. These include the most widely used electropneumatic positioner, SIPART PS2. The new SITRANS VP300 opens even more applications for our family of intelligent positioners. Whether a proven device or a new one – the fundamental features of our positioners are always the same: comprehensive functionalities, diagnostics capability, simple assembly, and fast commissioning. The result is also always the same: with Siemens positioners, processes are completely safe and reliable.

- **SITRANS VP300**
  SITRANS VP300 is our newest addition to the family. It supplements our range of positioners for use in hostile environments, and with compressed air, which is frequently moist or contaminated. Innovative features such as non-contacting position detection and rugged mechanical connection via an OPOS interface not only mean that the SITRANS VP300 is particularly resistant to vibration, but also permit simple and fast assembly with just two screws.
  - Standard aluminum enclosure to IP66/ NEMA 4x protection.
  - Non-contacting position detection (GMR effect).
  - Rapid assembly through innovative OPOS interface.
  - Simple operation using graphic display and menu prompting.
  - Plain text in several languages.
  - SIL–certified partial stroke test.

- **SIPART PS2**
  SIPART PS2 is currently the most widely used positioner for linear and part-turn actuators in a wide range of process industries. This is not without reason. The proven all-round design has a particularly flexible stroke range, intelligent diagnostics, and different communication protocols.

What has been proven so often is certainly the correct choice.

- 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.
- ExD explosion-proof version.
- SIPART PS2 is available in Macrolon, 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".

**Extended online diagnostic**
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

Detect to protect your process. Detect flow problems, blockages, screen faults, cavitation in pumps, or burst filter bags. Process protection devices can be an early warning system to avoid costly process interruptions and breakdowns of equipment. Rugged construction makes them impervious to dust, dirt, buildup and moisture.

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

- **Milltronics® MFA 4p with MSP or XPP probes**
  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.

- **Milltronics Millpulse 600**
  This heavy-duty 2-wire motion sensor provides a solid state switch output to PLCs when monitoring speed of rotating, reciprocating or conveying equipment.

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

ACOUSTIC SENSORS

- **Acoustic sensors for pump monitoring**
  Even the smallest leakages on delivery valves of oscillating positive displacement pumps (e.g. piston pumps) can be detected by measuring cavitation. The acoustic diagnostic device SITRANS DA400 consists of cavitation sensors and an analyzer unit which supplies the sensors with electrical energy and detects, filters and evaluates the measured signal and outputs an alarm signal on exceeding a defined limit value.

- **Acoustic sensors for material flow monitoring**
  The SITRANS AS 100 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 AS 100 can be connected to a SITRANS CU 02, 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.
Communication and Software

Totally integrated automation – TIA

Totally Integrated Automation 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.
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.
**Communication**

- **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 regulators).

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-to-use interface providing the required information on the process devices. The extension and standardization of the EDDL into Enhancement Levels 1 and 2 means a wide range of important functions are available in the EDD, including the OPC unified architecture.

Communication with process devices is by HART, PROFIBUS or alternative protocols.

SIMATIC PDM can be used as a non-proprietary parameterization tool as well as in the integrated version in the SIMATIC Step7/PCS 7 environment.

SIMATIC PDM meets both requirements in the field as well as those for a central engineering system and centralized service and maintenance.

- **HART – field communication protocol**

The HART® communication standard is widely used for field devices. HART devices are defined by the HCF (HART Communication Foundation). The HART standard extends analog 4 to 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.

HART 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.
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 only 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 and temperature 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.

Asset Management

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. SIMATIC PDM is particularly suited to plant-specific asset management with its comprehensive functionality for configuration, parameterization, commissioning, diagnostics and maintenance of intelligent field devices and components. To deliver detailed and reliable results, asset management systems require a large amount of basic information.

SIMATIC PDM can 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. It is based on the device descriptions (EDD) that are independent of the operating system. Extraction of information and interpretation of results are independent of the type of device, so it is irrelevant whether the device is an actuator or a sensor, a PROFIBUS or a HART device. 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.
Complete Solutions

Siemens offers a complete service package to assist you in engineering, designing, supplying, installing and commissioning measurement solutions for complete industrial plants. In addition, we guarantee seamless after-sales service based on user-friendly documentation of the solution and your plant.

Real-world measurement technology from Siemens is a multi-faceted 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 CIE 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, hook-ups, 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.
### Product overview

<table>
<thead>
<tr>
<th>Page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/2</td>
<td>Product overview</td>
</tr>
<tr>
<td>2/4</td>
<td>Transmitters for gauge, absolute and differential pressure</td>
</tr>
<tr>
<td>2/10</td>
<td>SITRANS P250 for differential pressure</td>
</tr>
<tr>
<td>2/15</td>
<td>ZD series for gauge and absolute pressure</td>
</tr>
<tr>
<td>2/19</td>
<td>Transmitter for pressure with wireless communication</td>
</tr>
<tr>
<td>2/24</td>
<td>SITRANS P300 for gauge and absolute pressure</td>
</tr>
<tr>
<td>2/28</td>
<td>Transmitters for food, pharmaceuticals and biotechnology</td>
</tr>
<tr>
<td>2/33</td>
<td>SITRANS P300 for gauge and absolute pressure</td>
</tr>
<tr>
<td>2/44</td>
<td>Technical description, technical specifications, ordering data, dimensional drawings</td>
</tr>
<tr>
<td>2/49</td>
<td>SITRANS P280 for gauge and absolute pressure</td>
</tr>
<tr>
<td>2/55</td>
<td>DS III series with PMC connection, SITRANS P300 with PMC connection</td>
</tr>
<tr>
<td>2/60</td>
<td>Transmitters for gauge, absolute and differential pressure, flow and level</td>
</tr>
<tr>
<td>2/67</td>
<td>DS III, DS III PA and DS III FF series, technical description</td>
</tr>
<tr>
<td>2/76</td>
<td>Technical specifications, ordering data, dimensional drawings</td>
</tr>
<tr>
<td>2/87</td>
<td>- for gauge pressure</td>
</tr>
<tr>
<td>2/96</td>
<td>- for absolute pressure (gauge construction)</td>
</tr>
<tr>
<td>105</td>
<td>- for differential pressure and flow</td>
</tr>
<tr>
<td>121</td>
<td>- for level</td>
</tr>
<tr>
<td>130</td>
<td>SITRANS P Accessories</td>
</tr>
<tr>
<td>136</td>
<td>Accessories/spare parts for SITRANS P, P300 and DS III series</td>
</tr>
<tr>
<td>140</td>
<td>Factory-mounting of valve manifolds on SITRANS P transmitters</td>
</tr>
<tr>
<td>144</td>
<td>Remote seals for transmitters and pressure gauges</td>
</tr>
<tr>
<td>150</td>
<td>Technical description</td>
</tr>
<tr>
<td>151</td>
<td>Pancake type diaphragm seal with flexible capillary tube</td>
</tr>
<tr>
<td>152</td>
<td>Flange-type diaphragm seal directly connected</td>
</tr>
<tr>
<td>154</td>
<td>Flange-type diaphragm seal, with extension</td>
</tr>
<tr>
<td>156</td>
<td>Diaphragm seal &quot;flanged off-line, low-pressure type&quot;, directly connected</td>
</tr>
<tr>
<td>158</td>
<td>Diaphragm seal &quot;flanged off-line type&quot;</td>
</tr>
<tr>
<td>160</td>
<td>Diaphragm seal &quot;flanged off-line, low-pressure type&quot;</td>
</tr>
<tr>
<td>162</td>
<td>Flushing rings</td>
</tr>
<tr>
<td>164</td>
<td>Diaphragm seal with quick connection</td>
</tr>
<tr>
<td>165</td>
<td>Inline diaphragm seal with quick connection</td>
</tr>
<tr>
<td>169</td>
<td>Diaphragm seal &quot;threaded design&quot;</td>
</tr>
<tr>
<td>170</td>
<td>Diaphragm seal &quot;threaded, low-pressure design&quot;</td>
</tr>
<tr>
<td>172</td>
<td>Inline diaphragm seal, wafer for pressure</td>
</tr>
<tr>
<td>174</td>
<td>Diaphragm seal, saddle</td>
</tr>
<tr>
<td>176</td>
<td>Measuring setups</td>
</tr>
<tr>
<td>177</td>
<td>- with remote seals</td>
</tr>
<tr>
<td>179</td>
<td>- without remote seals</td>
</tr>
<tr>
<td>181</td>
<td>Questionnaires</td>
</tr>
<tr>
<td>183</td>
<td>Fittings</td>
</tr>
<tr>
<td>184</td>
<td>Technical description</td>
</tr>
<tr>
<td>185</td>
<td>Double shut-off valves</td>
</tr>
<tr>
<td>186</td>
<td>2-, 3- and 5-spindle valve manifolds DN 5</td>
</tr>
<tr>
<td>188</td>
<td>Oval flange</td>
</tr>
</tbody>
</table>

You can download all instructions, catalogs and certificates for SITRANS P free of charge at the following internet address:

www.siemens.com/sitransp

© Siemens AG 2010
## Overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Page</th>
<th>Software for Parameterization</th>
</tr>
</thead>
</table>
| Two- or three-wire transmitters for measuring gauge and absolute pressure | SITRANS P, Z series  
Compact single-range transmitters  
Analog electronics  
Available ex stock | 2/4 | – |
| Two- or three-wire transmitters for measuring differential pressure | SITRANS P250  
Compact single-range transmitters  
Analog electronics  
Available ex stock | 2/10 | – |
| Two- or three-wire transmitters for measuring gauge and absolute pressure | SITRANS P, ZD series  
Turn down: 5 : 1  
Digital display  
Available ex stock | 2/15 | – |
| Wireless transmitter with wirelessHART for measuring of gauge and absolute pressure | SITRANS P280  
Wireless communication with WirelessHART  
Battery power supply  
Parameterization with SIMATIC PDM via WirelessHART or local with HART modem and using local pushbuttons | 2/19 | SIMATIC PDM |
| Two-wire transmitters for measuring gauge and absolute pressure | SITRANS P300  
• Sanitary design according to EHEDG, FDA and GMP  
• Parameterization over 3 buttons or communication over HART, PROFIBUS PA or FOUNDATION Fieldbus  
• Standard process connection G½, ½-NPT  
• Turn down 100 : 1 | 2/24 | SIMATIC PDM |
| Two-wire transmitters for measuring gauge pressure | SITRANS P300 and DS III series with PMC connection for the paper industry  
• Turn down 100 : 1  
• Process connections for the paper industry  
• Parameter assignment over 3 buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus | 2/44 | SIMATIC PDM |
| Two-wire transmitters for measuring:  
• Gauge pressure,  
• Absolute pressure  
• Differential pressure and  
• Flow or  
• Level | SITRANS P, DS III series  
SITRANS P, DS III PA series  
SITRANS P, DS III FF series  
Turn down: 100 : 1  
Parameterization using:  
• 3 pushbuttons and HART for DS III series  
• 3 pushbuttons and PROFIBUS-PA for DS III PA series  
• 3 buttons and FOUNDATION Fieldbus for DS III FF series  
• Available ex stock | 2/60 | SIMATIC PDM |
| 2-wire transmitter for measuring hydrostatic levels | SITRANS P, MPS series (submersible sensor)  
For measuring liquid levels in wells, tanks, channels, dams etc. | 2/140 | – |

© Siemens AG 2010
<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Page</th>
<th>Software for Parameterization</th>
</tr>
</thead>
</table>
| Remote seals for measuring viscous, corrosive or fibrous media (as well as media at extreme temperatures) | Remote seals in pancake and flange designs  
Quick-release remote seals for the food industry  
Wide range of diaphragm materials and filling liquids available | 2/144 | --                            |
| 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 | 2/183 | --                            |
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure

Z series for gauge and absolute pressure

Overview
SITRANS P pressure transmitters, Z series for pressure and absolute pressure (7MF1564-...), measure the gauge and absolute pressure as well as the level of liquids and gases.

Benefits
- High measuring accuracy
- Sturdy stainless steel housing
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapor
- Temperature-compensated measuring cell
- Compact design

Application
The pressure transmitter of the Z series for gauge pressure and absolute pressure (7MF1564-...) is used above all in the following industrial areas:
- Chemical industry
- Pharmaceutical industry
- Food industry
- Mechanical engineering
- Shipbuilding
- Water supply

Design
The design of the pressure transmitter is dependent on the measuring range.

Measuring range <1 bar (<14.5 psi)
Main components:
- Stainless steel housing with piezo-resistive silicon measuring cell (with stainless steel diaphragm, temperature-compensated) and electronics module
- Process connection made of stainless steel in diverse designs (see Selection and Ordering data)
- Electrical connection made using a plug to DIN 43650 with the cable inlet M16 x 1.5, ½-14 NPT or round plug connector M12.

The pressure transmitters with a nominal range < 1 bar g (< 14.5 psi g) are optionally available with or without explosion protection.

Function

Mode of operation

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

Measuring range ≥1 bar (≥14.5 psi)
Main components:
- Stainless steel housing with ceramic measuring cell and electronics module. The temperature-compensated ceramic measuring cell has a thin-film strain gauge which is mounted on a ceramic diaphragm. The ceramic diaphragm can also be used for aggressive media.
- Process connection made of stainless steel in diverse designs (see Selection and Ordering data)
- Electrical connection made using a plug to DIN 43650 with the cable inlet M16 x 1.5, ½-14 NPT or round plug connector M12.

The pressure transmitters with a nominal range ≥ 1 bar g (≥ 14.5 psi g) are optionally available with or without explosion protection.
Technical specifications

SITRANS P pressure transmitters, Z series for gauge pressure, absolute pressure and level

Mode of operation

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Pressure type</th>
<th>Measuring range</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 bar (14.5 psi)</td>
<td>Plezo-resistive</td>
<td>0 ... 400 bar g (0 ... 5802 psi g)</td>
<td>0 ... 6000 psi g</td>
</tr>
<tr>
<td>≥ 1 bar (14.5 psi)</td>
<td>Thin-film strain gauge</td>
<td>0 ... 16 bar a (0 ... 232 psi a)</td>
<td>0 ... 300 psi a</td>
</tr>
</tbody>
</table>

Input

- Measured variable: gauge and absolute pressure
- Measured range:
  - Metric: 0 ... 400 bar g (0 ... 5802 psi g)
  - US measuring range: 0 ... 6000 psi g
- Absolute pressure:
  - Metric: 0 ... 16 bar a (0 ... 232 psi a)
  - US measuring range: 0 ... 300 psi a

Output

- Output signal:
  - Current output signal: 4 ... 20 mA
  - Voltage output signal (only measuring range ≥ 1 bar (14.5 psi)): 0 ... 10 V DC

Accuracy

- Error in measurement (at 25 °C (77 °F), including conformity error, hysteresis and repeatability):
  - Measuring range < 1 bar (14.5 psi): 0.25 % of full-scale value
  - Measuring range ≥ 1 bar (14.5 psi): 0.25 % of full-scale value/year
- Response time T99: < 0.1 s
- Long-term drift: 0.25 % of full scale value/year
- Influence of ambient temperature:
  - Start of scale: 0.25 %/10 K (0.25 %/10 K) of full-scale value
  - Full-scale value: 0.25 %/10 K (0.25 %/10 K) of full-scale value

Rated operating conditions

- Process temperature: -30 ... +120 °C (-22 ... +248 °F)
- Ambient temperature: -25 ... +85 °C (-13 ... +185 °F)
- Storage temperature: -50 ... +100 °C (-58 ... +212 °F)
- Degree of protection to EN 60529: IP65

Design

- Weight: ≈ 0.25 kg (= 0.55 lb)
- Wetted parts materials:
  - Measuring cell:
    - Measuring range < 1 bar (14.5 psi): Stainless steel, mat. No. 14404/316L
    - Measuring range ≥ 1 bar (14.5 psi): Al2O3 – 96%
  - Process connection:
    - Stainless steel, mat. No. 14404/316L
  - Gasket: Viton
- Process connection: See Selection and Ordering data

Power supply \( U_H \)

- Terminal voltage on pressure transmitter:
  - For current output: DC 10 ... 36 V (DC 10 ... 30 V für Ex)
  - For voltage output signal (only measuring range ≥ 1 bar (14.5 psi)): 15 ... 36 V DC

Certificate and approvals

- Classification according to pressure equipment directive (DRGL 97/23/EC):
  - For gases of fluid group 1 and liquids of fluid 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
- Explosion protection:
  - Intrinsically safe “I” (only with current output):
    - Identification: TÜV 02 ATEX 1953X
    - Intrinsically safe “T.I.I.S.” (only with current output): Ex II 1/2G EEx ia IIC T4 applied
  - Lloyds Register of Shipping Germanischer Lloyd: Certificate No. 05/20049 (EZ) 33229-06 H
  - American Bureau of Shipping (ABS): 06-HG205130-PDA
  - Det Norske Veritas (DNV): A-10351
  - Drinking water approval (ACS): ACS 07 ACC NY 195
  - Underwriters Laboratories: File E194458

Dimensional drawings

- Pressure transmitter 7MF1564-... with process connection G½” male, dimensions in mm (inch):
  - Model 1:
    - Length on version for voltage output: 132 (5.2) without Ex protection
    - Inner diameter: 16 (0.63)
    - Diameter: 50 (1.97)
  - Model 2:
    - Length on version for voltage output: 122 (4.8) without Ex protection
    - Inner diameter: 16 (0.63)
    - Diameter: 50 (1.97)

- Pressure transmitter 7MF1564-... with process connection G¼” male, dimensions in mm (inch):
  - Model 1:
    - Length on version for voltage output: 131 (5.15) with Ex protection
    - Inner diameter: 16 (0.63)
    - Diameter: 50 (1.97)
  - Model 2:
    - Length on version for voltage output: 122 (4.8) without Ex protection
    - Inner diameter: 16 (0.63)
    - Diameter: 50 (1.97)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure

Z series for gauge and absolute pressure

Pressure transmitter 7MF1564-... with process connection 7/16-20 UNF male, dimensions in mm (inch)

Pressure transmitter 7MF1564-... with process connection ¼"-18 NPT male, dimensions in mm (inch)

Pressure transmitter 7MF1564-... with process connection ¼"-18 NPT female, dimensions in mm (inch)

Pressure transmitter 7MF1564-... with process connection ½"-14 NPT male, dimensions in mm (inch)

Pressure transmitter 7MF1564-... with process connection G1" male, dimensions in mm (inch)

Pressure transmitter 7MF1564-... with process connection ½"-14 NPT female, dimensions in mm (inch)

Schematics

SITRANS P pressure transmitters, Z series (7MF1564-...), connection diagram, with current output (top) and voltage output (bottom)
Siemens FI 01 · 2010 US Edition

SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure

Z series for gauge and absolute pressure

Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS P pressure transmitters for pressure, series Z for gauge and absolute pressure</th>
</tr>
</thead>
</table>

2 or 3-wire system, rising characteristic curve

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>perm. working pressure</th>
<th>Burst pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>For gauge pressure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

with metal measuring cell

- 0...100 mbar g (0...14.5 psi g)
- 0...50 bar g (0...725 psi g)
- 1 bar g (14.5 psi g) ➤ 3AA0
- 1 bar g (14.5 psi g) ➤ 3AB0
- 1 bar g (14.5 psi g) ➤ 3AC0
- 1 bar g (14.5 psi g) ➤ 3AD0
- 1 bar g (14.5 psi g) ➤ 3AE0
- 1 bar g (14.5 psi g) ➤ 3AF0
- 1 bar g (14.5 psi g) ➤ 3AG0

Other version for measuring range < 1 bar (< 14.5 psi g), add Order code and plain text:

- 0...16 bar a (0...2.32 psi a) ➤ 3AA1
- 0...10 bar a (0...1.45 psi a) ➤ 3AB1
- 0...6 bar a (0...0.87 psi a) ➤ 3AC1
- 0...4 bar a (0...0.58 psi a) ➤ 3AD1
- 0...2.5 bar a (0...0.36 psi a) ➤ 3AE1
- 0...2 bar a (0...0.28 psi a) ➤ 3AF1
- 0...1.6 bar a (0...0.23 psi a) ➤ 3AG1

with ceramic measuring cell

- 0...1 bar g (0...1.45 psi g) ➤ 3BB0
- 0...1 bar g (0...1.45 psi g) ➤ 3BD0
- 0...1 bar g (0...1.45 psi g) ➤ 3BE0
- 0...1 bar g (0...1.45 psi g) ➤ 3BG0

Other version for measuring range ≥ 1 bar g (≥ 14.5 psi g), add Order code and plain text:

- 0...20 bar a (0...2.9 psi a) ➤ 3AA0
- 0...12 bar a (0...1.7 psi a) ➤ 3AB0
- 0...8 bar a (0...1.16 psi a) ➤ 3AC0
- 0...6 bar a (0...0.87 psi a) ➤ 3AD0
- 0...4 bar a (0...0.58 psi a) ➤ 3AE0
- 0...2.5 bar a (0...0.36 psi a) ➤ 3AF0
- 0...2 bar a (0...0.28 psi a) ➤ 3AG0

For absolute pressure

- 0...600 mbar a (0...8.7 psi a)
- 0...1 bar a (0...1.45 psi a)
- 0...1.6 bar a (0...2.32 psi a)
- 0...2.5 bar a (0...3.63 psi a)
- 0...4 bar a (0...5.80 psi a)
- 0...6 bar a (0...8.70 psi a)

Order No. Order code
2 or 3-wire system, rising characteristic curve

<table>
<thead>
<tr>
<th>SITRANS P pressure transmitters for pressure, series Z for gauge and absolute pressure</th>
</tr>
</thead>
</table>

Available ex stock

D) Subject to export regulations AL: N, ECCN: EAR99H.
J) Subject to export regulations AL: 9A999, ECCN: EAR99.

1) The transmitters can also be ordered with special measuring ranges, e.g. the transmitter with the 1 bar measuring cell (14.5 psi measuring cell):

- 0.2...+0.8 bar g (+2.9...+11.6 psi g) or
- 0.4...+0.6 bar g (+5.8...+8.7 psi g) or... otherwise start-of-scale value not under -0.4 bar g (-5.8 psi g), also see column “min. perm. operating pressure”

Please note:

• It is not possible to have a smaller span than the smallest span of the device of the entire device range.
• The value must not fall below the minimum permissible operating pressure of the special measuring range of the selected measuring cell.
• The required span of the device must lie between the smallest and the largest possible span of the entire device range.
**SITRANS P measuring instruments for pressure**

Transmitters for gauge, absolute and differential pressure

### Z series for gauge and absolute pressure

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
<th>SITRANS P pressure transmitters for pressure, series Z for pressure and absolute pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2 or 3-wire system, rising characteristic curve</td>
</tr>
</tbody>
</table>

#### Output signal

- 4 ... 20 mA; C 2-wire system; power supply 10 ... 36 V DC
- 0 ... 10 V; 3-wire system; power supply 15 ... 36 V DC

#### Explosion protection

- Without
- With explosion protection Ex II 1/2 G Ex ia IIC T4 (only for version 4 ... 20 mA; 2-wire system; power supply 10 ... 36 V DC)
- With explosion protection “Intrinsic safety T.I.I.S.” (available soon)

#### Electrical connection

- Plug to DIN 43650, Form A, cable inlet M16 x 1.5
- Round connector M12, IP67
- Plug to DIN 43650, cable inlet ½-14 NPT
- Plug to DIN 43650, cable inlet Pg11
- Cable gland Pg11 with 2 m PE cable, IP68
- Special version (specify Order code and plain text)

**Measuring ranges for gauge pressure (only for US market)**

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Perm. working pressure min.</th>
<th>Perm. working pressure max.</th>
<th>Burst pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0 ... 10 psi g)</td>
<td>(-3 psi g)</td>
<td>(20 psi g)</td>
<td>(60 psi g)</td>
</tr>
<tr>
<td>(0 ... 15 psi g)</td>
<td>(-6 psi g)</td>
<td>(30 psi g)</td>
<td>(72 psi g)</td>
</tr>
<tr>
<td>(0 ... 20 psi g)</td>
<td>(-6 psi g)</td>
<td>(40 psi g)</td>
<td>(72 psi g)</td>
</tr>
<tr>
<td>(0 ... 30 psi g)</td>
<td>(-6 psi g)</td>
<td>(60 psi g)</td>
<td>(72 psi g)</td>
</tr>
<tr>
<td>(0 ... 60 psi g)</td>
<td>(-11.5 psi g)</td>
<td>(120 psi g)</td>
<td>(175 psi g)</td>
</tr>
<tr>
<td>(0 ... 100 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(200 psi g)</td>
<td>(360 psi g)</td>
</tr>
<tr>
<td>(0 ... 150 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(300 psi g)</td>
<td>(725 psi g)</td>
</tr>
<tr>
<td>(0 ... 200 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(400 psi g)</td>
<td>(725 psi g)</td>
</tr>
<tr>
<td>(0 ... 300 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(600 psi g)</td>
<td>(1750 psi g)</td>
</tr>
<tr>
<td>(0 ... 500 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(1000 psi g)</td>
<td>(1750 psi g)</td>
</tr>
<tr>
<td>(0 ... 750 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(1500 psi g)</td>
<td>(3600 psi g)</td>
</tr>
<tr>
<td>(0 ... 1000 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(2000 psi g)</td>
<td>(3600 psi g)</td>
</tr>
<tr>
<td>(0 ... 1500 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(3000 psi g)</td>
<td>(6525 psi g)</td>
</tr>
<tr>
<td>(0 ... 2000 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(4000 psi g)</td>
<td>(6525 psi g)</td>
</tr>
<tr>
<td>(0 ... 3000 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(6000 psi g)</td>
<td>(9425 psi g)</td>
</tr>
<tr>
<td>(0 ... 5000 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(8700 psi g)</td>
<td>(9425 psi g)</td>
</tr>
<tr>
<td>(0 ... 6000 psi g)</td>
<td>(-14.5 psi g)</td>
<td>(8700 psi g)</td>
<td>(9425 psi g)</td>
</tr>
</tbody>
</table>

**Measuring ranges for absolute pressure (only for US market)**

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Perm. working pressure min.</th>
<th>Perm. working pressure max.</th>
<th>Burst pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0 ... 10 psi a)</td>
<td>(0 psi a)</td>
<td>(20 psi a)</td>
<td>(60 psi a)</td>
</tr>
<tr>
<td>(0 ... 15 psi a)</td>
<td>(0 psi a)</td>
<td>(30 psi a)</td>
<td>(72 psi a)</td>
</tr>
<tr>
<td>(0 ... 20 psi a)</td>
<td>(0 psi a)</td>
<td>(40 psi a)</td>
<td>(72 psi a)</td>
</tr>
<tr>
<td>(0 ... 30 psi a)</td>
<td>(0 psi a)</td>
<td>(60 psi a)</td>
<td>(72 psi a)</td>
</tr>
<tr>
<td>(0 ... 60 psi a)</td>
<td>(0 psi a)</td>
<td>(120 psi a)</td>
<td>(175 psi a)</td>
</tr>
<tr>
<td>(0 ... 100 psi a)</td>
<td>(0 psi a)</td>
<td>(200 psi a)</td>
<td>(360 psi a)</td>
</tr>
<tr>
<td>(0 ... 150 psi a)</td>
<td>(0 psi a)</td>
<td>(300 psi a)</td>
<td>(725 psi a)</td>
</tr>
<tr>
<td>(0 ... 200 psi a)</td>
<td>(0 psi a)</td>
<td>(400 psi a)</td>
<td>(725 psi a)</td>
</tr>
<tr>
<td>(0 ... 300 psi a)</td>
<td>(0 psi a)</td>
<td>(600 psi a)</td>
<td>(1725 psi a)</td>
</tr>
</tbody>
</table>

Other version, add Order code and plain text: Measuring range: ... up to ... psi g

**Explosion protection**

- Without
- With explosion protection Ex II 1/2 G Ex ia IIC T4 (only for version 4 ... 20 mA; 2-wire system; power supply 10 ... 36 V DC)
- With explosion protection “Intrinsic safety T.I.I.S.” (available soon)

**Electrical connection**

- Plug to DIN 43650, Form A, cable inlet M16 x 1.5
- Round connector M12, IP67
- Plug to DIN 43650, cable inlet ½-14 NPT
- Plug to DIN 43650, cable inlet Pg11
- Cable gland Pg11 with 2 m PE cable, IP68
- Special version (specify Order code and plain text)

**Available ex stock**

- D) Subject to export regulations AL: N, ECCN: EAR99H.
- J) Subject to export regulations AL: 99999, ECCN: EAR99.

© Siemens AG 2010
## Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS P pressure transmitters for pressure, series Z for pressure and absolute pressure</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3-wire system, rising characteristic curve</td>
<td>D) 7MF1564-</td>
<td>-1</td>
</tr>
</tbody>
</table>

### Process connection
- G½" male to EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar)
- G½" male thread and G1/8" female thread
- G¼" male to EN837-1 (¼" BSP male)
- 7/16"-20 UNF male
- ¼"-18 NPT male (standard for pressure ranges psi)
- ¼"-18 NPT female
- ½"-14 NPT male
- ½"-14 NPT female
- RC ½" male to JIS B 7505

### Sealing material between sensor and housing
- Viton (standard)
- Neoprene
- Perbunan
- Special version (specify Order code and plain text)

### Further designs
- Quality inspection certificate (Factory calibration) to IEC 60770-2, add "-Z" to Order No. and Order code.

### Accessories
- Quality inspection certificate (Factory calibration) to IEC 60770-2 supplied later, specify factory no. of transmitter.

*Available ex stock*

D) Subject to export regulations AL: N, ECCN: EAR99H.
Overview

SITRANS P250 transmitter for differential pressure

The SITRANS P250 transmitter measures the differential pressure of liquids and gases.

Benefits

- High measuring accuracy
- Sturdy stainless steel enclosure
- For aggressive and non-aggressive media
- For the measurement of the differential pressure of liquids and gases
- Temperature-compensated measuring cell
- Compact design

Application

The SITRANS P250 transmitter for differential pressure is primarily used in the following industries:

- Chemical industry
- Pharmaceutical industry
- Food industry
- Mechanical engineering
- Shipbuilding
- Water supply

Design

Main components:
- Stainless steel enclosure with piezo-resistive ceramic measuring cell and (temperature-compensated) electronics module.
- Process connection made of stainless steel in diverse designs (see Selection and ordering data)
- Electrical connection through connectors acc. to EN 175301-803-A and round connectors M12, as well as with permanently fixed cable

Function

The pressure transmitter measures the differential pressure of liquids and gases.

Mode of operation

The piezoresistive ceramic measuring cell (membrane) has a Wheatstone bridge circuit, on which the operating pressure P1 and P2 of the media acts at both ends.

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 5 or 10 V DC.

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

Technische Daten

SITRANS P250 differential pressure transmitter

<table>
<thead>
<tr>
<th>Application</th>
<th>Liquids and neutral gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of operation</td>
<td></td>
</tr>
<tr>
<td>Measuring principle</td>
<td>Piezo-resistive measuring cell (ceramic diaphragm)</td>
</tr>
<tr>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Differential pressure</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0 ... 0.1 to 0 ... 25 bar (0 ... 1.45 to 0 ... 363 psi)</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>≤ 25 bar (363 psi) at a differential pressure range &lt; 6 bar (87 psi)</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>≤ 50 bar (725 psi) at a differential pressure range &gt; 10 bar (145 psi)</td>
</tr>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td>Voltage output signal</td>
<td>0 ... 5 V and 0 ... 10 V DC</td>
</tr>
<tr>
<td>Load</td>
<td>&gt; 10 kΩ</td>
</tr>
<tr>
<td>3-wire</td>
<td>≤ (UH - 11 V) / 0.02 A</td>
</tr>
<tr>
<td>2-wire</td>
<td></td>
</tr>
</tbody>
</table>

Measuring accuracy

Dynamic behavior (at 25°C (77°F), including conformity error, hysteresis and repeatability)

- ≤ 1 % of typical full-scale value, see "Measuring range" table
- ≤ 0.5 % of full-scale value/year

Long-term drift acc. to IEC 60770

- Influence of ambient temperature
  - Start of scale
    - ≤ 0.6 %/10 K of full-scale value (≤ 1.2 %/10 K for measuring cell 0 ... 0.1 bar (1.45 psi))
  - Full-scale value
    - ≤ 0.22 %/10 K of full-scale value (≤ 0.37 %/10 K for measuring cell 0 ... 0.1 bar (1.45 psi))

Dynamic behavior

- Suitable for static and dynamic measurements
- Response time $T_{99}$
- Load variation
  - < 5 ms
  - < 50 Hz
## SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure

### SITRANS P250 for differential pressure

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Max. permissible operating pressure (on either side)</th>
<th>Burst pressure</th>
<th>Max. permissible operating pressure (on one side)</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>[bar]</td>
<td>[psi]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... 0.1</td>
<td>0 ... 1.45</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>0.6 bar (8.7 psi)</td>
</tr>
<tr>
<td>0 ... 0.2</td>
<td>0 ... 2.9</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>0.6 bar (8.7 psi)</td>
</tr>
<tr>
<td>0 ... 0.25</td>
<td>0 ... 3.63</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>0.6 bar (8.7 psi)</td>
</tr>
<tr>
<td>0 ... 0.3</td>
<td>0 ... 4.35</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>0.6 bar (8.7 psi)</td>
</tr>
<tr>
<td>0 ... 0.4</td>
<td>0 ... 5.8</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>1.2 bar (17.4 psi)</td>
</tr>
<tr>
<td>0 ... 0.5</td>
<td>0 ... 7.25</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>1.2 bar (17.4 psi)</td>
</tr>
<tr>
<td>0 ... 0.6</td>
<td>0 ... 8.7</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>1.2 bar (17.4 psi)</td>
</tr>
<tr>
<td>0 ... 1.0</td>
<td>0 ... 14.5</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>3.2 bar (46.4 psi)</td>
</tr>
<tr>
<td>0 ... 1.6</td>
<td>0 ... 23.2</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>5 bar (72.5 psi)</td>
</tr>
<tr>
<td>0 ... 2.5</td>
<td>0 ... 36.3</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>8 bar (116 psi)</td>
</tr>
<tr>
<td>0 ... 4</td>
<td>0 ... 58</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>12 bar (174 psi)</td>
</tr>
<tr>
<td>0 ... 6</td>
<td>0 ... 87</td>
<td>25 bar (363 psi)</td>
<td>37.5 bar (544 psi)</td>
<td>20 bar (290 psi)</td>
</tr>
<tr>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>50 bar (725 psi)</td>
<td>75 bar (1088 psi)</td>
<td>20 bar (290 psi)</td>
</tr>
<tr>
<td>0 ... 16</td>
<td>0 ... 232</td>
<td>50 bar (725 psi)</td>
<td>75 bar (1088 psi)</td>
<td>32 bar (464 psi)</td>
</tr>
<tr>
<td>0 ... 25</td>
<td>0 ... 363</td>
<td>50 bar (725 psi)</td>
<td>75 bar (1088 psi)</td>
<td>50 bar (725 psi)</td>
</tr>
</tbody>
</table>

### Schematics

#### Connection: 1 (+), 2 (-)
- I<sub>o</sub> Output current
- R Load
- U<sub>p</sub> Power supply

Connection with current output 4 to 20 mA and plug to EN 175301-803-A

#### Connection: 1 (+), 3 (-)
- I<sub>o</sub> Output current
- R Load
- U<sub>p</sub> Power supply

Connection with current output 4 to 20 mA and round connector

#### Connection: 1 (+, brown), 2 (-, green)
- I<sub>o</sub> Output current
- R Load
- U<sub>p</sub> Power supply

Connection with current output 4 to 20 mA and permanently fixed cable

### Conditions of use

**Ambient conditions**
- Temperature of medium: -15 ... +85 °C (+5 ... +185 °F)
- Ambient temperature: -15 ... +85 °C (+5 ... +185 °F)
- Storage temperature: -40 ... +85 °C (-40 ... +185 °F)

**Degree of protection acc. to EN 60529**
- IP65

**Mounting position**
- Any

**Mounting bracket, included in delivery**

**Design**

**Weight**
- Approx. 430 g (approx. 0.95 lb)

**Enclosure material**
- Stainless steel 1.4305/AISI 303

**Electrical connection**
- Plug EN 175301-803-A
- Circular plug EN 60130-9
- Cable 1.5 m

**Process connection**
- Hose sleeve Ø 4 mm/6 mm
- Pipe union Ø 6 mm/8 mm
- Male thread 7/16-20 UNF, G1/8
- Female thread 1/8-27 NPT
- (Standard), G1/8

**Wetted parts materials**
- Stainless steel 1.4305/AISI 303, CuZn nickel-plated
- Ceramic Al₂O₃ (96 %)
- FPM (standard), EPDM, NBR, MVQ, CR

**Power supply U<sub>p</sub>**

**Terminal voltage on pressure transmitter**
- 2-wire, 4 ... 20 mA: 11 ... 33 V DC ± 15 %
- 3-wire, 0 ... 5 V DC: 11 ... 33 V DC/24 V AC ± 15 %
- 3-wire, 0 ... 10 V DC: 18 ... 33 V DC/24 V AC ± 15 %

**Current consumption at nominal pressure**
- 2-wire: < 20 mA
- 3-wire: < 5 mA

**Protection against polarity reversal**
- Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.

### Certificates and approvals

**Approval**
- CE conformity
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure

SITRANS P250 for differential pressure

Connection with voltage output 0 to 5 V DC (0 to 10 V DC) and plug to EN 175301-803-A

Connection with voltage output 0 to 5 V DC (0 to 10 V DC) and round connector

Connection with voltage output 0 to 5 V DC (0 to 10 V DC) and permanently fixed cable

Dimensional drawings

SITRANS P250 differential pressure transmitter with socket outlet to EN 175301-803-A, dimensions in mm (inch)

SITRANS P250 differential pressure transmitter with round connector to EN 60130-9, dimensions in mm (inch)

SITRANS P250 differential pressure transmitter with cable, dimensions in mm (inch)
### Process connections

<table>
<thead>
<tr>
<th>Process connections</th>
<th>Ø</th>
<th>Width across flats</th>
<th>L</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose connection for hose (CuZn nickel-plated, PVDF)</td>
<td>4</td>
<td>0.16</td>
<td>a</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td>a</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>a = 10</td>
<td>20</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 10</td>
<td>25</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td>61</td>
<td>2.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td>66</td>
<td>2.60</td>
</tr>
<tr>
<td>Pipe union with screw-in nipple for outer pipe (CuZn nickel-plated)</td>
<td>6</td>
<td>0.24</td>
<td>a</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 10</td>
<td>b</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0.32</td>
<td>a</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b = 14</td>
<td>24</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 10</td>
<td>25</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b = 12</td>
<td>65</td>
<td>2.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td>66</td>
<td>2.60</td>
</tr>
<tr>
<td>Pipe union with screw-in nipple for outer pipe (stainless steel 1.430S/AISI 303)</td>
<td>6</td>
<td>0.24</td>
<td>a</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 10</td>
<td>b</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0.32</td>
<td>a</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b = 14</td>
<td>24</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 10</td>
<td>25</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b = 12</td>
<td>65</td>
<td>2.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24</td>
<td>66</td>
<td>2.60</td>
</tr>
<tr>
<td>Male thread G1/8 7/16-20 UNF (CuZn nickel-plated)</td>
<td>-</td>
<td>-</td>
<td>a</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>18</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 14</td>
<td>69</td>
<td>2.67</td>
</tr>
<tr>
<td>Female thread G1/8 (stainless steel 1.430S/AISI 303)</td>
<td>-</td>
<td>-</td>
<td>a</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>12</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a = 14</td>
<td>53</td>
<td>2.07</td>
</tr>
<tr>
<td>Male thread G1/8 (CuZn nickel-plated)</td>
<td>-</td>
<td>-</td>
<td>a</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>b</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0.79</td>
<td>61</td>
<td>2.40</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure

SITRANS P250 for differential pressure

Selection and ordering data

Order No. | Order code
--- | ---
7MF1641 | 000

SITRANS P 250 pressure transmitter for differential pressure
Accuracy ≤ 1 %, wetted parts ceramic/stainless steel 1.4301,
scope of delivery: transmitter, mounting bracket and instruction manual, without explosion protection

Measuring range

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... 0.1 bar (0 ... 1.45 psi)</td>
<td>3AA</td>
</tr>
<tr>
<td>0 ... 0.2 bar (0 ... 2.90 psi)</td>
<td>3AC</td>
</tr>
<tr>
<td>0 ... 0.25 bar (0 ... 3.63 psi)</td>
<td>3AD</td>
</tr>
<tr>
<td>0 ... 0.3 bar (0 ... 5.35 psi)</td>
<td>3AE</td>
</tr>
<tr>
<td>0 ... 0.4 bar (0 ... 5.80 psi)</td>
<td>3AF</td>
</tr>
<tr>
<td>0 ... 0.5 bar (0 ... 7.25 psi)</td>
<td>3AG</td>
</tr>
<tr>
<td>0 ... 0.6 bar (0 ... 8.70 psi)</td>
<td>3AH</td>
</tr>
<tr>
<td>0 ... 1.0 bar (0 ... 14.5 psi)</td>
<td>3BA</td>
</tr>
<tr>
<td>0 ... 1.6 bar (0 ... 23.2 psi)</td>
<td>3BB</td>
</tr>
<tr>
<td>0 ... 2.5 bar (0 ... 36.3 psi)</td>
<td>3BD</td>
</tr>
<tr>
<td>0 ... 4.0 bar (0 ... 58.0 psi)</td>
<td>3BE</td>
</tr>
<tr>
<td>0 ... 6.0 bar (0 ... 87.0 psi)</td>
<td>3BG</td>
</tr>
<tr>
<td>0 ... 10.0 bar (0 ... 145 psi)</td>
<td>3CA</td>
</tr>
<tr>
<td>0 ... 16.0 bar (0 ... 232 psi)</td>
<td>3CB</td>
</tr>
<tr>
<td>0 ... 25.0 bar (0 ... 365 psi)</td>
<td>3CD</td>
</tr>
</tbody>
</table>

Output signal

<table>
<thead>
<tr>
<th>Output signal</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ... 20 mA</td>
<td>0</td>
</tr>
<tr>
<td>0 ... 5 V DC</td>
<td>1</td>
</tr>
<tr>
<td>0 ... 10 V DC</td>
<td>2</td>
</tr>
</tbody>
</table>

Electrical connection

Plug acc. to EN 175 301-803-A (suitable coupling included in scope of delivery) | 1 |
Round connector acc. to EN 60139-9 | 2 |
Cable 1.5 m with cable gland | 3 |

Process connection

Without connections, female thread 1/8-27 NPT | A |
Hose connection
• CuZn nickel-plated, for hose Ø 4 mm | B |
• CuZn nickel-plated, for hose Ø 6 mm | C |
• PVDF, for hose Ø 6 mm | D |
Pipe union
• CuZn nickel-plated, for pipe Ø 6 mm | E |
• Stainless steel 1.4304, for pipe Ø 6 mm | F |
• CuZn nickel-plated, for pipe Ø 8 mm | G |
• Stainless steel 1.4304, for pipe Ø 8 mm | H |
Male thread, 7/16-20 UNF (CuZn nickel-plated) | L |
Adapter
• Inner, G1/8 (stainless steel), for pipe Ø 6 mm | M |
• Outer, G1/8 (stainless steel), with union nut, for pipe Ø 6 mm | N |

Sealing material

Fluoro rubber (Viton/FPM) | A |
Ethylene propylene diene monomer rubber (EPDM) | B |
Nitrile butadiene rubber (NBR) | C |
Silicone rubber (MVQ) | D |
Neoprene (CR) | E |

Further designs

Available order code(s).

Available inspection certificate (Factory calibration) to IEC 60770-2 supplied

Order Code
C11

Available ex stock
Overview

SITRANS P pressure transmitters, ZD series, are for measuring the gauge pressure, absolute pressure and level of liquids and gases.

They are used to indicate and monitor the pressure measured at the point of installation. ZD pressure transmitters are available in an axial and a radial version.

Benefits

- Robust stainless steel housing with 2 connection versions
- Integrated display with status messages
- Thin-film measuring cell with ceramic diaphragm
- 2-wire system, 4 to 20 mA
- Parameterizable using keys underneath the housing cover
- Turn down 5:1 (max 10:1)
- Measuring accuracy < 0.25% (typical)

Application

The ZD is a configurable pressure transmitter for measuring the gauge and absolute pressure of gases, liquids and vapor.

It is equipped with a display for indicating the pressure value at the point of installation.

SITRANS P pressure transmitters, ZD series, are used in the following industrial areas for example:

- Chemical industry
- Mechanical engineering
- Food industry
- Pharmaceutical industry
- Shipbuilding
- Water supply

Function

The ZD pressure transmitter has a thin-film strain gauge which is mounted on a ceramic diaphragm.

The measuring cell is temperature-compensated.

SITRANS P pressure transmitters, ZD series, mode of operation

Mode of operation

The ZD pressure transmitter has a thin-film strain gauge which is mounted on a ceramic diaphragm.
**Functions**

The ZD pressure transmitter has a 5-digit display behind a glass cover. The following data are shown on the display:

- Measured pressure
- Pressure units (default setting: bar)
- Limit violation in upward or downward direction, indicated by LED and arrow symbols in the display.

The pressure transmitter is set using the 3 pushbuttons behind the glass cover underneath the display.

The key “M” is used to select the operating mode. Following modes of operation are available:

- Measured value
- Password
- Pressure units
- End of scale
- Upper and lower limit value
- Zero adjustment
- Upper and lower current saturation limit
- Electrical damping

The other two keys are used to set the values in the individual operating modes.

Two LED indicators are fitted above the display to monitor the set range and the status.

The green LED signals that the measured pressure lies within the set limits. The red LED lights up when the measured pressure lies outside the set limits and when there is an error.

**Technical specifications**

### SITRANS P pressure transmitters, ZD series

#### Mode of operation

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Thin-film strain gauge</th>
</tr>
</thead>
</table>

#### Input

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>gauge and absolute pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured range gauge pressure</td>
<td>Overload limit</td>
</tr>
<tr>
<td>min.</td>
<td>max.</td>
</tr>
<tr>
<td>0...2 bar (0...29 psi)</td>
<td>5 bar g (72.5 psig)</td>
</tr>
<tr>
<td>0...10 bar (0...145 psi)</td>
<td>25 bar g (363 psig)</td>
</tr>
<tr>
<td>0...50 bar (0...725 psi)</td>
<td>120 bar g (1740 psig)</td>
</tr>
<tr>
<td>0...200 bar (0...2900 psi)</td>
<td>500 bar g (7250 psig)</td>
</tr>
<tr>
<td>0...400 bar (0...5802 psi)</td>
<td>600 bar g (8700 psig)</td>
</tr>
</tbody>
</table>

| Measured range absolute pressure | Overload limit |
| min. | max. |
| 0...2 bar (0...29 psi) | 5 bar g (72.5 psig) | 0.6 bar a (8.7 psi a) |
| 0...10 bar (0...145 psi) | 25 bar a (363 psia) | 0 bar a (0 psia) |
| 0...50 bar (0...725 psi) | 120 bar a (1740 psia) | 0 bar a (0 psia) |
| 0...200 bar (0...2900 psi) | 500 bar a (7250 psia) | 0 bar a (0 psia) |
| 0...400 bar (0...5802 psi) | 600 bar a (8700 psia) | 0 bar a (0 psia) |

#### Range adjustment (turndown) | 5:1 |

### Output

<table>
<thead>
<tr>
<th>Output</th>
<th>4 ... 20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower current limit</td>
<td>min. 3.6 mA</td>
</tr>
<tr>
<td>Upper current limit</td>
<td>max. 23 mA</td>
</tr>
<tr>
<td>Output protected against</td>
<td>Reversed polarity, overvoltage and short-circuiting</td>
</tr>
<tr>
<td>Max. load</td>
<td>$R_{II} = (U_H - 12V) / 0.023 A$</td>
</tr>
<tr>
<td>Voltage measurement</td>
<td>Linear rising</td>
</tr>
</tbody>
</table>

### Measuring accuracy

Error in measurement (including non-linearity, hysteresis and repeatability, at 25 °C (77 °F))

- < 0.25 % of full-scale value (typical), max. 0.5 %

#### Adjustment time | < 100 ms |

#### Long-term drift | 0.25 % of full-scale value/year |

#### Influence of ambient temperature | < ±0.25 °C/10 K ( < ±0.25 %/10 K) of full-scale value |

#### Vibration influence | 0.05%/g to 500 Hz in all directions (to IEC 68-2-64) |

#### Power supply effect | < ±0.01 %/V of full-scale value |

### Rated conditions

#### Ambient conditions

- Ambient temperature | -25 ... +85 °C (-13 ... +185 °F) |
- Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
- Medium conditions | -30 ... +100 °C (-22 ... +212 °F) |
- Degree of protection | IP65 to EN 60529 |
- Electromagnetic compatibility | To EN 61326/A1 appendix A (1998) |
- Emitted interference and interference immunity | To EN 61326/A1 appendix A (1998) |

### Displays and controls

<table>
<thead>
<tr>
<th>Display</th>
<th>LCD, max. 5 digits, digit height 9 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal point</td>
<td>Freely parameterizable</td>
</tr>
<tr>
<td>Limit values</td>
<td>Freely parameterizable</td>
</tr>
<tr>
<td>Limit violation display</td>
<td>Red LED and message on LCD (↑ symbol / ↓ symbol in case of limit violation in upward / downward direction)</td>
</tr>
<tr>
<td>Parameterization</td>
<td>With 3 pushbuttons</td>
</tr>
<tr>
<td>Units</td>
<td>mA or % or physical variable (default setting: bar)</td>
</tr>
<tr>
<td>Other dimensions</td>
<td>mbar, kPa, MPa, mmH₂O, mH₂O, psi, inH₂O, mmHg, kg/cm², torr, atm</td>
</tr>
<tr>
<td>Damping</td>
<td>Between 0.1 and 100 s (increment: 0.1 s) freely parameterizable</td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>Weight</th>
<th>0.6 kg (~ 1.32 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Using 2-pole plug connector with M16x1.5-Cable inlet to EN 175301-803A, plastic</td>
</tr>
<tr>
<td>Process connection</td>
<td>Male thread G¼B and female thread G¼B</td>
</tr>
<tr>
<td>Version of housing/ process connection</td>
<td>G¼B to EN 837-1</td>
</tr>
<tr>
<td>Female thread: ¼-14 NPT</td>
<td></td>
</tr>
<tr>
<td>Radial (type A), can be swiveled by max. ±120° (α)</td>
<td></td>
</tr>
<tr>
<td>Axial (type B), can be swiveled by max. ±360°</td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010
**Material**

Non-wetted parts materials
- Field housing: Ø 80 mm (3.15 inch), stainless steel mat. No. 1.4016
- Cover: Stainless steel, mat. No. 1.4016 with glass

Wetted parts materials
- Measuring cell: Al₂O₃
- Gasket: Viton
- Process connection: Stainless steel, mat. No. 316L/316Ti

**Power supply**

Terminal voltage on pressure transmitter (Uₜ)
- 12 ... 30 V DC

**Certificate and approvals**

Classification according to pressure equipment directive 97/23/EC
- For gases of fluid group 1 and liquids of fluid 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

---

**Dimensional drawings**

SITRANS P pressure transmitters, ZD series, dimensional drawing, dimensions in mm (inch)

**Schematics**

SITRANS P pressure transmitters, ZD series, connection diagram
## SITRANS P measuring instruments for pressure

### Transmitters for gauge, absolute and differential pressure

#### ZD series for gauge and absolute pressure

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MF15800Z</td>
<td>SITRANS P pressure transmitters, ZD series for gauge and absolute pressure</td>
</tr>
</tbody>
</table>

- **Conformity error**: 0.25 %, range adjustment
- **Connection**: housing and process connection made of stainless steel, membrane made of ceramic, 2-wire system, output 4... 20 mA

### Input variable

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge pressure</td>
<td>Absolute pressure</td>
</tr>
</tbody>
</table>

### Measured range and Span

<table>
<thead>
<tr>
<th>Measured range</th>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... 2 bar</td>
<td>0 ... 0.4 / 2 bar</td>
</tr>
<tr>
<td>0 ... 10 bar</td>
<td>0 ... 2 / 10 bar</td>
</tr>
<tr>
<td>0 ... 50 bar</td>
<td>0 ... 10 / 50 bar</td>
</tr>
<tr>
<td>0 ... 200 bar</td>
<td>0 ... 40 / 200 bar</td>
</tr>
<tr>
<td>0 ... 400 bar</td>
<td>0 ... 80 / 400 bar</td>
</tr>
<tr>
<td>0 ... 2 bar</td>
<td>0 ... 0.4 / 2 bar</td>
</tr>
<tr>
<td>0 ... 10 bar</td>
<td>0 ... 2 / 10 bar</td>
</tr>
<tr>
<td>0 ... 50 bar</td>
<td>0 ... 10 / 50 bar</td>
</tr>
<tr>
<td>0 ... 200 bar</td>
<td>0 ... 40 / 200 bar</td>
</tr>
<tr>
<td>0 ... 400 bar</td>
<td>0 ... 80 / 400 bar</td>
</tr>
</tbody>
</table>

### Process connection

- **G½B male thread and G½B female thread**
- **G½B to EN 837-1**
- **Female thread ½-14 NPT**
- **G 1” male thread**

### Design

- Process connection vertically downwards, thread in connector M16x1.5
- Process connection horizontally to rear, thread in connector M16x1.5
- Process connection vertically downwards, thread in connector ½"-14 NPT
- Process connection horizontally to rear, thread in connector ½"-14 NPT

### Further designs

- Quality inspection certificate (Factory calibration) to IEC 60770-2 supplied
- Factory certificate to EN 10204-2.2 supplied
- Oxygen cleaning application, oil and grease-free cleaned
- Sealing material FEP between sensor and housing, instead of Viton

### Additional data

- Measuring range to be set, specify in plain text:
  - Y01: ... up to ... mbar, bar, kPa, MPa, psi
- TAG number made of stainless steel
- Accessories

### Quality inspection certificate (Factory calibration) to IEC 60770-2 supplied later, specify factory of transmitter.

- Available ex stock
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 representation 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 life time up to 5 years
- Extend battery life time with switch off the HART modem interface
- Optimized power consumption through new design, and increase in battery life time
- 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 WirelessHART as the standard communication interface.

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

- Flexible pressure measurements
- Save costs on wiring at 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 29, 145, 725, 2900 and 5800 psi (0 to 2, 10, 50, 200 and 400 bar).

The sensor is integrated into the transmitter’s housing.

On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial commissioning.

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 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 can operate directly on the device with 3 pushbuttons. It fits perfect with the strategy of all new Siemens field devices.

Using the device’s pushbuttons, 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 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 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 www.siemens.com/wirelesshart.

Detailed information on IE/WSN-PA LINK can be found in the FI 01 catalogue Sec. 8 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.

**Configuration**

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

- Initial commissioning 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, or onsite with a HART modem or via the local user interface.

---

**Technical specifications**

**SITRANS P280 WirelessHART Pressure Transmitter**

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>piezo-resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Gauge and absolute pressure</td>
</tr>
</tbody>
</table>

**Gauge pressure input**

- **Measuring range**
  - 0 ... 29 psi g (0 ... 2 bar g)
  - 0 ... 145 psi g (0 ... 10 bar g)
  - 0 ... 725 psi g (0 ... 50 bar g)
  - 0 ... 5800 psi g (0 ... 400 bar g)

- **Units**
  - mbar, bar, mmH2O, atm, Torr, gcm², kgcm², mPa, kPa, Pa, psi, mmHg, mmH2O, NH2O, inH2O, inHG, inH2O

**Absolute pressure input**

- **Measuring range**
  - 0 ... 29 psi a (0 ... 2 bar a)
  - 0 ... 145 psi a (0 ... 10 bar a)
  - 0 ... 725 psi a (0 ... 50 bar a)
  - 0 ... 7250 psi a (0 ... 650 bar a)

- **Units**
  - mbar, bar, mmH2O, atm, Torr, gcm², kgcm², mPa, kPa, Pa, psi, mmHg, mmH2O, NH2O, inH2O, inHG, inH2O

**Output**

- **Output signal**
  - 2.4 GHz Wireless signal with TSMP (Time Synchronized Mesh Protocol)

**Measuring accuracy**

- **Error in measurement** (including hysteresis and repeatability, at 25 °C (77 °F))
  - max. ±0.325 % of sensor’s span

- **Long-term drift**
  - max. ±0.25 % of sensor’s/yearly span

- **Ambient temperature effect**
  - max. ±0.025 %/K of sensor’s span

**Rated 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
### SITRANS P280 for gauge and absolute pressure

#### Design
- **Enclosure material**: low-copper die-cast aluminum, GD-AISi12
- **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**:
  - G½B male thread as per EN 837-1
  - ½-14 NPT
- **Sensor break**:
  - 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 pushbuttons
  - with SIMATIC PDM or HART Communicator

#### Auxiliary power
- **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**:
  - HART communication with HART modem
  - WirelessHART

#### Certificates and approvals
- **Wireless communication approvals**:
  - R&TTE
  - FCC
- **Classification according to PED 97/23/EC**:
  - Gases: Fluid group 1
  - Liquids: Fluid group 1;
  - meets requirements as per Section 3, Subsection 3 (good engineering practice)

#### Selection and ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 MP 1 1 2 0 - 7</td>
<td>SITRANS P280 WirelessHART pressure transmitter</td>
</tr>
</tbody>
</table>

(Required battery not included with delivery, see accessories)

#### Measuring cell filling
- **Dry measuring cell**

#### Measuring span
- **Gauge pressure**:
  - 0...29 psi g (0...2 bar g)
  - 0...145 psi g (0...10 bar g)
  - 0...725 psi g (0...50 bar g)
  - 0...2900 psi g (0...200 bar g)
  - 0...5800 psi g (0...400 bar g)
- **Absolute pressure**:
  - 0...29 psi a (0...2 bar a)
  - 0...145 psi a (0...10 bar a)
  - 0...725 psi a (0...50 bar a)
  - 0...2900 psi a (0...200 bar a)
  - 0...5800 psi a (0...400 bar a)

#### Wetted parts
- **Ceramic**

#### Display
- **Digital display, visible**

#### Enclosure
- **Die-cast aluminum**

#### Process connection
- **G½ as per EN 837-1**
- **½-14 NPT**

#### Explosion protection
- **Without**

#### Antenna
- Variable, attached to device

#### Further designs
- Please add “-Z” to Order No. and specify Order code(s) and plain text.

#### Measuring point number (TAG Nr.)
- max. 16 digits entered in plain text
- Y15: ....................

#### Measuring point message
- max. 27 characters entered in plain text
- Y16: ....................

#### Accessories
- **Lithium battery for SITRANS TF280/P280**
- **Mounting bracket, steel**
- **Mounting bracket, stainless steel**
- **Cover, die-cast aluminum, without window**
- **Cover, die-cast aluminum, with window**
- **IE/WSN-PA LINK**
- **HART modem with RS232 interface**
- **HART modem with USB interface**
- **SIMATIC PDM**

Available ex stock
SITRANS P280 WirelessHART pressure transmitter, process connection G½", dimensions in mm (inch)

- Antenna
- Pressure balance element M12 x 1.5
- SW27
- G½B
- 238 (9.4) for absolute pressure
- 246 (9.7) for gauge pressure
- 270 (10.6)
- 130 (5.12)
- 52 (2.05)
- Ø 80 (3.15)
- 154 (6.06)
SITRANS P280 WirelessHART pressure transmitter, process connection ½ - 14 NPT, dimensions in mm (inch)
Overview

The SITRANS P300 is a digital pressure transmitter for gauge and absolute pressure. All conventional thread versions are available as process connections. In addition, various sanitary connections and flange connections with front-flush diaphragms meet the requirements of a dead space free process connection.

The output signal is a load-independent direct current from 4 to 20 mA or a PROFIBUS PA signal, which is linearly proportional to the input pressure. Communication is over HART protocol or over 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 long life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnosis and simulation functions
- Small long-term drift
- Wetted parts made of high-grade materials (such as stainless steel, Hastelloy)
- Measuring range 0.1 psi to 5800 psi (0.008 bar to 400 bar)
- High measuring accuracy
- Parameterization via pushbuttons and HART communication or PROFIBUS PA communication

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 signal, 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" EEx 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 measuring span is 0.1 psi g, the largest 5800 psi g (0.01 bar g, the largest 400 bar g).

Level

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

For measuring the level in an open tank you require a gauge transmitter.

Absolute pressure

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

The smallest measuring span is 0.1 psi a, the largest 435 psi a (0.008 bar a, the largest 30 bar a).
**Design**

The device comprises:

- Electronics
- Housing
- Measuring cell

Perspective view of the SITRANS P300

The housing has a screw-on cover (3), with or without an inspection window depending on the version. The electrical terminal housing, the buttons for operation of the device and, depending on the version, the digital display are located under this cover. The connections for the auxiliary power UH 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 (5) is located on the underside of the housing. Depending on the version of the device, the measuring cell with the process connection may differ from the one shown in the diagram.

**Function**

*Operation of the electronics with HART communication*

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 with regard 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 voltage 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 with the measuring cell, the second with the electronics.

The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a digital 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).
The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2) and digitized in an 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 two non-volatile memories (6). The first 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 pushbuttons (8) you can parameterize the pressure transmitter directly at the point of measurement. The pushbuttons can also be used to control the view of the results, the error messages and the operating modes on the digital 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
- Front-flush diaphragm:
  - Flanges to EN
  - Flanges to ASME
- NuG and pharmaceutical connections
Measuring cell for gauge pressure

The input pressure ($p_a$) is transferred to the gauge pressure sensor (6) via the barrier diaphragm (4) and the fill fluid (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.

The transmitters with spans $\leq 926.1$ psi ($\leq 63$ bar) measure the input pressure against atmosphere, those with spans $\geq 2352$ psi ($\geq 160$ bar) against vacuum.

Measuring cell for absolute pressure

The input pressure ($p_a$) is transferred to the absolute pressure sensor (5) via the barrier diaphragm (3) and the fill fluid (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.

The transmitters with spans $\leq 926.1$ psi ($\leq 63$ bar) measure the input pressure against atmosphere, those with spans $\geq 2352$ psi ($\geq 160$ bar) against vacuum.

Measuring cell for gauge pressure, front-flush diaphragm

Measuring cell for absolute pressure, front-flush diaphragm

Measuring cell for gauge pressure, function chart

Measuring cell for absolute pressure, function chart

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

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

Measuring cell for absolute pressure, front-flush diaphragm, function chart
diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

**Parameterization of SITRANS P300**

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 pushbuttons (local operation)**

With the pushbuttons 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 system.

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 on SITRANS P300 with HART communication

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pushbuttons</th>
<th>HART communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of scale</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Full-scale value</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Electrical damping</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Start-of-scale value without application of a pressure (“Blind setting”)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Full-scale value without application of a pressure (“Blind setting”)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Zero adjustment</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Current transmitter</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Fault current</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Disabling of keys, write protection</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Linear or square root outputs</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Characterizer setup</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Freely-programmable LCD</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Diagnostics functions</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

1) Cancel apart from write protection

### Diagnostic functions for SITRANS P300 with HART communication

- Zero correction for position
- Event counter
- Transmitter output alarms
- Saturation alarm
- Min/Max registers
- Simulation functions
- Maintenance timer

### Available physical units of display for SITRANS P300 with HART communication

<table>
<thead>
<tr>
<th>Physical variable</th>
<th>Physical dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (setting can also be made in the factory)</td>
<td>Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², inH₂O, inH₂O (4 °C), mmH₂O, ftH₂O (20 °C), inHg, mmHg</td>
</tr>
<tr>
<td>Level (height data)</td>
<td>m, cm, mm, ft, in</td>
</tr>
<tr>
<td>Volume</td>
<td>m³, dm³, ft³, yd³, in³, US gallon, imp. gallon, bushel, barrel, barrel liquid</td>
</tr>
<tr>
<td>Mass</td>
<td>g, kg, t, lb, Ston, Lton, oz</td>
</tr>
<tr>
<td>Temperature</td>
<td>K, °C, °F, °R</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>%, mA</td>
</tr>
</tbody>
</table>
Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS puts the DS III PA in connection with 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 FF 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 P300 PA and FF

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pushbutton (DS III HART)</th>
<th>PROFIBUS PA and FOUNDATION Fieldbus interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical damping</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Zero adjustment (correction of position)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Key and/or function disabling</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Source of measured-value display</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Physical dimension of display</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Position of decimal point</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bus address</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Linear or square root output</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Characterizer setup</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Freely-programmable LCD</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Diagnostics functions</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Diagnostic functions for P300 PA and FF

- Event counter
- Min/Max registers
- Maintenance timer
- Simulation functions
- Zero correction for position
- Transmitter output alarms
- Saturation alarm

Physical dimensions available for the display

<table>
<thead>
<tr>
<th>Physical variable</th>
<th>Physical dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (setting can also be made in the factory)</td>
<td>MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm², kg/cm², mmH₂O, mmH₂O (4 °C), inH₂O, inH₂O (4 °C), ftH₂O (20 °C), mmHg, inHg</td>
</tr>
<tr>
<td>Level (height data)</td>
<td>m, cm, mm, ft, in, yd</td>
</tr>
<tr>
<td>Volume</td>
<td>m³, dm³, ft³, in³, US gallon, imp. gallon, bushel, barrel, barrel liquid</td>
</tr>
<tr>
<td>Volume flow</td>
<td>m³/min, m³/h, 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</td>
</tr>
<tr>
<td>Mass flow</td>
<td>g/s, g/min, gh, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, th, 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</td>
</tr>
<tr>
<td>Total mass flow</td>
<td>t, kg, g, lb, oz, LTon, STon</td>
</tr>
<tr>
<td>Temperature</td>
<td>°K, °C, °F, °R</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>%</td>
</tr>
</tbody>
</table>
### Technical specifications

**SITRANS P300 for gauge and absolute pressure**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Span</th>
<th>Max. perm. test pressure</th>
<th>Nominal measuring range</th>
<th>Max. perm. test pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gauge pressure input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>87 psi g (6 bar g)</td>
<td>14.5 psi g (1 bar g)</td>
<td>87 psi g (6 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.01 ... 1 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>145 psi g (10 bar g)</td>
<td>58 psi g (4 bar g)</td>
<td>145 psi g (10 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.04 ... 4 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 ... 232 psi g</td>
<td>464 psi g (32 bar g)</td>
<td>232 psi g (16 bar g)</td>
<td>464 psi g (32 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.16 ... 16 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.1 ... 914 psi g</td>
<td>1450 psi g (100 bar g)</td>
<td>914 psi g (63 bar g)</td>
<td>1450 psi g (100 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.6 ... 63 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.2 ... 2321 psi g</td>
<td>3626 psi g (250 bar g)</td>
<td>2321 psi g (160 bar g)</td>
<td>3626 psi g (250 bar g)</td>
<td></td>
</tr>
<tr>
<td>(1.6 ... 160 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58 ... 5802 psi g</td>
<td>8700 psi g (600 bar g)</td>
<td>5802 psi g (360 bar g)</td>
<td>8700 psi g (600 bar g)</td>
<td></td>
</tr>
<tr>
<td>(4.0 ... 400 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Depending on the process connection, the span may differ from these values
- Lower measuring limit: 0.44 psi a (30 mbar a)
- Upper measuring limit: 100 % of max. span

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Span</th>
<th>Max. perm. test pressure</th>
<th>Nominal measuring range</th>
<th>Max. perm. test pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Absolute pressure input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.12 ... 3.6 psi a</td>
<td>97 psi a (6 bar a)</td>
<td>3.6 psi a (250 mbar a)</td>
<td>87 psi a (6 bar a)</td>
<td></td>
</tr>
<tr>
<td>(0.8 ... 250 mbar a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.62 ... 19 psi a</td>
<td>145 psi a (10 bar a)</td>
<td>19 psi a (1.30 bar a)</td>
<td>145 psi a (10 bar a)</td>
<td></td>
</tr>
<tr>
<td>(0.043 ... 1.30 bar a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 ... 73 psi a</td>
<td>435 psi a (30 bar a)</td>
<td>73 psi a (5 bar a)</td>
<td>435 psi a (30 bar a)</td>
<td></td>
</tr>
<tr>
<td>(0.16 ... 5 bar a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.5 ... 435 psi a</td>
<td>1450 psi a (100 bar a)</td>
<td>435 psi a (30 bar a)</td>
<td>1450 psi a (100 bar a)</td>
<td></td>
</tr>
<tr>
<td>(1 ... 30 bar a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Lower measuring limit: 0 psi a (0 mbar a)
- Upper measuring limit: 100 % of max. span

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Span</th>
<th>Max. perm. test pressure</th>
<th>Nominal measuring range</th>
<th>Max. perm. test pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input of gauge pressure, with front-flush diaphragm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>87 psi g (6 bar g)</td>
<td>14.5 psi g (1 bar g)</td>
<td>87 psi g (6 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.01 ... 1 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>145 psi g (10 bar g)</td>
<td>58 psi g (4 bar g)</td>
<td>145 psi g (10 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.04 ... 4 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.32 ... 232 psi g</td>
<td>464 psi g (32 bar g)</td>
<td>232 psi g (16 bar g)</td>
<td>464 psi g (32 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.16 ... 16 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.14 ... 914 psi g</td>
<td>1450 psi g (100 bar g)</td>
<td>914 psi g (63 bar g)</td>
<td>1450 psi g (100 bar g)</td>
<td></td>
</tr>
<tr>
<td>(0.6 ... 63 bar g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Lower measuring limit: -1.45 psi g (-100 mbar g)
- Upper measuring limit: 100 % of max. span

- Lower measuring limit: 0.44 psi a (30 mbar a)
- Upper measuring limit: 100 % of max. span
## SITRANS P300 for gauge pressure and absolute pressure

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>HART</th>
<th>PROFIBUS PA and FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input of absolute pressure, with front-flush diaphragm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Absolute pressure (front-flush)</td>
<td>Nominal measuring range</td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td>Span: 0.62 ... 18.9 psi a (43 ... 1300 mbar a)</td>
<td>Max. perm. test pressure: 145 psi a (10 bar a)</td>
</tr>
<tr>
<td></td>
<td>Span: 2.32 ... 72.5 psi a (0.16 ... 5 bar a)</td>
<td>Nominal measuring range: 145 psi a (10 bar a)</td>
</tr>
<tr>
<td></td>
<td>Span: 14.5 ... 435 psi a (1 ... 30 bar a)</td>
<td>Max. perm. test pressure: 1450 psi a (100 bar a)</td>
</tr>
<tr>
<td>Depending on the process connection, the span may differ from these values</td>
<td></td>
<td>Depending on the process connection, the nominal measuring range may differ from these values</td>
</tr>
<tr>
<td><strong>Lower measuring limit</strong></td>
<td>0 psi a (0 bar a)</td>
<td>100 % der max. Messspanne</td>
</tr>
<tr>
<td><strong>Upper measuring limit</strong></td>
<td></td>
<td>100 % des max. Nennmessbereichs</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
<td>Digital PROFIBUS PA signal</td>
</tr>
<tr>
<td>Physical bus</td>
<td>-</td>
<td>IEC 61158-2</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.</td>
<td></td>
</tr>
<tr>
<td>Electrical damping T&lt;sub&gt;63&lt;/sub&gt; (step width 0.1 s)</td>
<td></td>
<td>Set to 0.1 s (0 ... 100 s)</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>To EN 60770-1</td>
<td></td>
</tr>
<tr>
<td>Reference conditions</td>
<td>Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, measuring cell with silicone oil, room temperature 25 °C (77 °F), span ratio (r = max. span / set span)</td>
<td></td>
</tr>
<tr>
<td>Measurement deviation with cut-off point setting, including hysteresis and repeatability.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear characteristic curve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• r ≤ 10</td>
<td>≤ (0.0029 · r + 0.071) %</td>
<td>≤ 0.1 %</td>
</tr>
<tr>
<td>• 10 &lt; r ≤ 30</td>
<td>≤ (0.0045 · r + 0.071) %</td>
<td>≤ 0.2 %</td>
</tr>
<tr>
<td>• 30 &lt; r ≤ 100</td>
<td>≤ (0.005 · r + 0.05) %</td>
<td>≤ 0.4 %</td>
</tr>
<tr>
<td>Settling time T&lt;sub&gt;63&lt;/sub&gt; without electrical damping</td>
<td>Approx. 0.2 s</td>
<td></td>
</tr>
<tr>
<td>Long-term drift at ± 30 °C (± 54 °F)</td>
<td>≤ (0.25 · r) %/5 years</td>
<td>≤ (0.1 · r) %/year</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• at -10 ... +60 °C (14 ... 140 °F)</td>
<td>≤ (0.08 · r + 0.1) %</td>
<td>≤ (0.2 · r + 0.3) %</td>
</tr>
<tr>
<td>• at -40 ... -10 °C and +60 ... +85 °C (-40 ... 14 °F and 140 ... 185 °F)</td>
<td>≤ (0.1 · r + 0.15) % / 10 K</td>
<td>≤ (0.2 · r + 0.3) %/10 K</td>
</tr>
<tr>
<td>Influence of the medium temperature (only with front-flush diaphragm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temperature difference between medium temperature and ambient temperature</td>
<td>3 mbar/10 K (0.04 psi/10 K)</td>
<td></td>
</tr>
</tbody>
</table>
## Rated operating conditions

<table>
<thead>
<tr>
<th>Installation conditions</th>
<th>HART</th>
<th>PROFIBUS PA and FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Measuring cell with silicone oil</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
<td>-40 ... +150 °C (-40 ... +302 °F)</td>
</tr>
<tr>
<td>Measuring cell with Neobee oil (with front-flush diaphragm)</td>
<td>-40 ... +150 °C (-40 ... +302 °F)</td>
<td>-40 ... +150 °C (-40 ... +302 °F)</td>
</tr>
<tr>
<td>Measuring cell with inert liquid (not with front-flush diaphragm)</td>
<td>-20 ... +85 °C (-4 ... +185 °F)</td>
<td>-20 ... +200 °C (-40 ... +392 °F)</td>
</tr>
<tr>
<td>Measuring cell with Neobee oil (with front-flush diaphragm)</td>
<td>-40 ... +200 °C (-40 ... +392 °F)</td>
<td>-40 ... +200 °C (-40 ... +392 °F)</td>
</tr>
<tr>
<td>Measuring cell with inert liquid</td>
<td>-20 ... +100 °C (-4 ... +212 °F)</td>
<td>-20 ... +100 °C (-4 ... +212 °F)</td>
</tr>
<tr>
<td>Measuring cell with high temperature oil</td>
<td>-10 ... +250 °C (+14 ... +482 °F)</td>
<td>-10 ... +250 °C (+14 ... +482 °F)</td>
</tr>
</tbody>
</table>

### Design (standard version)

<table>
<thead>
<tr>
<th>Weight (without options)</th>
<th>Approx. 800 g (1.8 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Stainless steel, mat. No. 1.4301/304</td>
</tr>
<tr>
<td>Material of parts in contact with the medium</td>
<td>Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819</td>
</tr>
<tr>
<td>Connection shank</td>
<td>Stainless steel, mat. No. 1.4404/316L</td>
</tr>
<tr>
<td>Oval flange</td>
<td>Stainless steel, mat. No. 1.4404/316L</td>
</tr>
<tr>
<td>Seal diaphragm</td>
<td>Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Silicone oil</td>
</tr>
<tr>
<td></td>
<td>Inert filling liquid</td>
</tr>
<tr>
<td>Process connection</td>
<td>G1/4B to DIN EN 837-1</td>
</tr>
<tr>
<td></td>
<td>Female thread ½-14 NPT</td>
</tr>
<tr>
<td></td>
<td>Oval flange PN 160 (MWP 2320 psi) with fastening thread:</td>
</tr>
<tr>
<td></td>
<td>- 1/16-20 UNF to IEC 61518</td>
</tr>
<tr>
<td></td>
<td>- M10 as per DIN 19213</td>
</tr>
</tbody>
</table>

### Design (version with front-flush diaphragm)

<table>
<thead>
<tr>
<th>Weight (without options)</th>
<th>Approx. 1 ... 13 kg (2.2 ... 29 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Stainless steel, mat. No. 1.4301/304</td>
</tr>
<tr>
<td>Material of parts in contact with the medium</td>
<td>Stainless steel, mat. No. 1.4404/316L</td>
</tr>
<tr>
<td>Process connection</td>
<td>Stainless steel, mat. No. 1.4404/316L</td>
</tr>
<tr>
<td>Seal diaphragm</td>
<td>Stainless steel, mat. No. 1.4404/316L</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Silicone oil</td>
</tr>
<tr>
<td></td>
<td>Inert filling liquid</td>
</tr>
<tr>
<td>Process connection</td>
<td>Flanges as per EN and ASME</td>
</tr>
<tr>
<td></td>
<td>FDA and pharmaceutical flanges</td>
</tr>
<tr>
<td>Surface quality touched-by-media</td>
<td>Rₚ values ≤ 0.8 µm (3.15·10⁻⁸ inch)(\times)welded seams Rₚ ≤ 1.6 µm (6.4·10⁻⁸ inch) (\times)welded seams Rₚ ≤ 0.8 µm (3.15·10⁻⁸ inch) (\times)welded seams Rₚ ≤ 0.8 µm (3.15·10⁻⁸ inch)</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
### SITRANS P300 for gauge pressure and absolute pressure

<table>
<thead>
<tr>
<th>Power supply $U_I$</th>
<th>HART</th>
<th>PROFIBUS PA and FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal voltage on transmitter</td>
<td>10.5 ... 42 V DC</td>
<td>Supplied through bus</td>
</tr>
<tr>
<td>for intrinsically safe operation: 10.5 ... 30 V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separate power supply</td>
<td>-</td>
<td>Not necessary</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>• Without EE</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>• For intrinsically-safe operation</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>• Max. basic current</td>
<td>-</td>
<td>12.5 mA</td>
</tr>
<tr>
<td>• Startup current ≤ basic current</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>• Max. fault current in the event of a fault</td>
<td>-</td>
<td>15.5 mA</td>
</tr>
<tr>
<td>Fault disconnection electronics (FDE)</td>
<td>-</td>
<td>Available</td>
</tr>
</tbody>
</table>

### Certificate 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 requirements of Article 3, paragraph 3 (sound engineering practice)

Available soon

**Explosion protection**

**Intrinsic safety “i”**

- **Identification**
  - PTB 05 ATEX 2048
- **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 maximum values:

- $U_i = 30 V$, $I_i = 100 mA$, $P_i = 750 mW$, $R_i = 300 \Omega$
- $U_i = 17.5 V$, $I_i = 380 mA$, $P_i = 5.32 W$
- Linear barrier:
  - $U_i = 24 V$, $I_i = 250 mA$, $P_i = 1.2 W$
  - $C_i = 1.1 nF$
  - $L_i = 7 \mu H$

**Effective inner capacitance:**

- $C_i = 6 nF$
- $C_i = 5 nF$

**Effective inner inductance:**

- $L_i = 0.4 mH$
- $L_i = 10 \mu H$

**Explosion protection to FM for USA and Canada (cFMUS)**

- **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 IIC T4 ... T6; CL I, DIV 2, GP ABGF T4 ... T6; CL II, DIV 2, GP FG; CL III
  - 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 ABGF T4 ... T6; CL II, DIV 2, GP FG; CL III

**Dust explosion protection for zone 20/21/22**

- **Identification**
  - PTB 05 ATEX 2048
  - 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) (with mineral glass window only -20 ... +85 °C (-4 ... +185 °F))
- Temperature class T5: -40 ... +70 °C (-40 ... +158 °F) (with mineral glass window only -20 ... +70 °C (-4 ... +158 °F))
- Temperature class T6: -40 ... +60 °C (-40 ... +140 °F) (with mineral glass window only -20 ... +60 °C (-4 ... +140 °F))

**Connection**

To certified intrinsically-safe circuits with peak values:

- $U_i = 30 V$, $I_i = 100 mA$, $P_i = 750 mW$
- $U_i = 24 V$, $I_i = 380 mA$, $P_i = 5,32 mW$
- $C_i = 5 nF$
- $L_i = 10 \mu H$
### SITRANS P300 for gauge and absolute pressure

<table>
<thead>
<tr>
<th>Type of protection Ex nA/nL/ic (Zone 2)</th>
<th>HART</th>
<th>PROFIBUS PA and FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Marking</td>
<td>PTB 05 ATEX 2048</td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 2/3 G Ex ic IIB/IIC T4/T5/T6</td>
<td>II 2/3 G Ex nA T4/T5/T6</td>
</tr>
<tr>
<td></td>
<td>II 2/3 G Ex nL IIB/IIC T4/T5/T6</td>
<td></td>
</tr>
<tr>
<td>• Permissible ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Temperature class T4</td>
<td>-40 ... +85 °C (-40 ... +185 °F) (with mineral glass window only -20 ... +85 °C (-4 ... +185 °F))</td>
<td></td>
</tr>
<tr>
<td>- Temperature class T5</td>
<td>-40 ... +70 °C (-40 ... +158 °F) (with mineral glass window only -20 ... +70 °C (-4 ... +158 °F))</td>
<td></td>
</tr>
<tr>
<td>- Temperature class T6</td>
<td>-40 ... +60 °C (-40 ... +140 °F) (with mineral glass window only -20 ... +60 °C (-4 ... +140 °F))</td>
<td></td>
</tr>
<tr>
<td>• Ex nA connection</td>
<td>To certified intrinsically-safe circuits with peak values:</td>
<td>To certified intrinsically-safe circuits with peak values:</td>
</tr>
<tr>
<td></td>
<td>$U_m = 45 \text{ V}$</td>
<td>$U_m = 32 \text{ V}$</td>
</tr>
<tr>
<td>• Ex ic/nL connection</td>
<td>To certified intrinsically-safe circuits with peak values:</td>
<td>To certified intrinsically-safe circuits with peak values:</td>
</tr>
<tr>
<td></td>
<td>$U_i = 45 \text{ V}$</td>
<td>$U_i = 32 \text{ V}$</td>
</tr>
<tr>
<td>• Effective inner capacitance</td>
<td>$C_i = 6 \text{ nF}$</td>
<td>$C_i = 5 \text{ nF}$</td>
</tr>
<tr>
<td>• Effective internal inductance</td>
<td>$L_i = 0.4 \text{ mH}$</td>
<td>$L_i = 20 \mu\text{H}$</td>
</tr>
</tbody>
</table>
### SITRANS P300 for gauge and absolute pressure

#### HART communication
- **HART communication**: 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 or local operation (standard setting address 126)
- **Cyclic data usage**
  - **Output byte**: 5 (one measuring value) or 10 (two measuring values)
  - **Input byte**: 0, 1, or 2 (register operating mode and reset function for metering)
- **Device profile**: PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B
- **Function profile**
  - **Analog input**
    - Adaptation to customer-specific process variables: Yes, linearly rising or falling characteristic
    - Electrical damping $T_{63}$, adjustable: 0 ... 100 s
    - Simulation function: Input / Output
    - Failure mode: Can be parameterized (last good value, substitute value, incorrect value)
    - Limit monitoring: Yes, one upper and lower warning limit and one alarm limit respectively
  - **Register (totalizer)**
    - Can be reset, preset, optional direction of counting, simulation function of register output
    - Failure mode: Can be parameterized (summation with last good value, continuous summation, summation with incorrect value)
    - Limit monitoring: One upper and lower warning limit and one alarm limit respectively
  - **Physical block**
    - 1 Resource block
  - **Transducer blocks**
    - 1 transducer block Pressure with calibration, 1 transducer block LCD
  - **Pressure transducer block**
    - Can be calibrated by applying two pressures: Yes
    - Monitoring of sensor limits: Yes
    - Characterizer: Max. 30 points
    - Transfer function: linear
    - Simulation function: available
    - Square-rooted characteristic for flow measurement: Yes
    - Simulation function for measured pressure value and sensor temperature: Constant value or over parameterizable ramp function

### Communication FOUNDATION Fieldbus
- **Function blocks**: 3 function blocks analog input, 1 function block PID
- **Analog input**
  - Adaptation to customer-specific process variables: Yes, linearly rising or falling characteristic
  - Electrical damping $T_{63}$, adjustable: 0 ... 100 s
  - Simulation function: Output / Input (can be locked within the device with a bridge)
  - Failure mode: Can be parameterized (last good value, substitute value, incorrect value)
  - Limit monitoring: Yes, one upper and lower warning limit and one alarm limit respectively
  - Square-rooted characteristic for flow measurement: Yes
- **PID**
  - Standard FF function block
- **Physical block**
  - 1 Resource block
- **Transducer blocks**
  - 1 transducer block Pressure with calibration, 1 transducer block LCD
- **Pressure transducer block**
  - Can be calibrated by applying two pressures: Yes
  - Monitoring of sensor limits: Yes
  - Simulation function: Measured pressure value, sensor temperature and electronics temperature: Constant value or over parameterizable ramp function
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Cleanliness level 2 to DIN 25410</td>
</tr>
</tbody>
</table>

#### Max. span

<table>
<thead>
<tr>
<th>Max. span</th>
<th>Measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>(0.01 ... 1 bar g)</td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>(0.04 ... 4 bar g)</td>
</tr>
<tr>
<td>2.32 ... 232 psi g</td>
<td>(0.16 ... 16 bar g)</td>
</tr>
<tr>
<td>9.14 ... 914 psi g</td>
<td>(0.63 ... 63 bar g)</td>
</tr>
<tr>
<td>23.2 ... 2320 psi g</td>
<td>(1.6 ... 160 bar g)</td>
</tr>
<tr>
<td>58 ... 5802 psi g</td>
<td>(4 ... 400 bar g)</td>
</tr>
<tr>
<td>0.036 ... 3.63 psi a</td>
<td>(2.5 ... 25 mbar a)</td>
</tr>
<tr>
<td>0.19 ... 18.9 psi a</td>
<td>(13 ... 1300 mbar a)</td>
</tr>
<tr>
<td>0.7 ... 72.5 psi a</td>
<td>(0.05 ... 5 bar a)</td>
</tr>
<tr>
<td>4.35 ... 435 psi a</td>
<td>(0.3 ... 30 bar a)</td>
</tr>
</tbody>
</table>

#### Wetted parts materials

<table>
<thead>
<tr>
<th>Seal diaphragm</th>
<th>Measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

#### Process connection

- G½B to EN 837-1
- ½-14 NPT
- Oval flange made of stainless steel
  - Mounting thread ½–20 UNF to EN 61518
  - Mounting thread M10 to DIN 19213
- Mounting thread M12 to DIN 19213
- Male thread M20 x 1.5
- Male thread ½ -14 NPT

#### Non-wetted parts materials

- St. steel, deep-drawn and electrolytically polished

#### Version

- Standard version

#### Explosion protection

- Without
- With ATEX, Type of protection:
  - *Intrinsic safety (Ex ia)*
  - Zone 20/21/22
  - Ex nA/nL (zone 2)
  - With FM „Intrinsic safe“ (cFMUS)

#### Electrical connection / cable entry

- Screwed gland M20x1.5 (Polyamide) 5)
- Screwed gland M20x1.5 (metal)
- Screwed gland M20x1.5 (stainless steel)
- M12 connector (metal, without cable socket)
- M12 connector (stainless steel, without cable socket)
- ½–14 NPT thread, metal 6)
- ½–14 NPT thread, stainless steel6)
## Selection and Ordering data

### SITRANS P300 pressure transmitters for gauge and absolute pressure with front-flush membrane, single-chamber measuring housing, rating plate inscription in English

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Cleanliness level 2 to DIN 25410</td>
</tr>
<tr>
<td>FDA compliant fill fluid</td>
<td></td>
</tr>
<tr>
<td>Neobee oil</td>
<td>Standard</td>
</tr>
</tbody>
</table>

### Max. span

<table>
<thead>
<tr>
<th>Max. span</th>
<th>0.15 ... 14.5 psi g</th>
<th>0.01 ... 1 bar g</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.58 ... 58 psi g</td>
<td>0.04 ... 4 bar g</td>
</tr>
<tr>
<td></td>
<td>2.32 ... 232 psi g</td>
<td>0.16 ... 16 bar g</td>
</tr>
<tr>
<td></td>
<td>9.14 ... 914 psi g</td>
<td>0.63 ... 63 bar g</td>
</tr>
<tr>
<td></td>
<td>0.19 ... 18.9 psi a(^1)</td>
<td>13 ... 1300 mbar a(^1)</td>
</tr>
<tr>
<td></td>
<td>0.7 ... 72.5 psi a(^1)</td>
<td>0.05 ... 5 bar a(^1)</td>
</tr>
<tr>
<td></td>
<td>4.35 ... 435 psi a(^1)</td>
<td>0.03 ... 30 bar a(^1)</td>
</tr>
</tbody>
</table>

### Wetted parts materials

<table>
<thead>
<tr>
<th>Seal diaphragm</th>
<th>Measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy(^2)</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

### Process connection

- Flange version with Order code M., N., R., or Q.. (see "Further designs")

### Non-wetted parts materials

- Stainless steel, deep-drawn and electrolytically polished

### Version

- Standard version

### Explosion protection

- Without
- With ATEX, Type of protection:  
  - "Intrinsic safety (Ex ia)"
  - Zone 20/21/22\(^3\)
  - Ex nA/nL (zone 2)\(^4\)
  - With FM „Intrinsic safe“ (cFMUS)

### Electrical connection / cable entry

- Screwed gland M20x1.5 (Polyamid)\(^5\)
- Screwed gland M20x1.5 (metal)
- Screwed gland M20x1.5 (stainless steel)
- M12 connector (without cable socket)
- M12 connector (stainless steel, without cable socket)
- ½-14 NPT thread, meta\(^6\)
- ½-14 NPT thread, stainless steel\(^6\)

### Display

- Without display, with keys, closed lid\(^5\)
- With display and keys, closed lid
- With display and keys, lid with macrolon washer (setting on HART devices: mA, on PROFIBUS PA and FOUNDATION Fieldbus devices: pressure units)
- With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with macrolon washer
- With display and keys, lid with glass pane (setting on HART devices: mA, on PROFIBUS PA and FOUNDATION Fieldbus devices: pressure units)
- With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane

### Power supply units

See "SITRANS I power supply units and isol. amplifiers".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM 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 for flanges with option M., N., and Q..
3. Not together with electrical connection option A.
4. Can only be ordered in conjunction with electrical connection Option B, C, F or G.
5. Only together with HART electronics.

F) Subject to export regulations AL: 9I999, ECCN: N.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Flange to EN 1092-1, form B1</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25, PN 40</td>
<td>M11</td>
</tr>
<tr>
<td>DN 25, PN 100</td>
<td>M21</td>
</tr>
<tr>
<td>DN 40, PN 40</td>
<td>M13</td>
</tr>
<tr>
<td>DN 40, PN 100</td>
<td>M23</td>
</tr>
<tr>
<td>DN 50, PN 16</td>
<td>M04</td>
</tr>
<tr>
<td>DN 50, PN 40</td>
<td>M14</td>
</tr>
<tr>
<td>DN 80, PN 16</td>
<td>M06</td>
</tr>
<tr>
<td>DN 80, PN 40</td>
<td>M16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flanges to ASME B16.5</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;, class 150</td>
<td>M40</td>
</tr>
<tr>
<td>1½&quot;, class 150</td>
<td>M41</td>
</tr>
<tr>
<td>2&quot;, class 150</td>
<td>M42</td>
</tr>
<tr>
<td>3&quot;, class 150</td>
<td>M43</td>
</tr>
<tr>
<td>4&quot;, class 150</td>
<td>M44</td>
</tr>
<tr>
<td>1&quot;, class 300</td>
<td>M45</td>
</tr>
<tr>
<td>1½&quot;, class 300</td>
<td>M46</td>
</tr>
<tr>
<td>2&quot;, class 300</td>
<td>M47</td>
</tr>
<tr>
<td>3&quot;, class 300</td>
<td>M48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threaded connection acc. to DIN 3852-2, Form A, Thread to ISO 228</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>G ¾&quot;-A, flush-mounted</td>
<td>R01</td>
</tr>
<tr>
<td>G 1&quot;-A, flush-mounted</td>
<td>R02</td>
</tr>
<tr>
<td>G 2&quot;-A, flush-mounted</td>
<td>R04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tank connection</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing is included in delivery</td>
<td>R10</td>
</tr>
<tr>
<td>TG 52/50, PN 40</td>
<td>R11</td>
</tr>
</tbody>
</table>

## Further designs

### Mounting bracket
- made completely of stainless steel, for wall or pipe mounting

### Cable socket for M12 plug
- **Metal**: A50
- **Stainless steel**: A51

### Rating plate inscription
- (instead of English)
  - **German**: B10
  - **French**: B12
  - **Spanish**: B13
  - **Italian**: B14

### English rating plate
- Pressure units in inH20 or psi

### Quality inspection certificate (Factory calibration) to IEC 60770-2
- C11

### Acceptance test certificate
- to EN 10204-3.1
- C12

### Factory certificate
- to EN 10204-2.2
- C14

### Type of protection IP68
- (only for M20x1.5 and ½-14 NPT)
- D12

---

## Further designs

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varient connection</td>
<td>Order code</td>
</tr>
<tr>
<td>certified to 3A and EHEDG</td>
<td>Order code</td>
</tr>
<tr>
<td>Type N = 68 for Varient housing DN 40 ... 125 and 1½&quot; ... 6&quot;, PN 40</td>
<td>N28</td>
</tr>
<tr>
<td>Temperature decoupler up to 200 °C for version with front-flush diaphragm</td>
<td>P00</td>
</tr>
<tr>
<td>Temperature decoupler up to 250 °C</td>
<td>P10</td>
</tr>
</tbody>
</table>

### Bio-Control (Neumo) sanitary connection
- certified to 3A and EHEDG
- DN 50, PN 16
- DN 65, PN 16
- Q53
- Q54

### Sanitary process connection to DRD
- 65 mm, PN 40
- M32

### SMS socket with union nut
- 2"
- 2½"
- 3"
- M67
- M68
- M69
- M73
- M74
- M75

### SMS threaded socket
- 2"
- 2½"
- 3"
- M92
- M93
- M94

### IDF socket with union nut ISO 2853
- 2"
- 2½"
- 3"
- M95
- M96

### Sanitary process connection to NEUMO Bio-Connect screw connection
- certified to 3A and EHEDG
- DN 50, PN 16
- Q05
- Q06
- Q07
- Q08
- Q13
- Q14
- Q15
- Q16

### Sanitary process connection to NEUMO Bio-Connect flange connection
- certified to 3A and EHEDG
- DN 50, PN 16
- Q23
- Q24
- Q25
- Q26
- Q31
- Q32
- Q33
- Q34

### Sanitary process connection to NEUMO Bio-Connect clamp connection
- certified to 3A and EHEDG
- DN 50, PN 16
- Q39
- Q40
- Q41
- Q42
- Q48
- Q49
- Q50
SITRANS P measuring instruments for pressure
Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further designs</strong></td>
<td></td>
</tr>
<tr>
<td>Add &quot;.Z&quot; to Order No. and specify Order code.</td>
<td></td>
</tr>
<tr>
<td><strong>Sanitary process connection to NEUMO Connect S flange connection</strong> certified to 3A and EHEDG</td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>Q63 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 65, PN 10</td>
<td>Q64 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 80, PN 10</td>
<td>Q65 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 100, PN 10</td>
<td>Q66 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 2&quot;, PN 16</td>
<td>Q72 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 2½&quot;, PN 10</td>
<td>Q73 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 3&quot;, PN 10</td>
<td>Q74 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 4&quot;, PN 10</td>
<td>Q75 ✓ ✓ ✓</td>
</tr>
<tr>
<td><strong>Aseptic threaded socket to DIN 11864-1</strong> Form A certified to 3A and EHEDG</td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 25</td>
<td>N33 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 65, PN 25</td>
<td>N34 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 80, PN 25</td>
<td>N35 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 100, PN 25</td>
<td>N36 ✓ ✓ ✓</td>
</tr>
<tr>
<td><strong>Aseptic flange with notch to DIN 11864-2</strong> Form A certified to 3A and EHEDG</td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>N43 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>N44 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>N45 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>N46 ✓ ✓ ✓</td>
</tr>
<tr>
<td><strong>Aseptic flange with groove to DIN 11864-2</strong> Form A certified to 3A and EHEDG</td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>N43 + P11 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>N44 + P11 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>N45 + P11 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>N46 + P11 ✓ ✓ ✓</td>
</tr>
<tr>
<td><strong>Aseptic clamp with groove to DIN 11864-3</strong> Form A certified to 3A and EHEDG</td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 25</td>
<td>N53 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 65, PN 25</td>
<td>N54 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>N55 ✓ ✓ ✓</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>N56 ✓ ✓ ✓</td>
</tr>
</tbody>
</table>

1) When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) Whle the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

3) Special Viton seal included in delivery.

4) Lower measuring limit 1.45 psi g (-100 mbar g).

5) The weldable socket can be ordered under accessories

6) Certified to 3A. The maximum temperatures of the medium depend on the respective cell fillings.

7) 3A certification only if used in conjunction with 3A-compliant sealing rings.

8) Preset values can only be modified over SIMATIC PDM.
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)
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 $H_2$.

- $H_1$ = 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.
**Flanges to EN and ASME**

**Flanges to EN**

**EN 1092-1**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>40</td>
<td>115 mm (4.5&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>25</td>
<td>100</td>
<td>140 mm (5.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>150 mm (5.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>100</td>
<td>170 mm (6.7&quot;)</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>16</td>
<td>165 mm (6.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>40</td>
<td>165 mm (6.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>200 mm (7.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>200 mm (7.9&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Flanges to ASME**

**ASME B16.5**

<table>
<thead>
<tr>
<th>DN</th>
<th>class</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>150</td>
<td>110 mm (4.3&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>300</td>
<td>130 mm (5.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>150</td>
<td>150 mm (5.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>300</td>
<td>165 mm (6.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>150</td>
<td>190 mm (7.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>300</td>
<td>210 mm (8.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>150</td>
<td>230 mm (9.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>300</td>
<td>255 mm (10.0&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**NuG and pharmaceutical connections**

**Connections to DIN**

**DIN 11851 (Dairy connection)**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>25</td>
<td>92 mm (3.6&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>80</td>
<td>25</td>
<td>127 mm (5.0&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Tri-Clamp according DIN 32676**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>64 mm (2.5&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>91 mm (3.6&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Other connections**

**Varivent connection**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>40</td>
<td>84 mm (3.3&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
</tbody>
</table>

**Bio-Control connection**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>90 mm (3.5&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>120 mm (4.7&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Sanitary process connection to DRD**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>40</td>
<td>105 mm (4.1&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
</tbody>
</table>

**Sanitary screw connection to NEUMO Bio-Connect**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>82 mm (3.2&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>105 mm (4.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>115 mm (4.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>145 mm (5.7&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>16</td>
<td>82 mm (3.2&quot;)</td>
<td></td>
</tr>
<tr>
<td>2½&quot;</td>
<td>16</td>
<td>105 mm (4.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>16</td>
<td>105 mm (4.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>16</td>
<td>145 mm (5.7&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Sanitary connection to NEUMO Bio-Connect flange connection**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>110 mm (4.3&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>140 mm (5.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>150 mm (5.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>175 mm (6.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>16</td>
<td>100 mm (3.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>2½&quot;</td>
<td>16</td>
<td>110 mm (4.3&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>16</td>
<td>140 mm (5.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>16</td>
<td>175 mm (6.9&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Sanitary connection to NEUMO Bio-Connect clamp connection**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>77.4 mm (3.0&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>10</td>
<td>90.9 mm (3.6&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>10</td>
<td>106 mm (4.2&quot;)</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>119 mm (4.7&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>16</td>
<td>64 mm (2.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>2½&quot;</td>
<td>16</td>
<td>77.4 mm (3.0&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>10</td>
<td>90.9 mm (3.6&quot;)</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>10</td>
<td>119 mm (4.7&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Sanitary connection to NEUMO Bio-Connect S flange connection**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>125 mm (4.9&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>10</td>
<td>145 mm (5.7&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>10</td>
<td>155 mm (6.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>180 mm (7.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>16</td>
<td>125 mm (4.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>2½&quot;</td>
<td>10</td>
<td>135 mm (5.3&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>10</td>
<td>145 mm (5.7&quot;)</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>10</td>
<td>180 mm (7.1&quot;)</td>
<td></td>
</tr>
</tbody>
</table>
### SITRANS P300 for gauge and absolute pressure

#### Thread connection G¾", G1" and G2" to DIN 3852

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾&quot;</td>
<td>63</td>
<td>37 mm (1.5&quot;)</td>
<td>Approx. 45 mm (1.8&quot;)</td>
</tr>
<tr>
<td>1&quot;</td>
<td>63</td>
<td>48 mm (1.9&quot;)</td>
<td>Approx. 47 mm (1.9&quot;)</td>
</tr>
<tr>
<td>2&quot;</td>
<td>63</td>
<td>78 mm (3.1&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
</tbody>
</table>

#### Tank connection TG52/50 und TG52/150

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>40</td>
<td>63 mm (2.5&quot;)</td>
<td>Approx. 63 mm (2.5&quot;)</td>
</tr>
<tr>
<td>25</td>
<td>40</td>
<td>63 mm (2.5&quot;)</td>
<td>Approx. 170 mm (6.7&quot;)</td>
</tr>
</tbody>
</table>

#### SMS socket with union nut

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>25</td>
<td>84 mm (3.3&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>2½&quot;</td>
<td>25</td>
<td>100 mm (3.9&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>3&quot;</td>
<td>25</td>
<td>114 mm (4.5&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### SMS threaded socket

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>25</td>
<td>70 x 1/6 mm</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>2½&quot;</td>
<td>25</td>
<td>85 x 1/6 mm</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>3&quot;</td>
<td>25</td>
<td>98 x 1/6 mm</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### IDF socket with union nut

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>25</td>
<td>77 mm (3&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>2½&quot;</td>
<td>25</td>
<td>91 mm (3.6&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>3&quot;</td>
<td>25</td>
<td>106 mm (4.2&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### IDF threaded socket

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>25</td>
<td>64 mm (2.5&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>2½&quot;</td>
<td>25</td>
<td>77.5 mm (3.1&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>3&quot;</td>
<td>25</td>
<td>91 mm (3.6&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### Aseptic socket to DIN 11864-1 Form A

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>25</td>
<td>78 x 1/6&quot;</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>25</td>
<td>95 x 1/6&quot;</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>80</td>
<td>25</td>
<td>110 x ¼&quot;</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>100</td>
<td>25</td>
<td>130 x ¼&quot;</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### Aseptic flange with notch to DIN 11864-2 Form A

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>94</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>113</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>133</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>159</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### Aseptic flange with groove to DIN 11864-2 Form A

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>94</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>113</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>133</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>159</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>

#### Aseptic clamp with groove to DIN 11864-3 Form A

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>25</td>
<td>77,5</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>25</td>
<td>91</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>106</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>130</td>
<td>Approx. 52 mm (2.1&quot;)</td>
</tr>
</tbody>
</table>
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 DS III series pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys, over HART communication, PROFIBUS PA or FOUNDATION Fieldbus interface (DS III only).

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 pressure 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
- Filling level
- Volume level
- Mass level

Benefits
- High quality and long 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 spans from 0.43 psi g to 232 psi g (0.03 bar g to 16 bar g) for DS III with HART interface
- Nominal measuring range from 14.5 psi g to 232 psi g (0.03 bar g to 16 bar g) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- Infinitely adjustable spans from 0.43 psi g to 232 psi g (0.03 bar g to 16 bar g) for SITRANS P300 with HART interface
- Nominal measuring range from 14.5 psi g to 232 psi g (1 bar g to 16 bar g) 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 ... 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 communication 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 HART: 0.433 ... 232 psi g (0.03 ... 16 bar g)
- Nominal measuring range
- For DS III PA and FF: 14.5 ... 232 psi g (1 ... 16 bar g)

SITRANS P300

Span (infinitely adjustable)
- For DS III HART: 0.433 ... 232 psi g (0.03 ... 16 bar g)
- Nominal measuring range
- For DS III PA: 14.5 ... 232 psi g (1 ... 16 bar g)
Design

SITRANS P, DS III series

The transmitter comprises a range of different components, depending on the order specifications. The various options are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (3, Figure “Front view”) with the Order 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 (6) can be fitted with a viewing pane so that the measured values can be read directly on the digital display. The inlet (4) 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 (1). The measuring cell is prevented from rotating by a locking screw (8). 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 (5), which hides the pushbuttons.

Example for an attached measuring point label

```
Y01 or Y02
= max. 27 char.
Y15 = max. 16 char.
Y99 = max. 10 char.
Y16 = max. 27 char.
```

© Siemens AG 2010
Function

**Operation of the electronics with HART communication**

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the instrument 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 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 each other.

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

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

The pressure transmitters with spans ≤ 914 psi g (≤ 63 bar g) measure the input pressure compared to atmosphere, transmitters with spans ≥ 2321 psi g (≥ 160 bar g) compared to vacuum.

**Operation of the electronics with PROFIBUS PA communication**

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the instrument 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 pushbuttons (8) you can parameterize the pressure transmitter directly at the point of measurement. The pushbuttons can also be used to control the view of the results, the error messages and the operating modes on the digital 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.
Mode of operation of the FOUNDATION Fieldbus electronics

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the instrument 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 a result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three pushbuttons (8) you can parameterize the pressure transmitter directly at the point of measurement. The pushbuttons can also be used to control the view of the results, the error messages and the operating modes on the digital 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

The pressure \( p_e \) is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm") 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 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 pushbuttons (local operation)

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 system.
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 HART and P300 HART

Parameterization through FOUNDATION Fieldbus Interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III FF 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 PA and FF and P300 PA and FF

Diagnostic functions for DS III PA and FF and P300 PA and FF

• Event counter
• Min/Max registers
• Maintenance timer
• Simulation functions
• Zero correction for position
• Transmitter output alarms
• Saturation alarm

Physical dimensions available for the display

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS puts the DS III PA in connection with 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).

Physical dimensions available for the display
## Technical specifications

### SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry

<table>
<thead>
<tr>
<th></th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Gauge pressure</td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td>0.15 ... 14.5 psi g (0.01 ... 1 bar g)</td>
<td>14.5 psi g (1 bar g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.58 ... 58 psi g (0.04 ... 4 bar g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.32 ... 232 psi g (0.16 ... 16 bar g)</td>
</tr>
<tr>
<td><strong>Lower measuring limit</strong></td>
<td>Measuring cell with silicone oil filling</td>
<td>1.45 psi a (100 mbar a)</td>
</tr>
<tr>
<td><strong>Upper measuring limit</strong></td>
<td>100% of max. span</td>
<td></td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td>• Lower limit (infinitely adjustable)</td>
<td>3.55 mA, factory preset to 3.84 mA</td>
<td>-</td>
</tr>
<tr>
<td>• Upper limit (infinitely adjustable)</td>
<td>23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA</td>
<td>-</td>
</tr>
<tr>
<td><strong>Load</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Without HART communication</td>
<td>( R_B \leq \left( \frac{U_H - 10.5 V}{0.023 A} \right) \Omega )</td>
<td>-</td>
</tr>
<tr>
<td>• With HART communication</td>
<td>( R_B = 230 \ldots 500 \Omega ) (SIMATIC PDM) or ( R_B = 230 \ldots 1100 \Omega ) (HART Communicator)</td>
<td>-</td>
</tr>
<tr>
<td>Physical bus</td>
<td></td>
<td>IEC 61158-2</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference conditions</td>
<td>To EN 60770-1</td>
<td></td>
</tr>
<tr>
<td>(All error data refer always refer to the set span)</td>
<td>Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)</td>
<td></td>
</tr>
<tr>
<td>Error in measurement and fixed-point setting (including hysteresis and repeatability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Linear characteristic</td>
<td>( \leq \left( 0.0029 \cdot r + 0.071 \right) ) %</td>
<td>( \leq 0.075 ) %</td>
</tr>
<tr>
<td>- ( r \leq 10 )</td>
<td>( \leq \left( 0.0045 \cdot r + 0.071 \right) ) %</td>
<td></td>
</tr>
<tr>
<td>- 10 &lt; ( r \leq 30 )</td>
<td>( \leq \left( 0.005 \cdot r + 0.05 \right) ) %</td>
<td></td>
</tr>
<tr>
<td>- 30 &lt; ( r \leq 100 )</td>
<td>( \leq \left( 0.25 \cdot r \right) ) % every 5 years</td>
<td>( \leq 0.25 ) % every 5 years</td>
</tr>
<tr>
<td>Long-term drift (temperature change ± 30 °C (± 54 °F))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td>( \leq \left( 0.08 \cdot r + 0.1 \right) ) %</td>
<td>( \leq 0.3 ) %</td>
</tr>
<tr>
<td>• at -10 ... +60 °C (14 ... 140 °F)</td>
<td>( \leq \left( 0.1 \cdot r + 0.15 \right) %/10 K</td>
<td>( \leq 0.25 ) %/10 K</td>
</tr>
<tr>
<td>• at -40 ... +185 °C (−40 ... +362 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influence of medium temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.04 psi/10 K (3 mbar/10 K)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influence of mounting position</td>
<td>( \leq 0.00145 ) psi g (0.1 mbar g) per 10° inclination</td>
<td>( 3 \cdot 10^{-5} ) of nominal measuring range</td>
</tr>
<tr>
<td>Measured Value Resolution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Rated operating conditions

**Degree of protection (to EN 60529)**
- IP65, IP68, NEMA X, enclosure cleaning, resistant to lyes, steam to 150°C (302°F)

**Process temperature**
- -20 ... +100°C (-4 ... +212°F)

**Ambient conditions**
- **Ambient temperature**
  - -20 ... +85°C (-4 ... +185°F)
- **Storage temperature**
  - -50 ... +85°C (-58 ... +185°F)
- **Climatic class**
  - **Condensation**
    - Permissible

**Electromagnetic compatibility**
- **Emitted interference and interference immunity**
  - To EN 61326 and NAMUR NE 21

### Design

**Weight (without options)**
- ≈ 1.5 kg (= 3.3 lb)

**Housing material**
- Low copper die-cast aluminium, GD-AlSi12 or stainless steel precision casting, mat. No. 1.4408

**Wetted parts materials**
- Stainless steel

**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)**
- Front-flush, 1½", PMC Standard design

**Process connection (minibolt)**
- Front-flush, 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

**Supplied through bus**
- -

**Separate 24 V power supply necessary**
- -

**Bus voltage**
- -

**Not Ex**
- -

**With intrinsically-safe operation**
- -

**Current consumption**
- Basic current (max.)
- -

**Startup current ≤ basic current**
- -

**Max. current in event of fault**
- -

**Fault disconnection electronics (FDE) available**
- -

**Certificate 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 requirements of Article 3, paragraph 3 (sound engineering practice)
### SITRANS P measuring instruments for pressure
**Transmitters for gauge pressure for the paper industry**

**DS III series with PMC connection**

<table>
<thead>
<tr>
<th>HART communication</th>
<th>230 … 1100 Ω</th>
<th>HART Version 5.x</th>
<th>SIMATIC PDM</th>
</tr>
</thead>
</table>

**PROFIBUS PA communication**

- Simultaneous communication with master class 2 (max.)
- The address can be set using Configuration tool or local operation (standard setting address 126)
- Cyclic data usage
  - Output byte
    - 5 (one measuring value) or 10 (two measuring 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 profile
  - Analog input
    - Adaptation to customer-specific process variables
    - Yes, linearly rising or falling characteristic
    - Electrical damping T<sub>63</sub>, adjustable
    - 0 … 100 s
    - Simulation function
    - Can be parameterized (last good value, substitute value, incorrect value)
    - Limit monitoring
    - Yes, one upper and lower warning limit and one alarm limit respectively
- Register (totalizer)
  - Failure mode
    - Can be reset, preset, optional direction of counting, simulation function of register output
  - Limit monitoring
    - One upper and lower warning limit and one alarm limit respectively
- Physical block
  - Transducer blocks
    - Pressure transducer block
      - Can be calibrated by applying two pressures
      - Monitoring of sensor limits
      - Characterizer
      - Simulation function for measured pressure value and sensor temperature
      - 1
      - Yes
      - Yes
      - Max. 30 points
      - Constant value or over parameterizable ramp function
      - Yes
      - Constant value or over parameterizable ramp function
- **Communication FOUNDATION Fieldbus**
  - Function blocks
    - 3 function blocks analog input, 1 function block PID
    - Analog input
      - Yes, linearly rising or falling characteristic
      - 0 … 100 s
      - Output/input (can be locked within the device with a bridge)
      - Can be parameterized (last good value, substitute value, incorrect value)
      - Yes, one upper and lower warning limit and one alarm limit respectively
    - PID
      - Standard FF function block
      - 1 Resource block
      - 1 transducer block Pressure with calibration, 1 transducer block LCD
    - Physical block
      - Transducer blocks
        - Pressure transducer block
          - Can be calibrated by applying two pressures
          - Monitoring of sensor limits
          - Characterizer
          - Simulation function: Measured pressure value, sensor temperature and electronics temperature
          - Yes
          - Yes
          - Constant value or over parameterizable ramp function
          - Yes
          - Constant value or over parameterizable ramp function
## SITRANS P measuring instruments for pressure

Transmitters for gauge pressure for the paper industry

### DS III series with PMC connection

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

### Span

- 0.15 ... 14.5 psi g (0.01 ... 1 bar g)
- 0.58 ... 58 psi g (0.04 ... 4 bar g)
- 2.32 ... 232 psi g (0.16 ... 16 bar g)

### Wetted parts materials

- Seal diaphragm: Connection shank
  - Hastelloy: Stainless steel

### Process connection

- PMC Style Standard: Thread 1½”
- PMC Style Mini bolt: 1” front-flush (min. span: 7.25 psi (500 mbar), can not be ordered with mit 14.5 psi (1-bar) measuring cell (Option B))

### Nominal measuring range

- 14.5 psi g (1 bar g)
- 58 psi g (4 bar g)
- 232 psi g (16 bar g)

### Explosion protection

- None
- FM/CSA Explosion proof

### Electrical connection / cable entry

- Female thread M20x1.5
- Female thread ½-14 NPT
- M12 connectors (metal)

### Display

- Without indicator
- Without visible digital indicator (digital indicator hidden, setting: mA)
- With visible digital indication, setting: mA
- With customer-specific digital indication (setting as specified, Order code “Y21” or “Y22” required)

### Power supply units

- See "SITRANS I power supply units and isolation amplifiers"

### Selection and Ordering data

**Order No.**

<table>
<thead>
<tr>
<th>SITRANS P pressure transmitter for gauge pressure, with PMC connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS III PA (PROFIBUS PA) series</td>
</tr>
<tr>
<td>DS III FF series (FOUNDATION Fieldbus)</td>
</tr>
</tbody>
</table>

**Measuring cell filling**

- Silicone oil: Standard
- Inert liquid: Grease-free

**Span**

- 0.15 ... 14.5 psi g (0.01 ... 1 bar g)
- 0.58 ... 58 psi g (0.04 ... 4 bar g)
- 2.32 ... 232 psi g (0.16 ... 16 bar g)

**Wetted parts materials**

- Seal diaphragm: Connection shank
  - Hastelloy: Stainless steel

**Process connection**

- PMC Style Standard: Thread 1½”
- PMC Style Mini bolt: 1” front-flush (min. span: 7.25 psi (500 mbar), can not be ordered with mit 14.5 psi (1-bar) measuring cell (Option B))

**Non-wetted parts materials**

- Housing made of die-cast aluminum
- Housing stainless steel precision casting

**Version**

- Standard version
- International version, English label inscriptions, documentation in 5 languages on CD

**Explosion protection**

- None
- FM/CSA Explosion proof

**Electrical connection / cable entry**

- Female thread M20x1.5
- Female thread ½-14 NPT
- M12 connectors (metal)

**Display**

- Without indicator
- Without visible digital indicator (digital indicator hidden, setting: mA)
- With visible digital indication, setting: mA
- With customer-specific digital indication (setting as specified, Order code “Y21” or “Y22” required)

---

1) Only with “PMC Style Standard” process connection
2) Sealing is included in delivery.
3) M12 delivered without cable socket

F) Subject to export regulations AL: 9I999, ECCN: N.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M12 cable sockets (metal)</strong></td>
<td>A50</td>
</tr>
<tr>
<td><strong>Rating plate inscription</strong></td>
<td>B11 <strong>English</strong>, B12 <strong>French</strong>, B13 <strong>Spanish</strong>, B14 <strong>Italian</strong></td>
</tr>
<tr>
<td><strong>English rating plate</strong></td>
<td>B21</td>
</tr>
<tr>
<td><strong>Quality inspection certificate (Factory calibration) to IEC 60770-2</strong></td>
<td>C11</td>
</tr>
<tr>
<td><strong>Acceptance test certificate</strong></td>
<td>C12</td>
</tr>
<tr>
<td><strong>Factory certificate</strong></td>
<td>C14</td>
</tr>
<tr>
<td><strong>Output signal can be set to upper limit of 22.0 mA</strong></td>
<td>D05</td>
</tr>
<tr>
<td><strong>Degree of protection IP68</strong></td>
<td>D12</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>P01 <strong>Weldable sockets for standard 1½&quot; threaded connection</strong>, P02 <strong>Weldable socket for mini bolt connection 1&quot; (incl. screw 5/16-18 UNC-2B and washer)</strong></td>
</tr>
<tr>
<td><strong>Entry of HART address (TAG)</strong></td>
<td>Y17</td>
</tr>
<tr>
<td><strong>Setting of pressure indication in pressure units</strong></td>
<td>Y21</td>
</tr>
<tr>
<td><strong>Setting of pressure indication in non-pressure units</strong></td>
<td>Y22</td>
</tr>
<tr>
<td><strong>Preset bus address</strong></td>
<td>Y25</td>
</tr>
</tbody>
</table>

### Additional data

| **Measuring range to be set** | Y01 |
| **Measuring point number (TAG No.)** | Y15 |
| **Measuring point text** | Y16 |
| **Entry of HART address (TAG)** | Y17 |
| **Setting of pressure indication in pressure units** | Y21 |
| **Setting of pressure indication in non-pressure units** | Y22 |
| **Preset bus address** | Y25 |

- **Note:** The following pressure units can be selected:
  - bar, mbar, mm H₂O, in H₂O, ft H₂O
  - mmHg, inHg, psi, kPa, MPa, g/cm², kg/cm², Torr, ATM or %
  - *ref. temperature 20 °C*

1) Preset values can only be modified over SIMATIC PDM.
SITRANS P measuring instruments for pressure
Transmitters for gauge pressure for the paper industry

DS III series with PMC connection

Dimensional drawings

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 \( H_2 \).

- \( H_1 \) = 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.

<table>
<thead>
<tr>
<th>Process connection: PMC standard</th>
<th>1) Allow approx. 20 mm (0.79 inch) thread length in addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanking plug</td>
<td>2) 92 mm (3.6 inch) for minimum distance to permit rotation with indicator</td>
</tr>
<tr>
<td>Electrical connection:</td>
<td></td>
</tr>
<tr>
<td>- screwed gland M20x1,5</td>
<td></td>
</tr>
<tr>
<td>- screwed gland ½-14 NPT</td>
<td></td>
</tr>
<tr>
<td>Terminal side</td>
<td></td>
</tr>
<tr>
<td>Electronics side, digital display (longer overall length for cover with window)</td>
<td></td>
</tr>
<tr>
<td>Protective cover over keys</td>
<td></td>
</tr>
<tr>
<td>Mounting bracket (option)</td>
<td></td>
</tr>
<tr>
<td>Sealing screw with valve (option)</td>
<td></td>
</tr>
<tr>
<td>Screw cover safety bracket (only for explosion-proof enclosure, not shown in the drawing)</td>
<td></td>
</tr>
</tbody>
</table>

PMC Style standard

<table>
<thead>
<tr>
<th>DN</th>
<th>FN</th>
<th>φD</th>
<th>( H_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>40.9 mm (1.6&quot;)</td>
<td>Approx. 36.8 mm (1.4&quot;)</td>
</tr>
</tbody>
</table>

PMC Style minibolt

<table>
<thead>
<tr>
<th>DN</th>
<th>FN</th>
<th>φD</th>
<th>( H_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>26.3 mm (1.0&quot;)</td>
<td>Approx. 33.1 mm (1.3&quot;)</td>
</tr>
</tbody>
</table>

PM C Style standard (left) and PMC Style minibolt (right) weldable sockets, dimensions in mm (inch)

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

**SITRANS P300 for gauge pressure with PMC connection for the paper industry**

<table>
<thead>
<tr>
<th>Input</th>
<th>HART</th>
<th>PROFIBUS PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Gauge pressure (flush-mounted)</td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Span</td>
<td>Max. perm. test pressure</td>
<td>Nominal measuring range</td>
</tr>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>87 psi g</td>
<td>14.5 psi g</td>
</tr>
<tr>
<td>(0.01 ... 1 bar g)</td>
<td>(6 bar g)</td>
<td>(1 bar g)</td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>145 psi g</td>
<td>58 psi g</td>
</tr>
<tr>
<td>(0.04 ... 4 bar g)</td>
<td>(10 bar g)</td>
<td>(4 bar g)</td>
</tr>
<tr>
<td>2.3 ... 232 psi g</td>
<td>464 psi g</td>
<td>232 psi g</td>
</tr>
<tr>
<td>(0.16 ... 16 bar g)</td>
<td>(32 bar g)</td>
<td>(16 bar g)</td>
</tr>
<tr>
<td></td>
<td>Depending on the process connection, the span may differ from these values</td>
<td>Depending on the process connection, the nominal measuring range may differ from these values</td>
</tr>
<tr>
<td>Lower measuring limit</td>
<td>• Measuring cell with silicone oil</td>
<td>1.45 psi a (100 mbar a)</td>
</tr>
<tr>
<td></td>
<td>• Measuring cell with silicone oil</td>
<td>100 % of max. span</td>
</tr>
<tr>
<td>Upper measuring limit</td>
<td>• Measuring cell with silicone oil</td>
<td>100 % of the max. nominal measuring range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>Physical bus</th>
<th>Protection against polarity reversal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
<td>Digital PROFIBUS PA signal</td>
</tr>
<tr>
<td>Physical bus</td>
<td>-</td>
<td>IEC 61158-2</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>Protected against short-circuit and polarity reversal: Each connection against the other with max. supply voltage.</td>
<td></td>
</tr>
<tr>
<td>Electrical damping $T_{63}$ (step width 0.1 s)</td>
<td>Set to 0.1 s (0 ... 100 s)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>To EN 60770-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference conditions</td>
<td>Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, measuring cell with silicone oil, room temperature 25 °C (77 °F), span ratio ($r = $max. span/set span)</td>
</tr>
<tr>
<td>Measurement deviation with cut-off point setting, including hysteresis and repeatability. Linear characteristic curve</td>
<td>$\leq (0.0029 \cdot r + 0.071) %$ $\leq 0.075 %$</td>
</tr>
<tr>
<td>$r \leq 10$</td>
<td>$\leq (0.0045 \cdot r + 0.071) %$ $\leq 0.075 %$</td>
</tr>
<tr>
<td>$10 &lt; r \leq 30$</td>
<td>$\leq (0.005 \cdot r + 0.05) %$ $\leq 0.075 %$</td>
</tr>
<tr>
<td>$30 &lt; r \leq 100$</td>
<td>Approx. 0.2 s</td>
</tr>
<tr>
<td>Setting time $T_{63}$ without electrical damping</td>
<td>$\leq (0.25 \cdot r) %/5 years$ $\leq 0.25 %/5 years$</td>
</tr>
<tr>
<td>Long-term drift at ±30 °C (±54 °F)</td>
<td>$\leq (0.1 \cdot r + 0.2)%$ $\leq 0.3 %$</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td>$\leq (0.1 \cdot r + 0.15)%/10 K$ $\leq 0.25 %/10 K$</td>
</tr>
<tr>
<td>$\pm 10 \ldots +60 ^\circ C$ (14 ... 140 °F)</td>
<td></td>
</tr>
<tr>
<td>$\pm 40 \ldots -10 ^\circ C$ and $+60 \ldots +85 ^\circ C$ ($-40 \ldots 14 ^\circ F$ and $140 \ldots 185 ^\circ F$)</td>
<td></td>
</tr>
<tr>
<td>Influence of the medium temperature (only with front-flush diaphragm)</td>
<td></td>
</tr>
<tr>
<td>• Temperature difference between medium temperature and ambient temperature</td>
<td>0.04 psi/10 K (3 mbar/10 K)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
<th>To EN 60770-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation conditions</td>
<td>Observe the temperature class in areas subject to explosion hazard.</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with silicone oil</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>• Digital display</td>
<td>-30 ... +85 °C (-22 ... +185 °F)</td>
</tr>
<tr>
<td>• Storage temperature</td>
<td>-50 ... +85 °C (-58 ... +185 °F)</td>
</tr>
<tr>
<td>Climate class</td>
<td></td>
</tr>
<tr>
<td>Condensation</td>
<td>Permissible</td>
</tr>
<tr>
<td>Degree of protection to EN 60529</td>
<td>IP65, IP68, NEMA X, enclosure cleaning, resistant to lyes, steam to 150° C (302 °F)</td>
</tr>
<tr>
<td>Electromagnetic compatibility</td>
<td>To EN 61326 and NAMUR NE 21</td>
</tr>
<tr>
<td>Emitted interference and interfer. immunity</td>
<td></td>
</tr>
</tbody>
</table>
### SITRANS P300 for gauge pressure with PMC connection for the paper industry

<table>
<thead>
<tr>
<th>Medium conditions</th>
<th>HART</th>
<th>PROFIBUS PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with silicone oil</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
<td></td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>Weight (without options)</th>
<th>Approx. 1 kg (2.2 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Stainless steel, mat. No. 1.4301/304</td>
</tr>
<tr>
<td>Material of parts in contact with the medium</td>
<td>Backfilling material: Hastelloy C276, mat. No. 2.4819, Silicone oil</td>
</tr>
<tr>
<td>• Seal diaphragm</td>
<td>Hastelloy C276, mat. No. 2.4819</td>
</tr>
<tr>
<td>• Measuring cell filling</td>
<td>Silicone oil</td>
</tr>
<tr>
<td>Surface quality touched-by-medium</td>
<td>Rₐ values ≤ 0.8 μm (3.15·10⁻⁸ inch), welded seams Rₐ ≤ 1.6 μm (6.4·10⁻⁸ inch)</td>
</tr>
</tbody>
</table>

### Power supply Uᵢ

| Terminal voltage on transmitter | 10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC | Supplied through bus |
| Separate power supply | - | Not necessary |
| Bus voltage | - | 9 ... 32 V |
| • Without EEx | - | 9 ... 24 V |
| • For intrinsically-safe operation | - | 12.5 mA |
| Current consumption | - | Yes |
| • Max. basic current | - | 15.5 mA |
| • Startup current ≤ basic current | - | Available |
| • Max. fault current in the event of a fault | - | |
| Fault disconnection electronics (FDE) | - | |

### Certificate and approvals

<table>
<thead>
<tr>
<th>Classification according to pressure equipment directive (DRGL 97/23/EC)</th>
<th>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosion protection</td>
<td>PTB 05 ATEX 2048</td>
</tr>
<tr>
<td>Intrinsic safety “i”</td>
<td>Ex II 1/2 G EEx ia/tb IIB/IIC T4, T5, T6</td>
</tr>
<tr>
<td>Identification</td>
<td></td>
</tr>
<tr>
<td>Permissible ambient temperature</td>
<td></td>
</tr>
<tr>
<td>• Temperature class T4</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>• Temperature class T5</td>
<td>-40 ... +70 °C (-40 ... +158 °F)</td>
</tr>
<tr>
<td>• Temperature class T6</td>
<td>-40 ... +60 °C (-40 ... +140 °F)</td>
</tr>
<tr>
<td>Connection</td>
<td></td>
</tr>
<tr>
<td>Effective inner capacitance:</td>
<td></td>
</tr>
<tr>
<td>Effective inner inductance:</td>
<td></td>
</tr>
<tr>
<td>Explosion protection to FM for USA and Canada (cFMUS)</td>
<td></td>
</tr>
<tr>
<td>• Identification (DIP) or (IS); (NI)</td>
<td>Certificate of Compliance 3025099</td>
</tr>
<tr>
<td>• Identification (DIP) or (IS)</td>
<td>Certificate of Compliance 3025099C</td>
</tr>
</tbody>
</table>
HART communication
- 230 ... 1100 Ω
- HART Version 5.x
- SIMATIC PDM

PROFIBUS PA communication
- 4
- Configuration tool
- Local operation (standard setting Address 126)

Cyclic data usage
- Output byte
  - One measuring value: 5 bytes
  - Two measuring values: 10 bytes
- Input byte
  - Register operating mode: 1 byte
  - Reset function due to metering: 1 byte

Device profile
- PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B

Function blocks
- Analog input
  - Adaptation to customer-specific process variables
  - Electrical damping T63 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

Communication FOUNDATION Fieldbus
- 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)
  - Can be parameterized (last good value, substitute value, incorrect value)
  - Yes, one upper and lower warning limit and one alarm limit respectively
  - Yes
  - Standard FF function block
  - 1 Resource block
  - 1 transducer block Pressure with calibration, 1 transducer block LCD

- Analogue characteristic
  - Linearly rising or falling characteristic
  - Input/output (can be locked within the device with a bridge)
  - Failure mode
    - Can be parameterized (last good value, substitute value, incorrect value)
    - Yes, one upper and lower warning limit and one alarm limit respectively
    - Yes
    - 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

- Physical block
- 1 Resource block
- 1 transducer block Pressure with calibration, 1 transducer block LCD

- Analogue characteristic
  - Linear
  - Optional direction of counting
  - Simulation function of the register output
  - One upper and lower warning limit and one alarm limit respectively
  - Can be reset and preset

- Physical block
- Transducer block “Electronic temperature”
- Simulation function
  - Available
## SITRANS P300 with PMC connection

### Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ... 20 mA/HART</td>
<td>F) 7 MF 8 1 2 3 -</td>
</tr>
<tr>
<td>PROFIBUS PA</td>
<td>F) 7 MF 8 1 2 4 -</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus (FF)</td>
<td>F) 7 MF 8 1 2 5 -</td>
</tr>
</tbody>
</table>

### Other options

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Cleanliness level 2 to DIN 25410</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5 psi</td>
<td>(1 bar)</td>
</tr>
<tr>
<td>58 psi</td>
<td>(4 bar)</td>
</tr>
<tr>
<td>232 psi</td>
<td>(16 bar)</td>
</tr>
</tbody>
</table>

### Wetted parts materials

<table>
<thead>
<tr>
<th>Seal diaphragm</th>
<th>Measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hastellox</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

### Process connection

- PMC Style Standard: Thread 1½
- PMC Style Mini bolt: 1" front-flush (min. span: 7.25 psi (500 mbar), can not be ordered with mit 14.5 psi (1-bar) measuring cell (Option B))

### Non-wetted parts materials

- Stainless steel, deep-drawn and electrolytically polished

### Version

- Standard version

### Explosion protection

- None
- A
- With ATEX, Type of protection:
  - "Intrinsic safety (Ex ia)"
  - Zone 20/21/22
  - Ex nA/nL (zone 2)
- With FM + CSA, Type of protection:
  - "Intrinsic Safe (is)" (planned)

### Electrical connection / cable entry

<table>
<thead>
<tr>
<th>Screwed gland M20x1.5 (Polymide)</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screwed gland M20x1.5 (metal)</td>
<td>B</td>
</tr>
<tr>
<td>Screwed gland M20x1.5 (stainless steel)</td>
<td>C</td>
</tr>
<tr>
<td>M12 connector (without cable socket)</td>
<td>D</td>
</tr>
<tr>
<td>M12 connector (stainless steel, without cable socket)</td>
<td>E</td>
</tr>
<tr>
<td>½-14 NPT thread, metal</td>
<td>F</td>
</tr>
<tr>
<td>½-14 NPT thread, stainless steel</td>
<td>G</td>
</tr>
</tbody>
</table>

### Display

- Without display, with keys, closed lid
- With display and keys, closed lid
- With display and keys, lid with glass pane (setting on HART devices: mA, on PROFIBUS PA and FOUNDATION Fieldbus devices: pressure unit)
- With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane

### Power supply units see "SITRANS I power supply units and isolation amplifiers"

- Included in delivery of the device:
  - Brief instructions (Leporello)
  - CD-ROM with detailed documentation
  - Sealing ring

### Further designs

- Add "-Z" to Order No. and specify Order code.

<table>
<thead>
<tr>
<th>Cable socket for M12 plug</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>A50</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>A51</td>
</tr>
</tbody>
</table>

### Rating plate inscription

- (instead of English)
  - German: B10
  - French: B12
  - Spanish: B13
  - Italian: B14

### English rating plate

- Pressure units in inH2O or psi

### Quality inspection certificate (Factory calibration) to IEC 60770-2

- Acceptance test certificate
  - To EN 10204-3.1

### Factory certificate

- To EN 10204-2.2

### Set output signal to upper limit of 22.0 mA

- Type of protection IP68
  - (only for M20x1.5 and ½-14 NPT)

### Mounting

- Weldable sockets for standard 1½" threaded connection
- Weldable socket for mini bolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)

### Additional data

- Add "-Z" to Order No. and specify Order code.

### Measuring range to be set

- Specify in plain text (max. 5 digits):
  - Y01: ... up to ... mbar, bar, kPa, MPa, psi

### Measuring point number (TAG No.)

- Y15: Max. 16 characters, specify in plain text: Y15: ...
- Y01: mbar, bar, kPa, MPa, psi

### Measuring point text

- Max. 16 characters, specify in plain text: Y15: ...

### Entry of HART address (TAG)

- Max. 8 characters, specify in plain text: Y17: ...

### Setting of pressure indication in pressure units

- Specify in plain text (standard setting: mA):
  - Y21: mbar, bar, kPa, MPa, psi
- Note: The following pressure units can be selected:
  - bar, mbar, mm H2O, inH2O, ftH2O, 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

- Specify in plain text:
  - Y22: ... up to ... l, m³, m, USg, ...
- (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)

### Preset bus address

- Specify in plain text:
  - Y25: 

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

✔ = available
**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

Only the height \( H_2 \) is indicated in the dimensions of the flanges.

**PMC Style Standard**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>( H_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.4 mm (1.6”)</td>
<td>Approx. 36.8 mm (1.4”)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PMC Style Minibolt**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>( H_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.3 mm (1.0”)</td>
<td>Approx. 33.1 mm (1.3”)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Material: Stainless steel, mat. No. 1.4404 / 316L
SITRANS P pressure transmitters, DS III series, are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys, over HART communication, 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
- For differential pressure transmitters
- Filling level
- Mass level
- Volume level
- Volume flow
- Mass flow

Benefits
- High quality and long 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
- Small long-term drift
- Wetted parts made of high-grade materials (e.g. stainless steel, Hastelloy, gold, Monel, tantalum)

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 communication 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 DS III HART: 0.15 psi to 10153 psi (0.01 bar to 700 bar)
- Nominal measuring range
  - for DS III PA and FF: 14.5 psi to 10153 psi (1 bar to 700 bar)

**Pressure transmitters for absolute pressure**
- Measured variable: Absolute pressure of aggressive and non-aggressive gases, vapors and liquids.
- Span (infinitely adjustable)
  - for DS III HART: 0.12 ... 1450 psi a (8.3 mbar a ... 100 bar a)
- Nominal measuring range
  - for DS III PA and FF: 3.63 ... 1450 psi a (250 mbar a ... 100 bar a)
- 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 \( q \sim \sqrt{\Delta p} \) (together with a primary differential pressure device (see Chapter "Flow Meters"))
- Span (infinitely adjustable)
  - for DS III HART: 0.0145 ... 435 psi (1 mbar ... 30 bar)
- Nominal measuring range
  - for DS III PA and FF: 0.29 ... 435 psi (20 mbar ... 30 bar)

**Pressure transmitters for level**
- Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Span (infinitely adjustable)
  - for DS III HART: 0.363 ... 72.5 psi (25 mbar ... 5 bar)
- Nominal measuring range
  - for DS III PA and FF: 3.63 ... 72.5 psi (250 mbar ... 5 bar)
- 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 low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed containers, the lower-pressure 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.

---

**Example for an attached measuring point label**

| Y01 or Y02 | = max. 27 char. |
| Y15 = max. 16 char. |
| Y99 = max. 10 char. |
| Y16 = max. 27 char. |

---

---

© Siemens AG 2010
Function

Operation of the electronics with HART communication

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the instrument 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 pushbuttons (8) you can parameterize the pressure transmitter directly at the point of measurement. The pushbuttons can also be used to control the view of the results, the error messages and the operating modes on the digital display (9).

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

The pressure transmitters with spans \( \leq 914 \text{ psi g} = 63 \text{ bar} \) measure the input pressure compared to atmosphere, transmitters with spans \( \geq 2321 \text{ psi g} = 160 \text{ bar} \) compared to vacuum.

Operation of the electronics with PROFIBUS PA communication

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the instrument 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 converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). 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 pushbuttons (8) you can parameterize the pressure transmitter directly at the point of measurement. The pushbuttons can also be used to control the view of the results, the error messages and the operating modes on the digital 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.
Mode of operation of the FOUNDATION Fieldbus electronics

| 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 |

Function diagram of the electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the instrument 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 pushbuttons (8) you can parameterize the pressure transmitter directly at the point of measurement. The pushbuttons can also be used to control the view of the results, the error messages and the operating modes on the digital 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

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 input pressure.

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

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 input pressure.
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

Measuring cell for absolute pressure from gauge pressure series

The absolute pressure \( p_a \) is transmitted through the seal diaphragm (3, Figure "Measuring cell for absolute pressure from the gauge pressure series, 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 input pressure.

Measuring cell for absolute pressure from differential pressure series

The input pressure \( p_a \) 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. The resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit thus changes. 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 level

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 (2) is flexed until the seal diaphragm rests on the body of the measuring cell (7), thus protecting the silicon pressure sensor from overloads.
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 pushbuttons (local operation)

With the pushbuttons 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 system.

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 HART

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pushbuttons (DS III HART)</th>
<th>HART communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of scale</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Full-scale value</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Electrical damping</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Start-of-scale value without application of a pressure (‘Blind setting’)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Full-scale value without application of a pressure (‘Blind setting’)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Zero adjustment</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Current transmitter</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Fault current</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Disabling of keys, write protection</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Type of dimension and actual dimension</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Linear or square root output</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Characterizer setup</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Freely-programmable LCD</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Diagnostics functions</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

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

Diagnostic functions for DS III HART

- Zero correction for position
- Event counter
- Transmitter alarms
- Saturation alarm
- Min/Max registers
- Simulation functions
- Maintenance timer

Available physical units of display for DS III HART

Table style: Technical specifications 2

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS puts the DS III PA is in connection with 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 FF 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 PA and FF

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pushbuttons (DS III HART)</th>
<th>PROFIBUS PA and FOUNDATION Fieldbus interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical damping</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Zero adjustment (correction of position)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Key and/or function disabling</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Source of measured-value display</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Physical dimension of display</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Position of decimal point</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bus address</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Linear or square root output</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Characterizer setup</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Freely-programmable LCD</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Diagnostics functions</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III, DS III PA and DS III FF series
Technical description

Diagnostic functions for DS III PA and FF
- Event counter
- Min/Max registers
- Maintenance timer
- Simulation functions
- Zero correction for position
- Transmitter output alarms
- Saturation alarm

Physical dimensions available for the display

<table>
<thead>
<tr>
<th>Physical variable</th>
<th>Physical dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (setting can also be made in the factory)</td>
<td>MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm², kg/cm², mmH₂O, mmH₂O (4 °C), inH₂O, inH₂O (4 °C), ftH₂O (20 °C), mmHg, inHg</td>
</tr>
<tr>
<td>Level (height data)</td>
<td>m, cm, mm, ft, in, yd</td>
</tr>
<tr>
<td>Volume</td>
<td>m³, dm³, hl, yd³, ft³, in³, US gallon, Imp. gallon, bushel, barrel, barrel liquid</td>
</tr>
<tr>
<td>Volume flow</td>
<td>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</td>
</tr>
<tr>
<td>Mass flow</td>
<td>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</td>
</tr>
<tr>
<td>Total mass flow</td>
<td>t, kg, g, lb, oz, LTon, STon</td>
</tr>
<tr>
<td>Temperature</td>
<td>K, °C, °F, °R</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>%</td>
</tr>
</tbody>
</table>
### Technical specifications

#### SITRANS P, DS III series for gauge pressure

<table>
<thead>
<tr>
<th>Input</th>
<th><strong>HART</strong></th>
<th><strong>PROFIBUS PA or FOUNDATION Fieldbus</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Gauge pressure</td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15 ... 14.5 psi g (0.01 ... 1 bar g)</td>
<td>87 psi g (6 bar g)</td>
<td>14.5 psi g (1 bar g)</td>
</tr>
<tr>
<td>0.58 ... 58 psi g (0.04 ... 4 bar g)</td>
<td>145 psi g (10 bar g)</td>
<td>58 psi g (4 bar g)</td>
</tr>
<tr>
<td>2.23 ... 232 psi g (0.16 ... 16 bar g)</td>
<td>464 psi g (32 bar g)</td>
<td>232 psi g (16 bar g)</td>
</tr>
<tr>
<td>9.14 ... 914 psi g (0.6 ... 63 bar g)</td>
<td>1450 psi g (100 bar g)</td>
<td>914 psi g (63 bar g)</td>
</tr>
<tr>
<td>23.2 ... 2320 psi g (1.6 ... 160 bar g)</td>
<td>3626 psi g (250 bar g)</td>
<td>2320 psi g (160 bar g)</td>
</tr>
<tr>
<td>58 ... 5802 psi g (4.0 ... 400 bar g)</td>
<td>8700 psi g (600 bar g)</td>
<td>5802 psi g (400 bar g)</td>
</tr>
<tr>
<td>102 ... 10153 psi g (7.0 ... 700 bar g)</td>
<td>11603 psi g (800 bar g)</td>
<td>10153 psi g (700 bar g)</td>
</tr>
<tr>
<td>Lower measuring limit</td>
<td>0.435 psi a (30 mbar a)</td>
<td>0.435 psi a (30 mbar a)</td>
</tr>
<tr>
<td>Upper measuring limit</td>
<td>100% of max. span (max. 2320 psi g (160 bar g) with oxygen measurement and inert liquid)</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
<td>Digital PROFIBUS PA or FOUNDATION Fieldbus signal</td>
</tr>
<tr>
<td>• Lower limit (infinitely adjustable)</td>
<td>3.55 mA, factory preset to 3.84 mA</td>
<td>-</td>
</tr>
<tr>
<td>• Upper limit (infinitely adjustable)</td>
<td>23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA</td>
<td>-</td>
</tr>
<tr>
<td>Load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Without HART communication</td>
<td>$R_b \leq (U_H - 10.5 V)/0.023 A$ in $\Omega$</td>
<td>-</td>
</tr>
<tr>
<td>• With HART communication</td>
<td>$R_b = 230 \ldots 500 \Omega$ (SIMATIC PDM) or $R_b = 230 \ldots 1100 \Omega$ (HART Communicator)</td>
<td>-</td>
</tr>
<tr>
<td>Physical bus</td>
<td>-</td>
<td>IEC 61158-2</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference conditions</td>
<td>To EN 60770-1</td>
<td>Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F) $r$: Span ratio ($r = $ max. span/set span)</td>
</tr>
<tr>
<td>Error in measurement and fixed-point setting (including hysteresis and repeatability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Linear characteristic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- $r \leq 10$</td>
<td>$\leq (0.0029 \cdot r + 0.071)$%</td>
<td>$\leq 0.075$%</td>
</tr>
<tr>
<td>- $10 &lt; r \leq 30$</td>
<td>$\leq (0.0045 \cdot r + 0.071)$%</td>
<td></td>
</tr>
<tr>
<td>- $30 &lt; r \leq 100$</td>
<td>$\leq (0.005 \cdot r + 0.05)$%</td>
<td></td>
</tr>
<tr>
<td>Long-term drift (temperature change ±30 °C (±54 °F))</td>
<td>$\leq (0.25 \cdot r)$% every 5 years</td>
<td>$\leq 0.25$% every 5 years</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• at -10 ... +60 °C (14 ... 140 °F)</td>
<td>$\leq (0.08 \cdot r + 0.1)$% (at 10153 psi (700 bar): $\leq (0.1 \cdot r + 0.2)$%</td>
<td>$\leq 0.3$%</td>
</tr>
<tr>
<td>• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)</td>
<td>$\leq (0.1 \cdot r + 0.15)$%/10 K</td>
<td>$\leq 0.25$%/10 K</td>
</tr>
<tr>
<td>Measured Value Resolution</td>
<td>-</td>
<td>3 \cdot 10^{-5} of nominal measuring range</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for gauge pressure

SITRANS P, DS III series for gauge pressure

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection (to EN 60529)</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>Process temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with silicone oil filling</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with inert filling liquid</td>
<td>-20 ... +100 °C (-4 ... +212 °F)</td>
<td></td>
</tr>
<tr>
<td>• In conjunction with dust explosion protection</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td></td>
</tr>
<tr>
<td>Ambient conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Digital indicators</td>
<td>-30 ... +85 °C (-22 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>• Storage temperature</td>
<td>-50 ... +85 °C (-58 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>• Climatic class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Condensation</td>
<td>Permissible</td>
<td></td>
</tr>
<tr>
<td>• Electromagnetic compatibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Emitted interference and interference immunity</td>
<td>To EN 61326 and NAMUR NE 21</td>
<td></td>
</tr>
</tbody>
</table>

Design

| Weight (without options)                        | ≈ 1.5 kg (= 3.3 lb)                       |                                    |
| Housing material                                | Low copper die-cast aluminium, GD-AISi12 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 |                                    |
| • 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 or inert filling liquid (max. 2320 psi g (160 bar) with oxygen measurement) |                                    |
| Process connection                              | Connection shank G½B to DIN EN 837-1, female thread ½ -14 NPT or oval flange (PN 160 (MWP 2320 psi g)) to DIN 19213 with mounting thread M10 or 7/16-20 UNF to EN 61518 |                                    |
| Material of the mounting bracket                |                                           |                                    |
| • Steel                                         | Sheet steel, Mat. No. 1.0330, chrome-plated |                                    |
| • Stainless steel                               | Stainless steel, Mat. No. 1.4301 (SS304) |                                    |

Power supply $U_h$

| Terminal voltage on transmitter                 | 10.5 ... 45 V DC                           | Supplied through bus               |
| Separate 24 V power supply necessary            | 10.5 ... 30 V DC in intrinsically-safe mode | -                                  |
| Bus voltage                                     | -                                         | -                                  |
| • Not Ex                                        | -                                         | -                                  |
| • With intrinsically-safe operation             | -                                         | 9 ... 32 V                         |
| Current consumption                             | -                                         | 9 ... 24 V                         |
| • Basic current (max.)                          | -                                         | 12.5 mA                            |
| • Startup current ≤ basic current              | -                                         | Yes                                |
| • Max. current in event of fault               | -                                         | 15.5 mA                            |
| Fault disconnection electronics (FDE) available | -                                         | Yes                                |
### SITRANS P, DS III series for gauge pressure

**Certificate and approvals**

<table>
<thead>
<tr>
<th>Classification according to pressure equipment directive (DRGL 97/23/EC)</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explosion protection**

- **Intrinsic safety “i”**
  - **Identification**
    - PTB 99 ATEX 2122
  - **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 maximum values:
      - $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
      - $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$
    - FISCO supply unit:
      - $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$
    - Linear barrier:
      - $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$
    - $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$
  - **Effective internal inductance/capacitance**
    - $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$
    - $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

- **Explosion-proof “d”**
  - **Identification**
    - PTB 99 ATEX 1160
  - **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: $U_i = 10.5 \text{ ... 45 V DC}$
    - FISCO supply unit:
      - $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$
    - Linear barrier:
      - $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$
    - $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

- **Dust explosion protection for zone 20**
  - **Identification**
    - PTB 01 ATEX 2055
  - **Permissible ambient temperature**
    - -40 ... +85 °C (-40 ... +185 °F)
  - **Max. surface temperature**
    - 120 °C (248 °F)
  - **Connection**
    - To certified intrinsically-safe circuits with maximum values:
      - $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
      - $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$
    - FISCO supply unit:
      - $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$
    - Linear barrier:
      - $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$
    - $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

- **Dust explosion protection for zone 21/22**
  - **Identification**
    - PTB 01 ATEX 2055
  - **Permissible ambient temperature**
    - -40 ... +85 °C (-40 ... +185 °F)
  - **Max. surface temperature**
    - 120 °C (248 °F)
  - **Connection**
    - To circuits with values: $U_i = 9 \text{ ... 32 V DC}$
    - FISCO supply unit:
      - $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$
    - Linear barrier:
      - $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$
    - $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

- **Type of protection “n” (zone 2)**
  - **Identification**
    - TÜV 01 ATEX 1696 X
  - **Explosion protection to FM**
    - Certificate of Compliance 5008490
  - **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 T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

- **Explosion protection to CSA**
  - **Identification (XP/DIP) or (IS)**
    - 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
DS III series
for gauge pressure

<table>
<thead>
<tr>
<th>HART communication</th>
<th>PROFIBUS PA communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART communication</td>
<td>Simultaneous communication with master class 2 (max.)</td>
</tr>
<tr>
<td>Protocol</td>
<td>The address can be set using configuration tool or local operation (standard setting address 126)</td>
</tr>
<tr>
<td>Software for computer</td>
<td>Cyclic data usage</td>
</tr>
<tr>
<td></td>
<td>• Output byte</td>
</tr>
<tr>
<td></td>
<td>• Input byte</td>
</tr>
<tr>
<td>Internal preprocessing</td>
<td>4</td>
</tr>
<tr>
<td>Device profile</td>
<td>PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B</td>
</tr>
<tr>
<td>Function blocks</td>
<td>Function blocks</td>
</tr>
<tr>
<td>• Analog input</td>
<td>• Analog input</td>
</tr>
<tr>
<td></td>
<td>- Adaptation to customer-specific process variables</td>
</tr>
<tr>
<td></td>
<td>- Electrical damping $T_{63}$, adjustable</td>
</tr>
<tr>
<td></td>
<td>- Simulation function</td>
</tr>
<tr>
<td></td>
<td>- Failure mode</td>
</tr>
<tr>
<td></td>
<td>- Limit monitoring</td>
</tr>
<tr>
<td>• Register (totalizer)</td>
<td>Can be reset, preset, optional direction of counting, simulation function of register output</td>
</tr>
<tr>
<td></td>
<td>- Failure mode</td>
</tr>
<tr>
<td></td>
<td>- Limit monitoring</td>
</tr>
<tr>
<td>• Physical block</td>
<td>• Physical block</td>
</tr>
<tr>
<td>Transducer blocks</td>
<td>• Pressure transducer block</td>
</tr>
<tr>
<td></td>
<td>- Can be calibrated by applying two pressures</td>
</tr>
<tr>
<td></td>
<td>- Monitoring of sensor limits</td>
</tr>
<tr>
<td></td>
<td>- Characterizer</td>
</tr>
<tr>
<td></td>
<td>- Square-rooted characteristic for flow measurement</td>
</tr>
<tr>
<td></td>
<td>- Transfer function</td>
</tr>
<tr>
<td></td>
<td>- Simulation function</td>
</tr>
<tr>
<td></td>
<td>- Gradual volume suppression and implementation point of square-root extraction</td>
</tr>
<tr>
<td></td>
<td>- Simulation function for measured pressure value and sensor temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function blocks</td>
</tr>
<tr>
<td>• Analog input</td>
</tr>
<tr>
<td>- Adaptation to customer-specific process variables</td>
</tr>
<tr>
<td>- Electrical damping $T_{63}$, adjustable</td>
</tr>
<tr>
<td>- Simulation function</td>
</tr>
<tr>
<td>- Failure mode</td>
</tr>
<tr>
<td>- Limit monitoring</td>
</tr>
<tr>
<td>• PID</td>
</tr>
<tr>
<td>• Physical block</td>
</tr>
<tr>
<td>Transducer blocks</td>
</tr>
<tr>
<td>• Pressure transducer block</td>
</tr>
<tr>
<td>- Can be calibrated by applying two pressures</td>
</tr>
<tr>
<td>- Monitoring of sensor limits</td>
</tr>
<tr>
<td>- Characterizer</td>
</tr>
<tr>
<td>- Square-rooted characteristic for flow measurement</td>
</tr>
<tr>
<td>- Transfer function</td>
</tr>
<tr>
<td>- Simulation function</td>
</tr>
<tr>
<td>- Gradual volume suppression and implementation point of square-root extraction</td>
</tr>
<tr>
<td>- Simulation function for measured pressure value and sensor temperature</td>
</tr>
</tbody>
</table>
## Selection and Ordering data

### SITRANS P pressure transmitters for gauge pressure, series DS III HART

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
<td>7 MF 4 0 3 3 -</td>
</tr>
<tr>
<td>Inert liquid&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>Grease-free</td>
<td></td>
</tr>
</tbody>
</table>

### Span

- 0.15 ... 14.5 psi g (0.01 ... 1 bar g)  
- 0.58 ... 58 psi g (0.04 ... 4 bar g)  
- 2.32 ... 232 psi g (0.16 ... 16 bar g)  
- 9.14 ... 914 psi g (0.63 ... 63 bar g)  
- 23.2 ... 2320 psi g (1.6 ... 160 bar g)  
- 58.0 ... 5802 psi g (4.0 ... 400 bar g)  
- 102.0 ... 10153 psi g (7.0 ... 700 bar g)

### Wetted parts materials

#### Seal diaphragm
- Stainless steel
- Hastelloy
- Version as diaphragm seal<sup>2)</sup>

#### Process connection
- Connection shank G½B to EN 837-1
- Female thread ½-14 NPT
- Oval flange made of stainless steel
  - Mounting thread ½-14 NPT to EN 61518
  - 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>4)</sup>

### Version

- Standard version
- International version, English label inscriptions, documentation in 5 languages on CD

### Explosion protection

- Without
- With ATEX, Type of protection:
  - "Intrinsic safety (Ex ia)"
  - "Explosion-proof (Ex d)"
  - "Intrinsic safety and explosion-proof enclosure (Ex ia + Ex d)"
  - "Ex nA/nL (zone 2)"
  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"
- With FM + CSA, Type of protection:
  - "Intrinsic safety and explosion-proof (is + xp)"

### Electrical connection / cable entry

- Screwed gland Pg 13.5 (adapter)<sup>5)</sup>
- Screwed gland M20x1.5
- Screwed gland ½-14 NPT
- Han 7D plug (plastic housing) incl. mating connector<sup>7)</sup>
- M12 connector (metal)<sup>8)</sup>

---

<sup>1)</sup> For oxygen cleaning application, add Order code E10.
<sup>2)</sup> When the manufacturer’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
<sup>3)</sup> When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
<sup>4)</sup> Not together with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
<sup>5)</sup> Without cable gland, with blanking plug
<sup>6)</sup> With enclosed cable gland EEx ia and blanking plug
<sup>7)</sup> Not together with types of protection "Explosion-proof" and "Ex nA", "Intrinsic safety" and "Explosion-proof".
<sup>8)</sup> M12 delivered without cable socketsafety and explosion-proof.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal measuring range</th>
<th>Measuring cell pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5 psi g (1 bar g)</td>
<td>B</td>
</tr>
<tr>
<td>58 psi g (4 bar g)</td>
<td>C</td>
</tr>
<tr>
<td>232 psi g (16 bar g)</td>
<td>D</td>
</tr>
<tr>
<td>914 psi g (63 bar g)</td>
<td>E</td>
</tr>
<tr>
<td>2320 psi g (160 bar g)</td>
<td>F</td>
</tr>
<tr>
<td>5802 psi g (400 bar g)</td>
<td>G</td>
</tr>
<tr>
<td>10153 psi g (700 bar g)</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetted parts materials</th>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal diaphragm</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Diaphragm seal</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Process connection</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Version</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection</th>
<th>Connection shank G½B to EN 837-1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female thread ½-14 NPT</td>
</tr>
<tr>
<td></td>
<td>Oval flange made of stainless steel</td>
</tr>
<tr>
<td></td>
<td>- Mounting thread ½-14 NPT</td>
</tr>
<tr>
<td></td>
<td>- Mounting thread M11 to DIN 19213</td>
</tr>
<tr>
<td></td>
<td>- Mounting thread M12 nach DIN 19213</td>
</tr>
<tr>
<td></td>
<td>Male thread M20 x 1,5</td>
</tr>
<tr>
<td></td>
<td>Male thread ½-14 NPT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-wetted parts materials</th>
<th>Housing made of die-cast aluminium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Housing stainless steel precision casting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Version</th>
<th>Standard version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>International version, English label inscriptions, documentation in 5 languages on CD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explosion protection</th>
<th>Without</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With ATEX, Type of protection:</td>
</tr>
<tr>
<td></td>
<td>- Intrinsic safety (Ex ia)*</td>
</tr>
<tr>
<td></td>
<td>- Explosion-proof (ExE d)*</td>
</tr>
<tr>
<td></td>
<td>- Intrinsic safety and explosion-proof enclosure (Ex ia + ExE d)*</td>
</tr>
<tr>
<td></td>
<td>- Ex na/nL (zone 2)*</td>
</tr>
<tr>
<td></td>
<td>- Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + ExE d + Zone 1D/2D)* (not for DS III FF)</td>
</tr>
<tr>
<td></td>
<td>With FM + CSA, Type of protection:</td>
</tr>
<tr>
<td></td>
<td>- Intrinsic safety and explosion-proof (is + xp)*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection / cable entry</th>
<th>Screwed gland M20x1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Screwed gland ½-14 NPT</td>
</tr>
<tr>
<td></td>
<td>Plug M12 (metal)*</td>
</tr>
</tbody>
</table>

---

1) For oxygen cleaning application, add Order code E10.
2) When the manufacturer’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
3) When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
4) Without cable gland, with blanking plug.
5) With enclosed cable gland ExE ia and blanking plug.
6) M12 delivered without cable socket

© Siemens AG 2010
**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order code</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
</table>

**Further designs**
Add “-Z” to Order No. and specify Order code.

- **Pressure transmitter with mounting bracket made of:**
  - Steel
  - Stainless steel

- **Plug**
  - Han 7D (metal, gray)
  - Han 8U (instead of Han 7D)

- **Cable sockets for M12 connectors (metal)**

**Rating plate inscription**
(Instead of German)

- English
- French
- Spanish
- Italian

**English rating plate**
Pressure units in inH₂O or psi

**Quality inspection certificate** (Factory calibration) to IEC 60770-2
To EN 10204-3.1

**Acceptance test certificate**
To EN 10204-2.2

**“Functional Safety (SIL)” certificate**

**“PROFIsafe” certificate and protocol**

**Setting of upper limit of output signal to 22.0 mA**

D05

**Manufacturer’s declaration acc. to NACE**
D07

**Type of protection IP68**
D12

**Digital indicator alongside the pushbuttons**
(Only together with the devices 7MF4033-......0.6 or -A.7-Z, Y21 or Y22 + Y01)

**Supplied with oval flange**
(1 item), PTFE packing and screws in thread of oval flange

**Use in or on zone 1D/2D**
(Only together with type of protection “Intrinsic safety (EEx ia)“)

**Use on zone 0**
(Only together with type of protection “Intrinsic safety (EEx ia)“)

**Oxygen cleaning application**
(max. 1740 psi g (120 bar g) at 60°C (140 °F) for oxygen measurement and inert liquid)

**Explosion-proof “Intrinsic safety” to INMETRO (Brazil)**
(Only for transmitter 7MF4.……..-.B..)

**Explosion-proof "Intrinsic safety" to NEPSI (China)**
(Only for transmitter 7MF4.……..-.B..)

**Explosion protection "Explosion-proof” to NEPSI (China)**
(Only for transmitter 7MF4.……..-.D..)

**Explosion-proof “Zone 2“ to NEPSI (China)**
(Only for transmitter 7MF4.……..-.E..)

**Additional data**
Add “-Z” to Order No. and specify Order code.

- **Measuring range to be set**
  Specify in plain text (max. 5 digits):
  Y01: ... up to ... mbar, bar, kPa, MPa, psi

- **Measuring point number (TAG No.)**
  Max. 16 characters, specify in plain text:
  Y15: ...........

- **Measuring point text**
  Max. 27 characters, specify in plain text:
  Y16: ...........................

- **Entry of HART address (TAG)**
  Max. 8 characters, specify in plain text:
  Y17: ...........................

- **Setting of pressure indication in non-pressure units**
  Specify in plain text:
  Y22: ...... up to ...... l/min, m³/h, m, USgpm, ...

- **Setting of pressure indication in non-pressure units**
  Specify in plain text: Y25: ..................

- **Preset bus address**
  (Possible between 1 and 126)
  Specify in plain text: Y25: ..................

  Only “Y01”, “Y21”, “Y22”, “Y25” and “D05” can be factory preset

  ✓ = available

**Ordering example**
Item line: 7MF4033-1EA00-1AA7-Z
B line: A01 + Y01 + Y21
C line: Y01: 145 ... 290 psi (10 ... 20 bar)
C line: Y21: psi (bar)

1) When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

3) Preset values can only be modified over SIMATIC PDM.
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for gauge pressure

Dimensional drawings

1 Process connection:
- ½-14 NPT,
- connection shank G½B or
- oval flange
2 Blanking plug
3 Electrical connection:
- screwed gland Pg 13,5 (adapter)\(^1\) \(^2\) \(^3\),
- screwed gland M20x1,5 \(^3\),
- screwed gland ½-14 NPT or
- Han 7D/ Han 8U \(^2\) \(^3\) plug
4 Terminal side
5 Electronic side, digital display (longer overall length for cover with window)
6 Protective cover over keys
7 Mounting bracket (option)
8 Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)

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) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) Minimum distance for rotating

SITRANS P pressure transmitters, DS III HART series for gauge pressure, dimensions in mm (inch)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for gauge pressure

1 Process connection:
   - ½-14 NPT,
   - connection shank G1/2B or
   - oval flange
2 Blanking plug
3 Electrical connection:
   - screwed gland M20x1.5 4),
   - screwed gland ½-14 NPT or
   - PROFIBUS-Stecker M12 3) 4)
4 Terminal side
5 Electronic side, digital display (longer overall
   length for cover with window)
6 Protective cover over keys
7 Mounting bracket (option)
8 Screw cover - safety bracket (only for type of protection
   "Explosion-proof enclosure", not shown in the drawing)

1) Allow approx. 20 mm (0.79 inch) thread length in addition
2) Minimum distance for rotating
3) Not with type of protection "Explosion-proof enclosure"
4) Not with type of protection "FM + CSA"
5) Minimum distance for rotating

SITRANS P pressure transmitters, DS III PA and FF series for gauge pressure, dimensions in mm (inch)
## Technical specifications

### Input gauge pressure, with front-flush diaphragm

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td>Gauge pressure, flush-mounted</td>
<td>Nominal measuring range</td>
</tr>
<tr>
<td>Span</td>
<td>Max. perm. test pressure</td>
<td>Max. perm. test pressure</td>
</tr>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>87 psi g (6 bar g)</td>
<td>14.5 psi g (1 bar g)</td>
</tr>
<tr>
<td>(0.01 ... 1 bar g)</td>
<td></td>
<td>87 psi g (6 bar g)</td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>145 psi g (10 bar g)</td>
<td>58 psi g (4 bar g)</td>
</tr>
<tr>
<td>(0.04 ... 4 bar g)</td>
<td></td>
<td>145 psi g (10 bar g)</td>
</tr>
<tr>
<td>2.23 ... 232 psi g</td>
<td>464 psi g (32 bar g)</td>
<td>232 psi g (16 bar g)</td>
</tr>
<tr>
<td>(0.16 ... 16 bar g)</td>
<td></td>
<td>464 psi g (32 bar g)</td>
</tr>
<tr>
<td>9.14 ... 914 psi g</td>
<td>1450 psi g (100 bar g)</td>
<td>914 psi g (63 bar g)</td>
</tr>
<tr>
<td>(0.6 ... 63 bar g)</td>
<td></td>
<td>1450 psi g (100 bar g)</td>
</tr>
<tr>
<td>Lower measuring limit</td>
<td>-1.45 psi a (-100 mbar a)</td>
<td></td>
</tr>
<tr>
<td>Upper measuring limit</td>
<td>100% of max. span</td>
<td>100% of nominal measuring range</td>
</tr>
</tbody>
</table>

### Input absolute pressure, with front-flush diaphragm

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Absolute pressure, flush-mounted</th>
<th>Nominal measuring range</th>
<th>Max. perm. test pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure</td>
<td>Span</td>
<td>Max. perm. test pressure</td>
<td></td>
</tr>
<tr>
<td>0.62 ... 18.9 psi a</td>
<td>145 psi a (10 bar a)</td>
<td>18.9 psi a (1300 mbar a)</td>
<td></td>
</tr>
<tr>
<td>(43 ... 1300 mbar a)</td>
<td></td>
<td>435 psi a (30 bar a)</td>
<td></td>
</tr>
<tr>
<td>2.32 ... 72.5 psi a</td>
<td>436 psi a (30 bar a)</td>
<td>72.5 psi a (5 bar a)</td>
<td></td>
</tr>
<tr>
<td>(0.16 ... 5 bar a)</td>
<td></td>
<td>435 psi a (30 bar a)</td>
<td></td>
</tr>
<tr>
<td>14.5 ... 435 psi a</td>
<td>1450 psi a (100 bar a)</td>
<td>1450 psi a (100 bar a)</td>
<td></td>
</tr>
<tr>
<td>(1 ... 30 bar a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depending on the process connection, the span may differ from these values</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Output

<table>
<thead>
<tr>
<th>Output signal</th>
<th>4 ... 20 mA</th>
<th>Digital PROFIBUS PA or FOUNDATION Fieldbus signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower limit (infinitely adjustable)</td>
<td>3.55 mA, factory preset to 3.84 mA</td>
<td>-</td>
</tr>
<tr>
<td>Upper limit (infinitely adjustable)</td>
<td>23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA</td>
<td>-</td>
</tr>
</tbody>
</table>

### Load

- Without HART communication
  \[
  R_B \leq U_H / 0.023 \times 10.5 \\
  U_H: \text{Power supply in V}
  \]
- With HART communication
  \[
  R_B = 230 \ldots 500 \Omega \text{ (SIMATIC PDM) or } \text{ } R_B = 230 \ldots 1100 \Omega \text{ (HART Communicator)}
  \]

### Protection against polarity reversal

- Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.

### Accuracy

- **Linear characteristic**
  - \( r \leq 10 \)
  - \( 10 < r \leq 30 \)
  - \( 30 < r \leq 100 \)

### Reference conditions (All error data refer always refer to the set span)

- Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F) \( r \): Span ratio \( r = \text{max. span/set span} \)

- Linear characteristic
  \[
  \frac{\Delta p}{p_2} \leq \frac{0.0029 \cdot r + 0.071}{r} \%
  \]

- Long-term drift (temperature change ±30 °C (±54 °F))
  \[
  \frac{\Delta p}{p_2} \leq \frac{0.25 \cdot r}{5 \text{ years}}
  \]

© Siemens AG 2010
### SITRANS P, DS III series for gauge and absolute pressure, with front-flush diaphragm

<table>
<thead>
<tr>
<th>Influence of ambient temperature</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>• at -10 ... +60 °C (14 ... 140 °F)</td>
<td>≤ (0.1 · r + 0.2) %</td>
<td>≤ (0.2 · r + 0.3) %</td>
</tr>
<tr>
<td>• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)</td>
<td>≤ (0.1 · r + 0.15) %/10 K</td>
<td>≤ (0.2 · r + 0.3) %/10 K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Influence of mounting position</th>
<th>Measured Value Resolution</th>
<th>Influence of the medium temperature (only with front-flush diaphragm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured Value Resolution</td>
<td>0.00145 psi g (0.1 mbar g) per 10° inclination</td>
<td>0.04 psi/10 K (3 mbar/10 K)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation conditions</td>
</tr>
<tr>
<td>Ambient temperature</td>
</tr>
<tr>
<td>• Measuring cell with silicone oil</td>
</tr>
<tr>
<td>• Measuring cell with Neobee oil (with front-flush diaphragm)</td>
</tr>
<tr>
<td>• Measuring cell with inert liquid (not with front-flush diaphragm)</td>
</tr>
<tr>
<td>• Digital display</td>
</tr>
<tr>
<td>• Storage temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measuring cell with silicone oil</td>
</tr>
<tr>
<td>• Measuring cell with silicone oil (with front-flush diaphragm)</td>
</tr>
<tr>
<td>• Measuring cell with Neobee oil (with front-flush diaphragm)</td>
</tr>
<tr>
<td>• Measuring cell with silicone oil, with temperature isolator (only with front-flush diaphragm)</td>
</tr>
<tr>
<td>• Measuring cell with inert liquid</td>
</tr>
<tr>
<td>• Measuring cell with high temperature oil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (without options)</td>
</tr>
<tr>
<td>Housing material</td>
</tr>
<tr>
<td>Wetted parts materials</td>
</tr>
<tr>
<td>Measuring cell filling</td>
</tr>
<tr>
<td>Process connection</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Surface quality touched-by-media</td>
</tr>
</tbody>
</table>
## SITRANS P, DS III series for gauge and absolute pressure, with front-flush diaphragm

### Power supply $U_H$

<table>
<thead>
<tr>
<th>Power supply $U_H$</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal voltage on transmitter</td>
<td>$10.5 \ldots 45$ V DC; $10.5 \ldots 30$ V DC in intrinsically-safe mode</td>
<td>Supplied through bus</td>
</tr>
<tr>
<td>Separate 24 V power supply necessary</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>• Not Ex</td>
<td></td>
<td>$9 \ldots 32$ V</td>
</tr>
<tr>
<td>• With intrinsically-safe operation</td>
<td></td>
<td>$9 \ldots 24$ V</td>
</tr>
<tr>
<td>Current consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Basic current (max.)</td>
<td></td>
<td>$12.5$ mA</td>
</tr>
<tr>
<td>• Startup current ≤ basic current</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>• Max. current in event of fault</td>
<td></td>
<td>$15.5$ mA</td>
</tr>
<tr>
<td>Fault disconnection electronics (FDE) available</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Certificate and approvals

**Classification according to pressure equipment directive (DRG 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"**
  - Identification: PTB 99 ATEX 2122
  - Permissible ambient temperature:
    - $-40 \ldots +85$ °C ($-40 \ldots +185$ °F) temperature class T4;
    - $-40 \ldots +70$ °C ($-40 \ldots +158$ °F) temperature class T5;
    - $-40 \ldots +60$ °C ($-40 \ldots +140$ °F) temperature class T6
  - Connection:
    - To certified intrinsically-safe circuits with maximum values:
      - $U_i = 30$ V, $I_i = 100$ mA,
      - $P_i = 750$ mW, $R_i = 300$ Ω
    - FISCO supply unit:
      - $U_o = 17.5$ V, $I_o = 380$ mA, $P_o = 5.32$ W
      - Linear barrier:
        - $U_o = 24$ V, $I_o = 250$ mA, $P_o = 1.2$ W
    - Effective internal inductance/capacitance:
      - $L_i = 0.4$ mH, $C_i = 6$ nF
- **Explosion-proof "d"**
  - Identification: PTB 99 ATEX 1160
  - Permissible ambient temperature:
    - $-40 \ldots +85$ °C ($-40 \ldots +185$ °F) temperature class T4;
    - $-40 \ldots +60$ °C ($-40 \ldots +140$ °F) temperature class T6
  - Connection:
    - To circuits with values: $U_H = 10.5 \ldots 45$ V DC
    - To circuits with values: $U_H = 9 \ldots 32$ V DC
  - Effective internal inductance/capacitance:
    - $L_i = 0.4$ mH, $C_i = 6$ nF

- **Dust explosion protection for zone 20**
  - Identification: PTB 01 ATEX 2055
  - Permissible ambient temperature:
    - $120$ °C ($248$ °F)
  - Connection:
    - To certified intrinsically-safe circuits with maximum values:
      - $U_i = 30$ V, $I_i = 100$ mA,
      - $P_i = 750$ mW, $R_i = 300$ Ω
    - FISCO supply unit:
      - $U_o = 17.5$ V, $I_o = 380$ mA, $P_o = 5.32$ W
      - Linear barrier:
        - $U_o = 24$ V, $I_o = 250$ mA, $P_o = 1.2$ W
    - Effective internal inductance/capacitance:
      - $L_i = 0.4$ mH, $C_i = 6$ nF

- **Dust explosion protection for zone 21/22**
  - Identification: PTB 01 ATEX 2055
  - Permissible ambient temperature:
    - $120$ °C ($248$ °F)
  - Connection:
    - To circuits with values: $U_H = 10.5 \ldots 45$ V DC
    - To circuits with values: $U_H = 9 \ldots 32$ V DC
  - Effective internal inductance/capacitance:
    - $L_i = 0.4$ mH, $C_i = 6$ nF

- **Type of protection "n" (zone 2)**
  - Identification: TÜV 01 ATEX 1696 X
  - Permissible ambient temperature:
    - $120$ °C ($248$ °F)
  - Connection:
    - To circuits with values: $U_i = 10.5 \ldots 45$ V DC; $P_{max} = 1.2$ W
    - To circuits with values: $U_i = 9 \ldots 32$ V DC; $P_{max} = 1.2$ W
  - Planned: -

- **Explosion protection to FM**
  - Identification: Certificate of Compliance 3008490
  - Permissible ambient temperature:
    - $120$ °C ($248$ °F)
  - Connection:
    - To circuits with values: $U_i = 10.5 \ldots 45$ V DC; $P_{max} = 1.2$ W
    - To circuits with values: $U_i = 9 \ldots 32$ V DC; $P_{max} = 1.2$ W
  - Planned: -

- **Explosion protection to CSA**
  - Identification: Certificate of Compliance 1153651
  - Permissible ambient temperature:
    - $120$ °C ($248$ °F)
  - Connection:
    - To circuits with values: $U_i = 10.5 \ldots 45$ V DC; $P_{max} = 1.2$ W
    - To circuits with values: $U_i = 9 \ldots 32$ V DC; $P_{max} = 1.2$ W
  - Planned: -

**Sanitary version**

In the case of SITRANS P DS III with 7MF413x front-flush diaphragm, selected connections comply with the requirements of EHEDG.
### HART communication

<table>
<thead>
<tr>
<th><strong>HART communication</strong></th>
<th>230 ... 1100 Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protocol</strong></td>
<td>HART Version 5.x</td>
</tr>
<tr>
<td><strong>Software for computer</strong></td>
<td>SIMATIC PDM</td>
</tr>
</tbody>
</table>

### PROFIBUS PA communication

<table>
<thead>
<tr>
<th><strong>Simultaneous communication with master class 2 (max.)</strong></th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The address can be set using</strong></td>
<td>Configuration tool or local operation (standard setting address 126)</td>
</tr>
<tr>
<td><strong>Cyclic data usage</strong></td>
<td>5 (one measuring value) or 10 (two measuring values)</td>
</tr>
<tr>
<td>- <strong>Output byte</strong></td>
<td>0, 1, or 2 (register operating mode and reset function for metering)</td>
</tr>
<tr>
<td>- <strong>Input byte</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Internal preprocessing

| **Device profile** | PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B |

#### Function profile

<table>
<thead>
<tr>
<th><strong>Function blocks</strong></th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog input</strong></td>
<td>Yes, linearly rising or falling characteristic</td>
</tr>
<tr>
<td>- <strong>Adaptation to customer-specific process variables</strong></td>
<td>0 ... 100 s</td>
</tr>
<tr>
<td>- <strong>Electrical damping T63</strong></td>
<td>adjustable</td>
</tr>
<tr>
<td>- <strong>Simulation function</strong></td>
<td>Input /Output</td>
</tr>
<tr>
<td>- <strong>Failure mode</strong></td>
<td>Can be parameterized (last good value, substitute value, incorrect value)</td>
</tr>
<tr>
<td>- <strong>Limit monitoring</strong></td>
<td>Yes, one upper and lower warning limit and one alarm limit respectively</td>
</tr>
<tr>
<td><strong>Register (totalizer)</strong></td>
<td>Can be reset, preset, optional direction of counting, simulation function of register output</td>
</tr>
<tr>
<td>- <strong>Failure mode</strong></td>
<td>Can be parameterized (summation with last good value, continuous summation, summation with incorrect value)</td>
</tr>
<tr>
<td>- <strong>Limit monitoring</strong></td>
<td>One upper and lower warning limit and one alarm limit respectively</td>
</tr>
</tbody>
</table>

#### Transducer blocks

<table>
<thead>
<tr>
<th><strong>Pressure transducer block</strong></th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>- <strong>Can be calibrated by applying two pressures</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>- <strong>Monitoring of sensor limits</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>- <strong>Characterization</strong></td>
<td>Max. 30 points</td>
</tr>
<tr>
<td>- <strong>Square-rooted characteristic for flow measurement</strong></td>
<td>Parameterizable</td>
</tr>
<tr>
<td>- <strong>Gradual volume suppression and implementation point of square-root extraction</strong></td>
<td></td>
</tr>
<tr>
<td>- <strong>Simulation function for measured pressure value and sensor temperature</strong></td>
<td>Constant value or over parameterizable ramp function</td>
</tr>
</tbody>
</table>

### CommunicationFOUNDATION Fieldbus

<table>
<thead>
<tr>
<th><strong>Function blocks</strong></th>
<th>3 function blocks analog input, 1 function block PID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog input</strong></td>
<td>Yes, linearly rising or falling characteristic</td>
</tr>
<tr>
<td>- <strong>Adaptation to customer-specific process variables</strong></td>
<td>0 ... 100 s</td>
</tr>
<tr>
<td>- <strong>Electrical damping T63</strong></td>
<td>adjustable</td>
</tr>
<tr>
<td>- <strong>Simulation function</strong></td>
<td></td>
</tr>
<tr>
<td>- <strong>Failure mode</strong></td>
<td></td>
</tr>
<tr>
<td>- <strong>Limit monitoring</strong></td>
<td>Yes, one upper and lower warning limit and one alarm limit respectively</td>
</tr>
<tr>
<td><strong>PID</strong></td>
<td>Standard FF function block</td>
</tr>
<tr>
<td><strong>Physical block</strong></td>
<td>1 Resource block</td>
</tr>
<tr>
<td><strong>Transducer blocks</strong></td>
<td>1 transducer block Pressure with calibration, 1 transducer block LCD</td>
</tr>
<tr>
<td>- <strong>Pressure transducer block</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>- <strong>Can be calibrated by applying two pressures</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>- <strong>Monitoring of sensor limits</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>- <strong>Simulation function: Measured pressure value, sensor temperature, and electronics temperature</strong></td>
<td>Constant value or over parameterizable ramp function</td>
</tr>
</tbody>
</table>
## SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

### DS III series for gauge and absolute pressure, with front-flush diaphragm

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
<tr>
<td>FDA compliant fill fluid</td>
<td></td>
</tr>
<tr>
<td>• Neobee oil</td>
<td>Standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>B</td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>C</td>
</tr>
<tr>
<td>2.32 ... 232 psi g</td>
<td>D</td>
</tr>
<tr>
<td>9.14 ... 914 psi g</td>
<td>E</td>
</tr>
<tr>
<td>0.19 ... 18.9 psi a</td>
<td>F</td>
</tr>
<tr>
<td>0.7 ... 72.5 psi a</td>
<td>G</td>
</tr>
<tr>
<td>43.5 ... 435 psi a</td>
<td>H</td>
</tr>
</tbody>
</table>

#### Wetted parts materials

<table>
<thead>
<tr>
<th>Seal diaphragm</th>
<th>Connection shank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flange version with Order code M.., N.., R.. or Q..</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-wetted parts materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing made of die-cast aluminium</td>
</tr>
<tr>
<td>Housing stainless steel precision casting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version</td>
</tr>
<tr>
<td>International version, English label inscriptions, documentation in 5 languages on CD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explosion protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without</td>
</tr>
<tr>
<td>With ATEX, Type of protection:</td>
</tr>
<tr>
<td>• Intrinsic safety (EEx ia)*</td>
</tr>
<tr>
<td>• Explosion-proof (EEx d)**</td>
</tr>
<tr>
<td>• Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)**</td>
</tr>
<tr>
<td>With FM + CSA, Type of protection:</td>
</tr>
<tr>
<td>• Intrinsic safety and explosion-proof (is + xp)**</td>
</tr>
<tr>
<td>(available soon)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection / cable entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner thread M20x1.5</td>
</tr>
<tr>
<td>Female thread ½-14 NPT</td>
</tr>
<tr>
<td>M12 connectors (metal)**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without indicator</td>
</tr>
<tr>
<td>Without visible digital indicator</td>
</tr>
<tr>
<td>(digital indicator hidden, setting: mA)</td>
</tr>
<tr>
<td>With visible digital indication, setting: mA</td>
</tr>
<tr>
<td>With customer-specific digital indication (setting as specified, Order code &quot;Y21&quot; or &quot;Y22&quot; required)</td>
</tr>
</tbody>
</table>

#### Power supply units see "SITRANS I power supply units and isolation amplifiers".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

### Footnotes:
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 for flanges with option M.., N.. and Q..
3) Without cable gland, with blanking plug.
4) With enclosed cable gland EEx ia and blanking plug.
5) Cannot be used together with the following types of protection: "Explosion-proof" and "Intrinsic safety and explosion-proof".
F) Subject to export regulations AL: 9I999, ECCN: N.
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS III PA series (PROFIBUS PA)</td>
<td>7 MF 4 1 3 4 -</td>
</tr>
<tr>
<td>DS III FF series (FOUNDATION Fieldbus)</td>
<td>7 MF 4 1 3 5 -</td>
</tr>
</tbody>
</table>

**Measuring cell filling**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Filling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
<tr>
<td>FDA compliant fill fluid</td>
<td>Neobee oil Standard</td>
</tr>
</tbody>
</table>

**Nominal measuring range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Unit (psi bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15 ... 14.5 psi g</td>
<td>0.01 ... 1 bar g</td>
</tr>
<tr>
<td>0.58 ... 58 psi g</td>
<td>0.04 ... 4 bar g</td>
</tr>
<tr>
<td>2.32 ... 232 psi g</td>
<td>0.16 ... 16 bar g</td>
</tr>
<tr>
<td>9.14 ... 914 psi g</td>
<td>0.63 ... 63 bar g</td>
</tr>
<tr>
<td>0.19 ... 18.9 psi a¹</td>
<td>13 ... 1300 mbar a¹</td>
</tr>
<tr>
<td>0.7 ... 72.5 psi a¹</td>
<td>0.05 ... 5 bar a¹</td>
</tr>
<tr>
<td>43.5 ... 435 psi a¹</td>
<td>3 ... 30 bar a¹</td>
</tr>
</tbody>
</table>

**Wetted parts materials**

<table>
<thead>
<tr>
<th>Material</th>
<th>Diaphragm</th>
<th>Connection shank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Standard</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy¹</td>
<td>Stainless steel</td>
<td></td>
</tr>
</tbody>
</table>

**Process connection**

- Flange version with Order code M.., N.., R.. or Q..

**Non-wetted parts materials**

- Housing made of die-cast aluminium
- Housing stainless steel precision casting

**Version**

- Standard version
- International version, English label inscriptions, documentation in 5 languages on CD

**Explosion protection**

- Without
- With ATEX, Type of protection:
  - "Intrinsic safety (EEx ia)" B
  - "Explosion-proof (EEx d)" D
  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)" R
- With FM + CSA, Type of protection:
  - "Intrinsic safety and explosion-proof (is + xp)" NC

**Electrical connection / cable entry**

- Screwed gland M20x1.5 B
- Screwed gland ½-14 NPT C
- Han 7D plug (plastic housing) incl. mating connector D
- M12 connectors (metal) F

**Display**

- Without indicator 0
- Without visible digital indicator (digital indicator hidden, setting: mA) 1
- With visible digital display 6
- With customer-specific digital display (setting as specified, Order code “Y21” or required) 7

Available ex stock

Included in delivery of the device:
- Brief instructions (Leporelo)
- CD-ROM with detailed documentation

¹) Not with temperature decoupler P00 and P10, not for process connections R01, R02, R04, R10 abd R11, and can only be ordered in conjunction with silicone oil.
²) Only for flanges with option M.., N.. and Q..
³) Without cable gland, with blanking plug.
⁴) With enclosed cable gland EEx ia and blanking plug.
⁵) Cannot be used together with the following types of protection: „Explosion-proof“ and „Intrinsic safety and explosion-proof“
⁶) M12 delivered without cable socket.

F) Subject to export regulations AL: 9I999, ECCN: N.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add &quot;Z&quot; to Order No. and specify Order code.</td>
<td></td>
</tr>
<tr>
<td><strong>Cable sockets for M12 connectors (metal)</strong></td>
<td>A50</td>
</tr>
<tr>
<td><strong>Rating plate inscription</strong></td>
<td></td>
</tr>
<tr>
<td>(instead of German)</td>
<td></td>
</tr>
<tr>
<td>• English</td>
<td>B11</td>
</tr>
<tr>
<td>• French</td>
<td>B12</td>
</tr>
<tr>
<td>• Spanish</td>
<td>B13</td>
</tr>
<tr>
<td>• Italian</td>
<td>B14</td>
</tr>
<tr>
<td><strong>English rating plate</strong></td>
<td>B21</td>
</tr>
<tr>
<td>Pressure units in inH2O or psi</td>
<td></td>
</tr>
<tr>
<td><strong>Quality inspection certificate (Factory calibration) to IEC 60770-2</strong></td>
<td>C11</td>
</tr>
<tr>
<td><strong>Acceptance test certificate</strong></td>
<td>C12</td>
</tr>
<tr>
<td>To EN 10204-3.1</td>
<td></td>
</tr>
<tr>
<td><strong>Factory certificate</strong></td>
<td>C14</td>
</tr>
<tr>
<td>To EN 10204-2.2</td>
<td></td>
</tr>
<tr>
<td><strong>&quot;PROFIsafe&quot; certificate and protocol</strong></td>
<td>C21</td>
</tr>
<tr>
<td><strong>Flanges to EN 1092-1</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 25, PN 40</td>
<td>M11</td>
</tr>
<tr>
<td>• DN 25, PN 100</td>
<td>M21</td>
</tr>
<tr>
<td>• DN 40, PN 40</td>
<td>M13</td>
</tr>
<tr>
<td>• DN 40, PN 100</td>
<td>M23</td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>M04</td>
</tr>
<tr>
<td>• DN 50, PN 40</td>
<td>M14</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>M06</td>
</tr>
<tr>
<td>• DN 80, PN 40</td>
<td>M16</td>
</tr>
<tr>
<td><strong>Flanges to ASME B16.5</strong></td>
<td></td>
</tr>
<tr>
<td>• Stainless steel flange 1” class 150</td>
<td>M40</td>
</tr>
<tr>
<td>• Stainless steel flange 1½” class 150</td>
<td>M41</td>
</tr>
<tr>
<td>• Stainless steel flange 2” class 150</td>
<td>M42</td>
</tr>
<tr>
<td>• Stainless steel flange 3” class 150</td>
<td>M43</td>
</tr>
<tr>
<td>• Stainless steel flange 4” class 150</td>
<td>M44</td>
</tr>
<tr>
<td>• Stainless steel flange 1” class 300</td>
<td>M45</td>
</tr>
<tr>
<td>• Stainless steel flange 1½” class 300</td>
<td>M46</td>
</tr>
<tr>
<td>• Stainless steel flange 2” class 300</td>
<td>M47</td>
</tr>
<tr>
<td>• Stainless steel flange 3” class 300</td>
<td>M48</td>
</tr>
<tr>
<td>• Stainless steel flange 4” class 300</td>
<td>M49</td>
</tr>
<tr>
<td><strong>Threaded connection acc. to DIN 3852-2, Form A, Thread to ISO 228</strong></td>
<td></td>
</tr>
<tr>
<td>• G ⅜”, flush-mounted</td>
<td>R01</td>
</tr>
<tr>
<td>• G ⅜”, flush-mounted</td>
<td>R02</td>
</tr>
<tr>
<td>• G 2”, flush-mounted</td>
<td>R04</td>
</tr>
<tr>
<td><strong>Tank connection</strong></td>
<td></td>
</tr>
<tr>
<td>(Sealing is included in delivery)</td>
<td></td>
</tr>
<tr>
<td>• TG 52/50, PN 40</td>
<td>R10</td>
</tr>
<tr>
<td>• TG 52/150, PN 40</td>
<td>R11</td>
</tr>
<tr>
<td><strong>Sanitary process connection according DIN 11851 (Dairy connection)</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 25</td>
<td>N04</td>
</tr>
<tr>
<td>• DN 80, PN 25</td>
<td>N06</td>
</tr>
<tr>
<td><strong>Tri-Clamp connection according DIN 3267/ISO 2852</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 50/2”, PN 16</td>
<td>N14</td>
</tr>
<tr>
<td>• DN 65/3”, PN 10</td>
<td>N15</td>
</tr>
<tr>
<td><strong>Varivent connection</strong></td>
<td></td>
</tr>
<tr>
<td>certified to EHEDG</td>
<td></td>
</tr>
<tr>
<td>• Type N = 68 for Varivent housing DN 40 ... 125 and 1½” ... 6”, PN 40</td>
<td>N28</td>
</tr>
</tbody>
</table>

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add &quot;Z&quot; to Order No. and specify Order code.</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature decoupler up to 200 °C</strong></td>
<td>P00</td>
</tr>
<tr>
<td>for version with front-flush diaphragm</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature decoupler up to 250 °C</strong></td>
<td>P10</td>
</tr>
<tr>
<td>Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil</td>
<td></td>
</tr>
<tr>
<td><strong>Bio-Control (Neumo) sanitary connection certified to EHEDG</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>Q53</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>Q54</td>
</tr>
<tr>
<td><strong>Sanitary process connection to DRD</strong></td>
<td></td>
</tr>
<tr>
<td>• 65 mm, PN 40</td>
<td>M32</td>
</tr>
<tr>
<td><strong>SMS socket with union nut</strong></td>
<td></td>
</tr>
<tr>
<td>• 2”</td>
<td>M67</td>
</tr>
<tr>
<td>• 2½”</td>
<td>M68</td>
</tr>
<tr>
<td>• 3”</td>
<td>M69</td>
</tr>
<tr>
<td><strong>SMS threaded socket</strong></td>
<td></td>
</tr>
<tr>
<td>• 2”</td>
<td>M73</td>
</tr>
<tr>
<td>• 2½”</td>
<td>M74</td>
</tr>
<tr>
<td>• 3”</td>
<td>M75</td>
</tr>
<tr>
<td><strong>IDF socket with union nut ISO 2853</strong></td>
<td></td>
</tr>
<tr>
<td>• 2”</td>
<td>M82</td>
</tr>
<tr>
<td>• 2½”</td>
<td>M83</td>
</tr>
<tr>
<td>• 3”</td>
<td>M84</td>
</tr>
<tr>
<td><strong>IDF threaded socket ISO 2853</strong></td>
<td></td>
</tr>
<tr>
<td>• 2”</td>
<td>M92</td>
</tr>
<tr>
<td>• 2½”</td>
<td>M93</td>
</tr>
<tr>
<td>• 3”</td>
<td>M94</td>
</tr>
<tr>
<td><strong>Sanitary process connection to NEUMO Bio-Connect screw connection certified to EHEDG</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>Q05</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>Q06</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>Q07</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>Q08</td>
</tr>
<tr>
<td>• DN 2&quot;, PN 16</td>
<td>Q13</td>
</tr>
<tr>
<td>• DN 2½&quot;, PN 16</td>
<td>Q14</td>
</tr>
<tr>
<td>• DN 3&quot;, PN 16</td>
<td>Q15</td>
</tr>
<tr>
<td>• DN 4&quot;, PN 16</td>
<td>Q16</td>
</tr>
<tr>
<td><strong>Sanitary process connection to NEUMO Bio-Connect flange connection certified to EHEDG</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>Q23</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>Q24</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>Q25</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>Q26</td>
</tr>
<tr>
<td>• DN 2&quot;, PN 16</td>
<td>Q31</td>
</tr>
<tr>
<td>• DN 2½&quot;, PN 16</td>
<td>Q32</td>
</tr>
<tr>
<td>• DN 3&quot;, PN 16</td>
<td>Q33</td>
</tr>
<tr>
<td>• DN 4&quot;, PN 16</td>
<td>Q34</td>
</tr>
<tr>
<td><strong>Sanitary process connection to NEUMO Bio-Connect clamp connection certified to EHEDG</strong></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>Q39</td>
</tr>
<tr>
<td>• DN 65, PN 10</td>
<td>Q40</td>
</tr>
<tr>
<td>• DN 80, PN 10</td>
<td>Q41</td>
</tr>
<tr>
<td>• DN 100, PN 10</td>
<td>Q42</td>
</tr>
<tr>
<td>• DN 2½&quot;, PN 16</td>
<td>Q48</td>
</tr>
<tr>
<td>• DN 3&quot;, PN 10</td>
<td>Q49</td>
</tr>
<tr>
<td>• DN 4&quot;, PN 10</td>
<td>Q50</td>
</tr>
</tbody>
</table>
**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary process connection to NEUMO Connect S flange connection certified to EHEDG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>Q63</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 65, PN 10</td>
<td>Q64</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 80, PN 10</td>
<td>Q65</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 100, PN 10</td>
<td>Q66</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 2&quot;, PN 16</td>
<td>Q72</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 3&quot;, PN 10</td>
<td>Q73</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 4&quot;, PN 10</td>
<td>Q74</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Aseptic threaded socket to DIN 11864-1 Form A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 25</td>
<td>N33</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 65, PN 25</td>
<td>N34</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 80, PN 25</td>
<td>N35</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 100, PN 25</td>
<td>N36</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Aseptic flange with notch to DIN 11864-2 Form A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>N43</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>N44</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>N45</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>N46</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Aseptic flange with groove to DIN 11864-2 Form A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 16</td>
<td>N43 + P11</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 65, PN 16</td>
<td>N44 + P11</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>N45 + P11</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>N46 + P11</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Aseptic clamp with groove to DIN 11864-3 Form A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DN 50, PN 25</td>
<td>N53</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 65, PN 25</td>
<td>N54</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 80, PN 16</td>
<td>N55</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>• DN 100, PN 16</td>
<td>N56</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

---

1) Special Viton seal included in delivery.
2) Lower measuring limit 1.45 psi g (-100 mbar g).
3) The weldable socket can be ordered under accessories.
4) The maximum temperatures of the medium depend on the respective cell fillings.

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Additional data</th>
<th>Order code</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... up to ... mbar, bar, kPa, MPa, psi</td>
<td>Y01</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring point number (TAG No.) Max. 16 characters, specify in plain text: Y15: .........................</td>
<td>Y15</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Measuring point text Max. 27 characters, specify in plain text: Y16: .........................</td>
<td>Y16</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17: .........................</td>
<td>Y17</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indicator in pressure units Specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H2O*, inH2O*, ftH2O*, mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM oder % * ref. temperature 20 °C</td>
<td>Y21</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Preset bus address (possible between 1 and 126) Specify in plain text: Y25: .........................</td>
<td>Y25</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

✔ = available

**Ordering example**

Item line: 7MF4133-1DB20-1AB7-Z B line: A22 + Y01 + Y21 C line: Y01: 14.5 ... 145 psi (1 ... 10 bar) C line: Y21: psi (bar)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DSIII series for gauge and absolute pressure, with front-flush diaphragm

Dimensional drawings

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 $H_2$.

$H_1$ = Height of the SITRANS 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.

Flanges to EN and ASME

Flanges to EN

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>$H_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>40</td>
<td>115 mm (4.5&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>25</td>
<td>100</td>
<td>140 mm (5.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>150 mm (5.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>100</td>
<td>170 mm (6.7&quot;)</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>16</td>
<td>165 mm (6.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>40</td>
<td>165 mm (6.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>200 mm (7.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>200 mm (7.9&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Flanges to ASME

<table>
<thead>
<tr>
<th>ASME B16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
</tr>
<tr>
<td>1&quot;</td>
</tr>
<tr>
<td>1½&quot;</td>
</tr>
<tr>
<td>1¼&quot;</td>
</tr>
<tr>
<td>2&quot;</td>
</tr>
<tr>
<td>2½&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
</tr>
<tr>
<td>3½&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
</tr>
<tr>
<td>4¼&quot;</td>
</tr>
</tbody>
</table>

NuG and pharmaceutical connections

Connections to DIN

DIN 11851 (Dairy connection)

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>$H_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>25</td>
<td>92 mm (3.6&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>80</td>
<td>25</td>
<td>127 mm (5.0&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Tri-Clamp according DIN 32676

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>$H_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>64 mm (2.5&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>91 mm (3.6&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Other connections

Varivent connection

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>$H_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 ... 125</td>
<td>40</td>
<td>84 mm (3.3&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
</tr>
</tbody>
</table>
### SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

#### DS III series for gauge and absolute pressure, with front-flush diaphragm

<table>
<thead>
<tr>
<th>Bio-Control connection</th>
<th>50 16</th>
<th>90 mm (3.5&quot;)</th>
<th>Approx. 52 mm (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN PN ØD H₂</td>
<td>65 16</td>
<td>120 mm (4.7&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyper-Control connection to DRD</th>
<th>50 16</th>
<th>105 mm (4.1&quot;)</th>
<th>Approx. 52 mm (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN PN ØD H₂</td>
<td>65 16</td>
<td>105 mm (4.1&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>DN PN ØD H₂</th>
<th>50 16</th>
<th>92 mm (3.2&quot;)</th>
<th>Approx. 52 mm (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 16 115 mm (4.5&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 16 145 mm (5.7&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot; 16 82 mm (3.2&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2½&quot; 16 105 mm (4.1&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&quot; 16 105 mm (4.1&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot; 16 145 mm (5.7&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Sanitary connection to NEUMO Bio-Connect G½", G1" and G2" to DIN 3852

<table>
<thead>
<tr>
<th>DN PN ØD H₂</th>
<th>4&quot; 63 37 mm (1.5&quot;)</th>
<th>Approx. 45 mm (1.8&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; 63 48 mm (1.9&quot;)</td>
<td>Approx. 47 mm (1.9&quot;)</td>
<td></td>
</tr>
<tr>
<td>2&quot; 63 78 mm (3.1&quot;)</td>
<td>Approx. 52 mm (2&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

#### Tank connection TGS2/50 and TGS2/150

<table>
<thead>
<tr>
<th>DN PN ØD H₂</th>
<th>25 40 63 mm (2.5&quot;)</th>
<th>Approx. 63 mm (2.5&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 40 63 mm (2.5&quot;)</td>
<td>Approx. 170 mm (6.7&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

#### SMS socket with union nut

<table>
<thead>
<tr>
<th>DN PN ØD H₂</th>
<th>2&quot; 25 84 mm (3.3&quot;)</th>
<th>Approx. 52 mm (2.1&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½&quot; 25 100 mm (3.9&quot;)</td>
<td>Approx. 52 mm (2.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>3&quot; 25 114 mm (4.5&quot;)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SMS threaded socket

<table>
<thead>
<tr>
<th>DN PN ØD H₂</th>
<th>2&quot; 25 70 x 1/6 mm</th>
<th>Approx. 52 mm (2.1&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½&quot; 25 95 x 1/6 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&quot; 25 98 x 1/6 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### IDF socket with union nut

<table>
<thead>
<tr>
<th>DN PN ØD H₂</th>
<th>2&quot; 25 77 mm (3&quot;)</th>
<th>Approx. 52 mm (2.1&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½&quot; 25 91 mm (3.6&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&quot; 25 106 mm (4.2&quot;)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

**DS III series for gauge and absolute pressure, with front-flush diaphragm**

**IDF threaded socket**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>25</td>
<td>64 mm (2.5”)</td>
<td>Approx. 52 mm (2.1”)</td>
</tr>
<tr>
<td>2½”</td>
<td>25</td>
<td>77.5 mm (3.1”)</td>
<td></td>
</tr>
<tr>
<td>3”</td>
<td>25</td>
<td>91 mm (3.6”)</td>
<td></td>
</tr>
</tbody>
</table>

**Aseptic threaded socket to DIN 11864-1 Form A**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>25</td>
<td>78 x 1/6”</td>
<td>Approx. 52 mm (2.1”)</td>
</tr>
<tr>
<td>65</td>
<td>25</td>
<td>95 x 1/6”</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>25</td>
<td>110 x ¼”</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>25</td>
<td>130 x ¼”</td>
<td></td>
</tr>
</tbody>
</table>

**Aseptic flange with notch to DIN 11864-2 Form A**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>94</td>
<td>Approx. 52 mm (2.1”)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>159</td>
<td></td>
</tr>
</tbody>
</table>

**Aseptic flange with groove to DIN 11864-2 Form A**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>16</td>
<td>94</td>
<td>Approx. 52 mm (2.1”)</td>
</tr>
<tr>
<td>65</td>
<td>16</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>159</td>
<td></td>
</tr>
</tbody>
</table>

**Aseptic clamp with groove to DIN 11864-3 Form A**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>ØD</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>25</td>
<td>77.5</td>
<td>Approx. 52 mm (2.1”)</td>
</tr>
<tr>
<td>65</td>
<td>25</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>130</td>
<td></td>
</tr>
</tbody>
</table>
**Technical specifications**

### SITRANS P, DS III series for absolute pressure (gauge construction)

<table>
<thead>
<tr>
<th>Input</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Span</td>
<td>Max. perm. test pressure</td>
<td></td>
</tr>
<tr>
<td>0.12 ... 3.6 psi a</td>
<td>87 psi a</td>
<td>3.6 psi a</td>
</tr>
<tr>
<td>(8.3 ... 250 mbar a)</td>
<td>(6 bar)</td>
<td>(250 mbar a)</td>
</tr>
<tr>
<td>0.62 ... 18.9 psi a</td>
<td>145 psi a</td>
<td>18.9 psi a</td>
</tr>
<tr>
<td>(43 ... 1300 mbar a)</td>
<td>(10 bar)</td>
<td>(1300 mbar a)</td>
</tr>
<tr>
<td>2.32 ... 72.5 psi a</td>
<td>435 psi a</td>
<td>72.5 psi a</td>
</tr>
<tr>
<td>(160 ... 5000 mbar a)</td>
<td>(5 bar)</td>
<td>(5 bar a)</td>
</tr>
<tr>
<td>14.5 ... 435 psi a</td>
<td>1450 psi a</td>
<td>435 psi a</td>
</tr>
<tr>
<td>(1 ... 30 bar a)</td>
<td>(100 bar a)</td>
<td>(30 bar a)</td>
</tr>
<tr>
<td>Lower measuring limit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring cell with silicone oil filling</td>
<td>0 psi a (0 mbar a)</td>
<td></td>
</tr>
<tr>
<td>Upper measuring limit</td>
<td>100% of max. span</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
<td>Digital PROFIBUS PA or FOUNDATION Fieldbus signal</td>
</tr>
<tr>
<td>Lower limit (infinitely adjustable)</td>
<td>3.55 mA, factory preset to 3.84 mA</td>
<td>-</td>
</tr>
<tr>
<td>Upper limit (infinitely adjustable)</td>
<td>23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA</td>
<td>-</td>
</tr>
<tr>
<td>Load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without HART communication</td>
<td>$R_B \leq \left(\frac{U_H - 10.5 V}{12} \right) \frac{0.023 A}{\Omega}$</td>
<td>-</td>
</tr>
<tr>
<td>With HART communication</td>
<td>$R_B = 230 \ldots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \ldots 1100 \Omega$ (HART Communicator)</td>
<td>-</td>
</tr>
<tr>
<td>Physical bus</td>
<td></td>
<td>IEC 61158-2</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference conditions</td>
<td>To EN 60770-1</td>
<td></td>
</tr>
<tr>
<td>(All error data refer always refer to the set span)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)) $r$: Span ratio ($r = \text{max. span} / \text{set span}$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear characteristic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- $r \leq 10$</td>
<td>$\leq 0.1 %$</td>
<td>$\leq 0.1 %$</td>
</tr>
<tr>
<td>- 10 $&lt; r \leq 30$</td>
<td>$\leq 0.2 %$</td>
<td>$\leq 0.1 % / \text{year}$</td>
</tr>
<tr>
<td>Long-term drift (temperature change $\pm 30 ^\circ \text{C}$ (±54 °F))</td>
<td></td>
<td>$\leq 0.1 % / \text{year}$</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td></td>
<td>$\leq 0.1 % / \text{year}$</td>
</tr>
<tr>
<td>- at -10 ... +60 °C (14 ... 140 °F)</td>
<td></td>
<td>$\leq 0.3 %$</td>
</tr>
<tr>
<td>- at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)</td>
<td></td>
<td>$\leq 0.25 % / 10 \text{K}$</td>
</tr>
<tr>
<td>Measured Value Resolution</td>
<td></td>
<td>$3 \cdot 10^{-5}$ of nominal measuring range</td>
</tr>
</tbody>
</table>
# SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

## DS III series for absolute pressure (gauge construction)

### SITRANS P, DS III series for absolute pressure (gauge construction)

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection (to EN 60529)</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>Process temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with silicone oil filling</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with inert filling liquid</td>
<td>-20 ... +100 °C (-4 ... +212 °F)</td>
<td></td>
</tr>
<tr>
<td>• In conjunction with dust explosion protection</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td></td>
</tr>
</tbody>
</table>

### Ambient conditions

- **Ambient temperature**
  - Digital indicators: -30 ... +85 °C (-22 ... +185 °F)
  - Storage temperature: -50 ... +85 °C (-58 ... +185 °F)
  - Climatic class: Permissible
  - Condensation: Permissible
  - Emitted interference and interference immunity: To EN 61326 and NAMUR NE 21

### Design

- **Weight (without options)**: ≈ 1.5 kg (≈ 3.3 lb)
- **Housing material**: Low copper die-cast aluminium, GD-AISi12 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
  - **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 or inert filling liquid (max. 2320 psi a (160 bar a) with oxygen measurement)
- **Process connection**
  - Connection shank G½B to DIN EN 837-1, female thread ½ -14 NPT or oval flange (PN 160 (MWP 2320 psi a)) to DIN 19213 with mounting thread M10 or 7/16-20 UNF to EN 61518
  - Material of the mounting bracket: Steel (Sheet steel, Mat. No. 1.0330, chrome-plated) or Stainless steel (Stainless steel, Mat. No. 1.4301 (SS304))

### Power supply $U_i$

- **Terminal voltage on transmitter**: 10.5 ... 45 V DC
  - 10.5 ... 30 V DC in intrinsically-safe mode
- **Separate 24 V power supply necessary**: No
- **Bus voltage**: 9 ... 32 V
- **Current consumption**
  - Basic current (max.): 12.5 mA
  - Startup current ≤ basic current: Yes
  - Max. current in event of fault: 15.5 mA
  - Fault disconnection electronics (FDE) available: Yes

---

© Siemens AG 2010
# Certificate and approvals

<table>
<thead>
<tr>
<th>Classification according to pressure equipment directive (DRGL 97/23/EC)</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Explosion protection

- **Intrinsic safety "i"**
  - Identification: PTB 99 ATEX 2122
  - Permissible ambient temperature:
    - To certified intrinsically-safe circuits with maximum values:
      - \( U_i = 30 \text{ V}, I_i = 100 \text{ mA} \)
      - \( P_i = 750 \text{ mW}, R_i = 300 \Omega \)
    - Effective internal inductance/capacitance:
      - \( L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF} \)
  - FISCO supply unit:
    - \( U_o = 17.5 \text{ V}, I_o = 380 \text{ mA}, P_o = 5.32 \text{ W} \)
    - Linear barrier:
      - \( U_o = 24 \text{ V}, I_o = 250 \text{ mA}, P_o = 1.2 \text{ W} \)
      - \( L_i = 7 \mu\text{H}, C_i = 1.1 \text{ nF} \)

- **Explosion-proof "d"**
  - Identification: PTB 99 ATEX 1160
  - Permissible ambient temperature:
    - -40 ... +85 °C (-40 ... +185 °F)
    - -40 ... +60 °C (-40 ... +140 °F)
  - Connection:
    - To circuits with values: \( U_i = 10.5 \ldots 45 \text{ V DC} \)
    - FISCO supply unit:
      - \( U_o = 17.5 \text{ V}, I_o = 380 \text{ mA}, P_o = 5.32 \text{ W} \)
      - Linear barrier:
        - \( U_o = 24 \text{ V}, I_o = 250 \text{ mA}, P_o = 1.2 \text{ W} \)
        - \( L_i = 7 \mu\text{H}, C_i = 1.1 \text{ nF} \)

- **Dust explosion protection for zone 20**
  - Identification: PTB 01 ATEX 2055
  - Permissible ambient temperature:
    - -40 ... +85 °C (-40 ... +185 °F)
  - Max. surface temperature:
    - 120 °C (248 °F)
  - Connection:
    - To circuits with values: \( U_i = 10.5 \ldots 45 \text{ V DC} \)
    - FISCO supply unit:
      - \( U_o = 17.5 \text{ V}, I_o = 380 \text{ mA}, P_o = 5.32 \text{ W} \)
      - Linear barrier:
        - \( U_o = 24 \text{ V}, I_o = 250 \text{ mA}, P_o = 1.2 \text{ W} \)
        - \( L_i = 7 \mu\text{H}, C_i = 1.1 \text{ nF} \)

- **Type of protection "n" (zone 2)**
  - Identification: TÜV 01 ATEX 1696 X
  - Connection:
    - To circuits with values: \( U_i = 10.5 \ldots 45 \text{ V DC} \), \( P_{\text{max}} = 1.2 \text{ W} \)
    - To circuits with values: \( U_i = 9 \ldots 32 \text{ V DC} \), \( P_{\text{max}} = 1.2 \text{ W} \)

## Identification (XP/DIP) or (IS); (NI)

- **Exploration 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 T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

## Certificate of Compliance

- **Examination**
  - Certificate of Compliance 1153651

- **Identification (XP/DIP) or (IS); (NI)**
  - 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

---

SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for absolute pressure (gauge construction)
### DS III series for absolute pressure (gauge construction)

<table>
<thead>
<tr>
<th><strong>HART communication</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HART communication</td>
<td>230 ... 1100 Ω</td>
</tr>
<tr>
<td>Protocol</td>
<td>HART Version 5.x</td>
</tr>
<tr>
<td>Software for computer</td>
<td>SIMATIC PDM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PROFIBUS PA communication</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Simultaneous communication with master class 2 (max.)</td>
<td>4</td>
</tr>
<tr>
<td>The address can be set using</td>
<td>Configuration tool or local operation (standard setting address 126)</td>
</tr>
<tr>
<td>Cyclic data usage</td>
<td></td>
</tr>
<tr>
<td>Output byte</td>
<td>5 (one measuring value) or 10 (two measuring values)</td>
</tr>
<tr>
<td>Input byte</td>
<td>0, 1, or 2 (register operating mode and reset function for metering)</td>
</tr>
<tr>
<td>Internal preprocessing</td>
<td></td>
</tr>
<tr>
<td>Device profile</td>
<td>PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B</td>
</tr>
</tbody>
</table>

| Function blocks | 2 |
| Analog input |  |
| - Adaptation to customer-specific process variables | Yes, linearly rising or falling characteristic |
| - Electrical damping $T_{63}$, adjustable | 0 ... 100 s |
| - Simulation function | Input/Output |
| - Failure mode | Can be parameterized (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| Register (totalizer) |  |
| - Failure mode | Can be parameterized (summation with last good value, continuous summation, summation with incorrect value) |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| Physical block | 1 |
| Transducer blocks | 1 |
| Pressure transducer block |  |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Characterizer | Max. 30 points |
| - Square-rooted characteristic for flow measurement | Yes |
| - Gradual volume suppression and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or over parameterizable ramp function |

### Communication FOUNDATION Fieldbus

| Function blocks | 3 function blocks analog input, 1 function block PID |
| Analog input | Yes, linearly rising or falling characteristic |
| - Adaptation to customer-specific process variables | |
| - Electrical damping $T_{63}$, adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Can be parameterized (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic for flow measurement | Yes |
| PID | Standard FF function block |
| Physical block | 1 Resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| Pressure transducer block |  |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: Measured pressure value, sensor temperature and electronics temperature | Constant value or over parameterizable ramp function |
### SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

**DS III series for absolute pressure** (gauge construction)

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS P pressure transmitters for absolute pressure, from the pressure series DS III HART</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MF 4 2 3 3</td>
<td></td>
</tr>
</tbody>
</table>

#### Measuring cell filling

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

#### Span

<table>
<thead>
<tr>
<th>Span</th>
<th>Measuring cell filling</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 ... 3.63 psi a</td>
<td>(8.3 ... 250 mbar a)</td>
</tr>
<tr>
<td>0.62 ... 18.9 psi a</td>
<td>(43 ... 1300 mbar a)</td>
</tr>
<tr>
<td>2.32 ... 72.5 psi a</td>
<td>(0.16 ... 5 bar a)</td>
</tr>
<tr>
<td>14.5 ... 435 psi a</td>
<td>(1 ... 30 bar a)</td>
</tr>
</tbody>
</table>

#### Wetted parts materials

<table>
<thead>
<tr>
<th>Wetted parts materials</th>
<th>Seal diaphragm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Hastelloy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Version</th>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version</td>
<td>Connection shank G½B to EN 837-1</td>
</tr>
<tr>
<td>International version, English label inscriptions, documentation in 5 languages on CD</td>
<td></td>
</tr>
</tbody>
</table>

#### Explosion protection

- Without
- With ATEX, Type of protection:
  - "Intrinsic safety (EEx ia)"
  - "Explosion-proof (EEx d)"
  - "Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)"
  - "Ex nA/nL (zone 2)"
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)"
- "With FM + CSA, Type of protection:
  - "Intrinsic safety and explosion-proof (is + xp)"

#### Electrical connection / cable entry

- Screwed gland Pg 13.5
- Screwed gland M20x1.5
- Screwed gland ½-14 NPT
- Han 7D plug (plastic housing) incl. mating connector
- Plug M12 (metal)

---

© Siemens AG 2010

*SITRANS I power supply units and isolation amplifiers.*

**Available ex stock**

Factory-mounting of shut-off valves and valve manifolds see page 2/136.

Included in delivery of the device:
- Brief instructions (Leiporelo)
- CD-ROM with detailed documentation

---

1) For oxygen cleaning application, add Order code E10.
2) Version 7MF4233-1DY... only up to max. span 2.9 psi a (200 mbar a)
3) When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
4) When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
5) Not together 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) Not together with types of protection “Explosion-proof” and “Ex nA”, “Intrinsic safety” and “Explosion-proof”.
9) M12 delivered without cable socket.
F) Subject to export regulations AL: 91999, ECCN: N.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS P pressure transmitters for absolute pressure (from the gauge pressure series)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DS III PA series (PROFIBUS PA)</td>
</tr>
<tr>
<td></td>
<td>DS III FF series (FOUNDATION Fieldbus)</td>
</tr>
<tr>
<td>F) 7 MF 4 2 3 4 -</td>
<td><strong>Display</strong></td>
</tr>
<tr>
<td>F) 7 MF 4 2 3 5 -</td>
<td></td>
</tr>
</tbody>
</table>

#### Measuring cell filling
- Silicone oil: Standard 1
- Inert liquid\(^1\): Grease-free 3

#### Nominal measuring range
- 3.63 psi a (250 mbar a) D
- 18.9 psi a (1300 mbar a) F
- 72.5 psi a (5 bar a) G
- 435 psi a (30 bar a) H

#### Wetted parts materials
- Seal diaphragm: Process connection F)
- Stainless steel: Stainless steel A
- Hastelloy: Stainless steel B
- Hastelloy: Hastelloy C
- Version as diaphragm seal\(^2\)(\(^3\)(\(^4\))): Y

#### Process connection
- Connection shank G½B to EN 837-1 0
- Female thread ½-14 NPT 1
- Oval flange made of stainless steel 2
  - Mounting thread G½B-20 UNF to EN 61518 3
  - Mounting thread M10 to DIN 19213 5
- Male thread M20 x 1.5 6
- Male thread ½-14 NPT 7

#### Non-wetted parts materials
- Housing made of die-cast aluminium 0
- Housing stainless steel precision casting 3

#### Version
- Standard version 1
- International version, English label inscriptions, documentation in 5 languages on CD 2

#### Explosion protection
- Without  A
- With ATEX, Type of protection:  
  - "Intrinsic safety (Ex ia)" B
  - "Ex-proof (Ex d)" D
  - "Intrinsic safety and explosion-proof enclosure (Ex ia + Ex d)" P
  - "Ex nA/nL (zone 2)" E
  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" NC
- With FM + CSA, Type of protection:  
  - "Intrinsic safety and explosion-proof (is + xp)" NC

#### Electrical connection / cable entry
- Screwed gland M20x1.5  B
- Screwed gland ½-14 NPT C
- Plug M12 incl. mating connector  F

---

\(^1\) For oxygen cleaning application, add Order code E10.

\(^2\) Version 7MF4233-1DY... only up to max. span 2.9 psi a (200 mbar a).

\(^3\) When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

\(^4\) When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

\(^5\) Without cable gland, with blanking plug.

\(^6\) With enclosed cable gland Ex ia and blanking plug.

\(^7\) M12 delivered without cable socket.

---

© Siemens AG 2010
Selection and Ordering data

Order code

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further designs</td>
<td>HART</td>
</tr>
<tr>
<td>Add &quot;-Z&quot; to Order No. and specify Order code.</td>
<td></td>
</tr>
<tr>
<td>Pressure transmitter with mounting bracket made of:</td>
<td></td>
</tr>
<tr>
<td>• Steel</td>
<td>A01</td>
</tr>
<tr>
<td>• Stainless steel</td>
<td>A02</td>
</tr>
<tr>
<td>Plug</td>
<td></td>
</tr>
<tr>
<td>• Han 7D (metal, gray)</td>
<td>A30</td>
</tr>
<tr>
<td>• Han 8U (instead of Han 7D)</td>
<td>A31</td>
</tr>
<tr>
<td>Cable sockets for M12 connectors (metal)</td>
<td>A50</td>
</tr>
<tr>
<td>Rating plate inscription (instead of German)</td>
<td></td>
</tr>
<tr>
<td>• English</td>
<td>B11</td>
</tr>
<tr>
<td>• French</td>
<td>B12</td>
</tr>
<tr>
<td>• Spanish</td>
<td>B13</td>
</tr>
<tr>
<td>• Italian</td>
<td>B14</td>
</tr>
<tr>
<td>English rating plate</td>
<td>B21</td>
</tr>
<tr>
<td>Pressure units in inH₂O or psi</td>
<td></td>
</tr>
<tr>
<td>Quality inspection certificate (Factory calibration) to IEC 60770-2</td>
<td>C11</td>
</tr>
<tr>
<td>Acceptance test certificate</td>
<td>C12</td>
</tr>
<tr>
<td>To EN 10204-3.1</td>
<td></td>
</tr>
<tr>
<td>Factory certificate</td>
<td>C14</td>
</tr>
<tr>
<td>To EN 10204-2.2</td>
<td></td>
</tr>
<tr>
<td>&quot;Functional Safety (SIL)&quot; certificate</td>
<td>C20</td>
</tr>
<tr>
<td>&quot;PROFIsafe&quot; certificate and protocol</td>
<td>C21</td>
</tr>
<tr>
<td>Setting of upper limit of output signal to 22.0 mA</td>
<td>D05</td>
</tr>
<tr>
<td>Manufacturer's declaration acc. to NACE</td>
<td>D07</td>
</tr>
<tr>
<td>Type of protection IP68 (only for M20x1.5 and ½-14 NPT)</td>
<td>D12</td>
</tr>
<tr>
<td>Digital indicator alongside the pushbuttons (only together with the devices 7MF4233-. . .-O-A, 6 or -. A, 7-Z, Y21 or Y22 + Y01).</td>
<td>D27</td>
</tr>
<tr>
<td>Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange</td>
<td>D37</td>
</tr>
<tr>
<td>Use in or on zone 1D/2D (only together with type of protection &quot;Intrinsic safety (EEx-ia)&quot;)</td>
<td>E01</td>
</tr>
<tr>
<td>Use on zone 0 (only together with type of protection &quot;Intrinsic safety (EEx-ia)&quot;)</td>
<td>E02</td>
</tr>
<tr>
<td>Oxygen cleaning application (max. 1740 psi a (120 bar a) at 60 °C (140 °F) with oxygen measurement and inert liquid)</td>
<td>E10</td>
</tr>
<tr>
<td>Explosion-proof &quot;Intrinsic safety&quot; to INMETRO (Brazil) (only for transmitter 7MF4...-....-.B..)</td>
<td>E25</td>
</tr>
<tr>
<td>Explosion-proof &quot;Intrinsic safety&quot; to NEPSI (China) (only for transmitter 7MF4...-....-.B..)</td>
<td>E55</td>
</tr>
<tr>
<td>Explosion protection &quot;Explosion-proof&quot; to NEPSI (China) (only for transmitter 7MF4...-....-.D..)</td>
<td>E56</td>
</tr>
<tr>
<td>Explosion-proof &quot;Zone 2&quot; to NEPSI (China) (only for transmitter 7MF4...-....-.E..)</td>
<td>E57</td>
</tr>
</tbody>
</table>

Selection and Ordering data

Order code

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional data</td>
<td>HART</td>
</tr>
<tr>
<td>Add &quot;-Z&quot; to Order No. and specify Order code.</td>
<td></td>
</tr>
<tr>
<td>Measuring range to be set</td>
<td>Y01</td>
</tr>
<tr>
<td>Specify in plain text (max. 5 digits): Y01: ... up to ... mbar, bar, kPa, MPa, psi</td>
<td></td>
</tr>
<tr>
<td>Measuring point number (TAG No.)</td>
<td>Y15</td>
</tr>
<tr>
<td>Max. 16 characters, specify in plain text: Y15: ........................................</td>
<td></td>
</tr>
<tr>
<td>Measuring point text</td>
<td>Y16</td>
</tr>
<tr>
<td>Max. 27 characters, specify in plain text: Y16: ........................................</td>
<td></td>
</tr>
<tr>
<td>Entry of HART address (TAG)</td>
<td>Y17</td>
</tr>
<tr>
<td>Max. 8 characters, specify in plain text: Y17: ........................................</td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indication in pressure units</td>
<td>Y21</td>
</tr>
<tr>
<td>Specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ...</td>
<td></td>
</tr>
<tr>
<td>Note: The following pressure units can be selected: bar, mbar, mm H₂O*, inH₂O*, ftH₂O*, kg/cm², Torr, ATM oder % *) ref. temperature 20 °C</td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indication in non-pressure units</td>
<td>Y22 + Y01</td>
</tr>
<tr>
<td>Specify in plain text: Y22: ... up to ... l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units &quot;Y01&quot; is essential, unit with max. 5 characters)</td>
<td></td>
</tr>
<tr>
<td>Preset bus address (possible between 1 and 126)</td>
<td>Y25</td>
</tr>
<tr>
<td>Specify in plain text: Y25: ........................................</td>
<td></td>
</tr>
</tbody>
</table>

Only "Y01", "Y21", "Y22", "Y25" and "D05" can be factory preset

= available

1) When the manufacturer’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) While the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

3) Preset values can only be modified over SIMATIC PDM.
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for absolute pressure
(gauge construction)

### Dimensional drawings

1. Process connection:
   - ½-14 NPT,
   - connection shank G½B or
   - oval flange
2. Blanking plug
3. Electrical connection:
   - screwed gland Pg 13,5 (adapter)\(2\)\(3\),
   - screwed gland M20x1,5 \(3\),
   - screwed gland ½-14 NPT or
   - Han 7D/ Han 8U \(2\)\(3\) plug
4. Terminal side
5. Electronic side, digital display (longer overall length for cover with window)
6. Protective cover over keys
7. Mounting bracket (option)
8. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)

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 + x)"
4) For Pg 13.5 with adapter approx. 45 mm (1.77 inch)
5) Minimum distance for rotating

SITRANS P pressure transmitters, DS III HART series for absolute pressure, from the pressure series, dimensions in mm (inch)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for absolute pressure (gauge construction)

1 Process connection:
- ½-14 NPT,
- connection shank G½B or
- oval flange

2 Blanking plug

3 Electrical connection:
- screwed gland M20x1,5 4),
- screwed gland ½-14 NPT or
- PROFIBUS-Stecker M12 3) 4)

4 Terminal side

5 Electronic side, digital display (longer overall length for cover with window)

6 Protective cover over keys

7 Mounting bracket (option)

8 Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)

1) Allow approx. 20 mm (0.79 inch) thread length in addition
2) Minimum distance for rotating
3) Not with type of protection "Explosion-proof enclosure"
4) Not with type of protection "FM + CSA"
5) Minimum distance for rotating

SITRANS P pressure transmitters, DS III PA and FF series for absolute pressure, from the pressure series, dimensions in mm (inch)
## Technical specifications

### SITRANS P, DS III series for absolute pressure (differential construction)

#### Input

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Absolute pressure</td>
<td></td>
</tr>
<tr>
<td>Span</td>
<td>Maximum working pressure</td>
<td>Nominal measuring range</td>
</tr>
<tr>
<td>0.12 ... 3.6 psi a (8.3 ... 250 mbar a)</td>
<td>464 psi a (32 bar a)</td>
<td>3.6 psi a (250 mbar a)</td>
</tr>
<tr>
<td>0.62 ... 18.9 psi a (43 ... 1300 mbar a)</td>
<td>464 psi a (32 bar a)</td>
<td>18.9 psi a (1300 mbar a)</td>
</tr>
<tr>
<td>2.32 ... 72.5 psi a (160 ... 5000 mbar a)</td>
<td>464 psi a (32 bar a)</td>
<td>72.5 psi a (5 bar a)</td>
</tr>
<tr>
<td>14.5 ... 435 psi a (1 ... 30 bar a)</td>
<td>2320 psi a (160 bar a)</td>
<td>435 psi a (30 bar a)</td>
</tr>
<tr>
<td>77 ... 1450 psi a (5.3 ... 100 bar a)</td>
<td>2320 psi a (160 bar a)</td>
<td>1450 psi a (100 bar a)</td>
</tr>
</tbody>
</table>

#### Lower measuring limit

- Measuring cell with silicone oil filling: 0 psi a (0 mbar a)

#### Upper measuring limit

- 100% of max. span

### Output

<table>
<thead>
<tr>
<th>Output signal</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower limit (infinitely adjustable)</td>
<td>4 ... 20 mA</td>
<td>Digital PROFIBUS PA or FOUNDATION Fieldbus signal</td>
</tr>
<tr>
<td>Upper limit (infinitely adjustable)</td>
<td>3.55 mA, factory preset to 3.84 mA</td>
<td></td>
</tr>
<tr>
<td>23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Load

- Without HART communication: 
  \[ R_B \leq \left( \frac{U_H - 10.5 V}{0.023 A} \right) \] in Ohms
  - \( U_H \): Power supply in V
- With HART communication: 
  \[ R_B = 230 \ldots 500 \Omega \text{ (SIMATIC PDM)} \] or 
  \[ R_B = 230 \ldots 1100 \Omega \text{ (HART Communicator)} \]

#### 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.

### Accuracy

#### Reference conditions (All error data refer always refer to the set span)

#### Error in measurement and fixed-point setting (including hysteresis and repeatability)

- Linear characteristic:
  - \( r \leq 10 \): \( \leq 0.1 \% \)
  - \( 10 < r \leq 30 \): \( \leq 0.2 \% \)

#### Long-term drift (temperature change \( \pm 30 ^\circ C \) (\( \pm 54 ^\circ F \))

\( \leq (0.1 \cdot r) \% / \text{year} \)

#### Influence of ambient temperature

- at \(-10 ... +60 ^\circ C \) (\(14 ... 140 ^\circ F \))
- \( \leq (0.1 \cdot r + 0.2) \%
- at \(-40 ... -10 ^\circ C \) and \(+60 ... +85 ^\circ C \)
  \(-40 ... +14 ^\circ F \) and \(+140 ... +185 ^\circ F \))
- \( \leq (0.1 \cdot r + 0.15) \% / 10 K \)
- \( \leq 0.25 \% / 10 K \)

#### Measured Value Resolution

- \( 3 \cdot 10^{-5} \) of nominal measuring range
## Rated operating conditions

<table>
<thead>
<tr>
<th>Degree of protection (to EN 60529)</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process temperature</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with silicone oil filling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with inert filling liquid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• In conjunction with dust explosion protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Digital indicators</td>
<td>-30 °C to +85 °C (-22 °F to +185 °F)</td>
<td>To EN 61326 and NAMUR NE 21</td>
</tr>
<tr>
<td>• Storage temperature</td>
<td>-50 °C to +85 °C (-58 °F to +185 °F)</td>
<td></td>
</tr>
<tr>
<td>• Climatic class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Condensation</td>
<td>Permissible</td>
<td></td>
</tr>
<tr>
<td>• Electromagnetic compatibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Emitted interference and interference immunity</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (without options)</td>
<td>≈ 4.5 kg (~ 9.9 lb)</td>
<td></td>
</tr>
<tr>
<td>Housing material</td>
<td>Low copper die-cast aluminium, GD-AISi12 or stainless steel precision casting, mat. No. 1.4408</td>
<td></td>
</tr>
<tr>
<td>Wetted parts materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Seal diaphragm</td>
<td>Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819, Monel, mat. No. 2.4360, tantalum or gold</td>
<td></td>
</tr>
<tr>
<td>• Process flanges and sealing screw</td>
<td>Stainless steel, mat. No. 1.4408, Hastelloy C4, mat. No. 2.4610 or Monel, mat. No. 2.4360</td>
<td></td>
</tr>
<tr>
<td>• O-Ring</td>
<td>FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR</td>
<td></td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Silicone oil or inert filling liquid (max. 2320 psi a (160 bar) with oxygen measurement)</td>
<td></td>
</tr>
<tr>
<td>Process connection</td>
<td>¼-18 NPT and flange connection to DIN 19213 with mounting thread M10 to DIN 19213 or 7/16-20 UNF to EN 61518</td>
<td></td>
</tr>
<tr>
<td>Material of the mounting bracket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Steel</td>
<td>Sheet steel, Mat. No. 1.0330, chrome-plated</td>
<td></td>
</tr>
<tr>
<td>• Stainless steel</td>
<td>Stainless steel, Mat. No. 1.4301 (SS304)</td>
<td></td>
</tr>
<tr>
<td><strong>Power supply $U_{H}$</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal voltage on transmitter</td>
<td>10.5 ... 45 V DC</td>
<td>Supplied through bus</td>
</tr>
<tr>
<td>Separate 24 V power supply necessary</td>
<td>No</td>
<td>-</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>• Not Ex</td>
<td>9 ... 32 V</td>
<td>No</td>
</tr>
<tr>
<td>• With intrinsically-safe operation</td>
<td>9 ... 24 V</td>
<td>No</td>
</tr>
<tr>
<td>Current consumption</td>
<td>12.5 mA</td>
<td>Yes</td>
</tr>
<tr>
<td>• Basic current (max.)</td>
<td>15.5 mA</td>
<td>Yes</td>
</tr>
<tr>
<td>• Startup current s basic current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Max. current in event of fault</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault disconnection electronics (FDE) available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Certificate and approvals

Classification according to pressure equipment directive (DRGL 97/23/EC)

Explosion protection
• Intrinsic safety "i"
  - Identification
    Ex II 1/2 G Ex ia IIB/IIC T6
  - 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 maximum values:
    \[ U_i = 30 \text{ V}, \ i = 100 \text{ mA}, \ R_i = 750 \text{ mW} \]
    with resistive load:
    \[ R_i = 300 \text{Ω} \]
    - Effective internal inductance/capacitance
    \[ L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF} \]

• Explosion-proof "d"
  - Identification
    Ex II 1/2 G Ex d IIC T4/T6
  - 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:
    \[ U_H = 10.5 \text{ ... 45 V DC} \]
    To circuits with values:
    \[ U_H = 9 \text{ ... 32 V DC} \]
    - FISCO supply unit:
      \[ U_o = 17.5 \text{ V}, i_o = 380 \text{ mA}, P_o = 5.32 \text{ W} \]
    - Linear barrier:
      \[ U_o = 24 \text{ V}, i_o = 250 \text{ mA}, P_o = 1.2 \text{ W} \]
    - Effective internal inductance/capacitance
      \[ L_i = 7 \text{ μH}, C_i = 1.1 \text{ nF} \]

• Dust explosion protection for zone 20
  - Identification
    Ex II 1/2 D Ex ip 65 T 120 °C
  - Permissible ambient temperature
    -40 ... +85 °C (-40 ... +185 °F)
  - Max. surface temperature
    120 °C (248 °F)
  - Connection
    To certified intrinsically-safe circuits with maximum values:
    \[ U_i = 30 \text{ V}, i = 100 \text{ mA}, \ R_i = 750 \text{ mW} \]
    with resistive load:
    \[ R_i = 300 \text{Ω} \]
    - Effective internal inductance/capacitance
    \[ L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF} \]

• Dust explosion protection for zone 21/22
  - Identification
    Ex II 2 D Ex ip 65 T 120 °C
  - Connection
    To circuits with values:
    \[ U_H = 10.5 \text{ ... 45 V DC}, P_{max} = 1.2 \text{ W} \]
    To circuits with values:
    \[ U_H = 9 \text{ ... 32 V DC}, P_{max} = 1.2 \text{ W} \]
    - FISCO supply unit:
      \[ U_o = 17.5 \text{ V}, i_o = 380 \text{ mA}, P_o = 5.32 \text{ W} \]
    - Linear barrier:
      \[ U_o = 24 \text{ V}, i_o = 250 \text{ mA}, P_o = 1.2 \text{ W} \]
    - Effective internal inductance/capacitance
      \[ L_i = 7 \text{ μH}, C_i = 1.1 \text{ nF} \]

• Type of protection "n" (zone 2)
  - Identification
    TÜV 01 ATEX 1696 X
  - Connection
    - TÜV 01 ATEX 1696 X
      \[ U_i = 30 \text{ V}, i = 100 \text{ mA}, \ R_i = 750 \text{ mW} \]
      with resistive load:
      \[ R_i = 300 \text{Ω} \]
    - Effective internal inductance/capacitance
      \[ L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF} \]

• Explosion protection to FM
  - Identification (XP/DIP) or (IS); (NI)
    Certificate of Compliance 3008490
  - Explosion protection to CSA
    Certificate of Compliance 1153651

<table>
<thead>
<tr>
<th>SITRANS P, DS III series for absolute pressure (differential construction)</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate and approvals</td>
<td>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)</td>
<td></td>
</tr>
<tr>
<td>Explosion protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Intrinsic safety &quot;i&quot;</td>
<td>PTB 99 ATEX 2122</td>
<td>FISCO supply unit:</td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 1/2 G EEx ia/ib IIB/IIC T6</td>
<td>[ U_o = 17.5 \text{ V}, i_o = 380 \text{ mA}, P_o = 5.32 \text{ W} ]</td>
</tr>
<tr>
<td>- Permissible ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F) temperature class T4;</td>
<td>Linear barrier:</td>
</tr>
<tr>
<td>- Connection</td>
<td>-40 ... +70 °C (-40 ... +158 °F) temperature class T5;</td>
<td>[ U_o = 24 \text{ V}, i_o = 250 \text{ mA}, P_o = 1.2 \text{ W} ]</td>
</tr>
<tr>
<td>- Effective internal inductance/capacitance</td>
<td>-40 ... +60 °C (-40 ... +140 °F) temperature class T6;</td>
<td>[ L_i = 7 \mu \text{H}, C_i = 1.1 \text{ nF} ]</td>
</tr>
<tr>
<td>• Explosion-proof &quot;d&quot;</td>
<td>PTB 99 ATEX 1160</td>
<td></td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 1/2 G EEx d IIC T4/T6</td>
<td></td>
</tr>
<tr>
<td>- Permissible ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F) temperature class T4;</td>
<td></td>
</tr>
<tr>
<td>- Connection</td>
<td>-40 ... +60 °C (-40 ... +140 °F) temperature class T6</td>
<td></td>
</tr>
<tr>
<td>- Effective internal inductance/capacitance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Dust explosion protection for zone 20</td>
<td>PTB 01 ATEX 2055</td>
<td></td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 1/2 D EEx ip 65 T 120 °C</td>
<td></td>
</tr>
<tr>
<td>- Permissible ambient temperature</td>
<td>Ex II 1/2 D EEx ip 65 T 120 °C</td>
<td></td>
</tr>
<tr>
<td>- Connection</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>- Effective internal inductance/capacitance</td>
<td>120 °C (248 °F)</td>
<td></td>
</tr>
<tr>
<td>• Dust explosion protection for zone 21/22</td>
<td>PTB 01 ATEX 2055</td>
<td></td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 2 D EEx ip 65 T 120 °C</td>
<td></td>
</tr>
<tr>
<td>- Connection</td>
<td>To circuits with values: [ U_H = 10.5 ... 45 \text{ V DC} ]</td>
<td>To circuits with values: [ U_H = 9 ... 32 \text{ V DC} ]</td>
</tr>
<tr>
<td>- Effective internal inductance/capacitance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type of protection &quot;n&quot; (zone 2)</td>
<td>TÜV 01 ATEX 1696 X</td>
<td></td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 3 G EEx nA L IIC T4/T5/T6</td>
<td></td>
</tr>
<tr>
<td>- Connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Effective internal inductance/capacitance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Explosion protection to FM</td>
<td>Certificate of Compliance 3008490</td>
<td></td>
</tr>
<tr>
<td>- Identification (XP/DIP) or (IS); (NI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Explosion protection to CSA</td>
<td>Certificate of Compliance 1153651</td>
<td></td>
</tr>
</tbody>
</table>
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

<table>
<thead>
<tr>
<th>HART communication</th>
<th>PROFIBUS PA communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART communication</td>
<td>Simultaneous communication with master class 2 (max.)</td>
</tr>
<tr>
<td>Protocol</td>
<td>The address can be set using Configuration tool or local operation (standard setting address 126)</td>
</tr>
<tr>
<td>Software for computer</td>
<td>Cyclic data usage</td>
</tr>
<tr>
<td>SIMATIC PDM</td>
<td>• Output byte 5 (one measuring value) or 10 (two measuring values)</td>
</tr>
<tr>
<td></td>
<td>• Input byte 0, 1, or 2 (register operating mode and reset function for metering)</td>
</tr>
<tr>
<td></td>
<td>Internal preprocessing</td>
</tr>
<tr>
<td></td>
<td>Device profile PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B</td>
</tr>
<tr>
<td>Function blocks</td>
<td>Function blocks</td>
</tr>
<tr>
<td>• Analog input</td>
<td>• Analog input</td>
</tr>
<tr>
<td>- Adaptation to customer-specific process variables Yes, linearly rising or falling characteristic</td>
<td></td>
</tr>
<tr>
<td>- Electrical damping T63 adjustable 0 ... 100 s</td>
<td></td>
</tr>
<tr>
<td>- Simulation function Input/Output</td>
<td></td>
</tr>
<tr>
<td>- Failure mode</td>
<td>Can be parameterized (last good value, substitute value, incorrect value)</td>
</tr>
<tr>
<td>- Limit monitoring</td>
<td>Yes, one upper and lower warning limit and one alarm limit respectively</td>
</tr>
<tr>
<td>• Register (totalizer)</td>
<td>Can be reset, preset, optional direction of counting, simulation function of register output</td>
</tr>
<tr>
<td>- Failure mode</td>
<td>Can be parameterized (summation with last good value, continuous summation, summation with incorrect value)</td>
</tr>
<tr>
<td>- Limit monitoring</td>
<td>One upper and lower warning limit and one alarm limit respectively</td>
</tr>
<tr>
<td>• Physical block</td>
<td>Physical block</td>
</tr>
<tr>
<td>1</td>
<td>Standard FF function block</td>
</tr>
<tr>
<td>2</td>
<td>1 Resource block</td>
</tr>
<tr>
<td>Transducer blocks</td>
<td>1 transducer block Pressure with calibration, 1 transducer block LCD</td>
</tr>
<tr>
<td>• Pressure transducer block</td>
<td>Pressure transducer block</td>
</tr>
<tr>
<td>- Can be calibrated by applying two pressures Yes</td>
<td></td>
</tr>
<tr>
<td>- Monitoring of sensor limits Yes</td>
<td></td>
</tr>
<tr>
<td>- Characterizer</td>
<td>Max: 30 points</td>
</tr>
<tr>
<td>- Square-rooted characteristic for flow measurement Yes</td>
<td></td>
</tr>
<tr>
<td>- Gradual volume suppression and implementation point of square-root extraction Parameterizable</td>
<td></td>
</tr>
<tr>
<td>- Simulation function for measured pressure value and sensor temperature Constant value or over parameterizable ramp function</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function blocks 3 function blocks analog input, 1 function block PID</td>
</tr>
<tr>
<td>• Analog input</td>
</tr>
<tr>
<td>- Adaptation to customer-specific process variables</td>
</tr>
<tr>
<td>- Electrical damping T63 adjustable 0 ... 100 s</td>
</tr>
<tr>
<td>- Simulation function</td>
</tr>
<tr>
<td>- Failure mode Can be parameterized (last good value, substitute value, incorrect value)</td>
</tr>
<tr>
<td>- Limit monitoring Yes, one upper and lower warning limit and one alarm limit respectively</td>
</tr>
<tr>
<td>- Square-rooted characteristic for flow measurement Yes</td>
</tr>
<tr>
<td>• PID Standard FF function block</td>
</tr>
<tr>
<td>• Physical block 1 Resource block</td>
</tr>
<tr>
<td>Transducer blocks 1 transducer block Pressure with calibration, 1 transducer block LCD</td>
</tr>
<tr>
<td>• Pressure transducer block</td>
</tr>
<tr>
<td>- Can be calibrated by applying two pressures Yes</td>
</tr>
<tr>
<td>- Monitoring of sensor limits Yes</td>
</tr>
<tr>
<td>- Characterizer Max: 30 points</td>
</tr>
<tr>
<td>- Square-rooted characteristic for flow measurement Yes</td>
</tr>
<tr>
<td>- Gradual volume suppression and implementation point of square-root extraction Parameterizable</td>
</tr>
<tr>
<td>- Simulation function for measured pressure value and sensor temperature Constant value or over parameterizable ramp function</td>
</tr>
</tbody>
</table>
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for absolute pressure
(differential construction)

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P pressure transmitters for absolute pressure, from the differential pressure, series DS III HART</td>
<td>7 MF 4 3 3 3 -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 ... 3.63 psi a (8.3 ... 250 mbar a)</td>
</tr>
<tr>
<td>0.62 ... 18.9 psi a (43 ... 1300 mbar a)</td>
</tr>
<tr>
<td>2.32 ... 72.5 psi a (0.16 ... 5 bar a)</td>
</tr>
<tr>
<td>14.5 ... 435 psi a (1 ... 30 bar a)</td>
</tr>
<tr>
<td>76.9 ... 1450 psi a (5.3 ... 100 bar a)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetted parts materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
</tr>
<tr>
<td>Tantalum</td>
</tr>
<tr>
<td>Monel</td>
</tr>
<tr>
<td>Gold</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-wetted parts materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process flange screws</td>
</tr>
<tr>
<td>Stainless steel</td>
</tr>
<tr>
<td>Stainless steel</td>
</tr>
<tr>
<td>Die-cast aluminium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version</td>
</tr>
<tr>
<td>International version</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explosion protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without</td>
</tr>
<tr>
<td>With ATEX, Type of protection:</td>
</tr>
<tr>
<td>- “Intrinsic safety (EEEx ia)”</td>
</tr>
<tr>
<td>- “Explosion-proof (EEEx d)”</td>
</tr>
<tr>
<td>- “Intrinsic safety and explosion-proof enclosure (EEEx ia + EEEx d)”</td>
</tr>
<tr>
<td>- “Ex nA/nL (zone 2)”</td>
</tr>
<tr>
<td>- “Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEEx ia + EEEx d + Zone 1D/2D)”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection / cable entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screwed gland Pg 13.5</td>
</tr>
<tr>
<td>Screwed gland M20x1.5</td>
</tr>
<tr>
<td>Han 7D plug (plastic housing) incl. mating connector</td>
</tr>
<tr>
<td>Plug M12 (metal)</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for absolute pressure
(differential construction)

Selection and Ordering data
Order No.

SITRANS P pressure transmitters for absolute pressure (from the differential pressure series)

DS III PA series (PROFIBUS PA)
7MF 4 3 3 4 -

DS III FF series (FOUNDATION Fieldbus)
7MF 4 3 3 5 -

Measuring cell filling

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

Nominal measuring range

<table>
<thead>
<tr>
<th>Nominal measuring range</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.63 psi a</td>
<td>(250 mbar a)</td>
</tr>
<tr>
<td>18.9 psi a</td>
<td>(1300 mbar a)</td>
</tr>
<tr>
<td>72.5 psi a</td>
<td>(5 bar a)</td>
</tr>
<tr>
<td>435 psi a</td>
<td>(30 bar a)</td>
</tr>
<tr>
<td>1450 psi a</td>
<td>(100 bar a)</td>
</tr>
</tbody>
</table>

Wetted parts materials

<table>
<thead>
<tr>
<th>Wetted parts materials</th>
<th>Parts of measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal diaphragm</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td>Hasselloy</td>
</tr>
<tr>
<td></td>
<td>Hasselloy</td>
</tr>
<tr>
<td></td>
<td>Tantalum</td>
</tr>
<tr>
<td></td>
<td>Monel</td>
</tr>
<tr>
<td></td>
<td>Gold</td>
</tr>
</tbody>
</table>

Process connection

<table>
<thead>
<tr>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female thread ¼-18 NPT with flange connection</td>
</tr>
<tr>
<td>• Sealing screw opposite process connection</td>
</tr>
<tr>
<td>- Mounting thread 7/16-20 UNF to EN 61518</td>
</tr>
<tr>
<td>- Mounting thread M10 to DIN 19213 (only for replacement needs)</td>
</tr>
<tr>
<td>• Vent on side of process flange (only for replacement needs)</td>
</tr>
<tr>
<td>- Mounting thread 7/16-20 UNF to EN 61518</td>
</tr>
<tr>
<td>- Mounting thread M10 to DIN 19213 (only for replacement needs)</td>
</tr>
</tbody>
</table>

Non-wetted parts materials

<table>
<thead>
<tr>
<th>Non-wetted parts materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process flange screws</td>
</tr>
<tr>
<td>Stainless steel</td>
</tr>
<tr>
<td>Die-cast aluminium</td>
</tr>
</tbody>
</table>

Version

<table>
<thead>
<tr>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version</td>
</tr>
<tr>
<td>International version, English label inscriptions, documentation in 5 languages on CD</td>
</tr>
</tbody>
</table>

Explosion protection

<table>
<thead>
<tr>
<th>Explosion protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Without</td>
</tr>
<tr>
<td>• With ATEX, Type of protection:</td>
</tr>
<tr>
<td>- &quot;Intrinsic safety (Ex ia)&quot;</td>
</tr>
<tr>
<td>- Explosion-proof (Ex d)</td>
</tr>
<tr>
<td>- &quot;Intrinsic safety and explosion-proof enclosure (Ex ia + Ex d)&quot;</td>
</tr>
<tr>
<td>- Ex nA/nL (Zone 2)</td>
</tr>
<tr>
<td>- &quot;Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)&quot; (not for DS III FF)</td>
</tr>
<tr>
<td>• With FM + CSA, Type of protection:</td>
</tr>
<tr>
<td>- &quot;Intrinsic safety and explosion-proof (is + xp)&quot;</td>
</tr>
</tbody>
</table>

Electrical connection / cable entry

<table>
<thead>
<tr>
<th>Electrical connection / cable entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Screwed gland M20x1.5</td>
</tr>
<tr>
<td>• Screwed gland ½-14 NPT</td>
</tr>
<tr>
<td>• M12 Connector (metal)</td>
</tr>
</tbody>
</table>

Included in delivery of the device:

• Brief instructions (Leporello)
• CD-ROM with detailed documentation
• Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) For oxygen cleaning application, add Order code E10.

2) Version 7MF4334-1DY... only up to max. span 2.9 psi a (200 mbar a).

3) When the manufacturer's certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

4) Whe the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

5) Not for nominal measuring range 1450 psi a (100 bar a). 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 EEx ia and blanking plug

8) M12 delivered without cable socket.

E) Combinations of the versions marked with E) are subject to the export regulations AL: 2B230, ECCN: N.

F) Subject to export regulations AL: 81999, ECCN: N.
## Selection and Ordering data

### Further designs

Add "Z" to Order No. and specify Order code.

<table>
<thead>
<tr>
<th>Pressure transmitter with mounting bracket made of:</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Steel</td>
<td>A01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stainless steel</td>
<td>A02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O-rings for process flanges (instead of FPM (Viton))</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PTFE (Teflon)</td>
<td>A20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FEP (with silicone core, approved for food)</td>
<td>A21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FFPM (Kalrez, compound 4079)</td>
<td>A22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• NBR (Buna N)</td>
<td>A23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sealing screws

½-18 NPT, with vent valve in material of process flanges.

### Cable sockets for M12 connectors (metal)

### Rating plate inscription (instead of German)

- • English: B11
- • French: B12
- • Spanish: B13
- • Italian: B14

### English rating plate

Pressure units in inH2O or psi.

### Quality inspection certificate (Facility calibration) to IEC 60770-2

### Acceptance test certificate

To EN 10204-3.1.

### Factory certificate

To EN 10204-2.2.

### "Functional Safety (SIL)" certificate

### "PROFIsafe" certificate and protocol

### Setting of upper limit of output signal to 22.0 mA

### Manufacturer's declaration acc. to NACE

(only together with seal diaphragm made of Hastelloy and stainless steel)

### Type of protection IP68

(only for M20x1.5 and ½-14 NPT)

### Digital indicator alongside the pushbuttons

(only together with the devices 7MF4333-…2-A.6 or -A.7-Z, Y21 or Y22 + Y01)

### Supplied with oval flange

(1 item), PTFE packing and stainless steel screws in thread of process flange

### Use in or on zone 1D/2D

(only together with type of protection "Intrinsic safety (Ex ia)"

### Use on zone 0

(only together with type of protection "Intrinsic safety (Ex ia)"

### Oxygen cleaning application

(max. 1740 psi a (120 bar a) at 60°C (140 °F) with oxygen measurement and inert liquid)

### Explosion-proof "Intrinsic safety" to INMETRO (Brazil)

(only for transmitter 7MF4...-.....-B..)

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range to be set</td>
<td>Y01</td>
</tr>
<tr>
<td>Setting of pressure indication in pressure units</td>
<td>Y21</td>
</tr>
<tr>
<td>Setting of upper limit of output signal to 22.0 mA</td>
<td>D05</td>
</tr>
<tr>
<td>Manufacturer's declaration acc. to NACE</td>
<td>D07</td>
</tr>
<tr>
<td>Type of protection IP68</td>
<td>D12</td>
</tr>
<tr>
<td>Digital indicator alongside the pushbuttons</td>
<td>D27</td>
</tr>
<tr>
<td>Supplied with oval flange</td>
<td>D37(1)</td>
</tr>
<tr>
<td>Use in or on zone 1D/2D</td>
<td>E01</td>
</tr>
<tr>
<td>Use on zone 0</td>
<td>E02</td>
</tr>
<tr>
<td>Oxygen cleaning application</td>
<td>E10</td>
</tr>
<tr>
<td>Explosion-proof &quot;Intrinsic safety&quot; to INMETRO (Brazil)</td>
<td>E25</td>
</tr>
</tbody>
</table>

---

**Additional data**

Add "Z" to Order No. and specify Order code.

### Measuring range to be set

Specify in plain text (max. 5 digits):

- Y01: .. up to ... mbar, bar, kPa, MPa, psi...
- Y15: ... characters, specify in plain text:
- Y17: ... characters, specify in plain text:
- Y21: ... up to ...

### Measuring point number (TAG No.)

Max. 16 characters, specify in plain text:

Y15: 

### Measuring point text

Max. 27 characters, specify in plain text:

Y16: 

### Entry of HART address (TAG)

Max. 8 characters, specify in plain text:

Y17: 

### Setting of pressure indication in non-pressure units

Specify in plain text:

- Y22: .. up to ...
- Y01: .. up to ...

### Preset bus address

(possible between 1 and 126)

Y25:

---

1) When the manufacture's certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) Where the acceptance test certificate 3.1 for transmitter with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

3) Preset values can only be modified over SIMATIC PDM.
Dimensional drawings

1 Process connection: ¼-18 NPT (EN 61518)
2 Blanking plug
3 Electrical connection:
   - screwed gland Pg 13,5 (adapter) \(^1\),
   - screwed gland M20x1,5 \(^2\),
   - screwed gland ½-14 NPT or
   - Han 7D/ Han 8U plug \(^2\)
4 Terminal side
5 Electronics side, digital display (longer overall length for cover with window)
6 Protective cover over keys
7 Mounting bracket (option)
8 Sealing screw (optionally with vent valve)
9 Screw cover - safety bracket (only for type of protection 
   "Explosion-proof enclosure", not shown in the drawing)
10 Lateral venting for liquid measurement (Standard)
11 Lateral venting for gas measurement (suffix H02)

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) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator
5) 45 mm (1.8 inch) for Pg 13.5 with adapter

SITRANS P pressure transmitters, DS III HART series for absolute pressure, from the differential pressure series, dimensions in mm (inch)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for absolute pressure
(differential construction)

1 Process connection: ¼-18 NPT (EN 61518)
2 Blanking plug
3 Electrical connection:
   - screwed gland M20x1,5 4),
   - screwed gland ½-14 NPT or
   - PROFIBUS plug M12 3) 4)
4 Terminal side
5 Electronic side, digital display (longer overall length for cover with window)
6 Protective cover over keys
7 Mounting bracket (option)
8 Sealing screw (optionally with vent valve)
9 Screw cover – safety bracket (only for explosion-proof enclosure, not shown in the drawing)
10 Lateral venting for liquid measurement (Standard)
11 Lateral venting for gas measurement (suffix H02)

1) Allow approx. 20 mm (0.79 inch) thread length in addition
2) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator
3) Not with type of protection "explosion-proof enclosure"
4) Not with type of protection "FM + CSA"

SITRANS P pressure transmitters, DS III PA and FF series for absolute pressure, from the differential pressure series, dimensions in mm (inch)
### Technical specifications

**SITRANS P, DS III series, for differential pressure and flow**

<table>
<thead>
<tr>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Differential pressure and flow</td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible working pressure</td>
<td>Span</td>
</tr>
<tr>
<td>0.4 ... 24 inH2O (1 ... 60 mbar)</td>
<td>464 psi (32 bar)</td>
</tr>
<tr>
<td>1 ... 100 inH2O (2.5 ... 250 mbar)</td>
<td>464 psi (32 bar)</td>
</tr>
<tr>
<td>2.4 ... 240 inH2O (6 ... 600 mbar)</td>
<td>624 psi (40 bar)</td>
</tr>
<tr>
<td>6.4 ... 642 inH2O (16 ... 1600 mbar)</td>
<td>642 psi (40 bar)</td>
</tr>
<tr>
<td>20 ... 2000 inH2O (50 ... 5000 mbar)</td>
<td>2320 psi (160 bar)</td>
</tr>
<tr>
<td>4.35 ... 435 psi (0.3 ... 30 bar)</td>
<td>435 psi (30 bar)</td>
</tr>
<tr>
<td>1 ... 100 inH2O (2.5 ... 250 mbar)</td>
<td>6091 psi (420 bar)</td>
</tr>
<tr>
<td>2.4 ... 240 inH2O (6 ... 600 mbar)</td>
<td>624 psi (40 bar)</td>
</tr>
<tr>
<td>6.4 ... 642 inH2O (16 ... 1600 mbar)</td>
<td>642 psi (40 bar)</td>
</tr>
<tr>
<td>20 ... 2000 inH2O (50 ... 5000 mbar)</td>
<td>2320 psi (160 bar)</td>
</tr>
<tr>
<td>4.35 ... 435 psi (0.3 ... 30 bar)</td>
<td>435 psi (30 bar)</td>
</tr>
</tbody>
</table>

Lower measuring limit
- Measuring cell with silicone oil filling
- 100% of max. span (-33% with 435 psi (30 bar) measuring cell or 0.44 psi (30 mbar a))

Upper measuring limit
- 100% of max. span (for oxygen version and inert filling liquid; max. 2320 psi g (160 bar g))

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 optionally set to 22.0 mA |

Load
- Without HART communication
  \[ R_L \leq \left( \frac{U_H - 10.5}{V} \right) \times 0.023 \ A \text{ in } \Omega \]
  \( U_H \): Power supply in V

- With HART communication
  \[ R_L = 230 \ldots 500 \ \Omega \text{ (SIMATIC PDM) or } R_L = 230 \ldots 1100 \ \Omega \text{ (HART Communicator) } \]

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.

Accuracy

| Reference conditions | To EN 60770-1 |
| (All error data refer always refer to the set span) | Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F) \( r \): Span ratio \( r = \text{max. span} / \text{set span} \) |

Error in measurement and fixed-point setting (including hysteresis and repeatability)
- Linear characteristic
  - \( r \leq 10 \)
  - \( 10 < r \leq 30 \)
  - \( 30 < r \leq 100 \)
- Square-root characteristic (flow > 50%)
  - \( r \leq 10 \)
  - \( 10 < r \leq 30 \)

<table>
<thead>
<tr>
<th>( r \leq 10 )</th>
<th>( 10 &lt; r \leq 30 )</th>
<th>( 30 &lt; r \leq 100 )</th>
<th>( r \leq 10 )</th>
<th>( 10 &lt; r \leq 30 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( r \leq 10 )</td>
<td>( 10 &lt; r \leq 30 )</td>
<td>( 30 &lt; r \leq 100 )</td>
<td>( r \leq 10 )</td>
<td>( 10 &lt; r \leq 30 )</td>
</tr>
<tr>
<td>( \left( 0.0029 \cdot r + 0.071 \right) % )</td>
<td>( \left( 0.0045 \cdot r + 0.071 \right) % )</td>
<td>( \left( 0.005 \cdot r + 0.05 \right) % )</td>
<td>( \leq 0.075 % )</td>
<td>( \leq 0.1 % )</td>
</tr>
<tr>
<td>( \leq 0.1 % )</td>
<td>( \leq 0.2 % )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SITRANS P, DS III series, for differential pressure and flow

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Square-root characteristic (flow 25 ... 50%)</td>
<td>≤ 0.2 %</td>
<td>≤ 0.2 %</td>
</tr>
<tr>
<td>- r ≤ 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 10 &lt; r ≤ 30</td>
<td>≤ 0.4 %</td>
<td></td>
</tr>
<tr>
<td>Long-term drift (temperature change ± 30 °C (± 54 °F))</td>
<td>(0.25 · r)% every 5 years</td>
<td>(0.25% every 5 years</td>
</tr>
<tr>
<td>static pressure max. 1015 psi g (70 bar g)</td>
<td>per year</td>
<td>static pressure max. 1015 psi g (70 bar g)</td>
</tr>
<tr>
<td>• 0.29 psi (20 mbar)-measuring cell</td>
<td>(0.2 · r) per year</td>
<td>(0.2 · r) per year</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• at -10 ... +60 °C (14 ... 140 °F)</td>
<td>≤ (0.08 · r + 0.1) %</td>
<td>≤ 0.3 %</td>
</tr>
<tr>
<td>• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)</td>
<td>≤ (0.1 · r + 0.15)%/10 K (Twice the value with 0.29 psi (20-mbar) measuring cell)</td>
<td>≤ 0.25%/10 K</td>
</tr>
<tr>
<td>Influence of static pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• on the zero point</td>
<td>≤ (0.15 · r)% per 1450 psi (100 bar)</td>
<td>≤ 0.15% per 1450 psi (100 bar)</td>
</tr>
<tr>
<td>- 0.29 psi (20 mbar)-measuring cell</td>
<td>≤ (0.15 · r)% per 464 psi (32 bar)</td>
<td>≤ 0.15% per 464 psi (32 bar)</td>
</tr>
<tr>
<td>• on the span</td>
<td>≤ 0.2% per 1450 psi (100 bar)</td>
<td></td>
</tr>
<tr>
<td>- 0.29 psi (20 mbar)-measuring cell</td>
<td>≤ 0.2% per 464 psi (32 bar)</td>
<td></td>
</tr>
<tr>
<td>Measured Value Resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Terminal voltage on transmitter</td>
<td>10.5 ... 45 V DC</td>
<td>Supplied through bus</td>
</tr>
<tr>
<td>Separate 24 V power supply necessary</td>
<td>10.5 ... 30 V DC in intrinsically-safe mode</td>
<td></td>
</tr>
<tr>
<td>Bus voltage</td>
<td>No</td>
<td>9 ... 32 V</td>
</tr>
<tr>
<td>• Not Ex</td>
<td></td>
<td>9 ... 24 V</td>
</tr>
<tr>
<td>• With intrinsically-safe operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated operating conditions</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>Degree of protection (to EN 60529)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with silicone oil filling</td>
<td>-100 °C (-40 ... +212 °F)</td>
<td></td>
</tr>
<tr>
<td>• Measuring cell with inert filling liquid</td>
<td>-100 °C (-4 ... +212 °F)</td>
<td></td>
</tr>
<tr>
<td>• In conjunction with dust explosion protection</td>
<td>-60 °C (-4 ... +140 °F)</td>
<td></td>
</tr>
<tr>
<td>Ambient conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td>-30 ... +85 °C (-22 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>- Digital indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Storage temperature</td>
<td>-50 ... +85 °C (-58 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>• Climatic class</td>
<td>Permissible</td>
<td></td>
</tr>
<tr>
<td>- Condensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Electromagnetic compatibility</td>
<td>To EN 61326 and NAMUR NE 21</td>
<td></td>
</tr>
<tr>
<td>- Emitted interference and interference immunity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material of the mounting bracket</td>
<td>Sheet steel, Mat. No. 1.0330, chrome-plated</td>
<td></td>
</tr>
<tr>
<td>• Steel</td>
<td>Stainless steel, Mat. No. 1.4301 (SS304)</td>
<td></td>
</tr>
<tr>
<td>• Stainless steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (without options)</td>
<td>≈ 4.5 kg (= 9.9 lb)</td>
<td></td>
</tr>
<tr>
<td>Housing material</td>
<td>Low copper die-cast aluminium, GD-A15i12 or stainless steel precision casting, mat. No. 1.4408</td>
<td></td>
</tr>
<tr>
<td>Wetted parts materials</td>
<td>Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819, Monel, mat. No. 2.4360, tantalum or gold</td>
<td></td>
</tr>
<tr>
<td>• Seal diaphragm</td>
<td>Silicone oil or inert filling liquid (max. 2320 psi g (160 bar) with oxygen measurement)</td>
<td></td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Female thread ¼-18 NPT and flange connection with mounting thread M10 to DIN 19213 or ½-20 UNF to EN 61518</td>
<td></td>
</tr>
<tr>
<td>Process connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply $U_h$</td>
<td>9 ... 32 V</td>
<td></td>
</tr>
<tr>
<td>Terminal voltage on transmitter</td>
<td>9 ... 24 V</td>
<td></td>
</tr>
</tbody>
</table>
### Power supply $U_H$

<table>
<thead>
<tr>
<th>Current consumption</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Basic current (max.)</td>
<td></td>
<td>12.5 mA</td>
</tr>
<tr>
<td>• Startup current ≤ basic current</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>• Max. current in event of fault</td>
<td></td>
<td>15.5 mA</td>
</tr>
<tr>
<td>Fault disconnection electronics (FDE) avail.</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Certificate and approvals

**Classification according to pressure equipment directive (DRGL 97/23/EC)**

- **PN 32/160 (MWP 464/2320 psi)**
  - For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)

- **PN 420 (MWP 6092 psi)**
  - For gases of fluid group 1 and liquids of fluid group 1; complies with basic safety 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"**
  - **PTB 99 ATEX 2122**
  - **Identification**
    - Ex II 1/2 G EEx ia/ib IIB/IIC T6
  - **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 maximum values:
      - $U_i = 30 V, I_i = 100 mA,$
      - $P_i = 750 mW, R_i = 300 Ω$
    - FISCO supply unit:
      - $U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W$
    - Linear barrier:
      - $U_o = 24 V, I_o = 250 mA, P_o = 1.2 W$
    - **Effective internal inductance/capacitance**
      - $L_i = 0.4 mH, C_i = 6 nF$
    - $L_i = 7 μH, C_i = 1.1 nF$

- **Explosion-proof "d"**
  - **PTB 99 ATEX 1160**
  - **Identification**
    - Ex II 1/2 G EEx d IIC T4/T6
  - **Permissible ambient temperature**
    - -40 ... +85 °C (-40 ... +185 °F)
    - 120 °C (248 °F)
  - **Connection**
    - To circuits with values: $U_{i,i} = 10.5 ... 45 V DC$
    - FISCO supply unit:
      - $U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W$
    - Linear barrier:
      - $U_o = 24 V, I_o = 250 mA, P_o = 1.2 W$
    - **Effective internal inductance/capacitance**
      - $L_i = 0.4 mH, C_i = 6 nF$
    - $L_i = 7 μH, C_i = 1.1 nF$

- **Dust explosion protection for zone 20**
  - **PTB 01 ATEX 2055**
  - **Identification**
    - Ex II 1 D IP65 T 120 °C
    - Ex II 1/2 D IP65 T 120 °C
  - **Permissible ambient temperature**
    - -40 ... +85 °C (-40 ... +185 °F)
  - **Max. surface temperature**
    - 120 °C (248 °F)
  - **Connection**
    - To certified intrinsically-safe circuits with maximum values:
      - $U_i = 30 V, I_i = 100 mA,$
      - $P_i = 750 mW, R_i = 300 Ω$
    - FISCO supply unit:
      - $U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W$
    - Linear barrier:
      - $U_o = 24 V, I_o = 250 mA, P_o = 1.2 W$
    - **Effective internal inductance/capacitance**
      - $L_i = 0.4 mH, C_i = 6 nF$
    - $L_i = 7 μH, C_i = 1.1 nF$

- **Dust explosion protection for zone 21/22**
  - **PTB 01 ATEX 2055**
  - **Identification**
    - Ex II 2 D IP65 T 120 °C
  - **Permissible ambient temperature**
    - -40 ... +85 °C (-40 ... +185 °F)
  - **Max. surface temperature**
    - 120 °C (248 °F)
  - **Connection**
    - To circuits with values: $U_{i,i} = 10.5 ... 45 V DC$;
    - $P_{max} = 1.2 W$
    - FISCO supply unit:
      - $U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W$
    - Linear barrier:
      - $U_o = 24 V, I_o = 250 mA, P_o = 1.2 W$
    - Planned:
      - $L_i = 0.4 mH, C_i = 6 nF$
    - $L_i = 7 μH, C_i = 1.1 nF$

- **Type of protection "n" (zone 2)**
  - **TÜV 01 ATEX 1696 X**
  - **Identification**
    - Ex II 3 G EEx n A IIC T4/T5/T6
  - **Explosion protection to FM**
  - **Identification (XP/DIP) or (IS); (NI)**
    - Certificate of Compliance 9008490
  - **Explosion protection to CSA**
    - **Identification (XP/DIP) or (IS)**
      - Certificate of Compliance 1153651
## SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

### DS III series for differential pressure and flow

<table>
<thead>
<tr>
<th><strong>HART communication</strong></th>
<th><strong>PROFIBUS PA communication</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HART communication</td>
<td>Simultaneous communication with master class 2 (max.)</td>
</tr>
<tr>
<td>Protocol</td>
<td>The address can be set using Configuration tool or local operation (standard setting address 126)</td>
</tr>
<tr>
<td>Software for computer</td>
<td>Cyclic data usage</td>
</tr>
<tr>
<td>SIMATIC PDM</td>
<td>• Output byte</td>
</tr>
<tr>
<td></td>
<td>5 (one measuring value) or 10 (two measuring values)</td>
</tr>
<tr>
<td></td>
<td>• Input byte</td>
</tr>
<tr>
<td></td>
<td>0, 1, or 2 (register operating mode and reset function for metering)</td>
</tr>
<tr>
<td>Internal preprocessing</td>
<td>Function blocks</td>
</tr>
<tr>
<td></td>
<td>• Analog input</td>
</tr>
<tr>
<td></td>
<td>- Adaptation to customer-specific process variables Yes, linearly rising or falling characteristic</td>
</tr>
<tr>
<td></td>
<td>- Electrical damping $T_{63}$, adjustable 0 ... 100 s</td>
</tr>
<tr>
<td></td>
<td>- Simulation function</td>
</tr>
<tr>
<td></td>
<td>- Failure mode</td>
</tr>
<tr>
<td></td>
<td>- Limit monitoring</td>
</tr>
<tr>
<td></td>
<td>• Register (totalizer)</td>
</tr>
<tr>
<td></td>
<td>- Failure mode</td>
</tr>
<tr>
<td></td>
<td>- Limit monitoring</td>
</tr>
<tr>
<td></td>
<td>• Physical block</td>
</tr>
<tr>
<td></td>
<td>Transducer blocks</td>
</tr>
<tr>
<td></td>
<td>• Pressure transducer block</td>
</tr>
</tbody>
</table>

### Communication FOUNDATION Fieldbus

<table>
<thead>
<tr>
<th>Function blocks</th>
<th>3 function blocks analog input, 1 function block PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input</td>
<td>Yes, linearly rising or falling characteristic</td>
</tr>
<tr>
<td>- Adaption to customer-specific process variables</td>
<td>0 ... 100 s</td>
</tr>
<tr>
<td>- Electrical damping $T_{63}$, adjustable</td>
<td></td>
</tr>
<tr>
<td>- Simulation function</td>
<td></td>
</tr>
<tr>
<td>- Failure mode</td>
<td></td>
</tr>
<tr>
<td>- Limit monitoring</td>
<td></td>
</tr>
<tr>
<td>Register (totalizer)</td>
<td></td>
</tr>
<tr>
<td>- Failure mode</td>
<td></td>
</tr>
<tr>
<td>- Limit monitoring</td>
<td></td>
</tr>
<tr>
<td>Physical block</td>
<td></td>
</tr>
<tr>
<td>Transducer blocks</td>
<td></td>
</tr>
<tr>
<td>Pressure transducer block</td>
<td></td>
</tr>
<tr>
<td>- Can be calibrated by applying two pressures</td>
<td></td>
</tr>
<tr>
<td>- Monitoring of sensor limits</td>
<td></td>
</tr>
<tr>
<td>- Characterizer</td>
<td></td>
</tr>
<tr>
<td>- Square-rooted characteristic for flow measurement</td>
<td></td>
</tr>
<tr>
<td>- Gradual volume suppression and implementation point of square-root extraction</td>
<td></td>
</tr>
<tr>
<td>- Simulation function for measured pressure value and sensor temperature</td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010
## Selection and Ordering Data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P pressure transmitters for differential pressure and flow, Series DS III HART</td>
<td>7 MF 4 4 3 3 -</td>
</tr>
</tbody>
</table>

### Measuring cell filling

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

### Span

| MWP | 0.4015 ... 8.03 inH₂O<sup>2)</sup> (1 ... 20 mbar) | B |
| MWP | 2320 psi (PN 160) | C |
| 1.004 ... 2008 inH₂O | 3 |
| 2.409 ... 240.9 inH₂O | 4 |
| 6.424 ... 642.4 inH₂O | 5 |
| 20.08 ... 2008 inH₂O | 6 |
| 4.35 ... 435 psi | 7 |

### Wetted parts materials

<table>
<thead>
<tr>
<th>(stainless steel process flanges)</th>
<th>Seal diaphragm</th>
<th>Parts of measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>A</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Hastelloy</td>
<td>B</td>
</tr>
<tr>
<td>Tantalum&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>Tantalum</td>
<td>C</td>
</tr>
<tr>
<td>Monel&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>Monel</td>
<td>D</td>
</tr>
<tr>
<td>Gold&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>Gold</td>
<td>E</td>
</tr>
</tbody>
</table>

### Version for diaphragm seal

<table>
<thead>
<tr>
<th>Version for diaphragm seal&lt;sup&gt;1), 5)&lt;/sup&gt;</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Process connection

<table>
<thead>
<tr>
<th>Female thread ¼-18 NPT with flange connection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing screw opposite process connection</td>
<td>2</td>
</tr>
<tr>
<td>Mounting thread ¼-18 UNF to EN 61518</td>
<td>3</td>
</tr>
<tr>
<td>Mounting thread M10 to DIN 19213 (only for replacement needs)</td>
<td>4</td>
</tr>
<tr>
<td>Vent on side of process flange&lt;sup&gt;2)&lt;/sup&gt;</td>
<td>5</td>
</tr>
<tr>
<td>Mounting thread ¼-18 UNF to EN 61518</td>
<td>6</td>
</tr>
<tr>
<td>Mounting thread M10 to DIN 19213 (only for replacement needs)</td>
<td>7</td>
</tr>
</tbody>
</table>

### Non-wetted parts materials

<table>
<thead>
<tr>
<th>Process flange screws</th>
<th>Electronics housing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Die-cast aluminium</td>
<td>2</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel precision casting&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>3</td>
</tr>
</tbody>
</table>

### Version

<table>
<thead>
<tr>
<th>Version</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version</td>
<td>1</td>
</tr>
<tr>
<td>International version, English label inscriptions, documentation in 5 languages on CD</td>
<td>2</td>
</tr>
</tbody>
</table>

### Explosion protection

<table>
<thead>
<tr>
<th>Without</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>With ATEX, Type of protection:</td>
<td></td>
</tr>
<tr>
<td>- Intrinsic safety (EEx ia)*</td>
<td>3</td>
</tr>
<tr>
<td>- Explosion-proof (EEx d)&lt;sup&gt;7)&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>- Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)&lt;sup&gt;9)&lt;/sup&gt;</td>
<td>5</td>
</tr>
<tr>
<td>- Ex nA/NL (zone 2)&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>6</td>
</tr>
<tr>
<td>- Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)&lt;sup&gt;8)&lt;/sup&gt;</td>
<td>7</td>
</tr>
<tr>
<td>With FM + CSA, Type of protection:</td>
<td></td>
</tr>
<tr>
<td>- Intrinsic safety and explosion-proof (is + xp)&lt;sup&gt;7)&lt;/sup&gt;</td>
<td>8</td>
</tr>
</tbody>
</table>

### Electrical connection / cable entry

<table>
<thead>
<tr>
<th>Screwed gland Pg 13.5&lt;sup&gt;9)&lt;/sup&gt;</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Screwed gland M20x1.5</td>
<td>2</td>
</tr>
<tr>
<td>Screwed gland ¼–14 NPT</td>
<td>3</td>
</tr>
<tr>
<td>Han 7D plug (plastic housing) incl. mating connector&lt;sup&gt;8)&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>M12 connectors (metal)&lt;sup&gt;10)&lt;/sup&gt;</td>
<td>5</td>
</tr>
</tbody>
</table>

### Display

<table>
<thead>
<tr>
<th>Without indicator</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Without visible digital indicator (digital indicator hidden, setting: mA)</td>
<td>6</td>
</tr>
<tr>
<td>With visible digital indication</td>
<td>7</td>
</tr>
<tr>
<td>With customer-specific digital indicator (setting as specified, Order code “Y21” or “Y22” required)</td>
<td>8</td>
</tr>
</tbody>
</table>

### Available ex stock

Power supply units see “SITRANS I power supply units and isolation amplifiers”.

Factory-mounting of shut-off valves and valve manifolds see page 2136.

Included in delivery of the device:

- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) For oxygen cleaning application, add Order code E10.
2) Not suitable for connection of remote seal. Position of the top vent valve in the process flanges (see dimensional drawing).
3) Not together with max. span 8.03 and 24.09 inH₂O (20 and 60 mbar).
4) When the manufacturer’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
5) When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
6) Not together with Electrical connection „Screwed gland Pg 13.5” and „Han7D plug”.
7) Without cable gland, with blanking plug
8) With enclosed cable gland EEx ia and blanking plug
9) Not together with type of protection “ Explosion-proof” and and type of protection “Ex nA”.
10) M12 delivered without cable socket.
### SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

#### DS III series

for differential pressure and flow

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P pressure transmitters for differential pressure and flow MWP 464/2320 psi (PN 32/160)</td>
<td>7MF 4434 -</td>
</tr>
<tr>
<td>DS III PA series (PROFIBUS PA)</td>
<td>7MF 4434 -</td>
</tr>
<tr>
<td>DS III FF series (FOUNDATION Fieldbus)</td>
<td>7MF 4435 -</td>
</tr>
</tbody>
</table>

### Measuring cell filling

<table>
<thead>
<tr>
<th>Measuring cell filling</th>
<th>Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid¹</td>
<td>Grease-free</td>
</tr>
</tbody>
</table>

### Nominal measuring range

<table>
<thead>
<tr>
<th>MWP 464 psi (PN 32)</th>
<th>8.03 inH₂O (20 mbar)²</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWP 2320 psi (PN 160)</td>
<td>60.9 inH₂O (150 mbar)</td>
<td>C</td>
</tr>
<tr>
<td>100.4 inH₂O (250 mbar)</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>240.9 inH₂O (600 mbar)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>642.4 inH₂O (1600 mbar)</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>2008 inH₂O (5 bar)</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>435 psi (30 bar)</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

### Wetted parts materials

<table>
<thead>
<tr>
<th>(stainless steel process flanges)</th>
<th>Parts of measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>A</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>B</td>
</tr>
<tr>
<td>Tantalum³</td>
<td>C</td>
</tr>
<tr>
<td>Mone³</td>
<td>D</td>
</tr>
<tr>
<td>Gold³</td>
<td>E</td>
</tr>
<tr>
<td>Version as diaphragm seal⁴⁵</td>
<td>F</td>
</tr>
</tbody>
</table>

### Process connection

Female thread ¼-18 NPT with flange connection

- Sealing screw opposite process connection
  - Mounting thread 7/16-20 UNF to EN 61518
  - Mounting thread M10 to DIN 19213 (only for replacement needs)
- Venting on side of process flanges²³
  - Mounting thread 7/16-20 UNF to EN 61518
  - Mounting thread M10 to DIN 19213 (only for replacement needs)

### Non-wetted parts materials

<table>
<thead>
<tr>
<th>Process flange screws</th>
<th>Electronics housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Die-cast aluminium</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel precision casting</td>
</tr>
</tbody>
</table>

### Version

- Standard version
- International version, English label inscriptions, documentation in 5 languages on CD

### Explosion protection

- Without
- With ATEX, Type of protection:
  - 'Intrinsic safety (EEx ia)'
  - ' Explosion-proof (EEx d)⁶'
  - 'Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)⁷'
  - 'n (Zone 2)' (planned)
  - 'Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)⁷ (not for DS III FF)
- With FM + CSA, Type of protection:
  - 'Intrinsic safety and explosion-proof (Is + xp)⁶'

### Electrical connection / cable entry

- Screwed gland M20x1.5
- Screwed gland ½-14 NPT
- M12 connectors (metal)⁸

### Display

- Without indicator
- Without visible digital indicator (digital indicator hidden, setting: mA)
- With customer-specific digital indication (setting as specified, Order code "Y21" or required)

### Available ex stock

Factory-mounting of shut-off valves and valve manifolds see page 2/136.

Included in delivery of the device:

- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flange(s)

1) For oxygen cleaning application, add Order code E10.
2) Not suitable for connection of remote seal. Position of the top vent valve in the process flanges see dimensional drawing.
3) Not together with max. span 8.03 and 24.09 inH₂O (20 and 60 mbar)
4) When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
5) Whe the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
6) Without cable gland, with blanking plug.
7) With enclosed cable gland ExEx ia and blanking plug.
8) M12 delivered without cable socket.

---

²) Not suitable for connection of remote seal.
³) Position of the top vent valve in the process flanges (see dimensional drawing).
⁴) When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
⁵) Whe the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
⁶) Without cable gland, with blanking plug.
⁷) With enclosed cable gland ExEx ia and blanking plug.
⁸) M12 delivered without cable socket.
### Selection and Ordering data

#### Order code

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add &quot;-Z&quot; to Order No. and specify Order code.</td>
<td>HART PA FF</td>
</tr>
</tbody>
</table>

#### Pressure transmitter with mounting bracket made of:
- Steel
- Stainless steel

#### O-rings for process flanges
- instead of FPM (Viton)
- FEP (with silicone core, approved for food)
- FFFP (Kelvair, compound 4079)
- NBR (Buna N)

#### Plug
- Han 7D (metal, gray)
- Han 8U (instead of Han 7D)

#### Sealing screws
- ¼-18 NPT, with vent valve in mat. of process flanges

#### Cable sockets for M12 connectors (metal)

#### Rating plate inscription (instead of German)
- English
- French
- Spanish
- Italian

#### English rating plate (calibration certificate)

#### Quality inspection certificate (Factory calibration) to IEC 60770-2

#### Acceptance test certificate

#### Factory certificate

#### Manufacturer’s declaration acc. to NACE

#### Type of protection IP68

#### Digital indicator alongside the pushbuttons

#### Process flange screws made of Monel

#### Supplied with oval flange set

#### Use in or on zone 1D/2D

#### Use on zone 0

#### TÜV approval to AD/TRA

#### Overfilling safety device for flammable and non-flammable liquids

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add &quot;-Z&quot; to Order No. and specify Order code.</td>
<td>HART PA FF</td>
</tr>
</tbody>
</table>

#### Oxygen cleaning application
(max. 1740 psi (120 bar) at 80°C (140 °F) with oxygen measurement and inert liquid)

#### Explosion-proof “Intrinsic safety” to INMETRO (Brazil)

#### Explosion-proof “Intrinsic safety” to NEPSI (China)

#### Explosion protection "Explosion-proof" to NEPSI (China)

#### Explosion-proof "Zone II" to NEPSI (China)

#### Interchanging of process connection side

#### Vent on side for gas measurements

#### Stainless steel process flanges for vertical differential pressure lines

---

1. When the manufacture’s certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2. When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.

3. Not suitable for connection of remote seal
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Measuring range to be set</th>
<th>Order code</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add &quot;-Z&quot; to Order No. and specify Order code.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring range to be set</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• With linear characteristic (max. 5 digits):</td>
<td>Y01</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y01: ... up to ... mbar, bar, kPa, MPa, psi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• With square-rooted characteristic (max. 5 digits):</td>
<td>Y02</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y02: ... up to ... mbar, bar, kPa, MPa, psi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring point number (TAG No.)</td>
<td>Y15</td>
<td>✓ ✓ ✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. 16 char., specify in plain text: Y15: ......</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring point text</td>
<td>Y16</td>
<td>✓ ✓ ✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. 27 char., specify in plain text: Y16: ......</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entry of HART address (TAG)</td>
<td>Y17</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. 8 char., specify in plain text: Y17: ......</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indicator in pressure units</td>
<td>Y21</td>
<td>✓ ✓ ✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The following pressure units can be selected: bar, mbar, mm H₂O*), inH₂O*), ftH₂O*), mmHg, inHg, psi, kPa, MPa, g/cm², kg/cm², Torr, ATM oder %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*) ref. temperature 20 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indicator in non-pressure units</td>
<td>Y22</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text:</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y22: ...... up to ...... l/min, m³/h, m, USgpm, ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(specification of measuring range in pressure units &quot;Y01&quot; or &quot;Y02&quot; is essential, unit with max. 5 characters)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preset bus address</td>
<td>Y25</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(possible between 1 and 126)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text: Y25: .....................</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Only "Y01", "Y21", "Y22", "Y25" and "D05" can be factory preset

✓ = available

1) Preset values can only be modified over SIMATIC PDM.

2) Not together with over-filling safety device for flammable and non-flammable liquids (Order code "E08")
### Selection and Ordering data

**Order No.**

<table>
<thead>
<tr>
<th>SITRANS P pressure transmitters for differential pressure and flow, Series DS III HART MWP 6092 psi (PN 420)</th>
<th>7 MF 4 5 3 3 -</th>
</tr>
</thead>
</table>

#### Measuring cell filling

<table>
<thead>
<tr>
<th>Measuring cell cleaning</th>
<th>Silicone oil</th>
<th>Standard</th>
<th>1</th>
</tr>
</thead>
</table>

#### Span

| 1.004 ... 100.4 inH₂O | 2.5 ... 250 mbar | D |
| 2.409 ... 240.9 inH₂O | 6 ... 600 mbar | E |
| 6.424 ... 642.4 inH₂O | 16 ... 1600 mbar | F |
| 20.08 ... 2008 inH₂O | 50 ... 5000 mbar | G |
| 4.35 ... 435 psi | 0.3 ... 30 bar | H |

#### Wetted parts materials

<table>
<thead>
<tr>
<th>Stainless steel process flanges</th>
<th>Seal diaphragm</th>
<th>Parts of measuring cell</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Stainless steel</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Gold1)</td>
<td>Gold</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

#### Process connection

<table>
<thead>
<tr>
<th>Female thread ¼-18 NPT with flange connection</th>
<th>Sealing screw opposite process connection</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Mounting thread 7/16-20 UNF to EN 61518</td>
<td>(only for replacement needs)</td>
<td>B</td>
</tr>
<tr>
<td>- Mounting thread M12 to DIN 19213</td>
<td>(only for replacement needs)</td>
<td>C</td>
</tr>
<tr>
<td>- Vents on side of process flanges. Position of the top vent valve in the process flanges (see dimensional drawing).</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>- Mounting thread 7/16-20 UNF to EN 61518</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>- Mounting thread M12 to DIN 19213</td>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

#### Non-wetted parts materials

<table>
<thead>
<tr>
<th>Process flange screws</th>
<th>Electronics housing</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Die-cast aluminium</td>
<td>B</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel precision casting2)</td>
<td>C</td>
</tr>
</tbody>
</table>

#### Version

- Standard version
- International version, English label inscriptions, documentation in 5 languages on CD

#### Explosion protection

- Without
- With ATEX, Type of protection:
  - "Intrinsic safety (Ex ia)"
  - "Explosion-proof (Ex d)"3)
  - "Intrinsic safety and explosion-proof enclosure (Ex ia + Ex d)"4)
  - "Ex na/nL (zone 2)"
  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + EEx d + Zone 1D/2D)"4)
- With FM + CSA, Type of protection:
  - "Intrinsic safety and explosion-proof (is + xp)"5), max PN 360

#### Electrical connection / cable entry

- Screwed gland Pg 13.55)
- Screwed gland M20x1.5
- Screwed gland ½-14 NPT
- Han 7D plug (plastic housing) incl. mating connector5)
- M12 connectors (metal)6)

---

1) Not together with max. span 240.9 inH₂O (600 mbar)
2) Not together with Electrical connection “Screwed gland Pg 13.5” and “Han7D plug”.
3) Without cable gland, with blanking plug
4) With enclosed cable gland Ex ia and blanking plug
5) Not together with type of protection “Explosion-proof” and and type of protection “Ex nA”.
6) Cannot be used together with the following types of protection: “Explosion-proof” and “Intrinsic safety and explosion-proof”.

---

© Siemens AG 2010

Factory-mounting of shut-off valves and valve manifolds see page 2/136.

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

---

© Siemens AG 2010
### SITRANS P measuring instruments for pressure

Transmitters for gauge, absolute and differential pressure, flow and level

#### DS III series

for differential pressure and flow

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P pressure transmitters for differential pressure and flow, Series DS III HART MWP 6092 psi (PN 420)</td>
<td>7 M F 4 5 3 4 -</td>
</tr>
<tr>
<td>DS III PA (PROFIBUS PA) series</td>
<td>7 M F 4 5 3 5 -</td>
</tr>
<tr>
<td>DS III FF series (FOUNDATION Fieldbus)</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Nominal measuring range

- 100.4 inH2O (250 mbar) D
- 240.9 inH2O (600 mbar) E
- 642.4 inH2O (1600 mbar) F
- 2008 inH2O (5 bar) G
- 435 psi (30 bar) H

#### Wetted parts materials

- (stainless steel process flanges)
  - Seal diaphragm: Parts of measuring cell A
  - Stainless steel: Stainless steel
  - Hastelloy: Stainless steel
  - Gold: Gold

#### Process connection

- Female thread ¾-18 NPT with flange connection
  - Sealing screw opposite process connection
    - Mounting thread fined 1/2-12 NPT UNF to EN 61518 3
    - Mounting thread M12 to DIN 19213 (only for replacement needs) 1
  - Venting on side of process flanges. Position of the top vent valve in the process flanges (see dimensional drawing).
    - Mounting thread 1/2-20 UNF to EN 61518 7
    - Mounting thread M12 to DIN 19213 (only for replacement needs) 5

#### Non-wetted parts materials

- Process flange screws: Electronics housing 2
- Stainless steel: Die-cast aluminium 3
- Stainless steel: Stainless steel precision casting

#### Version

- Standard version 1
- International version, English label inscriptions, documentation in 5 languages on CD 2

#### Explosion protection

- Without A
- With ATEX, Type of protection:
  - "Intrinsic safety (Ex ia)" B
  - "Explosion-proof (EEx d)" \(^2\) D
  - "Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)" \(^3\) P
  - "Ex nA/nL (zone 2)" E
  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)" \(^3\) (not for DS III FF) R
- With FM + CSA, Type of protection:
  - "Intrinsic safety and explosion-proof (is + xp)" \(^2\) \(^3\), max PN 360 NC

#### Electrical connection / cable entry

- Screwed gland M20x1.5 B
- Screwed gland ¾-14 NPT C
- Plug M12 incl. mating connector F

---

**Display**

- Without indicator 0
- Without visible digital indicator 1
- With visible digital indicator 6
- With customer-specific digital indicator (setting as specified, Order code "Y21" or required) 7

Available ex stock

Factory-mounting of shut-off valves and valve manifolds see page 2/136.

Included in delivery of the device:

- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) Not together with max. span 240.9 inH2O (600 mbar)
2) Without cable gland, with blanking plug.
3) With enclosed cable gland EEx ia and blanking plug.
4) Not together with types of protection "Explosion-proof" and "Intrinsic safety and explosion-proof"
<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
<th>HART</th>
<th>PA</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection and Ordering data</td>
<td>Order code</td>
<td>HART</td>
<td>PA</td>
<td>FF</td>
</tr>
<tr>
<td>Pressure transmitter with mounting bracket made of:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Steel</td>
<td>A01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stainless steel</td>
<td>A02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O-rings for process flanges (instead of FPM (Viton))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PTFE (Teflon)</td>
<td>A20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FEP (with silicone core, approved for food)</td>
<td>A21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FFPM (Kalrez, compound 4079)</td>
<td>A22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• NBR (Buna N)</td>
<td>A23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plug</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Han 7D (metal, gray)</td>
<td>A30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Han 8U (instead of Han 7D)</td>
<td>A31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sealing screws</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¼-18 NPT, with vent valve in material of process flanges</td>
<td>A40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable sockets for M12 connectors (metal)</td>
<td>A50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating plate inscription (instead of German)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• English</td>
<td>B11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• French</td>
<td>B12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Spanish</td>
<td>B13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Italian</td>
<td>B14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English rating plate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure units in inH₂O or psi</td>
<td>B21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality inspection certificate (Factory calibration) to IEC 60770-2</td>
<td>C11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptance test certificate</td>
<td>C12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To EN 10204:3.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factory certificate</td>
<td>C14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To EN 10204:2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Functional Safety (SIL)&quot; certificate</td>
<td>C20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;PROFIsafe&quot; certificate and protocol</td>
<td>C21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting of upper limit of output signal to 22.0 mA</td>
<td>D05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturer’s declaration acc. to NACE (only together with seal diaphragm made of Hastelloy and stainless steel)</td>
<td>D07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of protection IP68 (only for M20x1.5 and ½-14 NPT)</td>
<td>D12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(not together with Han 7D / Han 8U plug, Pg 13.5 screwed gland)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital indicator alongside the pushbuttons (only together with the devices 7MF4533-….2-..-A.6 or -A.7-Z, Y21 or Y22 + Y01)</td>
<td>D27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use in or on zone 1D/2D (only together with type of protection &quot;Intrinsic safety (Ex ia)&quot;)</td>
<td>E01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use on zone 0 (only together with type of protection &quot;Intrinsic safety (Ex ia)&quot;)</td>
<td>E02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion-proof &quot;Intrinsic safety&quot; to INMETRO (Brazil) (only for transmitter 7MF4-.....-B..)</td>
<td>E25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion-proof &quot;Intrinsic safety&quot; to NEPSI (China) (only for transmitter 7MF4-.....-B..)</td>
<td>E55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion protection &quot;Explosion-proof&quot; to NEPSI (China) (only for transmitter 7MF4-.....-D..)</td>
<td>E56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion-proof &quot;Zone 2&quot; to NEPSI (China) (only for transmitter 7MF4-.....-E..)</td>
<td>E57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interchanging of process connection side (only for transmitter 7MF4...-.....-.E..)</td>
<td>H01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel process flanges for vertical differential pressure lines</td>
<td>H03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional data (only together with seal diaphragm made of Hastelloy and stainless steel)</td>
<td>H03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated pressure indication in units &quot;Y01&quot; or &quot;Y02&quot; is essential, unit with specification of measuring range in pressure units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. 5 digits:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y01: ... up to ... mbar, bar, kPa, MPa, psi,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y02: ... up to ... mbar, bar, kPa, MPa, psi,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring point number (TAG No.)</td>
<td>Y15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. 16 characters, specify in plain text:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y15:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring point text</td>
<td>Y16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. 27 characters, specify in plain text:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y16:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indication in pressure units</td>
<td>Y21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text (standard setting: mA):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y21: mbar, bar, kPa, MPa, psi,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The following pressure units can be selected:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bar, mbar, mm H₂O², inH₂O², ftH₂O², mmH₂G, inH₂G, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) If rel. temperature 20 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting of pressure indication in non-pressure units</td>
<td>Y22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text (Y22: ... up to ... l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units &quot;Y01&quot; or &quot;Y02&quot; is essential, unit with max. 5 characters))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y21 or Y02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preset bus address (possible between 1 and 126)</td>
<td>Y25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y25:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Only "Y01", "Y21", "Y22", "Y25" and "D05" can be factory preset

1) Preset values can only be modified over SIMATIC PDM.
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for differential pressure and flow

Dimensional drawings

1. Process connection: ¼-18 NPT (EN 61518)
2. Blanking plug
3. Electrical connection:
   - screwed gland Pg 13,5 (adapter)
   - screwed gland M20x1,5
   - screwed gland ½-14 NPT or
   - Han 7D/ Han 8U plug
4. Terminal side
5. Electronics side, digital display (longer overall length for cover with window)
6. Protective cover over keys
7. Mounting bracket (option)
8. Sealing screw (optionally with vent valve)
9. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
10. Lateral venting for liquid measurement (Standard)
11. Lateral venting for gas measurement (suffix H02)

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) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator
5) 45 mm (1.8 inch) for Pg 13.5 with adapter

SITRANS P pressure transmitters, DS III HART series for differential pressure and flow, dimensions in mm (inch)
SITRANS P pressure transmitters, DS III PA and FF series for differential pressure and flow, dimensions in mm (inch)

1. Process connection: ¼-18 NPT (EN 61518)
2. Blank plug
3. Electrical connection:
   - screwed gland M20x1.5 (4),
   - screwed gland ½-14 NPT or
   - PROFIBUS plug M12 (3)
4. Terminal side
5. Electronic side, digital display (longer overall length for cover with window)
6. Protective cover over keys
7. Mounting bracket (option)
8. Sealing screw (optionally with vent valve)
9. Screw cover – safety bracket (only for explosion-proof enclosure, not shown in the drawing)
10. Lateral venting for liquid measurement (Standard)
11. Lateral venting for gas measurement (suffix H02)

1. Allow approx. 20 mm (0.79 inch) thread length in addition
2. 92 mm (3.62 inch) for minimum distance to permit rotation with indicator
3. Not with type of protection "explosion-proof enclosure"
4. Not with type of protection "FM + CSA"
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for differential pressure and flow

1 Process connection: ¼-18 NPT (EN 61518)
2 Blanking plug
3 Electrical connection:
   - screwed gland Pg 13,5 (adapter) ² ³, ³)
   - screwed gland M20x1.5 ³), ³)
   - screwed gland ⅜-14 NPT or
   - Han 7D/ Han 8U plug ² ³)
4 Terminal side
5 Electronics side, digital display (longer overall length for cover with
   window)
6 Protective cover over keys
7 Mounting bracket (option)
8 Sealing screw (optionally with vent valve)
9 Screw cover - safety bracket (only for type of protection
   "Explosion-proof enclosure", not shown in the drawing)

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) 92 mm (3.6 inch) for minimum distance to permit
   rotation with indicator
5) 74 mm (2.9 inch) for PN ≤ 420 (MWP ≤ 6092 psi)
6) 91 mm (3.6 inch) for PN ≤ 420 (MWP ≤ 6092 psi)
7) 219 mm (8.62 inch) for PN ≤ 420 (MWP ≤ 6092 psi)
8) 45 mm (1.8 inch) for Pg 13,5 with adapter

SITRANS P pressure transmitters, DS III HART series for differential pressure and flow, with process covers for vertical differential pressure lines, option "H03", dimensions in mm (inch)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for differential pressure and flow

1. Process connection ¼-18 NPT (EN 61 518)
2. Blanking plug
3. Electrical connection:
   - screwed gland M20x1.5
   - screwed gland ½-14 NPT or
   - PROFIBUS plug M12
4. Terminal side
5. Electronics side, digital display (longer overall length for cover with window)
6. Protective cover over keys
7. Mounting bracket (option)
8. Sealing screw (optionally with vent valve)
9. Screw cover safety bracket (only for explosion-proof enclosure, not shown in the drawing)

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) 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
5) 74 mm (2.9 inch) for PN ≤ 420 (MWP ≤ 6092 psi)
6) 91 mm (3.6 inch) for PN ≤ 420 (MWP ≤ 6092 psi)
7) 219 mm (8.62 inch) for PN ≤ 420 (MWP ≤ 6092 psi)

SITRANS P pressure transmitters, DS III PA and FF series for differential pressure and flow, with process covers for vertical differential pressure lines, option „H03“, dimensions in mm (inch)
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for differential pressure and flow

SITRANS P pressure transmitters, DS III FF series for differential pressure and flow, with digital indicator beside control keys, for vertical differential pressure lines, option „D27“, dimensions in mm (inch)

SITRANS P pressure transmitters, DS III series for differential pressure and flow, with digital indicator beside control keys
# Technical specifications

## SITRANS P, DS III series for level

<table>
<thead>
<tr>
<th>Input</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Spans (infinitely adjustable) or nominal measuring range and max. permissible working pressure</td>
<td>Span</td>
<td>Maximum working pressure</td>
</tr>
<tr>
<td>0.36 ... 3.63 psi g</td>
<td>See “Mounting flange”</td>
<td>3.63 psi g</td>
</tr>
<tr>
<td>(25 ... 250 mbar g)</td>
<td></td>
<td>(250 mbar g)</td>
</tr>
<tr>
<td>0.36 ... 8.7 psi g</td>
<td>See “Mounting flange”</td>
<td>8.7 psi g</td>
</tr>
<tr>
<td>(25 ... 600 mbar g)</td>
<td></td>
<td>(600 mbar g)</td>
</tr>
<tr>
<td>0.77 ... 23.2 psi g</td>
<td>See “Mounting flange”</td>
<td>23.2 psi g</td>
</tr>
<tr>
<td>(53 ... 1600 mbar g)</td>
<td></td>
<td>(1600 mbar g)</td>
</tr>
<tr>
<td>2.32 ... 72.5 psi g</td>
<td>See “Mounting flange”</td>
<td>72.5 psi g</td>
</tr>
<tr>
<td>(160 ... 5000 mbar g)</td>
<td></td>
<td>(5000 mbar g)</td>
</tr>
</tbody>
</table>

Lower measuring limit
- Measuring cell with silicone oil filling
  - 100% of max. span or 0.435 psi a (30 mbar), depending on mounting flange

Upper measuring limit
- 100% of the max. nominal measuring range

<table>
<thead>
<tr>
<th>Output</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA</td>
<td>Digital PROFIBUS PA or FOUNDATION Fieldbus signal</td>
</tr>
<tr>
<td>• Lower limit (infinitely adjustable)</td>
<td>3.55 mA, factory preset to 3.84 mA</td>
<td>-</td>
</tr>
<tr>
<td>• Upper limit (infinitely adjustable)</td>
<td>23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA</td>
<td>-</td>
</tr>
<tr>
<td>Load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Without HART communication</td>
<td>$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>$U_H$ : Power supply in V</td>
<td>-</td>
</tr>
<tr>
<td>• With HART communication</td>
<td>$R_B = 230 \ldots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \ldots 1100 \Omega$ (HART Communicator)</td>
<td>-</td>
</tr>
<tr>
<td>Physical bus</td>
<td>-</td>
<td>IEC 61158-2</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.</td>
<td></td>
</tr>
</tbody>
</table>

## Accuracy

<table>
<thead>
<tr>
<th>Reference conditions (All error data refer always refer to the set span)</th>
<th>To EN 60770-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error in measurement and fixed-point setting (including hysteresis and repeatability)</td>
<td>Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F) r: Span ratio (r = max. span / set span)</td>
</tr>
<tr>
<td>Linear characteristic</td>
<td>≤ 0.15 %</td>
</tr>
<tr>
<td>- r ≤ 10</td>
<td>≤ 0.15 %</td>
</tr>
<tr>
<td>- 10 &lt; r ≤ 30</td>
<td>≤ 0.3 %</td>
</tr>
<tr>
<td>- 30 &lt; r ≤ 100</td>
<td>≤ (0.0075 \cdot r + 0.075) %</td>
</tr>
<tr>
<td>Long-term drift (temperature change ±30 °C (±54 °F))</td>
<td>≤ (0.25 \cdot r) % every 5 years static pressure max. 1015 psi g (70 bar g)</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td>≤ (0.25 % every 5 years static pressure max. 1015 psi g (70 bar g))</td>
</tr>
<tr>
<td>• at -10 ... +60 °C (14 ... 140 °F)</td>
<td></td>
</tr>
<tr>
<td>- 3.63 psi (250 mbar) measuring cell</td>
<td>≤ (0.5 \cdot r + 0.2) % (0.4 instead of 0.2 with 10 &lt; r ≤ 30)</td>
</tr>
<tr>
<td>- 8.7 psi (600 mbar) measuring cell</td>
<td>≤ (0.3 \cdot r + 0.2) % (0.4 instead of 0.2 with 10 &lt; r ≤ 30)</td>
</tr>
<tr>
<td>- 23.2 and 72.5 psi (1600 and 5000 mbar) measuring cells</td>
<td>≤ (0.25 \cdot r + 0.2) % (0.4 instead of 0.2 with 10 &lt; r ≤ 30)</td>
</tr>
<tr>
<td>• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)</td>
<td></td>
</tr>
<tr>
<td>- 3.63 psi (250 mbar) measuring cell</td>
<td>≤ (0.25 \cdot r + 0.15) %/10 K double values with 10 &lt; r ≤ 30</td>
</tr>
<tr>
<td>- 8.7 psi (600 mbar) measuring cell</td>
<td>≤ (0.15 \cdot r + 0.15) %/10 K double values with 10 &lt; r ≤ 30</td>
</tr>
<tr>
<td>- 23.2 and 72.5 psi (1600 and 5000 mbar) measuring cells</td>
<td>≤ (0.12 \cdot r + 0.15) %/10 K double values with 10 &lt; r ≤ 30</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
Influence of static pressure

<table>
<thead>
<tr>
<th>Static Pressure</th>
<th>Zero Point</th>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.63 psi (250 mbar)</td>
<td>(0.3 \times r)% per nominal pressure</td>
<td>(0.3 \times r)% per nominal pressure</td>
</tr>
<tr>
<td>8.7 psi (600 mbar)</td>
<td>(0.15 \times r)% per nominal pressure</td>
<td>(0.15 \times r)% per nominal pressure</td>
</tr>
<tr>
<td>23.2 and 72.5 psi (1600 and 5000 mbar)</td>
<td>(0.1 \times r)% per nominal pressure</td>
<td>(0.1 \times r)% per nominal pressure</td>
</tr>
</tbody>
</table>

Measured Value Resolution
- \(3 \times 10^{-5}\) of nominal measuring range

Rated operating conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection (to EN 60529)</td>
<td>IP65</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-30 ... +85 °C (-22 ... +185 °F)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-50 ... +85 °C (-58 ... +185 °F)</td>
</tr>
</tbody>
</table>

Ambient conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-30 ... +85 °C (-22 ... +185 °F)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-50 ... +85 °C (-58 ... +185 °F)</td>
</tr>
</tbody>
</table>

Electromagnetic compatibility
- Emitted interference and interference immunity
  - To EN 61326 and NAMUR NE 21

Design

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (without options)</td>
<td>(\approx 11 ... 13) kg ((\approx 24.2 ... 28.7) lb)</td>
</tr>
<tr>
<td>Wetted parts material</td>
<td>Low copper die-cast aluminium, GD-AlSi12 or stainless steel precision casting, mat. No. 1.4408</td>
</tr>
<tr>
<td>Housing material</td>
<td>Stainless steel, mat. No. 1.4404/316L, Monel, mat. No. 2.4360, Hastelloy B2, mat. No. 2.4617, Hastelloy C276, mat. No. 2.4819, Hastelloy C4, mat. No. 2.4610, tantalum, PTFE, ECTFE</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Silicone oil</td>
</tr>
<tr>
<td>Process connection</td>
<td>Female thread (\frac{1}{4}-18) NPT and flange connection with mounting thread M10 to DIN 19213 or (\frac{7/16}{14}) UNF to EN 61518</td>
</tr>
</tbody>
</table>

Power supply \(U_{H}\)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal voltage on transmitter</td>
<td>10.5 ... 45 V DC</td>
</tr>
<tr>
<td>Separate 24 V power supply necessary</td>
<td>-</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>-</td>
</tr>
<tr>
<td>Current consumption</td>
<td>-</td>
</tr>
<tr>
<td>Basic current (max.)</td>
<td>12.5 mA</td>
</tr>
<tr>
<td>Startup current ≤ basic current</td>
<td>Yes</td>
</tr>
<tr>
<td>Max. current in event of fault</td>
<td>15.5 mA</td>
</tr>
</tbody>
</table>

Fault disconnection electronics (FDE) available
- Yes
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for level

### Certificate and approvals

<table>
<thead>
<tr>
<th>Classification and approvals</th>
<th>HART</th>
<th>PROFIBUS PA or FOUNDATION Fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification according to pressure equipment directive (DRGL 97/23/EC)</td>
<td>For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)</td>
<td></td>
</tr>
<tr>
<td><strong>Explosion protection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Intrinsic safety 'i'</td>
<td>PTB 99 ATEX 2122</td>
<td>PTB 99 ATEX 1160</td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 1/2 G Ex ia IIB/IIC T4/T6</td>
<td>Ex II 1/2 G Ex d IIC T4/T6</td>
</tr>
<tr>
<td>- Permissible ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F) temperature class T4; +40 ... +60 °C (-40 ... +140 °F) temperature class T6</td>
<td>-40 ... +85 °C (-40 ... +185 °F) temperature class T4; +40 ... +60 °C (-40 ... +140 °F) temperature class T6</td>
</tr>
<tr>
<td>- Connection</td>
<td>To certified intrinsically-safe circuits with maximum values: $U_i = 30 , V$, $I_i = 100 , mA$, $P_i = 300 , mW$, $R_i = 750 , \Omega$</td>
<td>FISCO supply unit: $U_o = 30 , V$, $I_o = 380 , mA$, $P_o = 15.32 , W$</td>
</tr>
<tr>
<td>- Effective internal inductance/capacitance</td>
<td>$L_i = 0.4 , mH$, $C_i = 6 , nF$</td>
<td>$L_i = 7 , \mu H$, $C_i = 1.1 , nF$</td>
</tr>
<tr>
<td>• Explosion-proof &quot;d&quot;</td>
<td>PTB 99 ATEX 2122</td>
<td>PTB 99 ATEX 1160</td>
</tr>
<tr>
<td>- Identification</td>
<td>Ex II 1/2 G Ex d IIC T4/T6</td>
<td>Ex II 1/2 G Ex d IIC T4/T6</td>
</tr>
<tr>
<td>- Permissible ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F) temperature class T4; +40 ... +60 °C (-40 ... +140 °F) temperature class T6</td>
<td>-40 ... +85 °C (-40 ... +185 °F) temperature class T4; +40 ... +60 °C (-40 ... +140 °F) temperature class T6</td>
</tr>
<tr>
<td>- Connection</td>
<td>To circuits with values: $U_i = 10.5 ... 45 , V$ DC</td>
<td>To circuits with values: $U_i = 9 ... 32 , V$ DC</td>
</tr>
</tbody>
</table>

### Type of protection "n" (zone 2)

<table>
<thead>
<tr>
<th>Identification</th>
<th>TÜV 01 ATEX 1696 X</th>
<th>TÜV 01 ATEX 1696 X</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identification</td>
<td>Ex II 2 G Ex x nAL IIC T4/T5/T6</td>
<td>Ex II 2 G Ex x nAL IIC T4/T5/T6</td>
</tr>
</tbody>
</table>

### Explosion protection to FM

<table>
<thead>
<tr>
<th>Identification (XP/DIP) or (IS); (NI)</th>
<th>TÜV 01 ATEX 1696 X</th>
<th>TÜV 01 ATEX 1696 X</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identification</td>
<td>CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III</td>
<td>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</td>
</tr>
</tbody>
</table>

### Explosion protection to CSA

<table>
<thead>
<tr>
<th>Identification (XP/DIP) or (IS)</th>
<th>Certificate of Compliance 1153651</th>
<th>Certificate of Compliance 1153651</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identification</td>
<td>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</td>
<td>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</td>
</tr>
</tbody>
</table>
### DS III series for level

#### HART communication

- **HART communication**: 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 or local operation (standard setting address 126)
- **Cyclic data usage**
  - **Output byte**: 5 (one measuring value) or 10 (two measuring 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**
  - **Analog input**
    - Adaptation to customer-specific process variables: Yes, linearly rising or falling characteristic
    - Electrical damping T63, adjustable: 0 ... 100 s
    - Simulation function: Input/Output
    - Failure mode: Can be parameterized (last good value, substitute value, incorrect value)
    - Limit monitoring: Yes, one upper and lower warning limit and one alarm limit respectively
  - **Register (totalizer)**
    - Can be reset, preset, optional direction of counting, simulation function of register output
    - Failure mode: Can be parameterized (summation with last good value, continuous summation, summation with incorrect value)
    - Limit monitoring: One upper and lower warning limit and one alarm limit respectively
  - **Physical block**
  - **Transducer blocks**
    - Pressure transducer block
      - Can be calibrated by applying two pressures: Yes
      - Monitoring of sensor limits: Yes
      - Characterizer: Max. 30 points
      - Square-rooted characteristic for flow measurement: Yes, constant value or over parameterizable ramp function
      - Gradual volume suppression and implementation point of square-root extraction: Parameterizable
      - Simulation function for measured pressure value and sensor temperature: Constant value or over parameterizable ramp function

#### Communication FOUNDATION Fieldbus

- **Function blocks**: 3 function blocks analog input, 1 function block PID
  - Analog input
    - Adaptation to customer-specific process variables: Yes, linearly rising or falling characteristic
  - Electrical damping T63, adjustable: 0 ... 100 s
  - Simulation function: Output/input (can be locked within the device with a bridge)
  - Failure mode: Can be parameterized (last good value, substitute value, incorrect value)
  - Limit monitoring: Yes, one upper and lower warning limit and one alarm limit respectively
  - Square-rooted characteristic for flow measurement: Yes
  - **PID**
    - Standard FF function block
  - **Physical block**
    - 1 Resource block
  - **Transducer blocks**
    - 1 transducer block Pressure with calibration, 1 transducer block LCD
  - **Pressure transducer block**
    - Can be calibrated by applying two pressures: Yes
    - Monitoring of sensor limits: Yes
    - Simulation function: Measured pressure value, sensor temperature and electronics temperature

#### Mounting flange

- **Nom. diam.**
  - To EN 1092-1
    - DN 80
    - DN 100
  - To ASME B16.5
    - 3 inch
    - 4 inch
- **Nom. press.**
  - PN 40
  - PN16, PN40
  - Class 150, class 300
  - Class 150, class 300
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series for level

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P pressure transmitters for level series DS III HART</td>
<td>7MF4633-...</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Measuring cell cleaning</td>
</tr>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Span</td>
<td></td>
</tr>
<tr>
<td>10 ... 100 inH₂O (25 ... 250 mbar)</td>
<td>D</td>
</tr>
<tr>
<td>10 ... 240 inH₂O (25 ... 600 mbar)</td>
<td>E</td>
</tr>
<tr>
<td>22 ... 640 inH₂O (53 ... 1600 mbar)</td>
<td>F</td>
</tr>
<tr>
<td>64 ... 2 000 inH₂O (0.16 ... 5 bar)</td>
<td>G</td>
</tr>
<tr>
<td>Process connection of low-pressure side</td>
<td></td>
</tr>
<tr>
<td>Female thread ¼-18 NPT with flange connection</td>
<td></td>
</tr>
<tr>
<td>Mounting thread ( \frac{7}{16} \text{-} 20 \text{ UNF} ) to EN 61518</td>
<td>2</td>
</tr>
<tr>
<td>Mounting thread M10 to DIN 19213 (only for replacement needs)</td>
<td>0</td>
</tr>
<tr>
<td>Non-wetted parts materials</td>
<td></td>
</tr>
<tr>
<td>Process flange screws</td>
<td>Electronics housing</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Die-cast aluminium</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel precision casting (^1)</td>
</tr>
<tr>
<td>Version</td>
<td></td>
</tr>
<tr>
<td>Standard version</td>
<td>1</td>
</tr>
<tr>
<td>International version, English label inscriptions, documentation in 5 languages on CD</td>
<td>2</td>
</tr>
<tr>
<td>Explosion protection</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>A</td>
</tr>
<tr>
<td>With ATEX, Type of protection:</td>
<td></td>
</tr>
<tr>
<td>- <em>Intrinsic safety (EEx ia)</em></td>
<td>B</td>
</tr>
<tr>
<td>- <em>Explosion-proof (EEx d)</em> (^2)</td>
<td>D</td>
</tr>
<tr>
<td>- <em>Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)</em> (^3)</td>
<td>P</td>
</tr>
<tr>
<td>- <em>Ex na/mL (zone 2)</em></td>
<td>E</td>
</tr>
<tr>
<td>- <em>Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)</em> (^3)</td>
<td>R</td>
</tr>
<tr>
<td>With FM + CSA, Type of protection:</td>
<td></td>
</tr>
<tr>
<td>- <em>Intrinsic safety and explosion-proof (is + xp)</em> (^1)</td>
<td>NC</td>
</tr>
<tr>
<td>Electrical connection / cable entry</td>
<td></td>
</tr>
<tr>
<td>Screwed gland Pg 13.5 (^4)</td>
<td>A</td>
</tr>
<tr>
<td>Screwed gland M20x1.5</td>
<td>B</td>
</tr>
<tr>
<td>Screwed gland ¾-14 NPT</td>
<td>C</td>
</tr>
<tr>
<td>Han 7D plug (plastic housing) incl. mating connector (^4)</td>
<td>D</td>
</tr>
<tr>
<td>M12 connectors (metal) (^5)</td>
<td>F</td>
</tr>
<tr>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>Without indicator</td>
<td>0</td>
</tr>
<tr>
<td>Without visible digital indicator (digital indicator hidden, setting: mA)</td>
<td>1</td>
</tr>
<tr>
<td>With visible digital indication</td>
<td>6</td>
</tr>
<tr>
<td>With customer-specific digital indicator (setting as specified, Order code “Y21” or “Y22” required)</td>
<td>7</td>
</tr>
</tbody>
</table>

Available ex stock

Ordering information:
1st order item: Pressure transmitter 7MF4633-...
2nd order item: Mounting flange 7MF4912-3...

Ordering example:
Item line 1: 7MF4633-1DY22-1AC1-Z
B line: Y01
C line: Y01: 32 to 58 inH₂O (80 to 143 mbar)
Item line 2: 7MF4812-3QA01

Power supply units see “SITRANS I power supply units and isolation amplifiers”.

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

\(^1\) Not together with Electrical connection „Screwed gland Pg 13.5” and „Han7D plug”.
\(^2\) Without cable gland, with blanking plug.
\(^3\) With enclosed cable gland EEx ia and blanking plug.
\(^4\) Not together with type of protection “Explosion-proof” and type of protection “Ex nA”.
\(^5\) M12 delivered without cable socket.
**SITRANS P measuring instruments for pressure**

Transmitters for gauge, absolute and differential pressure, flow and level

### DS III series for level

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P pressure transmitter for level</td>
<td></td>
</tr>
<tr>
<td>7MF4634 -</td>
<td></td>
</tr>
<tr>
<td>DS III PA series (PROFIBUS PA)</td>
<td></td>
</tr>
<tr>
<td>7MF4635 -</td>
<td></td>
</tr>
<tr>
<td>DS III FF series (FOUNDATION Fieldbus)</td>
<td></td>
</tr>
</tbody>
</table>

**Nominal measuring range**

<table>
<thead>
<tr>
<th>100 inH₂O (250 mbar)</th>
<th>240 inH₂O (600 mbar)</th>
<th>640 inH₂O (1600 mbar)</th>
<th>2 000 inH₂O (5 bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
</tr>
</tbody>
</table>

**Process connection of low-pressure side**

- Female thread ¾-18 NPT with flange connection
- Mounting thread M10 to DIN 19213 (only for replacement needs)
- Mounting thread ½-14 UNF to EN 61518

**Non-wetted parts materials**

- Process flange screws
- Electronics housing
  - Stainless steel
  - Die-cast aluminium
  - Stainless steel precision casting

**Version**

- Standard version
- International version, English label inscriptions, documentation in 5 languages on CD

**Expansion protection**

- Without
- With ATEX, Type of protection:
  - *Intrinsic safety (Ex ia)*
  - *Ex-proof (Ex d)*
  - *Intrinsic safety and explosion-proof enclosure (Ex ia + Ex d)*
  - *Ex ia/nL (Zone 2)*
  - *Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d)*
  - *Ex ia/nA/nL (Zone 2)*
  - *Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D)*
  - *Ex ia (1D)*

**Electrical connection / cable entry**

- Screwed gland M20x1.5
- Screwed gland ¾-14 NPT
- Plug M12 incl. mating connector

**Display**

- Without indicator
- With visible digital indicator (digital indicator hidden, setting: mA)
- With visible digital indication
- With customer-specific digital indication (setting as specified, Order code "Y21" or required)

**Further designs**

Add "Z" to Order No. and specify Order code.

**O-rings for process flanges on low-pressure side**

- (instead of FPM (Viton))
  - PTFE (Teflon)
  - FEP (with silicone core, approved for food)
  - FFPM (Kalrez, compound 4079)
  - NBR (Buna N)

**Plug**

- Han 7D (metal, gray)
- Han 8U (instead of Han 7D)

**Sealing screws**

- ¼-18 NPT, with vent valve in material of process flanges

**Cable sockets for M12 connectors (metal)**

**Rating plate inscription**

(Instead of German)

- English
- French
- Spanish
- Italian
- Chinese

**Rating plate**

- Pressure units in inH₂O or psi
- Quality inspection certificate (Factory calibration) to IEC 60770-2
- Acceptance test certificate
- To EN 10204-3.1
- Factory certificate
- To EN 10204-2.2
- "Functional Safety (SIL)" certificate
- "PROFIsafe" certificate and protocol
- Setting of upper limit of output signal to 22.0 mA
- Type of protection IP68 (only for M20x1.5 and ¾-14 NPT)
- Supplied with oval flange (1 item)
- PTUE packing and stainless steel screws in thread of process flange
- Use on zone 1D / 2D (only together with type of protection *Intrinsic safety (Ex ia)*)
- Use on zone 0 (only together with type of protection *Intrinsic safety (Ex ia)*)
- Overfilling safety device for flammable and non-flammable liquids (max. PN 32 (MVWP 464 psi), basic device with type of protection *Intrinsic safety (EEx ia)*)
- Explosion-proof "Intrinsic safety" to INMETRO (Brazil) (only for transmitter 7MF4...-....-B...)
- Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-....-B...)
- Explosion protection "Explosion-proof" to NEPSI (China)
- Explosion-proof "Zone 2" to NEPSI (China)
- Interchanging of process connection side

**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 (Leporelo)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) Without cable gland, with blanking plug.
2) With enclosed cable gland EEx ia and blanking plug.
3) M12 delivered without cable socket.

---

© Siemens AG 2010
### Selection and Ordering Data

<table>
<thead>
<tr>
<th>Additional data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add &quot;-Z&quot; to Order No. and specify Order code.</td>
<td>HART</td>
</tr>
<tr>
<td><strong>Measuring range to be set</strong></td>
<td>Y01</td>
</tr>
<tr>
<td>Specify in plain text (max. 5 digits): Y01: ... up to ... mbar, bar, kPa, MPa, psi</td>
<td></td>
</tr>
<tr>
<td><strong>Measuring point number (TAG No.)</strong></td>
<td>Y15</td>
</tr>
<tr>
<td>Max. 16 characters, specify in plain text: Y15: ...........................................</td>
<td></td>
</tr>
<tr>
<td><strong>Measuring point text</strong></td>
<td>Y16</td>
</tr>
<tr>
<td>Max. 27 characters, specify in plain text: Y16: ...........................................</td>
<td></td>
</tr>
<tr>
<td><strong>Entry of HART address (TAG)</strong></td>
<td>Y17</td>
</tr>
<tr>
<td>Max. 8 characters, specify in plain text: Y17: ...........................................</td>
<td></td>
</tr>
<tr>
<td><strong>Setting of pressure indicator in pressure units</strong></td>
<td>Y21</td>
</tr>
<tr>
<td>Specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ...</td>
<td></td>
</tr>
<tr>
<td>Note: The following pressure units can be selected: bar, mbar, mm H₂O, in H₂O, ft H₂O, mmHg, inHg, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or %</td>
<td></td>
</tr>
<tr>
<td>*) ref. temperature 20 °C</td>
<td></td>
</tr>
<tr>
<td><strong>Setting of pressure indicator in non-pressure units</strong></td>
<td>Y22</td>
</tr>
<tr>
<td>(+ Y01) Specify in plain text: Y22: ..... up to ..... l/min, m³/h, m, USgpm, ...</td>
<td></td>
</tr>
<tr>
<td>(specification of measuring range in pressure units &quot;Y01&quot; is essential, unit with max. 5 characters)</td>
<td></td>
</tr>
<tr>
<td><strong>Preset bus address</strong></td>
<td>Y25</td>
</tr>
<tr>
<td>(possible between 1 and 126) Specify in plain text: Y25: .................</td>
<td></td>
</tr>
<tr>
<td>Only &quot;Y01&quot;, &quot;Y21&quot;, &quot;Y22&quot;, &quot;Y25&quot; and &quot;D05&quot; can be factory preset</td>
<td></td>
</tr>
<tr>
<td>✓ = available</td>
<td></td>
</tr>
</tbody>
</table>

1) Not together with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

2) Preset values can only be modified over SIMATIC PDM.
### Dimensional drawings

SITRANS P pressure transmitters, DS III HART series for level, including mounting flange, dimensions in mm (inch)

**Connection to EN 1092-1**

<table>
<thead>
<tr>
<th>Nom. diam.</th>
<th>Nom. press.</th>
<th>b</th>
<th>D</th>
<th>d</th>
<th>d₂</th>
<th>d₄</th>
<th>d₅</th>
<th>d₆</th>
<th>f</th>
<th>k</th>
<th>n</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>DN 80</td>
<td>PN 40</td>
<td>24</td>
<td>200</td>
<td>90</td>
<td>18</td>
<td>138</td>
<td>76</td>
<td>72</td>
<td>2</td>
<td>160</td>
<td>8</td>
<td>0, 50, 100, 150 or 200</td>
</tr>
<tr>
<td>DN 100</td>
<td>PN 40</td>
<td>20</td>
<td>220</td>
<td>115</td>
<td>18</td>
<td>158</td>
<td>94</td>
<td>89</td>
<td>2</td>
<td>180</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>PN 40</td>
<td>PN 40</td>
<td>24</td>
<td>235</td>
<td>115</td>
<td>22</td>
<td>162</td>
<td>94</td>
<td>89</td>
<td>2</td>
<td>190</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

**Connection to ASME B16.5**

| Nom. diam. | Nom. press. | b | D | d₂ | d₄ | d₅ | d₆ | f | k | n | L |
|------------|-------------|---|---|---|---|---|---|---|---|---|---|---|
|            |             | lb/sq.in. | inch | inch | inch | inch | inch | inch | inch | inch | inch |
|            |             | mm         | (mm) | (mm) | (mm) | (mm) | (mm) | (mm) | (mm) | (mm) | (mm) |
| 3 inch     | 150         | 0.94       | (23.8) | 7.5 | (190.5) | 0.75 | (19.0) | 5 | (127) | 3 | (76) | 2.81 | (72) | 0.06 | (1.6) | 6 | (152.4) | 4 |
|            | 300         | 1.12       | (28.6) | 8.25 | (209.5) | 0.87 | (22.2) | 5 | (127) | 3 | (76) | 2.81 | (72) | 0.06 | (1.6) | 6.69 | (168.3) | 8 |
| 4 inch     | 150         | 0.94       | (23.8) | 9 | (228.5) | 0.75 | (19.0) | 6.19 | (157.2) | 3.69 | (94) | 3.5 | (89) | 0.06 | (1.6) | 7.5 | (190.5) | 8 |
|            | 300         | 1.25       | (31.7) | 10 | (254) | 0.87 | (22.2) | 6.19 | (157.2) | 3.69 | (94) | 3.5 | (89) | 0.06 | (1.6) | 7.88 | (200) | 8 |

---

1) Allow approx. 20 mm (0.79 inch) thread length in addition
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA [is + xp]"
4) 92 mm (3.62 inch) for minimum distance to permit rotation without indicator
5) Approx. 45 mm (1.77 inch) for Pg 13.5 with adapter

---

**DS III series for level**

Transmitters for gauge, absolute and differential pressure, flow and level

---

© Siemens AG 2010

---

1) 89 mm = 3½ inch with tube length L = 0.
SITRANS P measuring instruments for pressure
Transmitters for gauge, absolute and differential pressure, flow and level

DS III series
for level

---

<table>
<thead>
<tr>
<th>Nom. diam.</th>
<th>Nom. press.</th>
<th>b</th>
<th>D</th>
<th>d</th>
<th>d₂</th>
<th>d₄</th>
<th>d₅</th>
<th>d_M</th>
<th>f</th>
<th>k</th>
<th>n</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
</tr>
<tr>
<td>DN 80</td>
<td>PN 40</td>
<td>24</td>
<td>200</td>
<td>90</td>
<td>18</td>
<td>138</td>
<td>76</td>
<td>72</td>
<td>2</td>
<td>160</td>
<td>8</td>
<td>0, 50, 100, 150 or 200</td>
</tr>
<tr>
<td>DN 100</td>
<td>PN 40</td>
<td>20</td>
<td>220</td>
<td>115</td>
<td>18</td>
<td>158</td>
<td>94</td>
<td>89</td>
<td>2</td>
<td>180</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>PN 40</td>
<td></td>
<td>24</td>
<td>235</td>
<td>115</td>
<td>22</td>
<td>162</td>
<td>94</td>
<td>89</td>
<td>2</td>
<td>190</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

**Nom. diam.** Nom. press. | b | D | d_2 | d_4 | d_5 | d_M | f | k | n | L |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/sq.in.</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
<td>inch</td>
</tr>
<tr>
<td>3 inch</td>
<td>150</td>
<td>0.94</td>
<td>7.5 (190.5)</td>
<td>0.75</td>
<td>5 (127)</td>
<td>3</td>
<td>2.81</td>
<td>0.06</td>
<td>6 (152.4)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>1.12</td>
<td>8.25 (209.5)</td>
<td>0.87</td>
<td>5 (127)</td>
<td>3</td>
<td>2.81</td>
<td>0.06</td>
<td>6.69 (168.3)</td>
<td>8</td>
</tr>
<tr>
<td>4 inch</td>
<td>150</td>
<td>0.94</td>
<td>9 (228.5)</td>
<td>0.75</td>
<td>6.19 (157.2)</td>
<td>3.69</td>
<td>3.5</td>
<td>0.06</td>
<td>7.5 (190.5)</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>1.25</td>
<td>10 (254)</td>
<td>0.87</td>
<td>6.19 (157.2)</td>
<td>3.69</td>
<td>3.5</td>
<td>0.06</td>
<td>7.88 (200)</td>
<td>8</td>
</tr>
</tbody>
</table>

---

1) Allow approx. 20 mm (0.79 inch) thread length in addition
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA [is + xp]"
4) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

---

SITRANS P pressure transmitters, DS III PA and FF series for level, including mounting flange, dimensions in mm (inch)

**Connection to EN 1092-1**

**Connection to ASME B16.5**

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

---

© Siemens AG 2010
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement measuring cell for pressure for SITRANS P, DS III, DS III PA and DS III FF series</td>
<td>7MF4990 - 0 - 0DC0</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Silicone oil</td>
</tr>
<tr>
<td>Measuring cell cleaning</td>
<td>Inert liquid</td>
</tr>
<tr>
<td>Measured span</td>
<td>0.15 ... 14.5 psi g (0.01 ... 1 bar g)</td>
</tr>
<tr>
<td></td>
<td>0.6 ... 58 psi g (0.04 ... 4 bar g)</td>
</tr>
<tr>
<td></td>
<td>2.32 ... 232 psi g (0.16 ... 16 bar g)</td>
</tr>
<tr>
<td></td>
<td>9.14 ... 914 psi g (0.63 ... 63 bar g)</td>
</tr>
<tr>
<td></td>
<td>23.2 ... 2320 psi g (1.6 ... 160 bar g)</td>
</tr>
<tr>
<td></td>
<td>58.0 ... 5802 psi g (4.0 ... 400 bar g)</td>
</tr>
</tbody>
</table>

### Wetted parts materials

<table>
<thead>
<tr>
<th>Seal diaphragm</th>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Hastelloy</td>
</tr>
</tbody>
</table>

### Process connection

- Connection shank G½B to EN 837-1
- Female thread ½-14 NPT
- Oval flange made of stainless steel, max. span 160 bar (2320 psi)
  - Mounting thread 7/16-20 UNF to EN 61518
  - Mounting thread M10 to DIN 19213

### Additional designs

- Please add "Z" to Order No. and specify Order code.

### Acceptance test certificate

- to EN 10204-3.1

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement measuring cell for absolute pressure (from the pressure series) for SITRANS P, DS III, DS III PA and DS III FF series</td>
<td>7MF4992 - 0 - 0DC0</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Silicone oil</td>
</tr>
<tr>
<td>Measuring cell cleaning</td>
<td>Inert liquid</td>
</tr>
<tr>
<td>Measured span</td>
<td>0.12 ... 3.63 psi a (8.3 ... 250 mbar a)</td>
</tr>
<tr>
<td></td>
<td>0.62 ... 18.9 psi a (43 ... 1300 mbar a)</td>
</tr>
<tr>
<td></td>
<td>2.32 ... 72.5 psi a (0.16 ... 5 bar a)</td>
</tr>
<tr>
<td></td>
<td>14.5 ... 435 psi a (1 ... 30 bar a)</td>
</tr>
</tbody>
</table>

### Wetted parts materials

<table>
<thead>
<tr>
<th>Seal diaphragm</th>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Hastelloy</td>
</tr>
</tbody>
</table>

### Process connection

- Connection shank G½B to EN 837-1
- Female thread ½-14 NPT
- Oval flange made of stainless steel, max. span 160 bar (2320 psi)
  - Mounting thread 7/16-20 UNF to EN 61518
  - Mounting thread M10 to DIN 19213

### Acceptance test certificate

- to EN 10204-3.1

F) Subject to export regulations AL: 9I999, ECCN: N.
Selection and Ordering data

<table>
<thead>
<tr>
<th>Spare parts / Accessories</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement measuring cell for absolute pressure (from the differential pressure series) for SITRANS P, DS III, DS III PA and DS III FF series</td>
<td>7 MF 4 9 9 3 - 0 DC 0</td>
</tr>
<tr>
<td>Measuring cell filling</td>
<td>Measuring cell cleaning</td>
</tr>
<tr>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Inert liquid</td>
<td>Grease-free</td>
</tr>
<tr>
<td>Measured span</td>
<td></td>
</tr>
<tr>
<td>0.12 ... 3.63 psi a (8.3 ... 250 mbar a)</td>
<td>E</td>
</tr>
<tr>
<td>0.62 ... 18.9 psi a (43 ... 1300 mbar a)</td>
<td>E</td>
</tr>
<tr>
<td>2.32 ... 72.5 psi a (16 ... 50 bar a)</td>
<td>E</td>
</tr>
<tr>
<td>14.5 ... 435 psi a (1 ... 30 bar a)</td>
<td>E</td>
</tr>
<tr>
<td>76.9 ... 1450 psi a (53 ... 100 bar a)</td>
<td>E</td>
</tr>
<tr>
<td>Wetted parts materials</td>
<td></td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Hastelloy</td>
</tr>
<tr>
<td>Tantalum</td>
<td>Tantalum</td>
</tr>
<tr>
<td>Monel</td>
<td>Monel</td>
</tr>
<tr>
<td>Gold</td>
<td>Gold</td>
</tr>
<tr>
<td>Process connection</td>
<td></td>
</tr>
<tr>
<td>Female thread ¼-18 NPT with flange connection</td>
<td></td>
</tr>
<tr>
<td>- Sealing screw opposite process connection</td>
<td></td>
</tr>
<tr>
<td>- Mounting thread M10 to DIN 19213</td>
<td>0</td>
</tr>
<tr>
<td>- Mounting thread 7/16-20 UNF to EN 61518</td>
<td>2</td>
</tr>
<tr>
<td>- Vent on side of process flange 1)</td>
<td></td>
</tr>
<tr>
<td>- Mounting thread M10 to DIN 19213</td>
<td>4</td>
</tr>
<tr>
<td>- Mounting thread 7/16-20 UNF to EN 61518</td>
<td>6</td>
</tr>
<tr>
<td>Non-wetted parts materials</td>
<td></td>
</tr>
<tr>
<td>Stainless steel process flange screws</td>
<td>2</td>
</tr>
</tbody>
</table>

Further designs

Please add "Z" to Order No. and specify Order code.

O-rings for process flanges (instead of FPM (Viton))
- PTFE (Teflon) | A20
- FEP (with silicone core, approved for food) | A21
- FFPOM (Kalrez, compound 4079) | A22
- NBR (Buna N) | A23

Acceptance test certificate to EN 10204-3.1

Process connection G½B
- D16
- D20

Remote seal flanges
- (not together with K01, K02 and K04)
- H02

Vent on side for gas measurements

Process flanges
- without | K00
- with process flange made of
  - Hastelloy | K01
  - Monel | K02
  - Stainless steel with PVDF insert max. PN 10 (MWP 145 psi) max. temperature of medium 90 °C (194 °F) |

Further designs

Please add "Z" to Order No. and specify Order code.

O-rings for process flanges (instead of FPM (Viton))
- PTFE (Teflon) | A20
- FEP (with silicone core, approved for food) | A21
- FFPOM (Kalrez, compound 4079) | A22
- NBR (Buna N) | A23

Acceptance test certificate to EN 10204-3.1

Remote seal flanges
- (not together with K01, K02 and K04)
- D20

Vent on side for gas measurements
- H02

Stainless steel process flange screws for vertical differential pressure lines
- (not together with K01, K02 and K04)
- H03

Process flanges
- without | K00
- with process flange made of
  - Hastelloy | K01
  - Monel | K02
  - Stainless steel with PVDF insert max. PN 10 (MWP 145 psi) max. temperature of medium 90 °C (194 °F)

1) Not suitable for connection of remote seal
2) Only together with max. spans 3.63, 23.2, 72.5 and 435 psi (250, 1600, 5000 and 30000 mbar).
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Spare parts / Accessories</th>
<th>Measuring cell filling</th>
<th>Measuring cell cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement measuring cell for differential pressure and PN 420 (MWP 6092 psi) for SITRANS P, DS III, DS III PA and DS III FF series</td>
<td>Silicone oil</td>
<td>Standard</td>
</tr>
<tr>
<td>Measured span</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 ... 100 inH₂O</td>
<td>(2.5 ... 250 mbar)</td>
<td>D</td>
</tr>
<tr>
<td>2.4 ... 240 inH₂O</td>
<td>(6 ... 600 mbar)</td>
<td>E</td>
</tr>
<tr>
<td>6.4 ... 642 inH₂O</td>
<td>(16 ... 1600 mbar)</td>
<td>F</td>
</tr>
<tr>
<td>20 ... 2000 inH₂O</td>
<td>(50 ... 5000 mbar)</td>
<td>G</td>
</tr>
<tr>
<td>4.35 ... 435 psi</td>
<td>(0.3 ... 30 bar)</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetted parts materials (stainless steel process flanges)</th>
<th>Seal diaphragm</th>
<th>Parts of measuring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>Hastelloy</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>Gold¹)</td>
<td>Gold</td>
<td></td>
</tr>
</tbody>
</table>

| Process connection                                      |                        |                        |
| Female thread ¼-18 NPT with flange connection           |                        |                        |
| • Sealing screw opposite process connection             |                        |                        |
|   • Mounting thread M12 to DIN 19213                    |                        | 1                      |
|   • Mounting thread 7/16-20 UNF to EN 61518             |                        | 3                      |
| • Vent on side of process flange                        |                        |                        |
|   • Mounting thread M12 to DIN 19213                    |                        | 5                      |
|   • Mounting thread 7/16-20 UNF to EN 61518             |                        | 7                      |

| Non-wetted parts materials                              |                        |                        |
| • Stainless steel process flange screws                 |                        | 2                      |

### Further designs

Please add "-Z" to Order No. and specify Order code.

<table>
<thead>
<tr>
<th>O-rings for process flanges (instead of FPM (Viton))</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• PTFE (Teflon)</td>
<td>A20</td>
<td></td>
</tr>
<tr>
<td>• FEP (with silicone core, approved for food)</td>
<td>A21</td>
<td></td>
</tr>
<tr>
<td>• FFPM (Kalrez, compound 4079)</td>
<td>A22</td>
<td></td>
</tr>
<tr>
<td>• NBR (Buna N)</td>
<td>A23</td>
<td></td>
</tr>
</tbody>
</table>

| Acceptance test certificate to EN 10204-3.1             | C12                    |

<table>
<thead>
<tr>
<th>Stainless steel process flanges for vertical differential pressure lines without process flanges</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H03</td>
<td></td>
</tr>
<tr>
<td>K00</td>
<td></td>
</tr>
</tbody>
</table>

¹) Not together with max. span 240.9 inH₂O (600 mbar)
Selection and Ordering data

**Mounting bracket and mounting parts**

<table>
<thead>
<tr>
<th>Mounting bracket and mounting parts</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for pressure transmitters DS III, DS III PA and DS III FF series (7MF403.-.-.-...C.)</td>
<td>7MF4997-1AB</td>
</tr>
<tr>
<td>• made of steel</td>
<td>7MF4997-1AH</td>
</tr>
<tr>
<td>for absolute pressure transmitters DS III, DS III PA and DS III FF series (7MF423.-.-.-...C.)</td>
<td>7MF4997-1AC</td>
</tr>
<tr>
<td>• made of steel</td>
<td>7MF4997-1AJ</td>
</tr>
</tbody>
</table>

**Mounting bracket and mounting parts**

<table>
<thead>
<tr>
<th>Mounting bracket and mounting parts</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for differential pressure transmitters with flange thread M10 DS III, DS III PA and DS III FF series (7MF433.-.-.-... and 7MF443.-.-.-...)</td>
<td>7MF4997-1AD</td>
</tr>
<tr>
<td>• made of steel</td>
<td>7MF4997-1AK</td>
</tr>
</tbody>
</table>

**Mounting bracket and mounting parts**

<table>
<thead>
<tr>
<th>Mounting bracket and mounting parts</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for differential and absolute pressure transmitters with flange thread M12 DS III, DS III PA and DS III FF series (7MF453.-.-.-...)</td>
<td>7MF4997-1AE</td>
</tr>
<tr>
<td>• made of steel</td>
<td>7MF4997-1AL</td>
</tr>
</tbody>
</table>

**O-rings**

<table>
<thead>
<tr>
<th>O-rings</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for process flanges made of FPM (Viton)</td>
<td>7MF4997-2DA</td>
</tr>
<tr>
<td>PTFE (Teflon)</td>
<td>7MF4997-2DB</td>
</tr>
<tr>
<td>FEP (with silicone core, approved for food)</td>
<td>7MF4997-2DC</td>
</tr>
<tr>
<td>FFKM (Kalrez, compound 4079)</td>
<td>7MF4997-2DD</td>
</tr>
<tr>
<td>NBR (Buna N)</td>
<td>7MF4997-2DE</td>
</tr>
</tbody>
</table>

**Connection boards**

<table>
<thead>
<tr>
<th>Connection board</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for DS III series</td>
<td>7MF4997-1DN</td>
</tr>
<tr>
<td>for DS III PA series</td>
<td>7MF4997-1DL</td>
</tr>
<tr>
<td>for DS III FF series</td>
<td>7MF4997-1DM</td>
</tr>
</tbody>
</table>

**Metals**

<table>
<thead>
<tr>
<th>Measuring-point label</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• without inscription (5 off)</td>
<td>7MF4997-1CA</td>
</tr>
<tr>
<td>• with inscription (1 off)</td>
<td>7MF4997-1CB-Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring-point label</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y..: ................</td>
<td>7MF4997-1CD</td>
</tr>
</tbody>
</table>

**Weldable sockets for PMC connection**

<table>
<thead>
<tr>
<th>Weldable sockets for PMC connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for DS III and P300 series</td>
<td>7MF4997-2HA</td>
</tr>
<tr>
<td>• PMC Style Standard: Thread 1½&quot;</td>
<td>7MF4997-2HB</td>
</tr>
</tbody>
</table>

**Sealing rings for PMC connection**

<table>
<thead>
<tr>
<th>Sealing rings for PMC connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(packing unit: 5 pcs)</td>
<td>7MF4997-2HC</td>
</tr>
<tr>
<td>• Sealing ring made of PTFE</td>
<td>7MF4997-2HD</td>
</tr>
<tr>
<td>• sealing ring made of Viton for PMC Style Minibolt: front-flush 1&quot;</td>
<td>7MF4997-2HE</td>
</tr>
</tbody>
</table>

**Weldable sockets for TG 52/50 and TG 52/150 connection**

<table>
<thead>
<tr>
<th>Weldable sockets for TG 52/50 and TG 52/150 connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for DS III and P300 series</td>
<td>7MF4997-2HG</td>
</tr>
<tr>
<td>• TG 52/50 connection</td>
<td>7MF4997-2HF</td>
</tr>
</tbody>
</table>

**Seals for flange connection with flush-mounted diaphragm**

<table>
<thead>
<tr>
<th>Seals for flange connection with flush-mounted diaphragm</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material FPM (Viton), 10 units</td>
<td>7MF4997-2HH</td>
</tr>
<tr>
<td>• DN 25, PN 40 (M11)</td>
<td>7MF4997-2HJ</td>
</tr>
<tr>
<td>• DN 25, PN 100 (M21)</td>
<td>7MF4997-2HK</td>
</tr>
<tr>
<td>• 1&quot;, class 150 (M40)</td>
<td>7MF4997-2HL</td>
</tr>
<tr>
<td>• 1&quot;, class 300 (M45)</td>
<td>7MF4997-2HM</td>
</tr>
</tbody>
</table>

**Mounting bracket and mounting parts**

<table>
<thead>
<tr>
<th>Mounting bracket and mounting parts</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>for P300</td>
<td>7MF4997-1AA</td>
</tr>
<tr>
<td>• Made of stainless steel</td>
<td>7MF4997-1A</td>
</tr>
</tbody>
</table>

**Lid without window for P300**

<table>
<thead>
<tr>
<th>Lid without window for P300</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Gasket not included</td>
<td>7MF4997-1BA</td>
</tr>
</tbody>
</table>

**Lid with glass window for P300**

<table>
<thead>
<tr>
<th>Lid with glass window for P300</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Gasket not included</td>
<td>7MF4997-1BD</td>
</tr>
</tbody>
</table>

**NBR housing gasket for P300**

<table>
<thead>
<tr>
<th>NBR housing gasket for P300</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Gasket not included</td>
<td>7MF4997-1BG</td>
</tr>
</tbody>
</table>

**Measuring point label for P300**

<table>
<thead>
<tr>
<th>Measuring point label for P300</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Unlabeled</td>
<td>7MF4997-1CA</td>
</tr>
</tbody>
</table>

**Cable gland for P300**

<table>
<thead>
<tr>
<th>Cable gland for P300</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Metal</td>
<td>7MF4997-1EA</td>
</tr>
<tr>
<td>• Plastic (blue)</td>
<td>7MF4997-1EB</td>
</tr>
</tbody>
</table>
### Accessories / spare parts for SITRANS P

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>for P300 series with HART communication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- German: A5E00359580</td>
</tr>
<tr>
<td></td>
<td>- English: A5E00359579</td>
</tr>
<tr>
<td></td>
<td>- French: A5E00359578</td>
</tr>
<tr>
<td></td>
<td>- Spanish: A5E00359576</td>
</tr>
<tr>
<td></td>
<td>- Italian: A5E00359577</td>
</tr>
<tr>
<td></td>
<td>- Leporello: A5E00359581</td>
</tr>
<tr>
<td></td>
<td>for P300 series with PROFIBUS PA commu-</td>
</tr>
<tr>
<td></td>
<td>nication:</td>
</tr>
<tr>
<td></td>
<td>- German: A5E00414587</td>
</tr>
<tr>
<td></td>
<td>- English: A5E00414588</td>
</tr>
<tr>
<td></td>
<td>- French: A5E00414589</td>
</tr>
<tr>
<td></td>
<td>- Spanish: A5E00414590</td>
</tr>
<tr>
<td></td>
<td>- Italian: A5E00414591</td>
</tr>
<tr>
<td></td>
<td>- Leporello: A5E00414592</td>
</tr>
<tr>
<td></td>
<td>for DS III series:</td>
</tr>
<tr>
<td></td>
<td>- German: A5E00047090</td>
</tr>
<tr>
<td></td>
<td>- English: A5E00047092</td>
</tr>
<tr>
<td></td>
<td>- French: A5E00053218</td>
</tr>
<tr>
<td></td>
<td>- Spanish: A5E00053219</td>
</tr>
<tr>
<td></td>
<td>- Italian: A5E00053220</td>
</tr>
<tr>
<td></td>
<td>for DS III PA series:</td>
</tr>
<tr>
<td></td>
<td>- German: A5E00053275</td>
</tr>
<tr>
<td></td>
<td>- English: A5E00053276</td>
</tr>
<tr>
<td></td>
<td>- French: A5E00053277</td>
</tr>
<tr>
<td></td>
<td>- Spanish: A5E00053278</td>
</tr>
<tr>
<td></td>
<td>- Italian: A5E00053279</td>
</tr>
<tr>
<td></td>
<td>for DS III FF series:</td>
</tr>
<tr>
<td></td>
<td>- German: A5E00279627</td>
</tr>
<tr>
<td></td>
<td>- English: A5E00279629</td>
</tr>
<tr>
<td></td>
<td>- French (planned):</td>
</tr>
<tr>
<td></td>
<td>- Spanish (planned):</td>
</tr>
<tr>
<td></td>
<td>- Italian (planned):</td>
</tr>
</tbody>
</table>

#### Brief instructions (Leporello)

<table>
<thead>
<tr>
<th>Order No.</th>
<th>for DS III series, German, English</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A5E00047093</td>
</tr>
<tr>
<td></td>
<td>for DS III PA series, German, English</td>
</tr>
<tr>
<td></td>
<td>A5E00053274</td>
</tr>
<tr>
<td></td>
<td>for DS III FF series, German, English</td>
</tr>
<tr>
<td></td>
<td>A5E00282355</td>
</tr>
</tbody>
</table>

#### CD with documentation

- for P300, DS III, DS III PA and DS III FF series
- Available: A5E00090345

#### Instruction Manual

- for replacement of electronics, measuring cell and connection board
- Available: A5E00078060

#### HART modem

- with RS232 interface: 7MF4997-1DA
- with USB interface: 7MF4997-1DB

#### Supplementary electronics for 4-wire connection

- Available: see page 2/138
Dimensional drawings

Mounting bracket for SITRANS P gauge and absolute pressure transmitter, DS III series, dimensions in mm (inch)
Material of mounting bracket: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Mounting bracket for SITRANS P differential pressure transmitter, DS III series, dimensions in mm (inch)
Material of mounting bracket: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)
SITRANS P measuring instruments for pressure

SITRANS P Accessories

Factory-mounting of valve manifolds on SITRANS P transmitters

Overview

SITRANS P transmitters
• P300 for relative and absolute pressure,
• 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 relative 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 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 and is certified leak-proof with a factory certificate 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 EN10204 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

<table>
<thead>
<tr>
<th>7MF9011-4FA valve block on relative and absolute pressure transmitters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add -Z to the Order No. of the transmitter and add order codes.</td>
</tr>
<tr>
<td>SITRANS P DSIII 7MF403.-...1.-..., 7MF423.-...1.-... and 7MF802.-...1.-...</td>
</tr>
<tr>
<td>With process connection female thread ½-14 NPT in-sealed with PTFE sealing strip</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7MF9011-4EA valve block on relative and absolute pressure transmitters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add -Z to the Order No. of the transmitter and add order codes.</td>
</tr>
<tr>
<td>SITRANS P DSIII 7MF403.-...0.-..., 7MF423.-...0.-... and 7MF802.-...0.-...</td>
</tr>
<tr>
<td>with process connection collar G1/2 A to EN837-1 with gasket made of PTFE between valve manifold and transmitter</td>
</tr>
<tr>
<td>• soft iron</td>
</tr>
<tr>
<td>• stainless steel, Mat. No. 14571</td>
</tr>
<tr>
<td>• copper</td>
</tr>
<tr>
<td>Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2</td>
</tr>
</tbody>
</table>

Further designs:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)

Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold

Oil and grease-free cleaning for oxygen operation

<table>
<thead>
<tr>
<th>7MF9411-5BA valve manifold on absolute and differential pressure transmitters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add -Z to the Order No. of the transmitter and add order codes.</td>
</tr>
<tr>
<td>SITRANS P DSIII 7MF433.-... und 7MF453.-...</td>
</tr>
<tr>
<td>mounted with gaskets made of PTFE and screws made of</td>
</tr>
<tr>
<td>• chromized steel</td>
</tr>
<tr>
<td>• stainless steel</td>
</tr>
<tr>
<td>Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2</td>
</tr>
</tbody>
</table>

Further designs:

Delivery includes mounting bracket and mounting clips made of stainless steel.

Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold

Oil and grease-free cleaning for oxygen operation

<table>
<thead>
<tr>
<th>7MF9411-5CA valve manifold on differential pressure transmitters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add -Z to the Order No. of the transmitter and add order codes.</td>
</tr>
<tr>
<td>SITRANS P DSIII 7MF443.-... und 7MF453.-...</td>
</tr>
<tr>
<td>mounted with gaskets made of PTFE and screws made of</td>
</tr>
<tr>
<td>• chromized steel</td>
</tr>
<tr>
<td>• stainless steel</td>
</tr>
<tr>
<td>Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2</td>
</tr>
</tbody>
</table>

Further designs:

Delivery includes mounting bracket and mounting clips made of stainless steel.

Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold

Oil and grease-free cleaning for oxygen operation

1) For 7MF453.-... transmitters, you require a 7/10-20 UNF connection thread in the process flange.
**Dimensional drawings**

**Valve manifolds mounted on SITRANS P DS III**

Valve manifold 7MF9011-4EA with mounted relative pressure and absolute pressure transmitters

Valve manifold 7MF9011-4FA with mounted relative pressure and absolute pressure transmitters

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

Valve manifold 7MF9011-4FA with mounted relative pressure and absolute pressure transmitters, dimensions in mm (inch)
Valve manifold 7MF9411-5BA with mounted differential pressure transmitter

Valve manifold 7MF9411-5CA with mounted differential pressure transmitter

Valve manifold 7MF9411-5BA with mounted differential pressure transmitter, dimensions in mm (inch)

Valve manifold 7MF9411-5CA with mounted differential pressure transmitter, dimensions in mm (inch)
Valve manifolds mounted on SITRANS P300

Valve manifold 7MF9011-4EA with mounted relative pressure and absolute pressure transmitters

Valve manifold 7MF9011-4FA with mounted relative pressure and absolute pressure transmitters

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

Valve manifold 7MF9011-4FA with mounted relative pressure and absolute pressure transmitters, dimensions in mm
SITRANS P measuring instruments for pressure

Transmitters for hydrostatic level

MPS series (submersible sensor)

Overview

SITRANS P pressure transmitters, MPS series (submersible sensor)

SITRANS P pressure transmitters, MPS series, are submersible sensors for hydrostatic level measurements.

The pressure transmitters of the MPS series 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 P pressure transmitters, MPS series, are used in the following branches for example:

- Oil and gas industries
- Shipbuilding
- Water supply

Design

SITRANS P pressure transmitters, MPS series, have a flush-mounted piezo-resistive sensor with stainless steel diaphragm.

These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing.

The cable also contains a strength cord and vent pipe.

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

The sensor, electronic circuit and cable are sealed in a common housing of small dimensions.

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

Function

SITRANS P pressure transmitters, MPS series, are for measuring the liquid levels in wells, tanks, channels and dams.

On one side of the sensor, the diaphragm 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 in the connection cable.

The hydrostatic pressure of the liquid column acts on the sensor diaphragm, and transmits the pressure to the piezo-resistive 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 cable of the 7MF1570 transmitter must always be connected in the supplied junction box. 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.

Integration

Junction box 7MF1570-8AA, opened
SITRANS P measuring instruments for pressure
Transmitters for hydrostatic level

**Measuring point setup, in principle**

### Technical specifications

**SITRANS P pressure transmitters, MPS series (submersible sensor)**

#### Mode of operation

**Measuring principle**

Piezo-resistive

**Input**

- **Measured variable**: Hydrostatic level
- **Measuring range**
  - 0 ... 6 ftH₂O (0 ... 2 mH₂O)
  - 0 ... 12 ftH₂O (0 ... 4 mH₂O)
  - 0 ... 15 ftH₂O (0 ... 5 mH₂O)
  - 0 ... 18 ftH₂O (0 ... 6 mH₂O)
  - 0 ... 30 ftH₂O (0 ... 10 mH₂O)
  - 0 ... 60 ftH₂O (0 ... 20 mH₂O)

**Output**

- **Output signal**: 4 ... 20 mA

**Accuracy**

- **Error in measurement (including non-linearity, hysteresis and repeatability, at 25 °C (77 °F))**:
  - To EN 60770-1
  - 0.3 % of full-scale value (typical)
- **Influence of ambient temperature**
  - **Zero and span**
    - 1 ... 6 mH₂O (3 ... 18 ftH₂O)
    - 0.45 %/10 K of full-scale value
    - ≥ 6 mH₂O (≥ 18 ftH₂O)
    - 0.3 %/10 K of full-scale value

**Rated operating conditions**

- **Ambient conditions**
  - Process temperature: -10 ... +80 °C (+14 ... +176 °F)
  - Storage temperature: -40 ... +100 °C (-40 ... +212 °F)
- **Degree of protection to DIN EN 60529**: IP68

**Design**

- **Weight**
  - Pressure transmitters: ≈ 0.4 kg (≈ 0.88 lb)
  - Cable: 0.08 kg/m (≈ 0.054 lb/ft)
- **Electrical connection**: Cable with 2 conductors with screen and vent pipe, strength cord (max. 300 N (67.44 lbf))
- **Material**
  - Seal diaphragm: Stainless steel, 316L/316 Ti
  - Casing: Stainless steel, 316L/316 Ti
  - Gasket: Viton
  - Connecting cable: Optionally PE/HFFR sheath (non-halogen) or FEP sheath
- **Power supply**: Terminal voltage on pressure transmitter (Uₜₚ): 10 ... 36 V DC

**Certificate and approvals**

- **The transmitter is not subject to the pressure equipment directive (DGRL 97/23/EC)**
- **Explosion protection**
  - Intrinisc safety "i"
  - Identification: TÜV 03 ATEX 2004X
  - Ex II 1 G EEx ia IIC T4

**Application**

For mounting the transmitter

**Design**

- **Weight**: 0.16 kg (0.35 lb)
- **Material**: Galvanized steel, polyamide
SITRANS P measuring instruments for pressure
Transmitters for hydrostatic level

MPS series (submersible sensor)

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7MF1570 - A0</td>
<td></td>
</tr>
</tbody>
</table>

2-wire system

Note: Junction box and cable hanger included in delivery

Cable material
- PE
- FEP

Measuring range
- 0 ... 2 mH₂O 10 m
- 0 ... 4 mH₂O 10 m
- 0 ... 5 mH₂O 25 m
- 0 ... 6 mH₂O 25 m
- 0 ... 10 mH₂O 25 m
- 0 ... 20 mH₂O 25 m
- 0 ... 6 ftH₂O 32 ft
- 0 ... 12 ftH₂O 32 ft
- 0 ... 18 ftH₂O 82 ft
- 0 ... 30 ftH₂O 82 ft
- 0 ... 60 ftH₂O 82 ft

Special measuring range
- Special cable length

Specify measuring range and cable length in plain text

Explosion protection
- without
- with, type of protection “Intrinsic safety” (Ex II 1 G Ex ia IIC T4)
- With approval for drinking water to WRAS and ACS

Further designs

Order code
- C11
- 7MF1564-8CC11

Accessories (as spare parts)

Junction box
- 7MF1570-8AA

Cable hanger
- 7MF1570-8AB

Available ex stock

Power supply units see “SITRANS I power supply units and input isolators”.

1) Special measuring ranges between 0 ... 1 mH₂O (0 ... 3 ftH₂O) and 0 ... 200 mH₂O (0 ... 656 ftH₂O) and special cable lengths up to 1000 m (3281 ft) are possible. With Ex versions the max. special cable length is 50 m (150 ft). The length of free-hanging cable should not exceed 375 m.

C) Subject to export regulations AL: N, ECCN: EAR99.
D) Subject to export regulations AL: N, ECCN: EAR99H.
More information

Determination of the measuring range in case of media with a density \( \neq 1000 \text{ kg/m}^3 \) (medium \( \neq \) water)

Calculation of the measuring range:

\[ p = \rho \times g \times H \]

with:

- \( \rho \): density of medium
- \( g \): local acceleration due to gravity
- \( H \): maximum level

Example:

Medium: Diesel fuel = 850 kg/m\(^3\)
Acceleration due to gravity: 9.81 m/s\(^2\)
Start-of-scale: 0 m
Maximum level: 6.2 m

Calculation:

\[ p = 850 \text{ kg/m}^3 \times 9.81 \text{ m/s}^2 \times 6.2 \text{ m} \]
\[ p = 51698.7 \text{ N/m}^2 \]
\[ p = 517 \text{ mbar} \]

Transmitter to be ordered:

7MF1570-5ZA02-Z

J1Y: 0 ... 517 mbar; able length e.g. 8 m
Remote seals for transmitters and pressure gauges

Technical description

Application
The remote seals 7MF48.. can be fitted to SITRANS P transmitters for

- **pressure** (7MF4033 and 7MF4034),
- **absolute pressure** (7MF4233, 7MF4234, 7MF4333, 7MF4334) and
- **differential pressure and flow** (7MF4433 and 7MF4434).

Design and mode of operation
A remote seal system consists of a transmitter, one or two remote seals, an appropriate transmission liquid, and a connection between the transmitter and remote seal (direct mounting or capillary).

The volume in contact with the measured medium is defined by a flexible diaphragm. The volume between this diaphragm and the pressure transmitter is completely filled with a transmission fluid. If a pressure is now applied to the remote seal, this is transmitted via the flexible diaphragm and the fill fluid to the pressure transmitter.

In many cases, a capillary is located between the remote seal and the pressure transmitter in order e.g. to minimize temperature effects from the hot medium on the latter. However, the capillary line influences the response time and the temperature response of the complete remote seal system. When fitting remote seals to differential pressure transmitters, two capillaries of the same length must always be used.

Fields of use
Remote seal systems should be used if a separation between the measured medium and the measuring instrument is appropriate or essential for the following reasons:

- The **temperature of the medium** is outside the limits specified for the transmitter.
- The medium is **corrosive** and requires diaphragm materials in the transmitter which are not available.
- The medium is **highly viscous or contains solids** which would block the measuring chambers of the transmitter.
- The medium may freeze in the measuring chambers or impulse line.
- The medium is **heterogeneous** and **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 site, e.g. in a batch process.

Constructional designs
A differentiation is made between diaphragm seals and inline seals.

With the diaphragm seals, the pressure is measured via a flat convoluted diaphragm welded to a convoluted backup.

With the inline seals, the pressure is measured via a cylindrical diaphragm positioned in a pipe, and transmitted to the transmitter via the filling liquid.

The inline 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.

Diaphragm seal of pancake design, and also with extended diaphragm (extension)

Diaphragm seal of flush flange design, and also with extended diaphragm (extension)

Tri-Clamp sanitary remote seal

Diaphragm seals
The following types of diaphragm seals exist:

- Pancake design, and pancake design with extended diaphragm (extension) to DIN or ANSI which are secured using a backup blind flange.
- Flush flange design, and flange design with extended diaphragm (extension) to DIN or ANSI which are installed by using holes in the flange.
- Sanitary remote seals, e.g. to DIN 11851, Cherry Burrell, APC connection, Tri-clamp connection, etc.

The sanitary remote seals are common designs in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The sanitary clamp present on the remote seal means that quick dismounting is possible for cleaning.

- Button diaphragm seal with male thread for screwing into tapped holes.
- Remote seals with customer-specific process connections.
**Clamp-on seals**

The following types of clamp-on seals exist:
- Sanitary inline seals, e.g. to DIN 11851, Cherry Burrell, tri-clamp connection etc.  
  The sanitary facility enables the seal to be removed quickly for cleaning purposes.
- Inline seals for positioning between DIN or ANSI flanges.
- Inline seals with customer-specific process connections.

**Transmission response**

Temperature errors occur if the fill fluid in the remote seal and in the capillaries expands or contracts as a result of temperature effects. The temperature error depends on the diaphragm characteristic, the influence of the fill fluid, and the influence of the fill fluid under the process flanges or in the flanges on the transmitter (volume minimized for remote seals).

**Diaphragm characteristic**

The characteristic of the remote seal is of great importance. The larger the diaphragm diameter, the softer it is. In comparison to a smaller diaphragm, this means that it can respond far easier to temperature-based expansions of the filling liquid.

The result is that low measuring ranges are only possible with large diaphragm diameters. In addition, the diaphragm thickness, its material, and any coatings which may be present must also be considered.

**Fill fluid**

All fill fluids expand or contract when the temperature varies. Temperature-independent errors can be minimized by selecting a suitable filling liquid, but it must also be ensured that the filling liquid is appropriate for the temperature limits and operating pressure. For food and beverage as well as pharmaceutical applications see reference for FDA approved fill fluids.

Since the fill fluid is present under the remote seal diaphragm, in the capillaries and under the process flanges of the transmitter, the temperature error must be calculated separately for each combination.

**Response time**

The response time depends on the internal diameter of the capillaries, the viscosity of the filling liquid, the capillary extension length, and the pressure in the measuring system:

**Internal diameter:**

The response time decreases as the internal diameter increases, but the temperature error increases due to increased oil volume.

**Viscosity:**

The response time increases as the viscosity increases.

**Capillary length:**

The capillary length has a proportional effect on the response time and the temperature error.

**Measuring system pressure:**

The response time decreases as the pressure in the measuring system increases.

**Recommendations**

The following should be observed to obtain an optimum combination of transmitter and remote seal:
- The remote seal diameter, and thus the effective diameter of the diaphragm, should be selected as large as possible in order to keep the temperature-dependent errors as low as possible.
- The capillaries should be selected as short as possible in order to keep the response time and the temperature-dependent errors as low as possible.

**Note**

The remote seals listed in this catalog are a selection of the most common designs. As a result of the large variety of process connections, it may nevertheless be the case that certain remote seals which are not listed in the catalog are still available.

Other versions could be:
- Other process connections, standards
- Aseptic or sterile connections
- Other sizes
- Other nominal pressures
- Special diaphragm materials, including coatings
- Other sealing faces
- Other fill fluids
- Other capillary lengths
- Sheathing of capillaries with protective coat
- Calibration at higher/lower temperatures etc.

Please contact your Siemens Regional Office for more information.
Remote seals for transmitters and pressure gauges

Technical description

Technical data

Nominal diameter, nominal pressure, pressure connection
Sealing face (only for pancake and flanged remote seals)

See Ordering data

Sealing material in the transmitter pressure flanges
- For absolute pressure transmitters and vacuum applications
- For other applications

Max. pressure

Capillary
- Length
- Internal bore
- Smallest bending radius

Fill fluid
- For pancake and flange remote seals
- For sanitary remote seals

Ambient temperature

Certificates and approvals
Classification according to pressure equipment directive (DGRL 97/23/EC)

Measuring errors based on physical properties always result when using remote seals

Temperature errors of diaphragm seals when connected to pressure, absolute pressure or level transmitters, and with single-sided connection to differential pressure transmitters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; flush flanged</td>
<td>2.32</td>
<td>1.69</td>
<td>2.04</td>
<td>2.04</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>2&quot; with extension</td>
<td>1.89</td>
<td>2.81</td>
<td>5.1</td>
<td>5.1</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>3&quot; flush flanged</td>
<td>3.5</td>
<td>0.23</td>
<td>0.21</td>
<td>0.21</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>3&quot; with extension</td>
<td>2.83</td>
<td>0.58</td>
<td>0.53</td>
<td>0.53</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>4&quot; flush flanged</td>
<td>3.5</td>
<td>0.23</td>
<td>0.21</td>
<td>0.21</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>4&quot; with extension</td>
<td>4.88</td>
<td>0.12</td>
<td>0.07</td>
<td>0.07</td>
<td>0.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 flush flanged</td>
<td>3.5</td>
<td>1.69</td>
<td>2.04</td>
<td>2.04</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>DN 50 with extension</td>
<td>1.89</td>
<td>2.81</td>
<td>5.1</td>
<td>5.1</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>DN 80 flush flanged</td>
<td>3.5</td>
<td>0.23</td>
<td>0.21</td>
<td>0.21</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>DN 80 with extension</td>
<td>2.83</td>
<td>0.58</td>
<td>0.53</td>
<td>0.53</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>DN 100 flush flanged</td>
<td>3.5</td>
<td>0.23</td>
<td>0.21</td>
<td>0.21</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>DN 100 with extension</td>
<td>4.88</td>
<td>0.12</td>
<td>0.07</td>
<td>0.07</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>DN 125 flush flanged</td>
<td>4.88</td>
<td>0.12</td>
<td>0.07</td>
<td>0.07</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>DN 125 with extension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ½&quot;</td>
<td>1.26</td>
<td>9.51</td>
<td>35.73</td>
<td>35.73</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>2&quot;</td>
<td>1.57</td>
<td>3.93</td>
<td>7.67</td>
<td>7.67</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2 ½&quot;</td>
<td>2.52</td>
<td>1.69</td>
<td>2.57</td>
<td>2.57</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>3&quot;</td>
<td>2.83</td>
<td>0.58</td>
<td>0.53</td>
<td>0.53</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3.5</td>
<td>0.23</td>
<td>0.21</td>
<td>0.21</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NPT-male</td>
<td>0.98</td>
<td>13.97</td>
<td>81.7</td>
<td>81.7</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>1 ½ NPT-male</td>
<td>1.57</td>
<td>3.93</td>
<td>7.67</td>
<td>7.67</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2 NPT-male</td>
<td>2.05</td>
<td>2.23</td>
<td>2.57</td>
<td>2.57</td>
<td>7.5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Temperature errors of diaphragm seals (part 1)

Remarks:
- Values apply to fill fluid: silicone oil DC 200, high-temperature oil, halocarbon oil and Neobee M20.
- Values apply to stainless steel as the diaphragm material.

Materials
- Main body for pancake and flange remote seals
- Wetted parts materials
- Housing and diaphragm for Inline seals
- Capillary
- Armor

Stainless steel, mat. No. 1.4435/316L

See Ordering data

Sealing face (only for pancake and flange remote seals)
To ANSI B16.5 RF 250 RMS for stainless steel or solid materials or ANSI B16.5 RFSF (smooth finish) for other materials

Temperature errors of diaphragm seals when connected to pressure, absolute pressure or level transmitters, and with single-sided connection to differential pressure transmitters

Temperature error of remote seal: [inH2O/25 °F]
Temperature error of capillary: [inH2O/25 °F/3 ft]
Temperature error of transmitter flange connection: [inH2O/25 °F]
Recommended values, min. spans (observe temperature error): [psi]
Temperature errors of diaphragm seals with \textit{double-sided} connection to differential pressure transmitters

<table>
<thead>
<tr>
<th>Nominal diameter/design</th>
<th>Effective diaphragm diameter [in]</th>
<th>Temperature error of remote seal ([\text{inH}_2\text{O}/25 , ^\circ \text{F}])</th>
<th>Temperature error of capillary ([\text{inH}_2\text{O}/25 , ^\circ \text{F}/3 , \text{ft}])</th>
<th>Temperature error of transmitter flange connection ([\text{inH}_2\text{O}/25 , ^\circ \text{F}])</th>
<th>Recommended values, min. spans (observe temperature error) ([\text{psi}])</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flange to ANSI B16.5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot; flush flanged</td>
<td>2.32</td>
<td>0.384</td>
<td>0.42</td>
<td>0.42</td>
<td>3.5</td>
</tr>
<tr>
<td>2&quot; with extension</td>
<td>1.89</td>
<td>0.692</td>
<td>1.051</td>
<td>1.051</td>
<td>3.5</td>
</tr>
<tr>
<td>3&quot; flush flanged</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
<tr>
<td>3&quot; with extension</td>
<td>2.83</td>
<td>0.154</td>
<td>0.126</td>
<td>0.126</td>
<td>1.5</td>
</tr>
<tr>
<td>4&quot; flush flanged</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
<tr>
<td>4&quot; with extension</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
<tr>
<td>5&quot; flush flanged</td>
<td>4.88</td>
<td>0.038</td>
<td>0.017</td>
<td>0.017</td>
<td>0.3</td>
</tr>
<tr>
<td>5&quot; with extension</td>
<td>4.88</td>
<td>0.038</td>
<td>0.017</td>
<td>0.017</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Flange to DIN 2501</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50 flush flanged</td>
<td>2.32</td>
<td>0.384</td>
<td>0.42</td>
<td>0.42</td>
<td>3.5</td>
</tr>
<tr>
<td>DN 50 with extension</td>
<td>1.89</td>
<td>0.692</td>
<td>1.051</td>
<td>1.051</td>
<td>3.5</td>
</tr>
<tr>
<td>DN 80 flush flanged</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
<tr>
<td>DN 80 with extension</td>
<td>2.83</td>
<td>0.154</td>
<td>0.126</td>
<td>0.126</td>
<td>1.5</td>
</tr>
<tr>
<td>DN 100 flush flanged</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
<tr>
<td>DN 100 with extension</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
<tr>
<td>DN 125 flush flanged</td>
<td>4.88</td>
<td>0.038</td>
<td>0.017</td>
<td>0.017</td>
<td>0.3</td>
</tr>
<tr>
<td>DN 125 with extension</td>
<td>4.88</td>
<td>0.038</td>
<td>0.017</td>
<td>0.017</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Sanitary Tri-Clamp</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>1.57</td>
<td>0.961</td>
<td>1.849</td>
<td>1.849</td>
<td>30</td>
</tr>
<tr>
<td>$2 \frac{1}{2}$&quot;</td>
<td>2.52</td>
<td>0.384</td>
<td>0.42</td>
<td>0.42</td>
<td>3.5</td>
</tr>
<tr>
<td>3&quot;</td>
<td>2.83</td>
<td>0.154</td>
<td>0.126</td>
<td>0.126</td>
<td>1.5</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3.5</td>
<td>0.077</td>
<td>0.042</td>
<td>0.042</td>
<td>1</td>
</tr>
</tbody>
</table>

Temperature errors of clamp-on seals when connected to pressure or absolute pressure transmitters, and with \textit{single-sided} connection to differential pressure transmitters

<table>
<thead>
<tr>
<th>Nominal diameter/design</th>
<th>Temperature error of remote seal ([\text{inH}_2\text{O}/25 , ^\circ \text{F}])</th>
<th>Temperature error of capillary ([\text{inH}_2\text{O}/25 , ^\circ \text{F}/3 , \text{ft}])</th>
<th>Temperature error of transmitter flange connection ([\text{inH}_2\text{O}/25 , ^\circ \text{F}])</th>
<th>Recommended values, min. spans (observe temperature error) ([\text{psi}])</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>3.345</td>
<td>5.17</td>
<td>5.17</td>
<td>14.5</td>
</tr>
<tr>
<td>1 ½ inch</td>
<td>2.499</td>
<td>2.732</td>
<td>2.732</td>
<td>3.5</td>
</tr>
<tr>
<td>2 inch</td>
<td>2.23</td>
<td>3.068</td>
<td>1.849</td>
<td>1.5</td>
</tr>
<tr>
<td>3 inch</td>
<td>5.305</td>
<td>1.849</td>
<td>3.068</td>
<td>1.5</td>
</tr>
<tr>
<td>4 inch</td>
<td>0.461</td>
<td>0.084</td>
<td>0.084</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Temperature errors of clamp-on seals with \textit{double-sided} connection to differential pressure transmitters

<table>
<thead>
<tr>
<th>Nominal diameter/design</th>
<th>Temperature error of remote seal ([\text{inH}_2\text{O}/25 , ^\circ \text{F}])</th>
<th>Temperature error of capillary ([\text{inH}_2\text{O}/25 , ^\circ \text{F}/3 , \text{ft}])</th>
<th>Temperature error of transmitter flange connection ([\text{inH}_2\text{O}/25 , ^\circ \text{F}])</th>
<th>Recommended values, min. spans (observe temperature error) ([\text{psi}])</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>1.269</td>
<td>1.093</td>
<td>1.093</td>
<td>14.5</td>
</tr>
<tr>
<td>1 ½ inch</td>
<td>0.461</td>
<td>0.168</td>
<td>0.168</td>
<td>3.5</td>
</tr>
<tr>
<td>2 inch</td>
<td>0.154</td>
<td>0.084</td>
<td>0.084</td>
<td>1.5</td>
</tr>
<tr>
<td>3 inch</td>
<td>1.692</td>
<td>0.294</td>
<td>0.294</td>
<td>1.5</td>
</tr>
<tr>
<td>4 inch</td>
<td>0.577</td>
<td>0.084</td>
<td>0.084</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Temperature errors of clamp-on seals

Remarks:
- Values apply to fill fluids: silicone oil DC 200, high-temperature oil, halocarbon oil and Neobee M20.
- Values apply to stainless steel as the diaphragm material.
- Diaphragm thickness: 1" & 1 ½" & 2": 0.002 inch 3" & 4": 0.004 inch
Calculation of temperature error for remote seals

The following equation is used to calculate the temperature error for remote seals:

\[
dp = (t_{RS} - t_{Cal}) \cdot f_{RS} + (t_{Cap} - t_{Cal}) \cdot f_{Cap} + (t_{TR} - t_{Cal}) \cdot f_{PF}
\]

- \(dp\): Additional temperature error (inH₂O)
- \(t_{RS}\): Temperature on remote seal diaphragm (generally corresponds to temperature of medium)
- \(t_{Cal}\): Reference (calibration) temperature 68 °F
- \(t_{Cap}\): Temperature error of remote seal (see tables on pages 2/146 and 2/147)
- \(t_{Cap}\): Capillary extension length (error given per 3 ft)
- \(t_{Cap}\): Temperature error of capillaries (see tables on pages 2/146 and 2/147)
- \(t_{TR}\): Ambient temperature on transmitter
- \(f_{RS}\): Temperature error of oil filling in process flanges of transmitter (see tables on pages 2/146 and 2/147)
- \(f_{Cap}\): Temperature error of capillaries (see tables on pages 2/146 and 2/147)
- \(f_{PF}\): Temperature error of oil filling in process flanges of transmitter (see tables on pages 2/146 and 2/147)

Example of calculation of temperature error for remote seals

**Existing conditions:**

- SITRANS P transmitter for differential pressure, 100 inH₂O, set to 0 to 40 inH₂O with 3 in flush flanged remote seal, diaphragm made of stainless steel, mat. No. 1.4535/316L
- Capillary 2 x 15 ft
- Capillaries fitted on both sides
- Filled with silicone oil DC 200-10
- Temperature of medium 212 °F
- Temperature on capillaries 122 °F
- Temperature on transmitter 122 °F

**Required:**

Additional temperature error of remote seal: \(dp\)

**Calculation:**

\[
dp = (212 °F - 68 °F) \cdot 0.077 \text{ inH}₂\text{O}/25 °F + (122 °F - 68 °F) \cdot 15 \text{ ft} \cdot 2 \cdot 0.042 \text{ inH}₂\text{O}/25 °F/3 \text{ ft} + (122 °F - 68 °F) \cdot 0.042 \text{ inH}₂\text{O}/25 °F
\]

\[
dp = 0.444 \text{ inH}₂\text{O} + 0.907 \text{ inH}₂\text{O} + 0.091 \text{ inH}₂\text{O}
\]

**Result:**

\(dp = 1.442 \text{ inH}₂\text{O} \) (corresponds to 3.605 % of set span)

**Note:**

The temperature error determined above only applies to the error resulting from connection of the remote seal.

The transmission response of the respective transmitter is not included in this consideration. It must be calculated separately, and the resulting error added to the error determined above from connection of the remote seal.

Dependence of temperature error on diaphragm material

The errors listed in the tables on pages 2/146 and 2/147 refer to the use of stainless steel as the diaphragm material. If a different material is used, the listed values change by the amount shown in the following table.

<table>
<thead>
<tr>
<th>Diaphragm material</th>
<th>Change in temperature error of remote seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>Values as specified in tables on pages 2/146 and 2/147</td>
</tr>
<tr>
<td>Hastelloy C4, mat. No. 2.4610</td>
<td>Increase in values by 50%</td>
</tr>
<tr>
<td>Hastelloy C276, mat. No. 2.4819</td>
<td>Increase in values by 50%</td>
</tr>
<tr>
<td>Monel 400, mat. No. 2.4360</td>
<td>Increase in values by 60%</td>
</tr>
<tr>
<td>Tantalum</td>
<td>Increase in values by 50%</td>
</tr>
<tr>
<td>Titanium</td>
<td>Increase in values by 50%</td>
</tr>
<tr>
<td>Teflon lining on stainless steel diaphragm</td>
<td>Increase in values by 120%</td>
</tr>
<tr>
<td>Halar coating or PFA coating on stainless steel diaphragm</td>
<td>Increase in values by 100%</td>
</tr>
<tr>
<td>Gold coating on stainless steel diaphragm</td>
<td>Increase in values by 40%</td>
</tr>
</tbody>
</table>

Response times (approximate)

The listed values are the response times (in seconds, per meter of capillary extension) for a change in pressure which corresponds to the set span.

The listed values must be multiplied by the respective length of the capillary extension, or with transmitters for differential pressure and flow by the total length of both capillary extensions.

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 145 psi (10 bar). The response time of the transmitter has not been considered.
### Technical data of filling liquid

When selecting the filling liquid, check that it is suitable with respect to the permissible temperature of the medium and the process pressure. Also check the compatibility with the measured medium. For example, only food grade filling liquids may be used in the food industry. A special case are oxygen and chlorine as the measured media; the fill fluid must not react with them, otherwise an explosion or fire may occur if there is a leak in the remote seal.

#### Filling liquid

<table>
<thead>
<tr>
<th>Filling liquid</th>
<th>Density kg/dm³ (lb/in³)</th>
<th>Temperature on capillary °C (°F)</th>
<th>Response time in s/m (s/ft) with max. span of transmitter 250 mbar (3.63 psi) (0.07)</th>
<th>Density at 20 °C kg/dm³ (lb/in³)</th>
<th>Viscosity at 20 °C m²/s-10⁶ (ft²/s-10⁶)</th>
<th>Expansion coefficient 1°C (1°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil DC 200-10</td>
<td>0.934 (0.033)</td>
<td>+60 (+140) +20 (68) -20 (°4)</td>
<td>0.06 (0.018) 0.11 (0.034) 0.3 (0.091) 0.02 (0.006) 0.02 (0.006) 0.1 (0.006) 0.01 (0.006) 0.01 (0.006) 0.05 (0.015)</td>
<td>0.934 (0.033)</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Silicone oil DC 200-50</td>
<td>0.966 (0.035)</td>
<td>+60 (+140) +20 (68) -20 (°4)</td>
<td>0.6 (0.183) 0.61 (0.186) 1.69 (0.515) 0.25 (0.076) 0.26 (0.079) 0.71 (0.216) 0.09 (0.027) 0.1 (0.030) 0.26 (0.082)</td>
<td>0.966 (0.035)</td>
<td>0.23</td>
<td>0.23</td>
</tr>
<tr>
<td>Syltherm 800</td>
<td>0.935 (0.034)</td>
<td>+60 (+140) +20 (68) -20 (°4)</td>
<td>0.06 (0.018) 0.11 (0.034) 0.3 (0.091) 0.02 (0.006) 0.02 (0.006) 0.1 (0.006) 0.01 (0.006) 0.02 (0.006) 0.05 (0.015)</td>
<td>0.935 (0.034)</td>
<td>0.16</td>
<td>0.16</td>
</tr>
<tr>
<td>High-temperature oil</td>
<td>1.07 (0.039)</td>
<td>+60 (+140) +20 (68) -10 (°4)</td>
<td>0.14 (0.043) 0.65 (0.198) 3.96 (1.207) 0.06 (0.018) 0.27 (0.082) 1.65 (0.503) 0.02 (0.006) 0.1 (0.030) 0.62 (0.189)</td>
<td>1.07 (0.039)</td>
<td>0.16</td>
<td>0.16</td>
</tr>
<tr>
<td>Halocarbon oil</td>
<td>1.968 (0.071)</td>
<td>+60 (+140) +20 (68) -20 (°4)</td>
<td>0.07 (0.021) 0.29 (0.088) 2.88 (0.878) 0.12 (0.037) 1.2 (0.366) 0.01 (0.006) 0.05 (0.015) 0.45 (0.137)</td>
<td>1.968 (0.071)</td>
<td>0.23</td>
<td>0.23</td>
</tr>
<tr>
<td>Fluorolube</td>
<td>1.866 (0.068)</td>
<td>+60 (+140) +20 (68) -20 (°4)</td>
<td>0.07 (0.021) 0.29 (0.088) 2.88 (0.876) 0.12 (0.037) 1.2 (0.366) 0.01 (0.006) 0.05 (0.015) 0.45 (0.137)</td>
<td>1.866 (0.068)</td>
<td>0.16</td>
<td>0.16</td>
</tr>
<tr>
<td>Neobee M20</td>
<td>0.917 (0.033)</td>
<td>+60 (+140) +20 (68) -20 (°4)</td>
<td>0.18 (0.055) 0.43 (0.131) 1.19 (0.363) 0.08 (0.024) 0.18 (0.055) 0.5 (0.152) 0.03 (0.009) 0.07 (0.021) 0.18 (0.055)</td>
<td>0.917 (0.033)</td>
<td>0.16</td>
<td>0.16</td>
</tr>
<tr>
<td>Glycerine/water</td>
<td>1.22 (0.044)</td>
<td>+60 (+140) +20 (68) 0 (°4)</td>
<td>0.13 (0.040) 0.76 (0.232) 9.72 (2.963) 0.05 (0.015) 0.32 (0.098) 4.05 (12.34) 0.02 (0.006) 0.12 (0.037) 1.51 (0.460)</td>
<td>1.22 (0.044)</td>
<td>0.16</td>
<td>0.16</td>
</tr>
</tbody>
</table>

### Maximum temperature of medium

The following maximum temperatures of the medium apply depending on the wetted parts materials:

#### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>P&lt;sub&gt;abs&lt;/sub&gt; &lt; 1 bar (14.5 psi)</th>
<th>P&lt;sub&gt;abs&lt;/sub&gt; &gt; 1 bar (14.5 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel, mat. No. 1.4571/316Ti</td>
<td>200 (392) 350 (662)</td>
<td>200 (392) 350 (662)</td>
</tr>
<tr>
<td>PTFE coating</td>
<td>100 (212) 150 (302)</td>
<td>100 (212) 150 (302)</td>
</tr>
<tr>
<td>ECTFE/PFA coating</td>
<td>100 (212) 150 (302)</td>
<td>100 (212) 150 (302)</td>
</tr>
<tr>
<td>Hastelloy C4, mat. No. 2.4610</td>
<td>200 (392) 350 (662)</td>
<td>200 (392) 350 (662)</td>
</tr>
<tr>
<td>Hastelloy C276, mat. No. 2.4819</td>
<td>200 (392) 350 (662)</td>
<td>200 (392) 350 (662)</td>
</tr>
<tr>
<td>Monel 400, mat. No. 2.4360</td>
<td>200 (392) 350 (662)</td>
<td>200 (392) 350 (662)</td>
</tr>
<tr>
<td>Tantalum</td>
<td>200 (392) 350 (662)</td>
<td>200 (392) 350 (662)</td>
</tr>
</tbody>
</table>

### Maximum capillary length (guidance values for diaphragm seals and inline seals)

#### Nominal diameter

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Max. length of capillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 m</td>
<td>2.5 m (8.2 ft) 2.5 m (8.2 ft)</td>
</tr>
<tr>
<td>32 m</td>
<td>2.5 m (8.2 ft) 2.5 m (8.2 ft)</td>
</tr>
<tr>
<td>40 m</td>
<td>1.5 m (4.9 ft) 1.5 m (4.9 ft)</td>
</tr>
<tr>
<td>50 m</td>
<td>1.5 m (4.9 ft) 1.5 m (4.9 ft)</td>
</tr>
<tr>
<td>65 m</td>
<td>1.5 m (4.9 ft) 1.5 m (4.9 ft)</td>
</tr>
<tr>
<td>80 m</td>
<td>1.5 m (4.9 ft) 1.5 m (4.9 ft)</td>
</tr>
</tbody>
</table>

#### Size

<table>
<thead>
<tr>
<th>Size</th>
<th>Max. length of capillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 inch</td>
<td>30.0 ft</td>
</tr>
<tr>
<td>5 inch</td>
<td>30.0 ft</td>
</tr>
</tbody>
</table>
SITRANS P measuring instruments for pressure
Remote seals for transmitters and pressure gauges

Pancake type diaphragm seal
with flexible capillary tube

Overview

Pancake type diaphragm seal

Dimensions (Connection to ASME B16.5)

Dimensions (Connection to ASME B16.5)

This area (A) is to be coated with teflon (PFA) to a minimum thickness of 0.004" No foreign liquids or material are to enter these openings

Pancake type diaphragm seal, dimensions

Size | Class | D | DM | F | A [in²]
--- | --- | --- | --- | --- | ---
2" | 150 - 2500 | 3.94 | 2.32 | 0.79 | 12.2
3" | | 5.28 | 3.50 | 0.79 | 21.9
4" | | 6.22 | 3.50 | 0.79 | 30.4
5" | | 7.32 | 4.80 | 0.87 | 42.1

Size = Nominal pipe size
DM = Effective diaphragm diameter
Class = Flange rating per ASME B16.5
All dimensions in inches unless otherwise noted

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancake type diaphragm seal, connected to a SITRANS P transmitter (order separately)</td>
<td></td>
</tr>
<tr>
<td>for pressure 7MF40 • or 7MF42 •</td>
<td>C) 7MF4800 -</td>
</tr>
<tr>
<td>for absolute pressure 7MF43 •</td>
<td>C) 7MF4801 -</td>
</tr>
<tr>
<td>for differential pressure 7MF44 •</td>
<td>C) 7MF4803 -</td>
</tr>
<tr>
<td>• dual seals for DP</td>
<td></td>
</tr>
</tbody>
</table>

Size and class
• 2 inch class 150 ... 2500
• 3 inch class 150 ... 2500
• 4 inch class 150 ... 2500
• 5 inch class 150 ... 2500
Special design, customer information to be supplied

Materials and wetted parts
• SST 316L
• SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
• Monel 400, mat. No. 2.4360
• Hastelloy C276, mat. No. 2.4819
• Tantal
Special design, customer information to be supplied

Extension length (316SS standard)
Without extension (standard version)
Special design, customer information to be supplied for extension

System fill
• Silicone oil DC 200-10
• Silicone oil DC 200-50
• High temperature oil
• Halocarbon (for O2-application)
• Silicone oil M5
• Sytherm 800
• DC704 silicone oil
• Fluorolube
Special design, customer inform. to be supplied

Length of capillary
• 3 ft
• 5 ft
• 10 ft
• 15 ft
• 20 ft
• 25 ft
• 30 ft
Special design, customer inform. to be supplied

Further designs
Please add "-Z" to Order No. and specify Order code

for 7MF4800
Integrated flame path restriction
Certificate of calibration N.I.S.T. (20% steps)
Material conformance certificate
Vacuum service (must be specified with HT oil)
Calculation of span of transmitter (completed questionnaire to be attached)

for 7MF4801
Integrated flame path restriction
Certificate of calibration N.I.S.T. (20% steps)
Material conformance certificate
Vacuum service (must be specified with HT oil)
Calculation of span of transmitter (completed questionnaire to be attached)

for 7MF4803
Integrated flame path restriction
Certificate of calibration N.I.S.T. (20% steps)
Material conformance certificate
Vacuum service (must be specified with HT oil)
Calculation of span of transmitter (completed questionnaire to be attached)

© Siemens AG 2010

C) Subject to export regulations AL: N, ECCN: EAR99.
Flange-type diaphragm seal, directly connected

**Overview**

Flange-type diaphragm seal, without extension

**Dimensions (connection to ASME B16.5)**

<table>
<thead>
<tr>
<th>Size</th>
<th>DN</th>
<th>Class</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>DM</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>X</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>150</td>
<td>3.50</td>
<td>2.38</td>
<td>1.38</td>
<td>1.3</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>3.75</td>
<td>2.62</td>
<td>1.38</td>
<td>1.6</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>150</td>
<td>3.88</td>
<td>2.75</td>
<td>1.69</td>
<td>1.6</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>4.62</td>
<td>3.25</td>
<td>1.69</td>
<td>1.6</td>
<td>0.85</td>
<td>0.06</td>
<td>0.75</td>
<td>4</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>150</td>
<td>4.25</td>
<td>3.12</td>
<td>2.00</td>
<td>2.1</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>4.88</td>
<td>3.50</td>
<td>2.00</td>
<td>2.1</td>
<td>0.85</td>
<td>0.06</td>
<td>0.75</td>
<td>4</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>1.5&quot;</td>
<td>150</td>
<td>5.00</td>
<td>3.55</td>
<td>2.88</td>
<td>1.9</td>
<td>0.69</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>6.12</td>
<td>4.50</td>
<td>2.88</td>
<td>1.9</td>
<td>0.81</td>
<td>0.06</td>
<td>0.88</td>
<td>4</td>
<td>5.5</td>
<td></td>
</tr>
</tbody>
</table>

Optional instrument connections:
- Welded capillary connection
  - 1/4" NPT
  - 1/2" NPT

**System fill port**

Flange-type diaphragm seal without extension for flanges ≤ 1"

Flange-type diaphragm seal without extension for flanges ≥ 1.5"

Flange-type diaphragm seal, without extension, dimensions

DN = Nominal pipe size
DM = Effective diaphragm diameter
Class = Flange rating per ASME B16.5
X = Number of bolt holes
All dimensions in inches unless otherwise noted

© Siemens AG 2010
Flange-type diaphragm seal with extension

Overview

Flange-type diaphragm seal, with extension

Dimensions

Flange-type diaphragm seal, with extension, dimensions

Selection and Ordering data

<table>
<thead>
<tr>
<th>Size and class</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inch class 150</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>2 inch class 300</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>2 inch class 1500</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>3 inch class 150</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>3 inch class 300</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>3 inch class 1500</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>4 inch class 150</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>4 inch class 300</td>
<td>7MF4810-0</td>
<td></td>
</tr>
<tr>
<td>4 inch class 1500</td>
<td>7MF4810-0</td>
<td></td>
</tr>
</tbody>
</table>

Special design, customer information to be supplied

Materials and wetted parts

- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

Extension length (316SS standard)

Without extension (standard version)
- 2"
- 3"
- 4"
- 6"
- 8"

Special design, customer information to be supplied for extension

System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil
- Halocarbon (for O2-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

Further designs

Please add "Z" to Order No. and specify Order code

Integrated flame path restriction
Rotatable Flange
Certification of calibration N.I.S.T. (20% steps)
Material conformance certificate
Vacuum service (must be specified with HT oil)
Calculation of span of transmitter (completed questionnaire to be attached)

C) Subject to export regulations AL: N, ECCN: EAR99.

Flange-type diaphragm seal, with extension, dimensions

**Size** | **Class** | **A** | **B** | **C** | **DM** | **E** | **F** | **G** | **H** | **X** | **L**
------- | -------- |------ |------ |------ |------- |------ |------ |------ |------ |------ |------ |
2"     | 150      | 6.00 | 4.75 | 1.62 | 1.90   | 0.75  | 0.75  | 4.00  | 3.00  | 4.00  | 6.00  |
| 300    | 6.50     | 5.00 |       |      |        | 0.88  | 0.75  | 8.00  | 6.00  |       |       |
3"     | 150      | 7.50 | 6.00 | 5.00 | 2.8    | 2.99  | 0.94  | 1.12  | 0.88  | 8.00  |       |
| 300    | 8.25     | 6.62 |      |      |        | 1.25  | 0.88  |       |       |       |       |
4"     | 150      | 9.00 | 7.50 | 6.19 | 3.5    | 3.70  | 0.94  | 1.25  | 0.88  |       |       |
| 300    | 10.04    | 7.88 |      |      |        |       |       |       |       |       |       |

1) based on schedule 40
DN = Nominal pipe size
DM = Effective diaphragm diameter
Class = Flange rating per ASME B16.5
X = Number of bolt holes
All dimensions in inches unless otherwise noted
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Mounting flange</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>directly mounted at SITRANS P for Level 7MF46</td>
<td>C) 7MF 4812 - 3</td>
<td></td>
</tr>
</tbody>
</table>

### Materials and wetted parts
- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

### Extension length (316SS standard)

<table>
<thead>
<tr>
<th>Size</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inch</td>
<td>150</td>
</tr>
<tr>
<td>3 inch</td>
<td>300</td>
</tr>
<tr>
<td>4 inch</td>
<td>150</td>
</tr>
<tr>
<td>6 inch</td>
<td>300</td>
</tr>
</tbody>
</table>

### System fill
- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil
- Halocarbon (for O₂-application)
- Silicone oil M5
- Siltherm 800
- DC704 silicone oil
- Fluorolube

### Capillary length at low-side
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

### Further designs
- Integrated flame path restriction
- Rotatable Flange
- Certification of calibration N.I.S.T. (20% steps)
- Material conformance certificate
- Vacuum service (must be specified with HT oil)
- Calculation of span of transmitter (completed questionnaire to be attached)

C) Subject to export regulations AL: N, ECCN: EAR99.
SITRANS P measuring instruments for pressure
Remote seals for transmitters and pressure gauges

Diaphragm seal "flanged off-line low-pressure type", directly connected

Overview

Diaphragm seal "flanges off-line low-pressure type"

Dimensions (Connection to ASME B16.5)

<table>
<thead>
<tr>
<th>G2</th>
<th>G3</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>DM</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>½&quot;</td>
<td>½&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½&quot;</td>
<td>½&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½&quot;</td>
<td>½&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>½&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>½&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>½&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>½&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>½&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>½&quot;-11UNC</td>
<td>4</td>
<td>6.12</td>
<td>0.06</td>
<td>2.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>6.12</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>½&quot;-13UNC</td>
<td>8</td>
<td>6.50</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>½&quot;-11UNC</td>
<td>8</td>
<td>6.50</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DM = Effective diaphragm diameter
G1 = Instrument connection
G2 = Process connection
G3 = Threaded bolt hole
X = Number of bolt holes
Class = Flange rating per ASME B16.5
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Selection and Ordering data

Diaphragm seal "flanged off-line low-pressure type"
direct mount to transmitter, 316 stainless steel upper housing SITRANS P for 7MF44 or 7MF46 (order separately)

Size and class
- ½ inch class 150#RF
- ½ inch class 300#RF
- ½ inch class 600#RF
- ¾ inch class 150#RF
- ¾ inch class 300#RF
- ¾ inch class 600#RF
- 1 inch class 150#RF
- 1 inch class 300#RF
- 1 inch class 600#RF
- 1 ½ inch class 150#RF
- 1 ½ inch class 300#RF
- 1 ½ inch class 600#RF
- 2 inch class 150#RF
- 2 inch class 300#RF
- 2 inch class 600#RF

Special design, customer information to be supplied

Materials and wetted parts
- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

Flushing port(s)
None
1 x ⅜"NPT-female (available w/ SS, HC or MO)
2 x ⅜"NPT-female (available w/ SS, HC or MO)
Special design, customer information to be supplied
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Silicone oil DC 200-10</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Silicone oil DC 200-50</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>High temperature oil</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Halocarbon (for O₂-application)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Silicone oil M5</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Syltherm 800</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>DC704 silicone oil</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Fluorolube</td>
</tr>
<tr>
<td>9</td>
<td>M1 Y</td>
<td>Special design, customer information to be supplied</td>
</tr>
</tbody>
</table>

### Further designs

- Integrated flame path restriction: A01
- Certification of calibration N.I.S.T. (20 % steps): C11
- Material conformance certificate: C12
- Vacuum service (must be specified with HT oil): V01
- Calculation of span of transmitter (completed questionnaire to be attached): Y05

C) Subject to export regulations AL: N, ECCN: EAR99.
Remote seals for transmitters and pressure gauges

Flange-type diaphragm seal with flexible capillary tube

Overview

Flange-type diaphragm seal with flexible capillary extension

Dimensions (Connection to ASME B16.5)

Flange-type diaphragm seal for flanges ≤ 1"

Flange-type diaphragm seal for flanges ≥ 1.5"

Connection to ASME B16.5

<table>
<thead>
<tr>
<th>Size</th>
<th>DN</th>
<th>Class</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>DM</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>X</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>⅜&quot;</td>
<td>150</td>
<td>3.50</td>
<td>2.38</td>
<td>1.38</td>
<td>1.3</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>300</td>
<td>3.75</td>
<td>2.62</td>
<td>1.38</td>
<td>1.6</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>400</td>
<td>3.88</td>
<td>2.75</td>
<td>1.69</td>
<td>1.6</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>300</td>
<td>4.62</td>
<td>3.25</td>
<td>1.69</td>
<td>1.6</td>
<td>0.85</td>
<td>0.06</td>
<td>0.75</td>
<td>4</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>1.5&quot;</td>
<td>150</td>
<td>4.25</td>
<td>3.12</td>
<td>2.00</td>
<td>2.1</td>
<td>0.85</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>4.88</td>
<td>3.50</td>
<td>2.00</td>
<td>2.1</td>
<td>0.85</td>
<td>0.06</td>
<td>0.75</td>
<td>4</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>5.00</td>
<td>3.55</td>
<td>2.88</td>
<td>1.9</td>
<td>0.69</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>6.12</td>
<td>4.50</td>
<td>2.88</td>
<td>1.9</td>
<td>0.81</td>
<td>0.06</td>
<td>0.62</td>
<td>4</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>6.12</td>
<td>4.50</td>
<td>2.88</td>
<td>1.9</td>
<td>1.13</td>
<td>0.25</td>
<td>0.62</td>
<td>4</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>7.00</td>
<td>4.88</td>
<td>2.88</td>
<td>1.9</td>
<td>1.50</td>
<td>0.25</td>
<td>1.12</td>
<td>4</td>
<td>13.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2500</td>
<td>8.00</td>
<td>5.75</td>
<td>2.88</td>
<td>1.9</td>
<td>2.00</td>
<td>0.25</td>
<td>1.25</td>
<td>4</td>
<td>22.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>6.00</td>
<td>4.73</td>
<td>3.62</td>
<td>2.4</td>
<td>0.75</td>
<td>0.06</td>
<td>0.75</td>
<td>4</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>6.50</td>
<td>5.00</td>
<td>3.62</td>
<td>2.4</td>
<td>0.88</td>
<td>0.06</td>
<td>0.75</td>
<td>8</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>6.50</td>
<td>5.00</td>
<td>3.62</td>
<td>2.4</td>
<td>1.25</td>
<td>0.25</td>
<td>0.75</td>
<td>8</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>8.50</td>
<td>6.50</td>
<td>3.62</td>
<td>2.4</td>
<td>1.75</td>
<td>0.25</td>
<td>1.00</td>
<td>8</td>
<td>29.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2500</td>
<td>9.25</td>
<td>6.75</td>
<td>3.62</td>
<td>2.4</td>
<td>2.25</td>
<td>0.25</td>
<td>1.12</td>
<td>8</td>
<td>43.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>7.50</td>
<td>6.00</td>
<td>5.00</td>
<td>3.5</td>
<td>0.94</td>
<td>0.06</td>
<td>0.75</td>
<td>4</td>
<td>11.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>8.25</td>
<td>6.62</td>
<td>5.00</td>
<td>3.5</td>
<td>1.12</td>
<td>0.06</td>
<td>0.88</td>
<td>8</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>8.25</td>
<td>6.62</td>
<td>5.00</td>
<td>3.5</td>
<td>1.50</td>
<td>0.25</td>
<td>0.88</td>
<td>8</td>
<td>24.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>9.50</td>
<td>7.50</td>
<td>5.00</td>
<td>3.5</td>
<td>1.75</td>
<td>0.25</td>
<td>1.00</td>
<td>8</td>
<td>36.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>10.53</td>
<td>8.00</td>
<td>5.00</td>
<td>3.5</td>
<td>2.13</td>
<td>0.25</td>
<td>1.25</td>
<td>8</td>
<td>53.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2500</td>
<td>12.01</td>
<td>9.00</td>
<td>5.00</td>
<td>3.5</td>
<td>2.87</td>
<td>0.25</td>
<td>1.38</td>
<td>8</td>
<td>93.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>9.00</td>
<td>7.50</td>
<td>6.19</td>
<td>3.5</td>
<td>0.94</td>
<td>0.06</td>
<td>0.75</td>
<td>8</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>10.04</td>
<td>7.88</td>
<td>6.19</td>
<td>3.5</td>
<td>1.25</td>
<td>0.06</td>
<td>0.88</td>
<td>8</td>
<td>27.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>10.4</td>
<td>7.88</td>
<td>6.19</td>
<td>3.5</td>
<td>1.63</td>
<td>0.25</td>
<td>1.00</td>
<td>8</td>
<td>38.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>10.83</td>
<td>8.50</td>
<td>6.19</td>
<td>3.5</td>
<td>1.75</td>
<td>0.25</td>
<td>1.00</td>
<td>8</td>
<td>47.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>11.51</td>
<td>9.25</td>
<td>6.19</td>
<td>3.5</td>
<td>2.00</td>
<td>0.25</td>
<td>1.25</td>
<td>8</td>
<td>60.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>12.30</td>
<td>9.50</td>
<td>6.19</td>
<td>3.5</td>
<td>2.37</td>
<td>0.25</td>
<td>1.38</td>
<td>8</td>
<td>81.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2500</td>
<td>14.00</td>
<td>10.75</td>
<td>6.19</td>
<td>3.5</td>
<td>3.25</td>
<td>0.25</td>
<td>1.62</td>
<td>8</td>
<td>144.5</td>
<td></td>
</tr>
</tbody>
</table>

DN = Nominal pipe size
DM = Effective diaphragm diameter
Class = Flange rating per ASME B16.5
X = Number of bolt holes
All dimensions in inches unless otherwise noted
**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flange-type diaphragm seal with flexible capillary extension, connected to a SITRANS P transmitter (order separately) for pressure 7MF40 ■ ■ or 7MF42 ■ ■</td>
<td>C) 7 MF 4 8 2 0 -</td>
</tr>
<tr>
<td>for absolute pressure 7MF43 ■ ■</td>
<td>C) 7 MF 4 8 2 1 -</td>
</tr>
<tr>
<td>for differential pressure 7MF44 ■ ■ • dual seals for DP</td>
<td>C) 7 MF 4 8 2 3 -</td>
</tr>
</tbody>
</table>

### Size and class
- 2 inch class 150
- 2 inch class 300
- 2 inch class 600
- 2 inch class 1500
- 3 inch class 150
- 3 inch class 300
- 3 inch class 600
- 4 inch class 150
- 4 inch class 300
- 4 inch class 400
- 5 inch class 150
- 5 inch class 300
- 5 inch class 400

Special design, customer information to be supplied

### Materials and wetted parts
- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good upto 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

### Extension length (316SS standard)
- Without extension (standard version) 0
- Special design, customer information to be supplied for extension 9

### System fill
- Silicone oil DC 200-10 1
- Silicone oil DC 200-50 2
- High temperature oil 3
- Halocarbon (for O2-application) 4
- Silicone oil M5 5
- Syltherm 800 6
- DC704 silicone oil 7
- Fluorolube 8

Special design, customer information to be supplied

### Length of capillary
- 3 ft 2
- 5 ft 3
- 10 ft 4
- 15 ft 5
- 20 ft 6
- 25 ft 7
- 30 ft 8

Special design, customer information to be supplied

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further designs</td>
<td></td>
</tr>
<tr>
<td>Please add „Z“ to Order No. and specify</td>
<td></td>
</tr>
</tbody>
</table>

### for 7MF4820
- Integrated flame path restriction A01
- Rotatable Flange B01
- DP "H" flange service B02
- Certificate of calibration N.I.S.T. (20% steps) C11
- Material conformance certificate C12
- Vacuum service (must be specified with HT oil) V01
- Calculation of span of transmitter (completed questionnaire to be attached) Y05

### for 7MF4821
- Integrated flame path restriction A01
- Rotatable Flange B01
- Certificate of calibration N.I.S.T. (20% steps) C11
- Material conformance certificate C12
- Vacuum service (must be specified with HT oil) V05
- Calculation of span of transmitter (completed questionnaire to be attached) Y05

### for 7MF4823
- Integrated flame path restriction A02
- Rotatable Flange B01
- Certificate of calibration N.I.S.T. (20% steps) C11
- Material conformance certificate C12
- Vacuum service (must be specified with HT oil) V03
- Calculation of span of transmitter (completed questionnaire to be attached) Y05

© Siemens AG 2010
Diaphragm seal "flanged off-line type"

### Dimensions (Connection to ASME B16.5)

<table>
<thead>
<tr>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>DM</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot; 150#</td>
<td>4 x 1/8&quot;-13UNC</td>
<td>3.75</td>
<td>2.38</td>
<td>1.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/8&quot; 300#</td>
<td>4 x 1/8&quot;-13UNC</td>
<td>3.75</td>
<td>2.62</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/8&quot; 600#</td>
<td>4 x 1/8&quot;-13UNC</td>
<td>4.25</td>
<td>3.12</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4&quot; 150#</td>
<td>4 x 1/4&quot;-13UNC</td>
<td>4.88</td>
<td>3.50</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4&quot; 300#</td>
<td>4 x 1/4&quot;-13UNC</td>
<td>5.00</td>
<td>3.88</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4&quot; 600#</td>
<td>4 x 1/4&quot;-10UNC</td>
<td>6.12</td>
<td>4.50</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot; 150#</td>
<td>4 x 1/2&quot;-13UNC</td>
<td>6.60</td>
<td>4.75</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot; 300#</td>
<td>8 x 0.75</td>
<td>6.50</td>
<td>5.00</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot; 600#</td>
<td>8 x 0.75</td>
<td>6.50</td>
<td>5.00</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DM = Effective diaphragm diameter
G1 = Instrument connection
G2 = Process connection
G3 = Threaded bolt hole
All dimensions in inches unless otherwise noted

Diaphragm seal "flanged off-line type", dimensions
**Diaphragm seal "flanged off-line type"**

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Diaphragm seal &quot;flanged off-line type&quot; with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 and 7MF42 (order separately)</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>7MF4826</td>
</tr>
<tr>
<td>Seal design</td>
<td>Stud mount</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>All-welded stud mount</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Through-hole flange mount</td>
<td>3</td>
</tr>
<tr>
<td>Size and class</td>
<td>½ inch class 150#RF</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>½ inch class 300#RF</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>½ inch class 600#RF</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>¾ inch class 150#RF</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>¾ inch class 300#RF</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>¾ inch class 600#RF</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>1 inch class 150#RF</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>1 inch class 300#RF</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>1 inch class 600#RF</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>1 ½ inch class 150#RF</td>
<td>J</td>
</tr>
<tr>
<td></td>
<td>1 ½ inch class 300#RF</td>
<td>K</td>
</tr>
<tr>
<td></td>
<td>1 ½ inch class 600#RF</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>2 inch class 150#RF</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>2 inch class 300#RF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>2 inch class 600#RF</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>2 inch class 800#RF</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Special design, customer information to be supplied</td>
<td>Z</td>
</tr>
</tbody>
</table>

### Materials and wetted parts

- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

### Flushing port(s)

- None
- 1 x ¼"NPT-female (available w/ SS, HC or MO)
- 2 x ¼"NPT-female (available w/ SS, HC or MO)

### System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil (comes with metal gasket and stronger bolts)
- Halocarbon (for O2-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

### Length of capillary

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

### Further designs

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated flame path restriction</td>
<td>A01</td>
<td></td>
</tr>
<tr>
<td>DP &quot;H&quot; flange service</td>
<td>B02</td>
<td></td>
</tr>
<tr>
<td>Certification of calibration N.I.S.T. (20 % steps)</td>
<td>C11</td>
<td></td>
</tr>
<tr>
<td>Material conformance certificate</td>
<td>C12</td>
<td></td>
</tr>
<tr>
<td>Vacuum service (must be specified with HT oil)</td>
<td>V01</td>
<td></td>
</tr>
<tr>
<td>Calculation of span of transmitter (completed questionnaire to be attached)</td>
<td>Y05</td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010
Overview

Diaphragm seal "flanged off-line low-pressure type"

Dimensions (Connection to ASME B16.5)

<table>
<thead>
<tr>
<th>Size</th>
<th>Class</th>
<th>G2</th>
<th>G3</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>DM</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>½&quot;</td>
<td>150#</td>
<td>¾&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>½&quot;</td>
<td>300#</td>
<td>¾&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>½&quot;</td>
<td>600#</td>
<td>¾&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>150#</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>300#</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;</td>
<td>600#</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>150#</td>
<td>¾&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>300#</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>600#</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>150#</td>
<td>¾&quot;-13UNC</td>
<td>4</td>
<td>5.91</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>300#</td>
<td>¾&quot;-10UNC</td>
<td>4</td>
<td>6.12</td>
<td>0.06</td>
<td>2.46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>600#</td>
<td>¾&quot;-10UNC</td>
<td>4</td>
<td>6.12</td>
<td>0.25</td>
<td>2.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>150#</td>
<td>¾&quot;-11UNC</td>
<td>4</td>
<td>6.00</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>300#</td>
<td>¾&quot;-11UNC</td>
<td>8</td>
<td>6.50</td>
<td>0.06</td>
<td>2.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>600#</td>
<td>¾&quot;-11UNC</td>
<td>8</td>
<td>6.50</td>
<td>0.25</td>
<td>2.55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DM = Effective diaphragm diameter
G2 = Process connection
G3 = Threaded bolt hole
X = Number of bolt holes
Class = Flange rating per ASME B16.5
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Diaphragm seal "flanged off-line low-pressure type", dimensions
### Selection and Ordering data

| Diaphragm seal "flanged off-line low-pressure type" |
|-----------------|-----------------|-----------------|
| Order No. | Order code |
| 7 MF 4 8 2 7 - | A B |

#### Size and class

- **3/8 inch**: class 150#RF
- **3/4 inch**: class 600#RF
- **1 inch**: class 150#RF
- **1 1/2 inch**: class 600#RF
- **2 inch**: class 300#RF
- **2 inch**: class 600#RF

Special design, customer information to be supplied: Z Y

<table>
<thead>
<tr>
<th>Materials and wetted parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flushing port(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of capillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ft</td>
</tr>
</tbody>
</table>

### Selection and Ordering data

| Diaphragm seal "flanged off-line low-pressure type" |
|-----------------|-----------------|-----------------|
| Order No. | Order code |
| 7 MF 4 8 2 8 - | A B |

#### Size and class

- **3/8 inch**: class 150#RF
- **3/4 inch**: class 600#RF
- **1 inch**: class 150#RF
- **1 1/2 inch**: class 600#RF
- **2 inch**: class 300#RF
- **2 inch**: class 600#RF

Special design, customer information to be supplied: Z Y

<table>
<thead>
<tr>
<th>Materials and wetted parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flushing port(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of capillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ft</td>
</tr>
</tbody>
</table>

### Further designs

Please add "Z" to Order No. and specify order code:

- **Integrated flame path restriction**: A01
- **DP "H" flange service**: B02
- **Certification of calibration N.I.S.T. (20 % steps)**: C11
- **Material conformance certificate**: C12
- **Vacuum service (must be specified with HT oil)**: V01
- **Calculation of span of transmitter (completed questionnaire to be attached)**: Y05

C) Subject to export regulations AL: N, ECCN: EAR99.
### Flushing rings

**Overview**

Flushing rings are required for flange-mounted and pancake type remote seals (Order No. 7MF4800 ... 7MF4823) if the danger exists that the process conditions and the geometry of the connection could cause the process 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 Ordering data

**Design**

[Diagram of flushing ring installation example]

### Technical specifications

**Flushing ring for remote seals of pancake and flange design**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50</td>
<td>PN 16 ... PN 100</td>
</tr>
<tr>
<td>DN 80</td>
<td>PN 16 ... PN 100</td>
</tr>
<tr>
<td>DN 100</td>
<td>PN 16 ... PN 100</td>
</tr>
<tr>
<td>DN 125</td>
<td>PN 16 ... PN 100</td>
</tr>
<tr>
<td>2 inch</td>
<td>Class 150 ... class 600</td>
</tr>
<tr>
<td>3 inch</td>
<td>Class 150 ... class 600</td>
</tr>
<tr>
<td>4 inch</td>
<td>Class 150 ... class 600</td>
</tr>
<tr>
<td>5 inch</td>
<td>Class 150 ... class 600</td>
</tr>
</tbody>
</table>

**Sealing face**
- To EN 1092-1
  - Form B1
  - Form B2
  - Form D/Form D
  - Form C/ Form C
  - Form E
  - Form F
- To ASME B16.5
  - RF 125 ... 250 AA
  - RFSF
  - RJT ring groove

**Flushing holes (2 off), female thread:**
- G ¼
- G ½
- ¼ - 1 8N P T
- ½ - 1 4N P T

**Material**
- Stainless steel 1.4404/316L

**Dimensional drawings**

[Diagram of dimensional drawings]

**Connection to EN 1092-1**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN 16 ... 100</th>
<th>d4</th>
<th>d1</th>
<th>h</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>(mm)</td>
<td>(bar)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(kg)</td>
</tr>
<tr>
<td>50</td>
<td>102</td>
<td>62</td>
<td>30</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>138</td>
<td>92</td>
<td>30</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>162</td>
<td>92</td>
<td>30</td>
<td>3.15</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>188</td>
<td>126</td>
<td>30</td>
<td>3.50</td>
<td></td>
</tr>
</tbody>
</table>

**Connection to ASME B 16.5**

<table>
<thead>
<tr>
<th>DN 150 ... 600</th>
<th>Class</th>
<th>d4</th>
<th>d1</th>
<th>h</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>inch</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>kg</td>
<td>lb</td>
</tr>
<tr>
<td>2</td>
<td>92 (3.62)</td>
<td>62 (2.44)</td>
<td>30</td>
<td>0.60 (1.32)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>127 (5)</td>
<td>92 (3.62)</td>
<td>30</td>
<td>1.05 (2.31)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>157 (6.18)</td>
<td>92 (3.62)</td>
<td>30</td>
<td>1.85 (4.09)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>185.5 (7.3)</td>
<td>126 (4.96)</td>
<td>30</td>
<td>3.30 (7.28)</td>
<td></td>
</tr>
</tbody>
</table>

Flushing ring, dimension drawing
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Flushing ring</th>
<th>7MF4825 - 1 2 3 4 5 6 7 8 9</th>
<th>Order No. Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>for remote seals 7MF4900 to 7MF4923</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Nom. diam. Nom. press.  
- **2 inch** Class 150 ... 600: G  
- **3 inch** Class 150 ... 600: H  
- **4 inch** Class 150 ... 600: J  
- **5 inch** Class 150 ... 600: K  

### Other version  
Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...

### Sealing face  
- ASME B16.5  
  - RF 125 ... 250 AA: M  
  - RFSF: Q  
  - RJT ring groove: R  

### Other version  
Add Order code and plain text: Sealing face: ...

### Flushing holes (2 off)  
- Female thread G¼: 1  
- Female thread G½: 2  
- Female thread ¼-18 NPT: 3  
- Female thread ½-14 NPT: 4  

### Material  
- Stainless steel 316L: 0  

### Other version  
Add Order code and plain text: Material: ...

### Further designs  
Please add -Z- to Order No. and specify Order code.

### Acceptance test certificate B  
to EN 10204, section 3.1.B: C 1 2
Diaphragm seal with quick connection

Overview

Diaphragm seal with quick connection, with slotted union nut

Dimensions (connection to ASME B16.5)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>600</td>
<td>Rd 52 x 1/8</td>
<td>2.48</td>
<td>0.83</td>
<td>1.0</td>
<td>2.36</td>
<td>1/4&quot;-NPT male, 1/2&quot;-NPT female</td>
<td>1.3</td>
</tr>
<tr>
<td>32</td>
<td>600</td>
<td>Rd 58 x 1/8</td>
<td>2.76</td>
<td>0.83</td>
<td>1.3</td>
<td>2.72</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>600</td>
<td>Rd 65 x 1/8</td>
<td>3.07</td>
<td>0.83</td>
<td>1.6</td>
<td>2.17</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>360</td>
<td>Rd 78 x 1/8</td>
<td>3.62</td>
<td>0.87</td>
<td>2.1</td>
<td>2.32</td>
<td>2.8</td>
<td></td>
</tr>
</tbody>
</table>

Diaphragm seal with quick connection, with male thread, dimensions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>600</td>
<td>1.50</td>
<td>1.97</td>
<td>1.71</td>
<td>1.0</td>
<td>1.38</td>
<td>1/4&quot;-NPT male, 1/2&quot;-NPT female</td>
<td>1.3</td>
</tr>
<tr>
<td>2</td>
<td>550</td>
<td>1.50</td>
<td>2.52</td>
<td>2.22</td>
<td>1.6</td>
<td>1.7</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>450</td>
<td>2.52</td>
<td>3.05</td>
<td>2.76</td>
<td>2.0</td>
<td>2.0</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>350</td>
<td>2.31</td>
<td>3.58</td>
<td>3.26</td>
<td>2.8</td>
<td>2.7</td>
<td>2.7</td>
<td></td>
</tr>
</tbody>
</table>

DM = Effective diaphragm diameter
MWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
G1 = Instrument connection
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Diaphragm seal with quick connection, Tri-Clamp connection

Dimensions (connection to ASME B16.5)

DM = Effective diaphragm diameter
MWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
G1 = Instrument connection
Size = Nominal pipe size
All dimensions in inches unless otherwise noted
Diaphragm seal with quick connection, dimensions
Overview

- Diaphragm seal with quick connection, "i"-line (Cherry Burrell - male)

Dimensions (connection to ASME B16.5)

- Size MWP A B C DM E F G1 Weight
  - 1.5 500 1.18 2.00 1.3 1.74 1.38 1.3
  - 2 450 1.18 2.64 1.8 2.24 1.44 1.7
  - 3 350 1.30 3.87 2.8 3.30 1.59 2.4

DM = Effective diaphragm diameter
MWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
G1 = Instrument connection

- System fill
  - Vegetable oil
  - Glycerin/Water 86.5/13.5 %
  - Neobee M20
  - Mineral oil

- Length of capillary
  - Direct Mount
  - 3 ft
  - 5 ft
  - 10 ft
  - 15 ft
  - 20 ft
  - 25 ft
  - 30 ft
  - Special design, customer information to be supplied

Selection and Ordering data

- Order No. Order code
  - Diaphragm seal
    - with quick connection for gage pressure transmitter SITRANS P 7MF40 and 7MF42 (order separately)
    - made of 316 SS
  - Process connection
    - DIN 11 851 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
  - Tri-Clamp Connection
    - 1 ½" 600 psi
    - 2" 550 psi
    - 2 ½" 450 psi
    - 3" 350 psi
  - Varivent (Tuchenhagen)
    - Size 25132
    - Size 40150
  - Sanitary (4" Tank Spud)
    - 2" extension
    - 6" extension
  - "I"-Line (Cherry Burrell - male)
    - 1 ½" 500 psi
    - 2" 450 psi
    - 3" 350 psi
  - Special design, customer information to be supplied

- System fill
  - Vegetable oil
  - Glycerin/Water 86.5/13.5 %
  - Neobee M20
  - Mineral oil
  - Special design, customer information to be supplied

- Length of capillary
  - Direct Mount
    - 3 ft
    - 5 ft
    - 10 ft
    - 15 ft
    - 20 ft
    - 25 ft
    - 30 ft
  - Special design, customer information to be supplied

- Further designs
  - Please add "-Z" to Order No. and specify
  - Certification of calibration N.I.S.T. (20 % steps)
  - Material conformance certificate
  - Vacuum service (must be specified with vegetable oil)
  - Calculation of span of transmitter (completed questionnaire to be attached)

- Tank Spud accessories
  - Sanitary Tank Spud Clamp (1 pc.)
  - Sanitary Tank Spud O-ring (1 pc.)
  - Sanitary Tank Spud Weldolet 2" extension (1 pc.)
  - Sanitary Tank Spud Weldolet 6" extension (1 pc.)

C) Subject to export regulations AL: N, ECCN: EAR99.
## Inline diaphragm seal with quick connection

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with quick connection for differential transmitter SITRANS P 7MF44 (order separately) made of 316 SS</td>
<td>C) 7MF4843-</td>
<td>A0B</td>
</tr>
<tr>
<td>Process connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 11 851 with slotted union nut</td>
<td>1E</td>
<td></td>
</tr>
<tr>
<td>DIN 50/PN 25</td>
<td>1F</td>
<td></td>
</tr>
<tr>
<td>DIN 65/PN 25</td>
<td>1G</td>
<td></td>
</tr>
<tr>
<td>DIN 11 851 with screw necks</td>
<td>2E</td>
<td></td>
</tr>
<tr>
<td>DIN 50/PN 25</td>
<td>2F</td>
<td></td>
</tr>
<tr>
<td>DIN 65/PN 25</td>
<td>2G</td>
<td></td>
</tr>
<tr>
<td>Tri-Clamp Connection</td>
<td>4M</td>
<td></td>
</tr>
<tr>
<td>2&quot; 550 psi</td>
<td>4N</td>
<td></td>
</tr>
<tr>
<td>2 ½&quot; 450 psi</td>
<td>4P</td>
<td></td>
</tr>
<tr>
<td>3&quot; 350 psi</td>
<td>4Q</td>
<td></td>
</tr>
<tr>
<td>4&quot; 250 psi</td>
<td>5W</td>
<td>X</td>
</tr>
<tr>
<td>Sanitary (4&quot; Tank Spud)</td>
<td>6B</td>
<td></td>
</tr>
<tr>
<td>2&quot; extension</td>
<td>6D</td>
<td></td>
</tr>
<tr>
<td>6&quot; extension</td>
<td>9Z</td>
<td>H1Y</td>
</tr>
<tr>
<td>Special design, customer information to be supplied</td>
<td></td>
<td>+J1Y</td>
</tr>
<tr>
<td>System fill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable oil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Glycerin/Water 86.5/13.5 %</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Neobee M20</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mineral oil</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Special design, customer information to be supplied</td>
<td>9</td>
<td>M1Y</td>
</tr>
<tr>
<td>Length of capillary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 ft</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5 ft</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>10 ft</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>15 ft</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>20 ft</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>25 ft</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>30 ft</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Special design, customer information to be supplied</td>
<td>9</td>
<td>N1Y</td>
</tr>
<tr>
<td>Further designs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification of calibration N.I.S.T. (20 % steps)</td>
<td>C1</td>
<td></td>
</tr>
<tr>
<td>Material conformance certificate</td>
<td>C2</td>
<td></td>
</tr>
<tr>
<td>Vacuum service (must be specified with vegetable oil)</td>
<td>V03</td>
<td></td>
</tr>
<tr>
<td>Calculation of span of transmitter (completed questionnaire to be attached)</td>
<td>Y05</td>
<td></td>
</tr>
<tr>
<td>Tank Spud accessories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary Tank Spud Clamp (1 pc., two required)</td>
<td>P10</td>
<td></td>
</tr>
<tr>
<td>Sanitary Tank Spud O-ring (1 pc., two required)</td>
<td>P11</td>
<td></td>
</tr>
<tr>
<td>Sanitary Tank Spud Weldolet 2&quot; extension (1 pc., two required)</td>
<td>P12</td>
<td></td>
</tr>
<tr>
<td>Sanitary Tank Spud Weldolet 6&quot; extension (1 pc., two required)</td>
<td>P13</td>
<td></td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99.
## Overview

Inline diaphragm seal with quick connector, DIN 11851 with thread

## Dimensions (connection to ASME B16.5)

<table>
<thead>
<tr>
<th>DN [mm]</th>
<th>MWP [psi]</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>H</th>
<th>J</th>
<th>L</th>
<th>MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>600</td>
<td>1.10</td>
<td>1.57</td>
<td>0.71</td>
<td>0.12</td>
<td>0.16</td>
<td>0.47</td>
<td>4.1</td>
<td>0.63</td>
</tr>
<tr>
<td>25</td>
<td>600</td>
<td>1.50</td>
<td>2.05</td>
<td>1.18</td>
<td>0.14</td>
<td>0.28</td>
<td>0.55</td>
<td>5.0</td>
<td>1.02</td>
</tr>
<tr>
<td>40</td>
<td>600</td>
<td>2.17</td>
<td>2.56</td>
<td>1.65</td>
<td>0.14</td>
<td>0.28</td>
<td>0.55</td>
<td>6.3</td>
<td>1.50</td>
</tr>
<tr>
<td>50</td>
<td>360</td>
<td>2.68</td>
<td>3.07</td>
<td>2.13</td>
<td>0.14</td>
<td>0.28</td>
<td>0.55</td>
<td>6.7</td>
<td>1.97</td>
</tr>
<tr>
<td>65</td>
<td>360</td>
<td>3.35</td>
<td>3.74</td>
<td>2.80</td>
<td>0.14</td>
<td>0.31</td>
<td>0.63</td>
<td>7.2</td>
<td>2.60</td>
</tr>
<tr>
<td>80</td>
<td>360</td>
<td>4.33</td>
<td>4.33</td>
<td>3.35</td>
<td>0.14</td>
<td>0.31</td>
<td>0.79</td>
<td>7.2</td>
<td>3.19</td>
</tr>
<tr>
<td>100</td>
<td>360</td>
<td>5.12</td>
<td>5.12</td>
<td>4.09</td>
<td>0.16</td>
<td>0.39</td>
<td>0.79</td>
<td>7.2</td>
<td>3.94</td>
</tr>
</tbody>
</table>

MB = Internal diameter
MWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
DN = Nominal pipe size
All dimensions in inches unless otherwise noted

Inline diaphragm seal with quick connector, DIN 11851 with thread, dimensions

## Dimensions (connection to ASME B16.5)

<table>
<thead>
<tr>
<th>Size</th>
<th>MWP [psi]</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>L</th>
<th>MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾&quot;</td>
<td>600</td>
<td>0.7</td>
<td>1.34</td>
<td>0.8</td>
<td>0.98</td>
<td>3.8</td>
<td>0.6</td>
</tr>
<tr>
<td>1&quot;</td>
<td>600</td>
<td>1.4</td>
<td>1.97</td>
<td>1.7</td>
<td>1.97</td>
<td>4.5</td>
<td>1.0</td>
</tr>
<tr>
<td>1.5&quot;</td>
<td>600</td>
<td>1.7</td>
<td>1.97</td>
<td>1.7</td>
<td>1.97</td>
<td>5.7</td>
<td>1.5</td>
</tr>
<tr>
<td>2&quot;</td>
<td>550</td>
<td>2.2</td>
<td>2.50</td>
<td>2.2</td>
<td>2.50</td>
<td>6.1</td>
<td>1.9</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>450</td>
<td>2.7</td>
<td>3.10</td>
<td>2.8</td>
<td>3.10</td>
<td>6.1</td>
<td>2.4</td>
</tr>
<tr>
<td>3&quot;</td>
<td>350</td>
<td>3.2</td>
<td>3.60</td>
<td>3.3</td>
<td>3.60</td>
<td>6.1</td>
<td>2.9</td>
</tr>
<tr>
<td>3.5&quot;</td>
<td>350</td>
<td>3.7</td>
<td>4.20</td>
<td>3.8</td>
<td>4.20</td>
<td>6.1</td>
<td>3.3</td>
</tr>
<tr>
<td>4&quot;</td>
<td>250</td>
<td>4.3</td>
<td>4.70</td>
<td>4.3</td>
<td>4.70</td>
<td>6.1</td>
<td>3.8</td>
</tr>
</tbody>
</table>

MB = Internal diameter
MWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Inline diaphragm seal with quick connection, Tri-clamp, dimensions
Overview

Inline diaphragm seal with quick connection, “i”-Line (Cherry Burrell - male/male)

Dimensions (connection to ASME B16.5)

<table>
<thead>
<tr>
<th>Size</th>
<th>MWP [psi]</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>H</th>
<th>L</th>
<th>MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5&quot;</td>
<td>500</td>
<td>1.68</td>
<td>1.97</td>
<td>1.74</td>
<td>2.00</td>
<td>0.203</td>
<td>4.79</td>
<td>1.38</td>
</tr>
<tr>
<td>2&quot;</td>
<td>450</td>
<td>2.25</td>
<td>2.50</td>
<td>2.24</td>
<td>2.64</td>
<td>0.258</td>
<td>5.54</td>
<td>1.88</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>350</td>
<td>2.75</td>
<td>3.10</td>
<td>2.74</td>
<td>3.31</td>
<td>0.312</td>
<td>6.38</td>
<td>2.37</td>
</tr>
</tbody>
</table>

MB = Internal diameter
MWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Inline diaphragm seal with quick connection, “i”-Line (Cherry Burrell - male/male), dimensions

Selection and Ordering data

Order No. Order code

Inline diaphragm seal with quick connection for transmitter
SITRANS P for 7MF40 and 7MF42 (order separately) made of 316 SS C) 7MF 48 50 -

<table>
<thead>
<tr>
<th>Process connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 11 851 with thread [C]</td>
<td>2B</td>
</tr>
<tr>
<td>DN 25/PN 40</td>
<td>2D</td>
</tr>
<tr>
<td>DN 40/PN 40</td>
<td>2E</td>
</tr>
<tr>
<td>DN 50/PN 25</td>
<td>2F</td>
</tr>
<tr>
<td>DN 65/PN 25</td>
<td>2G</td>
</tr>
<tr>
<td>DN 80/PN 25</td>
<td>2H</td>
</tr>
<tr>
<td>DN100/PN 25</td>
<td>2I</td>
</tr>
<tr>
<td>Tri-Clamp Connection</td>
<td>2J</td>
</tr>
<tr>
<td>1” 600 psi</td>
<td>4K</td>
</tr>
<tr>
<td>1 ½ 600 psi</td>
<td>4L</td>
</tr>
<tr>
<td>2 550 psi</td>
<td>4M</td>
</tr>
<tr>
<td>2 ½ 450 psi</td>
<td>4N</td>
</tr>
<tr>
<td>3 350 psi</td>
<td>4P</td>
</tr>
<tr>
<td>“i”-Line (Cherry Burrell - male/male)</td>
<td>5R</td>
</tr>
<tr>
<td>1” 500 psi</td>
<td>5U</td>
</tr>
<tr>
<td>1 ½ 500 psi</td>
<td>5V</td>
</tr>
<tr>
<td>2 450 psi</td>
<td>5W</td>
</tr>
<tr>
<td>3 350 psi</td>
<td>5Y</td>
</tr>
</tbody>
</table>

Special design, customer information to be supplied C) 9Z + 1Y

System fill
- Vegetable oil
- Glycerin/Water 86.5/13.5 %
- Neobee M20
- Mineral oil

Special design, customer information to be supplied 9Z + M 1 Y

Length of capillary
- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied 9 N 1 Y

Further designs
Please add “-Z” to Order No. and specify Order code C) 11

Certification of calibration N.I.S.T. (20 % steps) C 11
Material conformance certificate C 12
Vacuum service (must be specified with vegetable oil) V 03
Calculation of span of transmitter (completed questionnaire to be attached) Y 05

C) Subject to export regulations AL: N, ECCN: EAR99.
Overview

Diaphragm seal "threaded design"

Dimensions (Connection to ASME B16.5)

### Diaphragm seal "threaded design"

<table>
<thead>
<tr>
<th>G1</th>
<th>G2</th>
<th>A</th>
<th>B</th>
<th>DM</th>
<th>E</th>
<th>F</th>
<th>Weight [lbs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼&quot;-NPT</td>
<td>½&quot;-NPT</td>
<td>3.74</td>
<td>1.18</td>
<td>2.1</td>
<td>2.20</td>
<td>0.63</td>
<td>3.0</td>
</tr>
<tr>
<td>½&quot;-NPT</td>
<td></td>
<td></td>
<td>1.41</td>
<td>2.1</td>
<td>2.36</td>
<td>0.70</td>
<td>3.4</td>
</tr>
<tr>
<td>1&quot;-NPT</td>
<td></td>
<td></td>
<td>1.77</td>
<td>2.1</td>
<td>3.46</td>
<td>1.89</td>
<td>3.6</td>
</tr>
</tbody>
</table>

G1 = Instrument connection, G2 = Process connection
DM = Effective diaphragm diameter
All dimensions in inches unless otherwise noted
Diaphragm seal "threaded design"

### Selection and Ordering data

**Diaphragm seal "threaded design"**
MWP 3675 psi
with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 and 7MF42 pressure
(order separately)

**Order No.** Order code

<table>
<thead>
<tr>
<th>Size and class</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼&quot;-NPT-female</td>
<td>7M4F861</td>
<td>-B</td>
</tr>
<tr>
<td>½&quot;-NPT-female</td>
<td>7M4F862</td>
<td>-B</td>
</tr>
<tr>
<td>¾&quot;-NPT-female</td>
<td>7M4F863</td>
<td>-B</td>
</tr>
<tr>
<td>1&quot;-NPT-female</td>
<td>7M4F864</td>
<td>-B</td>
</tr>
</tbody>
</table>

Special design, customer information to be supplied

**Materials and wetted parts**

- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
- SST 316L with Hastelloy C276 diaphragm
- SST 316L with PFA coated diaphragm (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C276 lower housing with Tantalum diaphragm

Special design, customer information to be supplied

**Flushing port(s)**

- None
- 1 x ¼"NPT-female
- 2 x ¼"NPT-female

Special design, customer information to be supplied

**System fill**

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil (comes with metal gasket and stronger bolts)
- Halocarbon (for O₂-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

**Length of capillary**

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

**Further designs**

Please add "Z" to Order No. and specify Ord. code

- Integrated flame path restriction
- DP 14" flange service
- Certification of calibration N.I.S.T. (20 % steps)
- Material conformance certificate
- Vacuum service (must be specified with HT oil)
- Calculation of span of transmitter (completed questionnaire to be attached)

C) Subject to export regulations AL: N, ECCN: EAR99.
**Overview**

Diaphragm seal "threaded, low-pressure design"

**Dimensions (Connection to ASME B16.5)**

Diaphragm seal "threaded, low-pressure design, dimensions"

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
<th>Diaphragm seal &quot;threaded, low-pressure design&quot; MWP 1,500 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MF4862</td>
<td>B</td>
<td>with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 and 7MF42 pressure (order separately)</td>
</tr>
</tbody>
</table>

**Size and class**

- ¼"NPT-female
- ½"NPT-female
- ¾"NPT-female
- 1"NPT-female

Special design, customer information to be supplied

**Materials and wetted parts**

- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm
- SST 316L with Hastelloy C276 diaphragm
- SST 316L with PFA coated diaphragm
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C276 lower housing with Tantalum diaphragm

Special design, customer information to be supplied

**Flushing port(s)**

- None
- 1 x ¼"NPT-female
- 2 x ¼"NPT-female

Special design, customer information to be supplied

**System fill**

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil (comes with metal gasket and stronger bolts)
- Halocarbon (for O2-application)
- Silicone oil M5
- Sytherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

**Length of capillary**

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

**Further designs**

Please add ".Z" to Order No. and specify Order code

- Integrated flame path restriction
- Certification of calibration N.I.S.T. (20 % steps)
- Material conformance certificate
- Vacuum service (must be specified with HT oil)
- Calculation of span of transmitter (completed questionnaire to be attached)

<table>
<thead>
<tr>
<th>G1</th>
<th>G2</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>DM</th>
<th>E</th>
<th>F</th>
<th>Weight [lbs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼&quot;-NPT or ½&quot;-NPT</td>
<td>5.91</td>
<td>4.92</td>
<td>1.25</td>
<td>3.00</td>
<td>0.90</td>
<td>14.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾&quot;-NPT</td>
<td>1.25</td>
<td>3.00</td>
<td>0.90</td>
<td>14.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;-NPT</td>
<td>1.38</td>
<td>3.20</td>
<td>1.10</td>
<td>14.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.75</td>
<td>3.50</td>
<td>1.40</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

G1 = Instrument connection
G2 = Process connection
DM = Effective diaphragm diameter
All dimensions in inches unless otherwise noted

© Siemens AG 2010
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Diaphragm seal &quot;threaded, low-pressure design&quot; MWP 1,500 psi</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF44 (order separately)</td>
<td>7MF4863-1</td>
<td>B J Y</td>
</tr>
</tbody>
</table>

#### Size and class
- ¼”NPT-female
- ½”NPT-female
- ¾”NPT-female

Special design, customer information to be supplied

#### Materials and wetted parts

- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good upto 500 °F)
- SST 316L with Hastelloy C276 diaphragm
- SST 316L with PFA coated diaphragm (good upto 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C276 lower housing with Tantalum diaphragm

Special design, customer information to be supplied

#### Flushing port(s)

- None
- 1 x ¼”NPT-female
- 2 x ¼”NPT-female

Special design, customer information to be supplied

#### System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil (comes with metal gasket and stronger bolts)
- Halocarbon (for O2-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

#### Length of capillary

- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

#### Further designs

- Integrated flame path restriction
- Certification of calibration N.I.S.T. (20 % steps)
- Material conformance certificate
- Vacuum service (must be specified with HT oil)
- Calculation of span of transmitter (completed questionnaire to be attached)

Order code

<table>
<thead>
<tr>
<th>Integrated flame path restriction</th>
<th>A 0 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification of calibration N.I.S.T. (20 % steps)</td>
<td>C 1 1</td>
</tr>
<tr>
<td>Material conformance certificate</td>
<td>C 1 2</td>
</tr>
<tr>
<td>Vacuum service (must be specified with HT oil)</td>
<td>V 0 3</td>
</tr>
<tr>
<td>Calculation of span of transmitter (completed questionnaire to be attached)</td>
<td>Y 0 5</td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99.
**Overview**

Inline diaphragm seal, wafer for pressure

**Dimensions (Connection to ASME B16.5)**

<table>
<thead>
<tr>
<th>Size</th>
<th>Class</th>
<th>A</th>
<th>MB</th>
<th>L</th>
<th>Weight [lbs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>150# - 2500#</td>
<td>2.4</td>
<td>1.12</td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>1.5&quot;</td>
<td></td>
<td>3.3</td>
<td>1.69</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>2&quot;</td>
<td></td>
<td>3.7</td>
<td>2.15</td>
<td></td>
<td>5.5</td>
</tr>
<tr>
<td>3&quot;</td>
<td></td>
<td>5.1</td>
<td>3.25</td>
<td></td>
<td>8.8</td>
</tr>
<tr>
<td>4&quot;</td>
<td></td>
<td>5.9</td>
<td>4.21</td>
<td>2.36</td>
<td>10.3</td>
</tr>
<tr>
<td>5&quot;</td>
<td></td>
<td>7.3</td>
<td>5.20</td>
<td></td>
<td>15.0</td>
</tr>
<tr>
<td>6&quot;</td>
<td></td>
<td>8.5</td>
<td>6.26</td>
<td></td>
<td>20.9</td>
</tr>
</tbody>
</table>

MB = Effective internal diameter  
Class = Flange rating per ASME B16.5  
Size = Nominal pipe size  
All dimensions in inches unless otherwise noted  

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Inline diaphragm seals wafer assembled to</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P for 7MF40 ■ ■ and 7MF42 ■ ■</td>
<td>7MF4880 - 1</td>
<td>M0 - B</td>
</tr>
</tbody>
</table>

**Size and class**

- 1 inch class 150 to 2500
- 1 ½ inch class 150 to 2500
- 2 inch class 150 to 2500
- 3 inch class 150 to 2500
- 4 inch class 150 to 2500

Special design, customer information to be supplied

**Materials and wetted parts**

- SST 316L
- SST 316L with PFA-Coating (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

**System fill**

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil
- Halocarbon (for O2-application)
- Silicone oil M5
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

**Length of capillary**

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

**Further designs**

Add "-Z" to Order No. and specify Order code

- Integrated flame path restriction
- Certification of calibration N.I.S.T. (20% steps)
- Material conformance certificate
- Vacuum service (must be specified with HT oil)
- Calculation of span of transmitter (completed questionnaire to be attached)

C) Subject to export regulations AL: N, ECCN: EAR99.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Inline diaphragm seal wafer assembled to</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P for 7MF44 ▉ (order separately)</td>
<td>7MF4883 -</td>
<td>1 0 B 1 Y</td>
</tr>
</tbody>
</table>

### Size and class

- **1 inch** class 150 to 2500
- **1 ½ inch** class 150 to 2500
- **2 inch** class 150 to 2500
- **3 inch** class 150 to 2500
- **4 inch** class 150 to 2500

Special design, customer information to be supplied

### Materials and wetted parts

- **SST 316L**
- **SST 316L with PFA-Coating (good up to 500 °F)**
- **Monel 400, mat. No. 2.4360**
- **Hastelloy C276, mat. No. 2.4819**
- **Tantal**

Special design, customer information to be supplied

### System fill

- **Silicone oil DC 200-10**
- **Silicone oil DC 200-50**
- **High temperature oil**
- **Halocarbon (for O2-application)**
- **Silicone oil M5**
- **DC704 silicone oil**
- **Fluorolube**

Special design, customer information to be supplied

### Length of capillary

- **3 ft**
- **5 ft**
- **10 ft**
- **15 ft**
- **20 ft**
- **25 ft**
- **30 ft**

Special design, customer information to be supplied

### Further designs

- Integrated flame path restriction A 02
- Certification of calibration N.I.S.T. (20% steps) C 11
- Material conformance certificate C 12
- Vacuum service (must be specified with HT oil) V 03
- Calculation of span of transmitter (completed questionnaire to be attached) Y 05

© Siemens AG 2010
Overview

Dimensions (Connection to ASME B16.5)

<table>
<thead>
<tr>
<th>Radius</th>
<th>To fit Pipe size</th>
<th>Pipe O.D.</th>
<th>G1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.49</td>
<td>2.5</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>1.77</td>
<td>3.0</td>
<td>3.50</td>
<td></td>
</tr>
<tr>
<td>2.24</td>
<td>4.0</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>2.76</td>
<td>5.0</td>
<td>5.50</td>
<td></td>
</tr>
<tr>
<td>3.35</td>
<td>6.0</td>
<td>6.63</td>
<td></td>
</tr>
<tr>
<td>4.311</td>
<td>8.0</td>
<td>8.625</td>
<td></td>
</tr>
<tr>
<td>5.374</td>
<td>10.0</td>
<td>10.75</td>
<td></td>
</tr>
<tr>
<td>6.378</td>
<td>12.0</td>
<td>12.75</td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td>14.0</td>
<td>14.75</td>
<td></td>
</tr>
</tbody>
</table>

G1 = Instrument connection
All dimensions in inches unless otherwise noted
Diaphragm seal, saddle, dimensions
## Selection and Ordering data

### Diaphragm seal, saddle, MWP 1,500 psi

with flexible armored capillary or direct mount, 316 stainless steel upper housing and assembly hardware SITRANS P for 7MF40 or 7MF42 (order separately)

<table>
<thead>
<tr>
<th>Nominal pipe size</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2&quot;</td>
<td>7MF4890</td>
<td>B</td>
</tr>
<tr>
<td>3&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrofit 3&quot; Conoflow (6 bolt pattern)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrofit 3&quot; M&amp;G style (8 bolt pattern)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrofit 4&quot; Conoflow (6 bolt pattern)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrofit 4&quot; M&amp;G style (8 bolt pattern)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Special design, customer information to be supplied

### Diaphragm material

- SST 316L
- SST 316L with carbon pigmented Teflon lined diaphragm (good up to 500 °F)
- SST 316L with PFA coated diaphragm (good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

### Saddle Material

- None (Retrofit order)
- Carbon steel, Ni plated SST 316L
- Hastelloy C276, mat. No. 2.4819

Special design, customer information to be supplied

### System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- High temperature oil (comes with metal gasket and stronger bolts)
- Halocarbon (for O2-application)
- Silicone oil M5
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

### Length of capillary

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

### Further designs

Please add „Z“ to Order No. and specify Order code

- Integrated flame path restriction
- Certification of calibration N.I.S.T. (20 % steps)
- Material conformance certificate
- Vacuum service (must be specified with HT oil)
- Calculation of span of transmitter (completed questionnaire to be attached)

C) Subject to export regulations AL: N, ECCN: EAR99.
Measuring setups

The following pages show examples of typical measuring setups for use of SITRANS P transmitters with and without remote seals, such as:

- Setups for transmitters with connection of remote seals, with associated equations for calculation.
- Questionnaires
  Checking of combination between transmitter and remote seal
- Setups for transmitters without remote seals, with associated equations for calculation
- Questionnaires
  For hydrostatic level measurements

Installation

Remote seals of pancake design are fitted between the connection flange of the measuring point and a blind flange. Remote seals of flanged design are fitted directly on the connection flange of the measuring point. The respective pressure rating of the blind flange or the flanged remote seal must be observed. The transmitter should always be installed below the connection flange, and below the lower connection flange in the case of differential pressure transmitters. When measuring at pressures above atmospheric, the transmitter can also be installed above the connection flange. When measuring at pressures below atmospheric, the transmitter must always be installed below the connection flange, and below the lower connection flange in the case of differential pressure transmitters.

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 results from the oil filling of the remote seal capillaries. This results in an offset of the actual measuring range and must be taken into account when adjusting the transmitter. An offset in the measuring range also occurs when combining a remote seal with a transmitter if the latter is not installed at the same height as the former.

Transmitter output

If the level, separation layer or density increase in closed vessels, the differential pressure and the output signal of the transmitter also increase. If an inverted relationship is desired 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, an increasing pressure is usually assigned to an increasing level, separation layer or density.

Influence of ambient temperature

The capillaries between the remote seal and the transmitter should be kept as short as possible to obtain the good transmission response. Temperature differences between the individual capillaries or between the individual remote seals should be avoided.

If the complete setup is exposed to temperature variations, errors result from the thermal expansion of the filling liquid in the capillaries, in the remote seals and in the connection units of the transmitters.

Notes

- When measuring separation layers, ensure that the layer is positioned between the two spigots. Also ensure that the level in the vessel is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level is usually above the top spigot.

Possible combinations of transmitter and remote seal

<table>
<thead>
<tr>
<th>Installation type</th>
<th>Transmitter</th>
<th>Remote seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/B</td>
<td>7MF4033</td>
<td>7MF4034</td>
</tr>
<tr>
<td></td>
<td>7MF4800,</td>
<td>7MF4810,</td>
</tr>
<tr>
<td></td>
<td>7MF4820,</td>
<td>7MF4826,</td>
</tr>
<tr>
<td></td>
<td>7MF4827,</td>
<td>7MF4840,</td>
</tr>
<tr>
<td></td>
<td>7MF4850,</td>
<td>7MF4861,</td>
</tr>
<tr>
<td></td>
<td>7MF4862,</td>
<td>7MF4880</td>
</tr>
<tr>
<td></td>
<td>7MF4890</td>
<td>(vacuum-proof design required)</td>
</tr>
<tr>
<td>C1/C2</td>
<td>7MF4233</td>
<td>7MF4234</td>
</tr>
<tr>
<td></td>
<td>7MF4800,</td>
<td>7MF4810,</td>
</tr>
<tr>
<td></td>
<td>7MF4820,</td>
<td>7MF4826,</td>
</tr>
<tr>
<td></td>
<td>7MF4827,</td>
<td>7MF4840,</td>
</tr>
<tr>
<td></td>
<td>7MF4850,</td>
<td>7MF4861,</td>
</tr>
<tr>
<td></td>
<td>7MF4862,</td>
<td>7MF4880</td>
</tr>
<tr>
<td></td>
<td>7MF4890</td>
<td>(vacuum-proof design)</td>
</tr>
<tr>
<td>D</td>
<td>7MF4433</td>
<td>7MF4434</td>
</tr>
<tr>
<td></td>
<td>7MF4803,</td>
<td>7MF4823,</td>
</tr>
<tr>
<td></td>
<td>7MF4828,</td>
<td>7MF4843,</td>
</tr>
<tr>
<td></td>
<td>7MF4863</td>
<td>7MF4883</td>
</tr>
<tr>
<td>E</td>
<td>7MF4433</td>
<td>7MF4434</td>
</tr>
<tr>
<td></td>
<td>7MF4803,</td>
<td>7MF4823,</td>
</tr>
<tr>
<td></td>
<td>7MF4828,</td>
<td>7MF4843,</td>
</tr>
<tr>
<td></td>
<td>7MF4863</td>
<td>7MF4883</td>
</tr>
</tbody>
</table>
Schematics

**Types of installation for pressure and level measurements (open vessels)**

**Installation type A**
Start-of-scale:
\[ p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_1 \]
Full-scale:
\[ p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_1 \]

**Installation type B**
Start-of-scale:
\[ p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{Oil} \cdot g \cdot H_1 \]
Full-scale:
\[ p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{Oil} \cdot g \cdot H_1 \]

**Legend**
- \( p_{MA} \): Start-of-scale value to be set
- \( p_{ME} \): Full-scale value to be set
- \( \rho_{FL} \): Density of medium in vessel
- \( \rho_{Oil} \): Density of filling oil in the capillary to the remote seal
- \( g \): Local acceleration due to gravity
- \( H_U \): Start-of-scale value
- \( H_O \): Full-scale value
- \( H_1 \): Distance between vessel flange and pressure trans.

**Installation type C₁ and C₂**
Start-of-scale:
\[ p_{MA} = p_{START} + \rho_{Oil} \cdot g \cdot H_1 \]
Full-scale:
\[ p_{ME} = p_{END} + \rho_{Oil} \cdot g \cdot H_1 \]

**Legend**
- \( p_{MA} \): Start-of-scale value to be set
- \( p_{ME} \): Full-scale value to be set
- \( p_{START} \): Start-of-scale value
- \( p_{END} \): Full-scale value
- \( \rho_{Oil} \): Density of filling oil in the capillary to the remote seal
- \( g \): Local acceleration due to gravity
- \( H_1 \): Distance between vessel flange and pressure trans.

**Installation type D**
Filter monitoring
Start-of-scale:
\[ p_{MA} = p_{START} - \rho_{Oil} \cdot g \cdot H_V \]
Full-scale:
\[ p_{ME} = p_{END} - \rho_{Oil} \cdot g \cdot H_V \]

**Legend**
- \( p_{MA} \): Start-of-scale value to be set
- \( p_{ME} \): Full-scale value to be set
- \( p_{START} \): Start-of-scale value
- \( p_{END} \): Full-scale value
- \( \rho_{Oil} \): Density of filling oil in the capillary to the remote seal
- \( g \): Local acceleration due to gravity
- \( H_V \): Distance between the measuring points (spigots)
Types of installation for level measurements (closed vessels)

**Installation type E**

Start-of-scale: \( p_{\text{sw}} = \rho_{\text{FL}} \cdot g \cdot h_{\text{U}} - \rho_{\text{Oil}} \cdot g \cdot h_{\text{V}} \)

Full-scale: \( p_{\text{MF}} = \rho_{\text{FL}} \cdot g \cdot h_{\text{O}} - \rho_{\text{Oil}} \cdot g \cdot h_{\text{V}} \)

Legend

- \( p_{\text{sw}} \): Start-of-scale value to be set
- \( p_{\text{MF}} \): Full-scale value to be set
- \( \rho_{\text{FL}} \): Density of medium in vessel
- \( \rho_{\text{Oil}} \): Density of filling oil in the capillary to the remote seal
- \( g \): Local acceleration due to gravity
- \( h_{\text{U}}, h_{\text{O}}, h_{\text{V}} \): Distance between the measuring points (spigots)

**Legend**

- \( p_{\text{MA}} \): Start-of-scale value to be set
- \( p_{\text{ME}} \): Full-scale value to be set
- \( \rho_{\text{FL}} \): Density of medium in vessel
- \( \rho_{\text{Oil}} \): Density of filling oil in the capillary to the remote seal
- \( g \): Local acceleration due to gravity
- \( H_{\text{U}}, H_{\text{O}}, H_{\text{V}} \): Distance between the measuring points (spigots)

**Installation type G**, **H**, and **J**

**Installation type G**

Pressure transmitter for differential pressure above the upper measuring point, no vacuum

- \( H_{\text{U}} \leq 7 \text{ m (23 ft)} \)
- with halocarbon oil as filling liquid only \( H_{\text{V}} \leq 4 \text{ m (13.1 ft)} \)

**Installation type H**

- below the lower measuring point

- \( H_{\text{U}} \leq 7 \text{ m (23 ft)} \)
- with halocarbon oil as filling liquid only \( H_{\text{V}} \leq 4 \text{ m (13.1 ft)} \)

**Installation type J**

- between the measuring points, no vacuum

- \( H_{\text{U}} \leq 7 \text{ m (23 ft)} \)
- with halocarbon oil as filling liquid only \( H_{\text{V}} \leq 4 \text{ m (13.1 ft)} \)

Legend

- \( p_{\text{sw}} \): Start-of-scale value to be set
- \( p_{\text{MF}} \): Full-scale value to be set
- \( \rho_{\text{FL}} \): Density of medium in vessel
- \( \rho_{\text{Oil}} \): Density of filling oil in the capillary to the remote seal
- \( g \): Local acceleration due to gravity
- \( H_{\text{U}}, H_{\text{O}}, H_{\text{V}} \): Distance between the measuring points (spigots)
### Overview

#### Notes
- For the separation layer measurement, the separation layer has to be positioned between the two spigots.
- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot.

### Schematics

#### Pressure transmitters for differential pressure, for flanging

**Measuring setups for open containers**

**Level measurement**

Start-of-scale: \( p_{\text{MA}} = \rho \cdot g \cdot H_U \)

Full-scale: \( p_{\text{ME}} = \rho \cdot g \cdot H_O \)

Legend
- \( p_{\text{MA}} \): Start-of-scale value to be set
- \( p_{\text{ME}} \): Full-scale value to be set
- \( \rho \): Density of medium in vessel
- \( g \): Local acceleration due to gravity
- \( H_U \): Start-of-scale value
- \( H_O \): Full-scale value

**Separation layer measurement**

Start-of-scale: \( p_{\text{MA}} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2) \)

Full-scale: \( p_{\text{ME}} = \rho_1 \cdot g \cdot H_O \)

Legend
- \( p_{\text{MA}} \): Start-of-scale value to be set
- \( p_{\text{ME}} \): Full-scale value to be set
- \( \rho_1 \): Density of heavier liquid
- \( \rho_2 \): Density of lighter liquid
- \( g \): Local acceleration due to gravity
- \( H_U \): Start-of-scale value
- \( H_O \): Full-scale value

**Density measurement**

Start-of-scale: \( p_{\text{MA}} = \rho_{\text{MIN}} \cdot g \cdot H_O \)

Full-scale: \( p_{\text{ME}} = \rho_{\text{MAX}} \cdot g \cdot H_O \)

Legend
- \( p_{\text{MA}} \): Start-of-scale value to be set
- \( p_{\text{ME}} \): Full-scale value to be set
- \( \rho_{\text{MIN}} \): Minimum density of medium in vessel
- \( \rho_{\text{MAX}} \): Maximum density of medium in vessel
- \( g \): Local acceleration due to gravity
- \( H_O \): Full-scale value in m
**Level measurement, Version 1**

Start-of-scale: \( \Delta p_{\text{MA}} = \rho \cdot g \cdot H_U \)

Full-scale: \( \Delta p_{\text{ME}} = \rho \cdot g \cdot H_O \)

**Legend**
- \( \Delta p_{\text{MA}} \) Start-of-scale value to be set
- \( \Delta p_{\text{ME}} \) Full-scale value to be set
- \( \rho \) Density of medium in vessel
- \( g \) Local acceleration due to gravity
- \( H_U \) Start-of-scale value
- \( H_O \) Full-scale value

**Level measurement, Version 2**

Start-of-scale: \( \Delta p_{\text{MA}} = g \cdot (H_U \cdot \rho - H_V \cdot \rho') \)

Full-scale: \( \Delta p_{\text{ME}} = g \cdot (H_O \cdot \rho - H_V \cdot \rho') \)

**Legend**
- \( \Delta p_{\text{MA}} \) Start-of-scale value to be set
- \( \Delta p_{\text{ME}} \) Full-scale value to be set
- \( \rho \) Density of medium in vessel
- \( \rho' \) Density of liquid in the negative pressure line (corresponding to the temperature existing there)
- \( g \) Local acceleration due to gravity
- \( H_U \) Start-of-scale value
- \( H_O \) Full-scale value
- \( H_V \) Distance between the measuring points (spigots)

**Separation layer measurement**

Start-of-scale: \( \Delta p_{\text{MA}} = g \cdot (H_V \cdot \rho_1 + (H_O - H_U) \cdot \rho_2 - H_V \cdot \rho_2') \)

Full-scale: \( \Delta p_{\text{ME}} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho_2') \)

**Legend**
- \( \Delta p_{\text{MA}} \) Start-of-scale value to be set
- \( \Delta p_{\text{ME}} \) Full-scale value to be set
- \( \rho_1 \) Density of heavier liquid with separation layer in vessel
- \( \rho_2 \) Density of lighter liquid with separation layer
- \( \rho_2' \) Density of liquid in the negative pressure line (corresponding to the temperature existing there)
- \( g \) Local acceleration due to gravity
- \( H_U \) Start-of-scale value
- \( H_O \) Full-scale value
- \( H_V \) Distance between the measuring points (spigots)
Questionnaire (suitable for US market)
for hydrostatic level measurements

Order date: _______________________________________________
Processing date: __________________________________________
Ordering code (customer): _________________________________
Ordering code (supplier): __________________________________
Customer reference:_______________________________________
Measuring point: __________________________________________
Position:__________________________________________________
Dimensions: ______________________________________________

Pressure:  □ psi  □ K  □ °F
Temperature: □ °C  □ °F
Measuring range: □ inch □ ft
(please mark with cross)
Order No. of transmitter 1):

Y01

The different pressures and tempera-
tures (densities) in the vessel and in the reference column result in an offset in the start-of-scale and full-scale values. The calibration data are determined in addition. 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:

<table>
<thead>
<tr>
<th>Please mark type of boiler with a cross:</th>
<th>Closed 1)</th>
<th>Open or not under pressure 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium _______________________________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Licensed boiler pressure (absolute) | __________ psi |
| Operating pressure (absolute)      | Lowest __________ psi |
|                                      | Normal 3) __________ psi |
|                                      | Highest __________ psi |
| Temperature of reference column (cold) | __________ °F |
| Distance between measuring points (dimension according to sketch) | H_V = _________ ft |
| Measuring range 4) = start-of-scale value to full-scale value | |
| Start-of-scale value | H_U =___________ ft |
| Full-scale value | H_O =___________ ft |
| Position of equalizing vessel above bottom measuring point if different from H_V | |       |
| Please mark pressure correction of level with a cross: | No | Yes 4) |

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.
Questionnaire (suitable for US market)
Checking of transmitter/remote seal combinations

* Customer:___________________ Tag. No.: _____________________
* Plant:____________________  Item No.: _____________________
* Ordering code:______________ Person responsible: ___________
* Ordering department: _____ Phone: _____________________

* Transmitter Order No.: 7MF 4□□□–1 □□□□□–1 □□□

Order No. of transmitter known?

Order No. of remote seal:
7MF 4 □□□□□□□□ □□□□□–□□□□–□□□

Suffixes _______________________
Suffixes _______________________

* Or without Order No.: Process connection

* Standard: ______________________
* Nominal diameter: ______________________
* Nominal pressure: ______________________
* Constructional design: 
  □ Pancake-type rem. seal
  □ Flanged remote seal
  □ Quick-release remote seal
  □ Clamp-on seal
  □ Other: ______________________

* Connection: 
  □ Direct connection
  □ Capillary on one side; 
    connection to: + side □ – side
  □ Capillaries on both sides; 
    Capillary length: ___ ft
  □ Yes □ No

* Vacuum-proof design: ______________________
* Wetted parts materials: ______________________
  □ Tube: ______________________
  □ Filling liquid ______________________
  □ Miscellaneous: ______________________

Calculation of measuring range necessary?

* Range to be set: 
  (without calculation)
  Start-of-scale: ______ psi ( 4 mA)
  Full-scale: ______ psi (20 mA)

* Required measuring accuracy: 
  Error: < . % of set span per 18 °F change in temperature

* Medium
  Density of medium: __________ kg/m³
  * Temperature of medium:
    Normal ________ °F
    Minimum ________ °F
    Maximum ________ °F

* Ambient temperature on capillaries:

* Ambient temperature on transmitter:

  * Operating pressure referred to absolute zero:
    __________ psi
  * Does a vacuum occur during startup? 
    No □ Yes □

  If yes, associated temperature of medium: ________ °F

* Installation type, see pages 2/180 and 2/181

* Measuring:
  With install. types A, B, C1, C2 and D: from ___ to ___ psi
  range
  With install. types A, B, G, H and J: 
    H1 = ___ inch; H2 = ___ inch

* Dimensions:
  With install. types A, B, C1 and C2: 
    H1 = ___ inch
  With install. types D, G, H and J: 
    H1 = ___ inch

* Start-of-scale value following calculation:
  __________ psi ( 4 mA)

* Full-scale value following calculation:
  __________ psi (20 mA)

* Associated span: __________ psi

* Error to be expected: < . % of set span per 18 °F change in temperature

* Range to be set: (without calculation)
  Start-of-scale: ______ psi ( 4 mA)
  Full-scale: ______ psi (20 mA)

* Required measuring accuracy:
  Error: < . % of set span per 18 °F change in temperature

* Medium
  Density of medium: __________ kg/m³
  * Temperature of medium:
    Normal ________ °F
    Minimum ________ °F
    Maximum ________ °F

* Ambient temperature on capillaries:

* Ambient temperature on transmitter:

  * Operating pressure referred to absolute zero:
    __________ psi
  * Does a vacuum occur during startup? 
    No □ Yes □

  If yes, associated temperature of medium: ________ °F

* Installation type, see pages 2/180 and 2/181

* Measuring:
  With install. types A, B, C1, C2 and D: from ___ to ___ psi
  range
  With install. types A, B, G, H and J: 
    H1 = ___ inch; H2 = ___ inch

* Dimensions:
  With install. types A, B, C1 and C2: 
    H1 = ___ inch
  With install. types D, G, H and J: 
    H1 = ___ inch

* Start-of-scale value following calculation:
  __________ psi ( 4 mA)

* Full-scale value following calculation:
  __________ psi (20 mA)

* Associated span: __________ psi

* Error to be expected: < . % of set span per 18 °F change in temperature

*) Values must be entered here!

Please fill in this questionnaire and enclose with every order!

Checked: ____________________________
Department: __________________________
Date: __________________________
Overview

All 21-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 shut-off 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.

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.

Selection of available shut-off valves

<table>
<thead>
<tr>
<th>Transmitters</th>
<th>Shut-off valves for general applications</th>
<th>Page</th>
<th>Shut-off valves for special applications</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative and absolute pressure transmitters with process connection G1/2&quot; male thread e.g.</td>
<td>Double shut-off valve DN 5 7MF9011-4FA and 7MF9011-4GA</td>
<td>2/184</td>
<td>Double shut-off valve DN 5 for crossover 1/2-NPT-F to G1/2 nipple connection 7MF9011-4EA</td>
<td>2/184</td>
</tr>
<tr>
<td>Relative and absolute pressure transmitter with G1/2&quot;-14 NPT female thread e.g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute pressure transmitter with process connection to IEC 61518 e.g.</td>
<td>2-spindle valve manifold DN 5 7MF9411-5A</td>
<td>2/186</td>
<td>For 3/5-spindle valve manifold DN 5 7MF9411-5B and 7MF9411-5C</td>
<td>2/186</td>
</tr>
<tr>
<td>Differential pressure transmitter with process connection to IEC 61518 e.g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Double shut-off valves

### Overview

The double shut-off valves DN 5 are suitable for pressure gauges and pressure transmitters and available in 4 versions:
- Sleeve-collar
- Sleeve-sleeve
- Sleeve-nipple
- Collar-collar

### Characteristic curves

Permissible operating pressure as a function of the permissible operating temperature

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Double shut-off valves DN 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MF9011-4DA</td>
<td>Material: X 6 CrNiMoTi 17 13 2 (mat. No. 1.4404/316L), max. permissible working pressure 420 bar;</td>
</tr>
<tr>
<td>7MF9011-4EA</td>
<td>Sleeve-sleeve</td>
</tr>
<tr>
<td>7MF9011-4FA</td>
<td>Sleeve-nipple connection</td>
</tr>
<tr>
<td>7MF9011-4GA</td>
<td>Sleeve-collar</td>
</tr>
<tr>
<td>7MF9011-4FA</td>
<td>Collar-collar</td>
</tr>
</tbody>
</table>

### Accessories

- Factory test certificate EN 10204-2.2 7MF9000-8AB
- Material acceptance test certificate EN 10204-3.1 7MF9000-8AD

### Further designs

Add “Z” to Order No. and specify Order Code.

- Oil and grease-free cleaning for oxygen operation, max. pressure PN 100 (1450 psi) S12

### Dimensional drawings

- Double shut-off valve DN 5 (collar-collar) 7MF9011-4GA, dimensions in mm
- Double shut-off valve DN 5 (sleeve-nipple) 7MF9011-4EA, dimensions in mm
- Double shut-off valve DN 5 (sleeve-sleeve) 7MF9011-4DA, dimensions in mm
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

<table>
<thead>
<tr>
<th>Mounting set for shut-off valves</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 7MF9011-4DA und -4EA</td>
<td>7MF9011-8AB</td>
</tr>
<tr>
<td>made of stainless steel, scope of delivery:</td>
<td></td>
</tr>
<tr>
<td>1x mounting bracket,</td>
<td></td>
</tr>
<tr>
<td>2x hexagon screws M6x40,</td>
<td></td>
</tr>
<tr>
<td>1x mounting clip,</td>
<td></td>
</tr>
<tr>
<td>2x washers 8.4 to DIN 125;</td>
<td></td>
</tr>
<tr>
<td>2x hexagon nuts 8.4 to DIN EN 24032</td>
<td></td>
</tr>
<tr>
<td>• 7MF9011-4FA und -4GA</td>
<td>7MF9011-8AC</td>
</tr>
<tr>
<td>made of stainless steel, scope of delivery:</td>
<td></td>
</tr>
<tr>
<td>1x mounting bracket,</td>
<td></td>
</tr>
<tr>
<td>2x hexagon screws M6x10,</td>
<td></td>
</tr>
<tr>
<td>1x mounting clip,</td>
<td></td>
</tr>
<tr>
<td>2x washers 8.4 to DIN 125;</td>
<td></td>
</tr>
<tr>
<td>2x hexagon nuts 8.4 to DIN EN 24032</td>
<td></td>
</tr>
</tbody>
</table>

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
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
- 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 EN 61518, form B. The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection ¼-18 NPT.

The valves have an external spindle thread.

**Materials used**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
<th>Mat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>X 2 CrNiMo 17 13 2</td>
<td>1.4404/316L</td>
</tr>
<tr>
<td>Cones</td>
<td>X 6 CrNiMoTi 17 12 2</td>
<td>1.4571/316Ti</td>
</tr>
<tr>
<td>Spindles</td>
<td>X 2 CrNiMo 18 10</td>
<td>1.4404/316L</td>
</tr>
<tr>
<td>Head parts</td>
<td>X 5 CrNiMo 18 10</td>
<td>1.4401/316</td>
</tr>
<tr>
<td>Packings</td>
<td>PTFE</td>
<td>-</td>
</tr>
</tbody>
</table>

**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
SITRANS P measuring instruments for pressure
Fittings - Shut-off valves for differential pressure transmitters

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

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order code</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>K16</td>
<td>7MF9411-6BB</td>
</tr>
<tr>
<td>K26</td>
<td>7MF9411-6BC</td>
</tr>
</tbody>
</table>

Further designs1)

- 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, 80 °C
  Flange connection with M10 screws only permissible up to PN 160.

- for 2-spindle valve manifold DN 5
  K35: 2 screws 7/16-20 UNF x 1¾ inch to ASME B18.2.1, 1 flat gasket
  K15: 2 screws M10x45 to DIN EN 24014, 2 washers, 1 flat gasket

- for 3-spindle and 5-way valve manifold DN 5
  K36: 4 screws 7/16-20 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, 80 °C

Note: Flange connection with PTFE, max. 420 bar, 80 °C

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

- for pipe mounting, weight 0.7 kg
  1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)

- for valve manifold, made of stainless 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

- for pipe mounting, weight 0.7 kg
  1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)

阀 manifold 100 bar

Suitable for oxygen

- for 7MF9411-5A
- for 7MF9411-5B
- for 7MF9411-5C

Characteristics curves

Valve manifolds PN 5 (7MF9411-5..), permissible working pressure as a function of the permissible working temperature

1) When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Order No.
2) Flange connections to DIN 19213 only permissible up to 160!
SITRANS P measuring instruments for pressure
Fittings - Shut-off valves for differential pressure transmitters

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

**Dimensional drawings**

2-spindle valve manifold DN 5 (7MF9411-5A.), dimensions in mm

3-spindle valve manifold DN 5 (7MF9411-5B.), dimensions in mm

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
The oval flange 7MF9408-2C., for pressure transmitters for absolute pressure and differential pressure has a ½-14 NPT female thread and is designed for max. operating pressure 400 bar.

### Accessories

- E34: 2 screws 7/16-20 UNF x 1½ 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)
- E36: 2 screws 7/16-20 UNF x 1½ inch to ASME B18.2.1, 1 flat gasket
- 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, 80 °C

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar, 120 °C

**Note:** M10 screws only permissible up to PN 160!

### Dimensional drawings

Oval flange 7MF9408-2C., dimensions in mm
### Product overview

<table>
<thead>
<tr>
<th>3/4</th>
<th>Transmitters for mounting in sensor head</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/7</td>
<td>SITRANS TH200, two-wire system universal</td>
</tr>
<tr>
<td>3/13</td>
<td>SITRANS TH300, two-wire system universal, HART</td>
</tr>
<tr>
<td>3/19</td>
<td>SITRANS TH400, fieldbus transmitter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3/24</th>
<th>Transmitters for rail mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/30</td>
<td>SITRANS TR300, two-wire system universal, HART</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3/36</th>
<th>Transmitter for field mounting with temperature sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/39</td>
<td>SITRANS TF280, WirelessHART</td>
</tr>
<tr>
<td>3/44</td>
<td>SITRANS TF, two-wire system</td>
</tr>
<tr>
<td>3/51</td>
<td>SITRANS TF, fieldbus transmitter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3/44</th>
<th>Field indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SITRANS TF, Field indicator for 4 to 20 mA</td>
</tr>
</tbody>
</table>

You can download all instructions, catalogs and certificates for SITRANS T free of charge at the following Internet address: [www.siemens.com/sitranst](http://www.siemens.com/sitranst)
### Overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Mounting of transmitter with Ex protection</th>
<th>Page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitters for temperature for mounting in sensor heads</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS TH100</td>
<td>Zone 2, zone 1</td>
<td>3/4</td>
<td>SIPROM T</td>
</tr>
<tr>
<td>Transmitters for Pt100</td>
<td>Zone 2, zone 1, zone 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Mounting in sensor head</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS TH200</td>
<td>Zone 2, zone 1</td>
<td>3/7</td>
<td>SIPROM T</td>
</tr>
<tr>
<td>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</td>
<td>Zone 2, zone 1, zone 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Two-wire system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Universal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS TH300</td>
<td>Zone 2, zone 1</td>
<td>3/13</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</td>
<td>Zone 2, zone 1, zone 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Two-wire system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Universal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• HART</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS TH400</td>
<td>Zone 2, zone 1, zone 21</td>
<td>3/19</td>
<td>SIMATIC PDM for TH 400 with PROFIBUS PA</td>
</tr>
<tr>
<td>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.9 V</td>
<td>Zone 2, zone 1, zone 0, zone 21, zone 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fieldbus transmitter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PROFIBUS PA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FOUNDATION Fieldbus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitters for temperature for rail mounting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS TR200</td>
<td>Zone 2, zone 1, zone 21</td>
<td>3/24</td>
<td>SIPROM T</td>
</tr>
<tr>
<td>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</td>
<td>Zone 2, zone 1, zone 0, zone 21, zone 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Two-wire system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Universal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS TR300</td>
<td>Zone 2, zone 1, zone 21</td>
<td>3/30</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V</td>
<td>Zone 2, zone 1, zone 0, zone 21, zone 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Two-wire system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Universal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• HART</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Transmitter for temperature for field mounting

<table>
<thead>
<tr>
<th>Application</th>
<th>Mounting of transmitter with Ex protection</th>
<th>Page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS TF2</strong></td>
<td>-</td>
<td>3/36</td>
<td>Local programming using keys</td>
</tr>
<tr>
<td>Digital display thermometer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Transmitter with LCD display and mounted Pt100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SITRANS TF280</strong></td>
<td>-</td>
<td>3/39</td>
<td>• SIMATIC PDM via WirelessHART</td>
</tr>
<tr>
<td>Transmitters for connection to resistance-based sensors</td>
<td>-</td>
<td></td>
<td>• SIMATIC PDM local with HARTmodem</td>
</tr>
<tr>
<td>• In field housing for heavy industrial use</td>
<td>-</td>
<td></td>
<td>• Local programming using push buttons</td>
</tr>
<tr>
<td>• Battery power supply</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• WirelessHART</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SITRANS TF</strong></td>
<td>Zone 2, zone 1</td>
<td>3/44</td>
<td>Depends on mounted transmitter TH200/TH300</td>
</tr>
<tr>
<td>Transmitters for connection to resistance-based sensors, thermocouples and DC voltages up to 1.1 V</td>
<td>Zone 2, zone 1, zone 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• In field housing for heavy industrial use</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SITRANS TF</strong></td>
<td>Zone 2, Zone 1</td>
<td>3/51</td>
<td>• SIMATIC PDM for PROFIBUS PA</td>
</tr>
<tr>
<td>Fieldbus transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.8 V</td>
<td>Zone 2, Zone 1, Zone 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• In field enclosure for heavy industrial use</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PROFIBUS PA</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FOUNDATION fieldbus</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Field indicator for 4 to 20 mA signals

<table>
<thead>
<tr>
<th>Application</th>
<th>Mounting of transmitter with Ex protection</th>
<th>Page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS TF</strong></td>
<td>Zone 2, zone 1</td>
<td>3/44</td>
<td>-</td>
</tr>
<tr>
<td>Field indicator for 4 to 20 mA signals</td>
<td>Zone 2, zone 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display of units can be user-defined</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SITRANS T measuring instruments for temperature
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" (Order 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
## Technical specifications

### Input
- **Resistance thermometer:** Temperature
- **Measured variable:** Pt100 to IEC 60751
- **Sensor type:** Temperature-linear
- **Characteristic:** 2, 3 or 4-wire circuit
- **Resolution:** 14 bit
- **Measuring accuracy:**
  - Span < 250 °C (450 °F) < 0.25 °C (0.45 °F)
  - Span > 250 °C (450 °F) < 0.1 °C of span
- **Repeatability:** < 0.1 °C (0.18 °F)
- **Measuring current:** approx. 0.4 mA
- **Measuring cycle:** < 0.7 s
- **Range:**
  - -200 ... +850 °C (-328 ... +1562 °F)
  - 25 ... 1050 °C (77 ... 1922 °F)
- **Unit:** °C or °F
- **Offset:** programmable: -100 ... +100 °C (-180 ... +180 °F)
- **Line resistance:** Max. 20 Ω (total from feeder and return conductor)
- **Noise rejection:** 50 and 60 Hz

### Output
- **Output signal:** 4 ... 20 mA, two-wire
- **Power supply:** 8.5 ... 36 V DC (30 V for Ex)
- **Max. load:** (U_{aux} - 8.5 V)/0.023 A
- **Overrange:** 3.6 ... 23 mA, continuously adjustable (default value: 3.84 ... 20.5 mA)
- **Error signal (in the event of sensor breakage):** 3.6 ... 23 mA, continuously adjustable (default value: 3.6 mA or 22.8 mA)
- **Damping time:** 0 ... 30 s (default value: 0 s)
- **Protection:** Against reversed polarity
- **Resolution:** 12 bit
- **Accuracy at 23 °C (73.4 °F):** < 0.1 % of span
- **Temperature effect:** < 0.1 °C/10 °C (0.1 %/18 °F)
- **Effect of auxiliary power:** < 0.01 % of span/V
- **Effect of load impedance:** < 0.025 % of max. span/100 Ω
- **Long-term drift:**
  - in the first month: < 0.025 % of max. span
  - after one year: < 0.035 % of max. span
  - after 5 years: < 0.05 % of max. span
- **Ambient temperature:**
  - 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: According to EN 61326 and NAMUR NE21

### Design
- **Approx. weight:** 50 g
- **Dimensions:**
- **Material:** Molded plastic
- **Cross-section of cables:** Max. 2.5 mm² (AWG 13)
- **Degree of protection to EN 60529:**
  - IP00
  - IP40
  - IP00
- **Enclosure:**
- **Terminals:**
- **Protection:**
  - IP00
  - IP40
  - IP00

## Certificate and approvals
- **Explosion protection ATEX:**
  - EC type test certificate
  - Intrinsically-safe type of protection
  - „Operating equipment that is non-ignitable and has limited energy“ type of protection
  - Explosion protection to FM for USA and Canada (cFMus)
  - FM approval
  - Degree of protection

## Selection and Ordering data
- **Order-No.:** 7NG3211-0NN00

### SITRANS TH100 temp. transmitters for Pt100
- **For installation in the connection head, Type B (DIN 43729):**
  - Two-wire system 4 ... 20 mA, programmable, without electrical isolation
  - Without explosion protection
  - With explosion protection, "Intrinsic safety" and for zone 2
    - to ATEX
    - to FM (cFMUS)

### Further details
- Please add "-Z" to Order No. and specify Order code(s)

### Customer-defined operating data
- **Test protocol (5 measuring points):** C11

### Accessories
- **Order-No.:**
  - **Modem for SITRANS TH100 and TH200 incl. SIPROM T parameterization software:** 7NG3092-8KA
  - **CD for meas. instruments for temperature:** A5E00364512
  - **4-wire connection cable:** 7NG3092-8KC

### Softw. requirements for SIPROM T
- **PC operating system:** Windows ME, 2000 and XP; also Windows 95, 98 and 98SE, but only in connection with RS-232 modem.

### Additional features
- **Accessories:**
  - With RS 232 connection
  - With USB connection
- **CD for meas. instruments for temperature:**
  - With documentation in German, English, French, Spanish, Italian, Portuguese and NAMUR NE21
  - Provided with SIPROM T parameterization software
  - Customer-defined operating data
  - Test protocol (5 measuring points)

### Power supply units
- See “SITRANS I supply units and input isolators”.

### Factory setting:
- **Pt100 (IEC 751) with three-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
SITRANS T measuring instruments for temperature

Transmitters for mounting in sensor head

**SITRANS TH100**
two-wire system (Pt100)

### Dimensional drawings

- **Internal diameter**
  - Center hole 6.3 (0.25)

- **Mounting screw**
  - M4x25

1(+) and 2(-) Auxiliary power supply $U_{aux}$, output current $I_{out}$

3, 4, 5, and 6 Pt100 sensor (for connection, see Sensor connection assignment)

**SITRANS TH100, dimensions in mm (inch)**

### Schematics

- **Two-wire system** (parameterizable line resistance)

- **Three-wire system**

- **Four-wire system**

**Connection of auxiliary power supply ($U_{aux}$)**

**SITRANS TH100, sensor connection assignment**

---

**Mounting on DIN rail**

- **DIN rail adaptor, dimensions in mm (inch)**

---

© Siemens AG 2010
**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

**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 (two, three or four-wire system)
- Thermocouple elements
- 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.
## Technical specifications

### Input

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>Pt25 ... Pt1000</td>
</tr>
<tr>
<td>• to IEC 60751</td>
<td>Pt25 ... Pt1000</td>
</tr>
<tr>
<td>• to JIS C 1604;  a = 0.00392 K⁻¹</td>
<td>Ni25 ... Ni1000</td>
</tr>
<tr>
<td>• to IEC 60751</td>
<td>over special characteristic (max. 30 points)</td>
</tr>
<tr>
<td>Sensor factor</td>
<td>0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... Pt1000)</td>
</tr>
<tr>
<td>Units</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

### Connection

- **Standard connection**: 1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
- **Generation of average value**: 2 identical resistance thermometers in 2-wire system for generation of average temperature
- **Generation of difference**: 2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)

### Interface

- **Two-wire system**: Parameterizable line resistance ≤ 100 Ω (loop resistance)
- **Three-wire system**: No balancing required
- **Four-wire system**: No balancing required
- **Sensor current**: ≤ 0.45 mA
- **Response time**: ≤ 250 ms for 1 sensor with open-circuit monitoring

### Open-circuit monitoring

- **Short-circuit monitoring**: can be switched off
- **Measuring range**: Parameterizable, max. 0 ... 2200 Ω (see Table "Digital measuring errors")
- **Min. measured span**: 5 Ω ... 25 Ω (see Table "Digital measuring errors")
- **Characteristic curve**: Resistance-linear or special characteristic

### Thermocouple elements

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type (thermocouples)</td>
<td>Pt30Rh-Pt6Rh to DIN IEC 584</td>
</tr>
<tr>
<td>• Type B</td>
<td>W5 %-Re to ASTM 988</td>
</tr>
<tr>
<td>• Type C</td>
<td>W3 %-Re to ASTM 988</td>
</tr>
<tr>
<td>• Type D</td>
<td>NiCr-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>• Type E</td>
<td>Fe-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>• Type J</td>
<td>NiCr-Ni to DIN IEC 584</td>
</tr>
<tr>
<td>• Type K</td>
<td>Fe-CuNi to DIN 43710</td>
</tr>
<tr>
<td>• Type L</td>
<td>NiCrSi-NiSi to DIN IEC 584</td>
</tr>
<tr>
<td>• Type N</td>
<td>Pt13Rh-Pt to DIN IEC 584</td>
</tr>
<tr>
<td>• Type R</td>
<td>Pt10Rh-Pt to DIN IEC 584</td>
</tr>
<tr>
<td>• Type S</td>
<td>Cu-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>• Type T</td>
<td>Cu-CuNi to DIN 43710</td>
</tr>
<tr>
<td>• Type U</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

### Resistance-based sensors

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Actual resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>Resistance-based, potentiometers</td>
</tr>
<tr>
<td>Units</td>
<td>Ω</td>
</tr>
</tbody>
</table>

### Connection

- **Standard connection**: 1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
- **Generation of average value**: 2 resistance-based sensors in 2-wire system for generation of average value
- **Generation of difference**: 2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)

### Interface

- **Two-wire system**: Parameterizable line resistance ≤ 100 Ω (loop resistance)
- **Three-wire system**: No balancing required
- **Four-wire system**: No balancing required
- **Sensor current**: ≤ 0.45 mA
- **Response time**: ≤ 250 ms for 1 sensor with open-circuit monitoring

### Open-circuit monitoring

- **Short-circuit monitoring**: can be switched off
- **Measuring range**: Parameterizable, max. 0 ... 2200 Ω (see Table "Digital measuring errors")
- **Min. measured span**: 5 Ω ... 25 Ω (see Table "Digital measuring errors")
- **Characteristic curve**: Resistance-linear or special characteristic

### mV sensor

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>DC voltage</td>
</tr>
<tr>
<td>Units</td>
<td>DC voltage source (DC voltage source possible over an externally connected resistor)</td>
</tr>
<tr>
<td>Response time</td>
<td>mV</td>
</tr>
<tr>
<td>Open-circuit monitoring</td>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
</tr>
<tr>
<td>Short-circuit monitoring</td>
<td>can be switched off</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

Factory setting:
• 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

Digital measuring errors
Resistance thermometer

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 ib/ia IIC T6/T4
• “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 to FM for USA
• FM approval
FM 3024169
• Degree of protection
IS/Cl I, II, III/Div 1/
GP ABCDEFG T6, T5, T4
IS/Cl IZN D/Ex ia IIC T6, T5, T4
NI/CI I, II, III/Div 2/
GP ABCDEFG T6, T5, T4
NI/CI IZN 2/IIC T6, T5, T4

Explosion protection to FM for
Canada („FM US“)
• FM approval
FM 3024169C
• Degree of protection
IS/Cl IZN D/Ex ia IIC T6, T5, T4
NI/CI IZN 2/IIC T6, T5, T4

Software requirements for SIPROM T
PC operating system
Windows ME, 2000 and XP; also
Windows 95, 98 and 98 SE, but
only in connection with RS 232
modem.

Measuring range
-10 ... +70 mV
-100 ... +1100 mV
Min. measured span
2 mV or 20 mV
Overload capability of the input
-1.5 ... +3.5 V DC
Input resistance
≥ 1 MΩ
Characteristic curve
Voltage-linear or special character-
istic

Output
Output signal
4 ... 20 mA, 2-wire
Auxiliary power supply
11 ... 35 V DC (to 30 V with EEx)
Max. load
(Uaux – 11 V)/0.023 A
Overrange
3.6 ... 23 mA, infinitely adjustable
(default range: 3.8 mA ... 20.50 mA)
Error signal (e.g. in the event of sen-
bor breakage)
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
Electrical isolation
Input against output (1 kVeff)

Measuring accuracy
Digital measuring errors See Table “Digital measuring
errors”
Reference conditions
• Auxiliary power supply
24 V ± 1 %
• Load
500 Ω
• Ambient temperature
23 °C
• Warming-up time
> 5 min
Error in the analog output (digi-
tal/analog converter)
< 0.025 % of span
Error due to internal cold junction
< 0.5 °C (0.9 °F)
Temperature effect
< 0.1 % of max. span\10 °C (18 °F)
Power supply effect
< 0.001 % of span\V
Effect of load impedance
< 0.002 % of span/100 Ω
Long-term drift
• in the first month
< 0.02 % of max. span
• after one year
< 0.2 % of max. span
• after 5 years
< 0.3 % of max. span

Rated conditions
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

Design
Material
Molded plastic
Weight
50 g (0.11 lb)
Dimensions
See *Dimensional drawings*
Cross-section of cables
Max. 2.5 mm² (AWG 13)
Degree of protection to IEC 60529
• Enclosure
IP40
• Terminals
IP00

Input
Measuring range
Min. measured span
Digital accuracy
°C (°F)
°C (°F)
°C (°F)
Pt25
-200 ... +850
(-328 ... +1562)
10 (18)
0,2 (0.36)
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)

Ni 25 to Ni1000
-60 ... +250
(-76 ... +482)
10 (18)
0,1 (0.18)
Resistance-based sensors

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance</td>
<td>0...390</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>Resistance</td>
<td>0...2200</td>
<td>25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Thermocouple elements

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B</td>
<td>0...1820 (32...3308)</td>
<td>100 (180)</td>
<td>2(^1) (3.6)(^1)</td>
</tr>
<tr>
<td>Type C (W5)</td>
<td>0...2300 (32...4172)</td>
<td>100 (180)</td>
<td>2 (3.6)</td>
</tr>
<tr>
<td>Type D (W3)</td>
<td>0...2300 (32...4172)</td>
<td>100 (180)</td>
<td>1(^2) (1.8)(^2)</td>
</tr>
<tr>
<td>Type E</td>
<td>-200...+1000 (-328...+1832)</td>
<td>50 (90)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Type J</td>
<td>-210...+1200 (-346...+2182)</td>
<td>50 (90)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Type K</td>
<td>-230...+1370 (-382...+2498)</td>
<td>50 (90)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Type L</td>
<td>-200...+900 (-328...+1652)</td>
<td>50 (90)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Type N</td>
<td>-200...+1300 (-328...+2372)</td>
<td>50 (90)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Type R</td>
<td>-50...+1760 (-58...+3200)</td>
<td>100 (180)</td>
<td>2 (3.6)</td>
</tr>
<tr>
<td>Type S</td>
<td>-50...+1760 (-58...+3200)</td>
<td>100 (180)</td>
<td>2 (3.6)</td>
</tr>
<tr>
<td>Type T</td>
<td>-200...+400 (-328...+752)</td>
<td>40 (72)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Type U</td>
<td>-200...+600 (-328...+1112)</td>
<td>50 (90)</td>
<td>2 (3.6)</td>
</tr>
</tbody>
</table>

\(^1\) The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).
\(^2\) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV sensor</td>
<td>-10...+70</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>mV sensor</td>
<td>-100...+1100</td>
<td>20</td>
<td>400</td>
</tr>
</tbody>
</table>

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 0.1 % 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).
**Dimensional drawings**

**SITRANS TH200, dimensions and pin assignment, dimensions in mm (inch)**

1(+), 2(-)  Auxiliary power supply $U_{aux}$, output current $I_{out}$
3, 4, 5 and 6  Pt100 sensor (for connections, see Sensor connection assignment)
Test (+), Test (-)  Measurement of the output current with a multimeter

(1)  Test terminal
(2)  Mounting screw M4x30
(3)  LED for operation indication
(4)  Internal diameter of center hole 6.3 (0.25)

**Mounting on DIN rail**

**DIN rail adaptor, dimensions in mm (inch)**
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

SITRANS TH200
two-wire system, universal

Schematics

Resistance thermometer

Resistance

Thermocouple

Two-wire system

Three-wire system

Four-wire system

Generation of average value / difference

Cold junction compensation

Internal/fixed value

Cold junction compensation with external Pt100

Two-wire system

Three-wire system

Four-wire system

Generation of average value / difference

with internal cold junction compensation

Voltage measurement

Current measurement

Connection of auxiliary power supply (Uaux)

1) Programmable line resistance for the purpose of correction.

SITRANS TH200, sensor connection assignment
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
• SIL 2 (with order code C20)
• Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
• Special characteristic
• Electromagnetic compatibility to EN 61326 and NE21

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.

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 (two, three or four-wire system)
• Thermocouple elements
• 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.

SITRANS TH200/TH300

[Diagram of SITRANS TH300 function]

Input

A/D Analog-digital converter
Sensors Resistance thermometer, thermocouple, resistance-based sensor, mV sensor
μC1 Microcontroller, secondary circuit

Output

μC2 Microcontroller, primary circuit
D/A Digital-analog converter
U_{aux} Auxiliary power supply
I_{out} Output current

(1) Electrically isolated
(2) LED
### SITRANS T measuring instruments for temperature

**Transmitters for mounting in sensor head**

**SITRANS TH300**

two-wire system, universal, HART

---

#### Technical specifications

<table>
<thead>
<tr>
<th>Input</th>
<th>Resistance thermometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Temperature</td>
</tr>
<tr>
<td>Sensor type</td>
<td>Pt25 ... Pt1000</td>
</tr>
<tr>
<td>Special type</td>
<td>Ni25 ... Ni1000</td>
</tr>
<tr>
<td>Sensor factor</td>
<td>0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... Pt1000)</td>
</tr>
<tr>
<td>Unit</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
<th>Standard connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system</td>
<td></td>
</tr>
<tr>
<td>2 identical resistance thermometers in 2-wire system for generation of average temperature</td>
<td></td>
</tr>
<tr>
<td>2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 − RTD 2 or RTD 2 − RTD 1)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interface</th>
<th>Two-wire system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameterizable line resistance ≤ 100 Ω (loop resistance)</td>
<td></td>
</tr>
</tbody>
</table>

| Short-circuit monitoring | can be switched off (value is adjustable) |

| Measuring range | Parameterizable, max. 0 ... 2200 Ω (see Table "Digital measuring errors") |

| Min. measured span | 5 ... 25 Ω (see Table "Digital measuring errors") |

| Characteristic curve | Resistance-linear or special characteristic |

<table>
<thead>
<tr>
<th>Thermocouples</th>
<th>Measured variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type (thermocouples)</td>
<td></td>
</tr>
<tr>
<td>Type B</td>
<td>Pt30Rh-Pt6Rh to DIN IEC 584</td>
</tr>
<tr>
<td>Type C</td>
<td>W5 %-Re to ASTM 988</td>
</tr>
<tr>
<td>Type D</td>
<td>W3 %-Re to ASTM 988</td>
</tr>
<tr>
<td>Type E</td>
<td>NiCr-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>Type J</td>
<td>Fe-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>Type K</td>
<td>NiCr-Ni to DIN IEC 584</td>
</tr>
<tr>
<td>Type L</td>
<td>Fe-CuNi to DIN 43710</td>
</tr>
<tr>
<td>Type N</td>
<td>NiCrSi-NiSi to DIN IEC 584</td>
</tr>
<tr>
<td>Type R</td>
<td>Pt13Rh-Pt to DIN IEC 584</td>
</tr>
<tr>
<td>Type S</td>
<td>Pt10Rh-Pt to DIN IEC 584</td>
</tr>
<tr>
<td>Type T</td>
<td>Cu-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>Type U</td>
<td>Cu-CuNi to DIN 43710</td>
</tr>
<tr>
<td>Unit</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
<th>Standard connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 thermocouple (TC)</td>
<td></td>
</tr>
<tr>
<td>2 thermocouples (TC)</td>
<td></td>
</tr>
<tr>
<td>2 thermocouples (TC) TC1 − TC2 or TC2 − TC1</td>
<td></td>
</tr>
<tr>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td>can be switched off</td>
<td></td>
</tr>
</tbody>
</table>

| Response time | ≤ 250 ms for 1 sensor with open-circuit monitoring |

<table>
<thead>
<tr>
<th>Cold junction compensation</th>
<th>With integrated Pt100 resistance thermometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>With external Pt100 IEC 60571 (2-wire or 3-wire connection)</td>
</tr>
<tr>
<td>External</td>
<td>Cold junction temperature can be set as fixed value</td>
</tr>
</tbody>
</table>

| Measuring range | Parameterizable (see table "Digital measuring errors") |

| Min. measured span | Min. 50 ... 199 °C (90 ... 180 °F) (see Table "Digital measuring errors") |

| Characteristic curve | Temperature-linear or special characteristic |

<table>
<thead>
<tr>
<th>mV sensor</th>
<th>Measured variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>DC voltage</td>
</tr>
<tr>
<td>DC voltage source (DC voltage source possible over an externally connected resistor)</td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td>mV</td>
</tr>
<tr>
<td>Response time</td>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
</tr>
</tbody>
</table>

| Open-circuit monitoring | can be switched off |

---

© Siemens AG 2010
SITRANS TH300
two-wire system, universal, HART

Certificate 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 ib ia IIC T6/T4
• “Operating equipment that is non-ignitable and has limited energy” type of protection
II 3 G Ex nII IC T6/T4
II 3 G Ex nA IIC T6/T4

Explosion protection to FM for USA
FM approval
FM 3024169
• Degree of protection
FM 3024169C
• Degree of protection

Factory setting:
• 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

Digital measuring errors

Resistance thermometer

Input | Measuring range | Min. measured span | Digital accuracy |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>°C</td>
<td>°C</td>
<td>°C</td>
</tr>
<tr>
<td>°F</td>
<td>°F</td>
<td>°F</td>
<td>°F</td>
</tr>
</tbody>
</table>

To IEC 60751

| Pt25 | -200 ... +850 (382 ... +1562) | 10 (18) | 0.2 (0.36) |
| Pt50 | -200 ... +850 (382 ... +1562) | 10 (18) | 0.15 (0.27) |
| Pt100 ... Pt200 | -200 ... +850 (382 ... +1562) | 10 (18) | 0.1 (0.18) |
| Pt500 | -200 ... +850 (382 ... +1562) | 10 (18) | 0.15 (0.27) |
| Pt1000 | -200 ... +350 (562 ... +662) | 10 (18) | 0.15 (0.27) |

To JIS C1604-81

| Pt25 | -200 ... +649 (382 ... +1200) | 10 (18) | 0.2 (0.36) |
| Pt50 | -200 ... +649 (382 ... +1200) | 10 (18) | 0.15 (0.27) |
| Pt100 ... Pt200 | -200 ... +649 (382 ... +1200) | 10 (18) | 0.1 (0.18) |
| Pt500 | -200 ... +649 (382 ... +1200) | 10 (18) | 0.15 (0.27) |
| Pt1000 | -200 ... +350 (562 ... +662) | 10 (18) | 0.15 (0.27) |

Ni 25 to Ni1000
-60 ... +250 (-76 ... +482) | 10 (18) | 0.1 (0.18)
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

SITRANS TH300
two-wire system, universal, HART

Resistance-based sensors

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance</td>
<td>0 ... 390</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>Resistance</td>
<td>0 ... 2200</td>
<td>25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Thermocouple elements

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B</td>
<td>0 ... 1820</td>
<td>100</td>
<td>2°(*)</td>
</tr>
<tr>
<td>Type C (W5)</td>
<td>0 ... 2300</td>
<td>100</td>
<td>2°(*)</td>
</tr>
<tr>
<td>Type D (W3)</td>
<td>0 ... 2300</td>
<td>100</td>
<td>2°(*)</td>
</tr>
<tr>
<td>Type E</td>
<td>-200 ... +1000</td>
<td>50</td>
<td>1°</td>
</tr>
<tr>
<td>Type J</td>
<td>-210 ... +1200</td>
<td>50</td>
<td>1°</td>
</tr>
<tr>
<td>Type K</td>
<td>-230 ... +1370</td>
<td>50</td>
<td>1°</td>
</tr>
<tr>
<td>Type L</td>
<td>-200 ... +900</td>
<td>50</td>
<td>1°</td>
</tr>
<tr>
<td>Type N</td>
<td>-200 ... +1300</td>
<td>50</td>
<td>1°</td>
</tr>
<tr>
<td>Type R</td>
<td>-50 ... +1760</td>
<td>100</td>
<td>2°</td>
</tr>
<tr>
<td>Type S</td>
<td>-50 ... +1760</td>
<td>100</td>
<td>2°</td>
</tr>
<tr>
<td>Type T</td>
<td>-200 ... +400</td>
<td>40</td>
<td>1°</td>
</tr>
<tr>
<td>Type U</td>
<td>-200 ... +600</td>
<td>50</td>
<td>1°</td>
</tr>
</tbody>
</table>

1) The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).
2) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV sensor</td>
<td>-10 ... +70</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>mV sensor</td>
<td>-100 ... +1100</td>
<td>20</td>
<td>400</td>
</tr>
</tbody>
</table>

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 0.1 % 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 (possibly with the addition of cold junction errors in the case of thermocouple measurements).

Selection and Ordering Data

Temperature transmitter
SITRANS TH300
for installation in the connection head type B (DIN 43729)
2-wire connection 4 ... 20 mA, communication-capable acc. to HART, with electrical isolation

- Without explosion protection
- With explosion protection acc. to ATEX
- With explosion protection acc. to FM (cFMUS)

Further designs
Please add “Z” to Order No. and specify Order code(s)

Customer-specific setting of operating data (specify operating data in plain text)
with test protocol (5 measuring points)
SIL 2 (functional safety)

Accessories
Order No.

CD for measuring instruments
with documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software

HART modem
• With RS 232 connection
• With USB connection

SIMATIC PDM operating software
See Section 9

DIN rail adapters for head transmitters
(Quantity delivered: 5 units)

4-wire connection cable
150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)

Available ex stock.

Power supply units see “SITRANS I supply units and isolation amplifiers”.

Factory setting:
- 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
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

**SITRANS TH300**
two-wire system, universal, HART

### Dimensional drawings

**Mounting on DIN rail**

SITRANS TH300, mounting of transmitter on DIN rail

**DIN rail adapter, dimensions in mm (inch)**

1(+) and 2(-) Auxiliary power supply $U_{aux}$, output current $I_{out}$
3, 4, 5 and 6 Pt100 sensor (for connections, see Sensor connection assignment)
Test (+), Test (-) Measurement of the output current with a multimeter

(1) Test terminal
(2) Mounting screw M4x30
(3) LED for operation indication
(4) Internal diameter of center hole 6.3 (0.25)

SITRANS TH300, dimensions and pin assignment, dimensions in mm (inch)
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

SITRANS TH300
two-wire system, universal, HART

Schematics

Resistance thermometer

Two-wire system

Three-wire system

Four-wire system

RTD

RTD

RTD

RTD2

RTD1

Generation of average value / difference

Cold junction compensation

Internal/fixed value

Cold junction compensation with external Pt100

in two-wire system

Cold junction compensation with external Pt100 in three-wire system

Generation of average value / difference

Connection of auxiliary power supply (Uaux)

Voltage measurement

Current measurement

1) Programmable line resistance for the purpose of correction.

SITRANS TH200/TH300, sensor connection assignment
Overview

SITRANS TH400 fieldbus transmitters

Versions:
- for FOUNDATION Fieldbus and
- 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 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 thermocouple elements
- Differential, mean-value or redundant temperature measurement with resistance thermometers or thermocouple 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

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 plan 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
Technical specifications

Input

Analog-to-digital conversion
- Measurement rate: < 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
  - Sensor current: Max. 50 Ω Nominal 0.2 mA
- Sensor fault detection
  - Yes
  - Yes, < 15 Ω

Resistance-based sensors
- Measuring range
  - 0 Ω ... 10 kΩ
  - Max. 50 Ω
  - Nominal 0.2 mA
- Sensor fault detection
  - Yes
  - Yes, < 15 Ω

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

<table>
<thead>
<tr>
<th>Type of input</th>
<th>Absolute accuracy</th>
<th>Temperature coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>( \leq \pm 0.05 % ) of measured value</td>
<td>( \leq \pm 0.002 % ) of measured value/°C</td>
</tr>
</tbody>
</table>

Basic values

<table>
<thead>
<tr>
<th>Type of input</th>
<th>Basic accuracy</th>
<th>Temperature coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage source</td>
<td>( \leq \pm 0.05 ) μV</td>
<td>( \leq \pm 0.02 ) μV/°C</td>
</tr>
<tr>
<td>Thermal element, type: E, J, K, L, N, T, U</td>
<td>( \leq \pm 0.5 ) °C</td>
<td>( \leq \pm 0.01 ) °C</td>
</tr>
<tr>
<td>Thermal element, type: B, R, S, W3, W5</td>
<td>( \leq \pm 1 ) °C</td>
<td>( \leq \pm 0.025 ) °C</td>
</tr>
<tr>
<td>Cold junction compensation</td>
<td>( \leq \pm 0.5 ) °C</td>
<td></td>
</tr>
</tbody>
</table>

Reference conditions

| Warming-up time | 30 s |
| Signal-to-noise ratio | Min. 60 dB |
| Calibration condition | 20 ... 28 °C (68 ... 82 °F) |
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

### Rated conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Permissible ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≤ 98 %, with condensation</td>
</tr>
<tr>
<td>Electrically isolated</td>
<td>Input against output 1 kV&lt;sub&gt;eff&lt;/sub&gt;</td>
</tr>
<tr>
<td>• without Ex</td>
<td>Input against output 500 V&lt;sub&gt;eff&lt;/sub&gt;</td>
</tr>
<tr>
<td>• with Ex</td>
<td>IEC 60068-2-6 and IEC 60068-2-64</td>
</tr>
<tr>
<td>4 g/2 ... 100 Hz</td>
<td></td>
</tr>
<tr>
<td>Permissible storage temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≤ 98 %, with condensation</td>
</tr>
<tr>
<td>Electrically isolated</td>
<td>Input against output 1 kV&lt;sub&gt;eff&lt;/sub&gt;</td>
</tr>
<tr>
<td>• without Ex</td>
<td>Input against output 500 V&lt;sub&gt;eff&lt;/sub&gt;</td>
</tr>
<tr>
<td>• with Ex</td>
<td>IEC 60068-2-6 and IEC 60068-2-64</td>
</tr>
<tr>
<td>4 g/2 ... 100 Hz</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≤ 98 %, with condensation</td>
</tr>
<tr>
<td>Electrically isolated</td>
<td>Input against output 1 kV&lt;sub&gt;eff&lt;/sub&gt;</td>
</tr>
<tr>
<td>• without Ex</td>
<td>Input against output 500 V&lt;sub&gt;eff&lt;/sub&gt;</td>
</tr>
<tr>
<td>• with Ex</td>
<td>IEC 60068-2-6 and IEC 60068-2-64</td>
</tr>
<tr>
<td>4 g/2 ... 100 Hz</td>
<td></td>
</tr>
</tbody>
</table>

### Electromagnetic compatibility

<table>
<thead>
<tr>
<th>Noise type</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC noise voltage influence</td>
<td>&lt; ±0.1 % of span</td>
</tr>
<tr>
<td>Extended EMC noise immunity: NAMUR NE 21, criterion A, Burst</td>
<td>≤ 1 % of span</td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Molded plastic</td>
</tr>
<tr>
<td>Weight</td>
<td>55 g (0.12 lb)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>See &quot;Dimensional drawings&quot;</td>
</tr>
<tr>
<td>Cross-section of cables</td>
<td>Max. 2.5 mm&lt;sup&gt;2&lt;/sup&gt; (AWG 13)</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>Transmitter enclosure IP40</td>
</tr>
<tr>
<td>• Terminal</td>
<td>IP00</td>
</tr>
</tbody>
</table>

### Auxiliary power supply

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Standard, Ex nA, Ex nL and NI</td>
<td>DC 9.0 ... 32 V</td>
</tr>
<tr>
<td>• ATEX, FM, UL and CSA</td>
<td>DC 9.0 ... 30 V</td>
</tr>
<tr>
<td>• In FISCO/FNICO installation</td>
<td>DC 9.0 ... 17.5 V</td>
</tr>
<tr>
<td>Power consumption</td>
<td>&lt; 11 mA</td>
</tr>
<tr>
<td>Max. increase in power consumption in the event of a fault</td>
<td>&lt; 7 mA</td>
</tr>
</tbody>
</table>

### Certificate and approvals

**Explosion protection ATEX**

- EC type test certificate
- "Intrinsic safety" type of protection
  - II 1 GD EEx ia IIC T4 ... T6
  - T65 °C ... T105 °C
- II 2(1) GD EEx ib [ia] IIC T4 ... T6
  - T65 °C ... T105 °C

**Explosion protection FM for USA**

- FM approval
- Degree of protection

**Explosion protection CSA for Canada**

- CSA approval
- Degree of protection

### Communication

<table>
<thead>
<tr>
<th>Interface</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameterization interface</td>
<td>PROFIBUS PA connection</td>
</tr>
<tr>
<td>• Protocol</td>
<td>FF Protocol</td>
</tr>
<tr>
<td>• Address (for delivery)</td>
<td>126</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus connect</td>
<td>Basic or LAS</td>
</tr>
<tr>
<td>• Protocol</td>
<td>ITK 4.6</td>
</tr>
<tr>
<td>• Functionality</td>
<td>2 x Analog and 1 x PID</td>
</tr>
<tr>
<td>• Version</td>
<td></td>
</tr>
<tr>
<td>• Function blocks</td>
<td></td>
</tr>
</tbody>
</table>

### Factory setting for SITRANS TH400 PA and SITRANS TH400 FF

<table>
<thead>
<tr>
<th>Setting</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td>Pt100 (IEC)</td>
</tr>
<tr>
<td>Type of connection</td>
<td>Three-wire system</td>
</tr>
<tr>
<td>Unit</td>
<td>°C</td>
</tr>
<tr>
<td>Failure mode</td>
<td>Last valid value</td>
</tr>
<tr>
<td>Filter time</td>
<td>0 s</td>
</tr>
<tr>
<td>only for SITRANS TH400 PA</td>
<td>126</td>
</tr>
<tr>
<td>PROFIBUS Ident No.</td>
<td>Manufacturer-specific</td>
</tr>
<tr>
<td>only for SITRANS TH400 FF</td>
<td>22</td>
</tr>
<tr>
<td>Node address</td>
<td></td>
</tr>
</tbody>
</table>
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

SITRANS TH400 fieldbus transmitter

Selection and Ordering data

Temperature transmitter SITRANS TH400
for installation in the sensor head, with electrical isolation, order instruction manual separately.

- Bus-capable to PROFIBUS PA
  - without explosion protection or EEx n or NI
    - 7NG3214-0NN00
  - with explosion protection „intrinsic safety to ATEX/FM/CSA”
    - 7NG3214-0AN00

- Bus-capable to FOUNDATION Fieldbus
  - without explosion protection or EEx n or NI
    - 7NG3215-0NN00
  - with explosion protection „intrinsic safety to ATEX/FM/CSA”
    - 7NG3215-0AN00

Further designs
Please add „-Z“ to Order No. and specify Order code (s) and plain text.

- Customer-specific setting of operating data (specify in plain text) Y01 1)

- With test protocol (5 measuring points) C11 2)

Accessories

CD for measuring instruments for temperature
with documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software

SIMATIC PDM operating software see chapter 9

DIN rail adapters for head transmitters
(Quantity delivered: 5 units) 7NG3092-8KA

4-wire connection cable
150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units) 7NG3092-8KC

For additional PA components see catalog IK PI

▼ Available ex stock.

1) Y01: Please specify all data that does not correspond to factory settings (see below).
2) Can only be ordered together with Y01 (it is essential to specify the measuring range).
C) Subject to export regulations AL: N, ECCN: EAR99.

Factory setting:

- for SITRANS TH400 PA:
  - Pt100 (IEC 751) with three-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 three-wire circuit
  - Unit: °C
  - Failure mode: Last valid value
  - Filter time: 0 s
  - Node address: 22

Dimensional drawings

SITRANS TH400 dimensions in mm (inches) and connections

Mounting on DIN rail

SITRANS TH400, mounting of transmitter on DIN rail

DIN rail adapter, dimensions in mm (inch)
SITRANS T measuring instruments for temperature
Transmitters for mounting in sensor head

SITRANS TH400
fieldbus transmitter

Schematics

Resistance thermometer

- Two-wire system
- Three-wire system
- Four-wire system

Thermocouple

- Internal cold junction compensation
- Cold junction compensation with external Pt100 in two-wire system
- Cold junction compensation with external Pt100 in three-wire system

Resistance

- Two-wire system
- Three-wire system
- Four-wire system

Mean-value/differential or redundancy generation
- 2 x two-wire system
- 1 sensor in two-wire system
- 1 sensor 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

Mean value, differential or redundancy generation

Voltage measurement

- One voltage source
- Measurement of mean value, differential and redundancy with 2 voltage sources

1) Programmable line resistance for the purpose of correction.

SITRANS TH400, sensor connection assignment
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
- SIL 2 (with order code C20)

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 (two, three or four-wire system)
- Thermocouple elements
- 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.
**Technical specifications**

<table>
<thead>
<tr>
<th>Input</th>
<th>Resistance thermometer</th>
<th>Open-circuit monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Temperature</td>
<td>Always active (cannot be disabled)</td>
</tr>
<tr>
<td>Sensor type</td>
<td>Pt25 ... Pt1000</td>
<td>Can be switched off (value is adjustable)</td>
</tr>
<tr>
<td>• to IEC 60751</td>
<td>Pt25 ... Pt1000</td>
<td>Parameterizable, max. 0 ... 2200 Ω (see Table &quot;Digital measuring errors&quot;)</td>
</tr>
<tr>
<td>• to JIS C 1604; a=0.00392 K⁻¹</td>
<td>Nt25 ... Nt1000</td>
<td>5 ... 25 Ω (see Table &quot;Digital measuring errors&quot;)</td>
</tr>
<tr>
<td>• to IEC 60751</td>
<td></td>
<td>Resistance-linear or special characteristic</td>
</tr>
<tr>
<td>• Special type</td>
<td>Pt25 ... Pt1000</td>
<td></td>
</tr>
<tr>
<td>Sensor factor</td>
<td>0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... Pt1000)</td>
<td></td>
</tr>
<tr>
<td>Units</td>
<td>°C or °F</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>1 resistance thermometer (RTD) in 2-wire system, 3-wire or 4-wire system</td>
<td></td>
</tr>
<tr>
<td>• Standard connection</td>
<td>2 identical resistance thermometers in 2-wire system for generation of average temperature</td>
<td></td>
</tr>
<tr>
<td>• Generation of average value</td>
<td>2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)</td>
<td></td>
</tr>
<tr>
<td>• Generation of difference</td>
<td>Parameterizable line resistance ≤ 100 Ω (loop resistance)</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>No balancing required</td>
<td></td>
</tr>
<tr>
<td>• Two-wire system</td>
<td>No balancing required</td>
<td></td>
</tr>
<tr>
<td>• Three-wire system</td>
<td>≤ 0.45 mA</td>
<td></td>
</tr>
<tr>
<td>• Four-wire system</td>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td>Sensor current</td>
<td>Open-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td>Min. measured span</td>
<td>Short-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td>Characteristic curve</td>
<td>Measuring range</td>
<td></td>
</tr>
<tr>
<td>Resistance-based sensors</td>
<td>Min. measured span</td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Characteristic curve</td>
<td></td>
</tr>
<tr>
<td>Sensor type</td>
<td>Resistance-linear or special characteristic</td>
<td></td>
</tr>
<tr>
<td>Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Normal connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Generation of average value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Generation of difference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Two-wire system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Three-wire system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Four-wire system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time T&lt;sub&gt;63&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-circuit monitoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold junction compensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Internal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• External</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• External fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. measured span</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic curve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mV sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor type</td>
<td>DC voltage</td>
<td></td>
</tr>
<tr>
<td>Units</td>
<td>DC voltage source (DC voltage source possible over an externally connected resistor)</td>
<td></td>
</tr>
<tr>
<td>Response time T&lt;sub&gt;63&lt;/sub&gt;</td>
<td>mV</td>
<td></td>
</tr>
<tr>
<td>Open-circuit monitoring</td>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can be switched off</td>
</tr>
</tbody>
</table>

**Thermocouple elements**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Sensor type (thermocouples)</th>
<th>Units</th>
<th>Connection</th>
<th>Generation of average value</th>
<th>Generation of difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Pt30Rh-Pt6Rh to DIN IEC 584</td>
<td>°C or °F</td>
<td>1 thermocouple element (TC)</td>
<td>2 identical thermocouple elements (TC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5 %-Re to ASTM 988</td>
<td></td>
<td></td>
<td>2 identical thermocouple elements (TC) TC1 – TC2 or TC2 – TC1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W3 %-Re to ASTM 988</td>
<td></td>
<td></td>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NiCr-CuNi to DIN IEC 584</td>
<td></td>
<td></td>
<td>Can be switched off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fe-CuNi to DIN 43710</td>
<td></td>
<td></td>
<td>With integrated Pt100 resistance thermometer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NiCr-Ni to DIN 43710</td>
<td></td>
<td></td>
<td>With external Pt100 IEC 60571 (2-wire or 3-wire connection)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Copper-Ni to DIN 43710</td>
<td></td>
<td></td>
<td>Cold junction temperature can be set as fixed value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NiCrSi-NiSi to DIN IEC 584</td>
<td></td>
<td></td>
<td>Parameterizable (see table &quot;Digital measuring errors&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pt13Rh-Pt to DIN IEC 584</td>
<td></td>
<td></td>
<td>Min. 50 ... 100 °C (90 ... 180 °F) (see table &quot;Digital measuring errors&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pt10Rh-Pt to DIN IEC 584</td>
<td></td>
<td></td>
<td>Temperature-linear or special characteristic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cu-CuNi to DIN IEC 584</td>
<td></td>
<td></td>
<td>mV</td>
<td></td>
</tr>
</tbody>
</table>

**Thermocouple elements**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Sensor type</th>
<th>Units</th>
<th>Connection</th>
<th>Generation of average value</th>
<th>Generation of difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pt10Rh-Pt</td>
<td>°C or °F</td>
<td>1 thermocouple element (TC)</td>
<td>2 identical thermocouple elements (TC) TC1 – TC2 or TC2 – TC1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NiCr-Ni</td>
<td></td>
<td></td>
<td>≤ 250 ms for 1 sensor with open-circuit monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fe-CuNi</td>
<td></td>
<td></td>
<td>Can be switched off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NiCrSi-NiSi</td>
<td></td>
<td></td>
<td>With integrated Pt100 resistance thermometer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pt30Rh-Pt6Rh</td>
<td></td>
<td></td>
<td>With external Pt100 IEC 60571 (2-wire or 3-wire connection)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5 %-Re</td>
<td></td>
<td></td>
<td>Cold junction temperature can be set as fixed value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W3 %-Re</td>
<td></td>
<td></td>
<td>Parameterizable (see table &quot;Digital measuring errors&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NiCr-CuNi</td>
<td></td>
<td></td>
<td>Min. 50 ... 100 °C (90 ... 180 °F) (see table &quot;Digital measuring errors&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Resistance-based sensors**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Sensor type</th>
<th>Units</th>
<th>Connection</th>
<th>Generation of average value</th>
<th>Generation of difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual resistance</td>
<td>Resistance-based, potentiometers</td>
<td>Ω</td>
<td>1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 resistance-based sensors in 2-wire system for generation of average value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)</td>
<td></td>
</tr>
</tbody>
</table>

**Connection**

| Normal connection | 1 resistance thermometer (RTD) in 2-wire system, 3-wire or 4-wire system |
|-------------------| 2 identical resistance thermometers in 2-wire system for generation of average temperature |
|                   | 2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1) |

**Response time T<sub>63</sub>**

| ≤ 250 ms for 1 sensor with open-circuit monitoring | Always active (cannot be disabled) |
| Can be switched off (value is adjustable) | Parameterizable, max. 0 ... 2200 Ω (see Table "Digital measuring errors") |
| 5 ... 25 Ω (see Table "Digital measuring errors") | Resistance-linear or special characteristic |

© Siemens AG 2010
SITRANS T measuring instruments for temperature
Transmitters for rail mounting

SITRANS TR200
two-wire system, universal

Measuring range

<table>
<thead>
<tr>
<th>Parameterizable max.</th>
<th>-100 ... 1100 mV</th>
</tr>
</thead>
</table>

Min. measured span

| 2 mV or 20 mV |

Overload capability of the input

| -1.5 ... +3.5 V DC |

Input resistance

| ≥ 1 MΩ |

Characteristic curve

| Voltage-linear or special characteristic |

Output

| Output signal | 4 ... 20 mA, 2-wire |

Auxiliary power supply

| 11 ... 35 V DC (to 30 V with Ex) |

Max. load

| (U_{aux} - 11 V)/0.023 A |

Overrange

| 3.6 ... 23 mA, infinitely adjustable |

(default range: 3.84 mA ... 20.50 mA)

Error signal (e.g. in the event of sensor breakage)

| 3.6 ... 23 mA, infinitely adjustable |

(default value: 22.8 mA)

Sample cycle

| 0.25 s |

Damping

| Software filter 1st order 0 ... 30 s (parameterizable) |

Protection

| Against reversed polarity |

Electrically isolated

| Input against output (1 kV_{eff}) |

Measuring accuracy

Digital measuring errors

See Table "Digital measuring errors"

Reference conditions

| Auxiliary power supply | 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 | < 0.55 °C (0.9 °F) |
| Temperature effect | < 0.1 % of max. span/10 °C (18 °F) |
| Power supply effect | < 0.001 % of span/V |
| Effect of load impedance | < 0.002 % of span/100 Ω |
| Long-term drift | |
| in the first month | < 0.02 % of max. span |
| after one year | < 0.2 % of max. span |
| after 5 years | < 0.3 % of max. span |

Rated conditions

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

| According to EN 61326 and NAMUR NE21 |

Design

Material

| Plastic, electronic module potted |

Weight

| 122 g |

Dimensions

See "Dimensional drawings"

Cross-section of cables

| Max. 2.5 mm² (AWG 13) |

Degree of protection to IEC 60529

| IP20 |

Factory setting:

| 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 |

Error in the analog output (digital/analog converter)

< 0.025 % of span

Error due to internal cold junction

< 0.55 °C (0.9 °F)

Temperature effect

< 0.1 % of max. span/10 °C (18 °F)

Power supply effect

< 0.001 % of span/V

Effect of load impedance

< 0.002 % of span/100 Ω

Long-term drift

< 0.02 % of max. span

after one year

< 0.2 % of max. span

after 5 years

< 0.3 % of max. span

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 2(1) D Ex iaD/ibD 20/21 T115 °C |

Type of protection, "equipment has limited energy"

| II 3 G Ex nL IIC T6/T4 |

Type of protection, "equipment is non-arcing"

| II 3 G Ex nA IIC T6/T4 |

Software requirements for SIPROM T

PC operating system

Windows ME, 2000 and XP; also Windows 95, 98 and 98 SE, but only in connection with RS 232 modem.

Digital measuring errors

Resistance thermometer

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C (°F)</td>
<td>°C (°F)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>to IEC 60751</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P25</td>
<td>-200 ... +850 (-328 ... +1562)</td>
<td>10 (18)</td>
<td>0.2 (0.36)</td>
</tr>
<tr>
<td>P50</td>
<td>-200 ... +850 (-328 ... +1562)</td>
<td>10 (18)</td>
<td>0.15 (0.27)</td>
</tr>
<tr>
<td>P100 ... P1200</td>
<td>-200 ... +850 (-328 ... +1562)</td>
<td>10 (18)</td>
<td>0.1 (0.18)</td>
</tr>
<tr>
<td>P1500</td>
<td>-200 ... +850 (-328 ... +1562)</td>
<td>10 (18)</td>
<td>0.15 (0.27)</td>
</tr>
<tr>
<td>P1800</td>
<td>-200 ... +350 (-328 ... +662)</td>
<td>10 (18)</td>
<td>0.15 (0.27)</td>
</tr>
<tr>
<td>to JIS C1604-81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P25</td>
<td>-200 ... +649 (-328 ... +1200)</td>
<td>10 (18)</td>
<td>0.2 (0.36)</td>
</tr>
<tr>
<td>P50</td>
<td>-200 ... +649 (-328 ... +1200)</td>
<td>10 (18)</td>
<td>0.15 (0.27)</td>
</tr>
<tr>
<td>P100 ... P1200</td>
<td>-200 ... +649 (-328 ... +1200)</td>
<td>10 (18)</td>
<td>0.1 (0.18)</td>
</tr>
<tr>
<td>P1500</td>
<td>-200 ... +649 (-328 ... +1200)</td>
<td>10 (18)</td>
<td>0.15 (0.27)</td>
</tr>
<tr>
<td>P1800</td>
<td>-200 ... +350 (-328 ... +662)</td>
<td>10 (18)</td>
<td>0.15 (0.27)</td>
</tr>
<tr>
<td>Ni 25 to Ni1000</td>
<td>-60 ... +250 (-76 ... +482)</td>
<td>10 (18)</td>
<td>0.1 (0.18)</td>
</tr>
</tbody>
</table>
Resistance-based sensors

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance</td>
<td>0 ... 390 Ω</td>
<td>5 Ω</td>
<td>0.05 Ω</td>
</tr>
<tr>
<td>Resistance</td>
<td>0 ... 2200 Ω</td>
<td>25 Ω</td>
<td>0.25 Ω</td>
</tr>
</tbody>
</table>

Thermocouple elements

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B</td>
<td>0 ... 1820 °C</td>
<td>100 °C</td>
<td>2 °C (3.6 °F)</td>
</tr>
<tr>
<td>Type C (W5)</td>
<td>0 ... 2300 °C</td>
<td>100 °C</td>
<td>2 °C (3.6 °F)</td>
</tr>
<tr>
<td>Type D (W3)</td>
<td>0 ... 2300 °C</td>
<td>100 °C</td>
<td>1.2 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type E</td>
<td>-200 ... +1000 °C</td>
<td>50 °C</td>
<td>1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type J</td>
<td>-210 ... +1200 °C</td>
<td>50 °C</td>
<td>1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type K</td>
<td>-230 ... +1370 °C</td>
<td>50 °C</td>
<td>1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type L</td>
<td>-200 ... +900 °C</td>
<td>50 °C</td>
<td>1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type N</td>
<td>-200 ... +1300 °C</td>
<td>50 °C</td>
<td>1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type R</td>
<td>-50 ... +1760 °C</td>
<td>100 °C</td>
<td>2 °C (3.6 °F)</td>
</tr>
<tr>
<td>Type S</td>
<td>-50 ... +1760 °C</td>
<td>100 °C</td>
<td>2 °C (3.6 °F)</td>
</tr>
<tr>
<td>Type T</td>
<td>-200 ... +400 °C</td>
<td>40 °C</td>
<td>1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Type U</td>
<td>-200 ... +600 °C</td>
<td>50 °C</td>
<td>2 °C (3.6 °F)</td>
</tr>
</tbody>
</table>

1) The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).
2) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV sensor</td>
<td>-10 ... +70 mV</td>
<td>2 mV</td>
<td>μV</td>
</tr>
<tr>
<td>mV sensor</td>
<td>-100 ... +1100 mV</td>
<td>20 mV</td>
<td>40 μV</td>
</tr>
</tbody>
</table>

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 0.1 % 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).
SITRANS T measuring instruments for temperature
Transmitters for rail mounting

SITRANS TR200
two-wire system, universal

Dimensional drawings

SITRANS TR200, dimensions in mm (inch)

Schematics

SITRANS pin assignment, TR200

Assignments
1 (+) and 2 (-) Test terminals (Test) for measurement of the output current with a multimeter
3 (+) and 4 (-) Power supply $U_{aux}$, Output current $I_{out}$
5, 6, 7 and 8 Sensor assignment, see schematics
SITRANS TR200, sensor connection assignment

1) Programmable line resistance for the purpose of correction.

- Resistance thermometer
- Resistance
- Thermocouple

- Two-wire system
- Three-wire system
- Four-wire system

- Generation of average value/difference

- Cold junction compensation
  - Internal/fixed value
  - with external Pt100 in two-wire system
  - with external Pt100 in three-wire system

- Power supply/
  - 4 ... 20 mA ($U_{aux}$)

SITRANS TR200, measuring instruments for temperature
Transmitters for rail mounting

Siemens FI 01 · 2010 US Edition
"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
- SIL 2 (with order code C20)

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 (two, three or four-wire system)
- Thermocouple elements
- 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.

SITRANS TR300 function diagram
## Technical specifications

### Input

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Resistance thermometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>Pt25 ... Pt1000</td>
</tr>
<tr>
<td>to IEC 60751</td>
<td>Ni25 ... Ni1000</td>
</tr>
<tr>
<td>to JIS C 1604; a=0.00392 K-1</td>
<td></td>
</tr>
<tr>
<td>Special type</td>
<td>over special characteristic (max. 30 points)</td>
</tr>
<tr>
<td>Sensor factor</td>
<td>0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... Pt1000)</td>
</tr>
<tr>
<td>Units</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

### Connection

- Standard connection
  - 1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
- Generation of average value
  - 2 identical resistance thermometers in 2-wire system for generation of average temperature
- Generation of difference
  - 2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)

### Interface

- Two-wire system
  - Parameterizable line resistance ≤ 100 Ω (loop resistance)
- Three-wire system
  - No balancing required
- Four-wire system
  - No balancing required

### Response time T₆₃

- ≤ 250 ms for 1 sensor with open-circuit monitoring

### Open-circuit monitoring

- Can be switched off

### Short-circuit monitoring

- Can be switched off (value is adjustable)

### Range

- Parameterizable, max. 0 ... 2200 Ω (see Table "Digital measuring errors")

### Min. measured span

- 5 Ω ... 25 Ω (see Table "Digital measuring errors")

### Characteristic

- Resistance-linear or special characteristic

### Thermocouple elements

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type (thermocouples)</td>
<td>Pt30Rh-Pt6Rh to DIN IEC 584</td>
</tr>
<tr>
<td>Type B</td>
<td>W5 %-Re to ASTM 988</td>
</tr>
<tr>
<td>Type C</td>
<td>W3 %-Re to ASTM 988</td>
</tr>
<tr>
<td>Type D</td>
<td>NiCr-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>Type E</td>
<td>Fe-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>Type F</td>
<td>NiCr-Ni to DIN IEC 584</td>
</tr>
<tr>
<td>Type G</td>
<td>Fe-CuNi to DIN 43710</td>
</tr>
<tr>
<td>Type H</td>
<td>NiCrSi-NiSi to DIN IEC 584</td>
</tr>
<tr>
<td>Type I</td>
<td>Pt13Rh-Pt to DIN IEC 584</td>
</tr>
<tr>
<td>Type J</td>
<td>Pt10Rh-Pt to DIN IEC 584</td>
</tr>
<tr>
<td>Type K</td>
<td>Cu-CuNi to DIN IEC 584</td>
</tr>
<tr>
<td>Type L</td>
<td>Cu-CuNi to DIN 43710</td>
</tr>
<tr>
<td>Type M</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

### Cold junction compensation

- Internal
- External
- External fixed

### Range

- Parameterizable (see table "Digital measuring errors")

### Min. measured span

- 50 ... 199 °C (90 ... 180 °F) (see table "Digital measuring errors")

### Characteristic

- Temperature-linear or special characteristic

### mV Sensor

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>DC voltage</td>
</tr>
<tr>
<td>Units</td>
<td>DC voltage source (DC voltage source possible over an externally connected resistor)</td>
</tr>
</tbody>
</table>

### Response time T₆₃

- ≤ 250 ms for 1 sensor with open-circuit monitoring

### Open-circuit monitoring

- Can be switched off

### Short-circuit monitoring

- Can be switched off (value is adjustable)
SITRANS TR300
two-wire system, universal, HART

-10 ... 70 mV
-100 ... 1100 mV

-1.5 ... +3.5 V DC

3.6 ... 23 mA, continuously adjustable (default range: 3.84 ... 20.50 mA)

0.25 s nominal

Input resistance

≥ 1 MΩ

Characteristic

Voltage-linear or special characteristic

• Power supply
24 V ± 1 %

• Load
500 Ω

• Storage temperature
23 °C

• Warming-up time
> 5 min

< 0.025 % of span

< 0.5 °C (0.9 °F)

< 0.1 % der max. span/10°C (18 °F)

< 0.001 % of span/V

< 0.002 % of span/100 Ω

• in the first month
< 0.02 % of max. span

• after one year
< 0.2 % of max. span

• after 5 years
< 0.3 % of max. span

-200 ... +850 °C (-328 ... +1562 °F)

-200 ... +850 °C (-328 ... +1562 °F)

-200 ... +850 °C (-328 ... +1562 °F)

-200 ... +850 °C (-328 ... +1562 °F)

-200 ... +850 °C (-328 ... +1562 °F)

-200 ... +850 °C (-328 ... +1562 °F)

-200 ... +350 °C (-328 ... +662 °F)

-60 ... +250 °C (-76 ... +482 °F)
SITRANS T measuring instruments for temperature
Transmitters for rail mounting

SITRANS TR300
two-wire system, universal, HART

Resistance-based sensors

<table>
<thead>
<tr>
<th>Input</th>
<th>Range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance</td>
<td>0 ... 390</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>Resistance</td>
<td>0 ... 2200</td>
<td>25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Thermocouple elements

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B (W5)</td>
<td>0 ... 1820 (32 ... 3308)</td>
<td>100 (180)</td>
<td>2(^1) (3.60)(^1)</td>
</tr>
<tr>
<td>Type C (W5)</td>
<td>0 ... 2300 (32 ... 4172)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type D (W3)</td>
<td>0 ... 2300 (32 ... 4172)</td>
<td>100 (180)</td>
<td>1(^2) (1.80)(^2)</td>
</tr>
<tr>
<td>Type E</td>
<td>-200 ... +1000 (-328 ... +1802)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type J</td>
<td>-210 ... +1200 (-346 ... +2192)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type K</td>
<td>-230 ... +1370 (-382 ... +2498)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type L</td>
<td>-200 ... +900 (-328 ... +1652)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type N</td>
<td>-200 ... +1300 (-328 ... +2372)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type R</td>
<td>-50 ... +1760 (-58 ... +3200)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type S</td>
<td>-50 ... +1760 (-58 ... +3200)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type T</td>
<td>-200 ... +400 (-328 ... +752)</td>
<td>40 (72)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type U</td>
<td>-200 ... +600 (-328 ... +1112)</td>
<td>50 (90)</td>
<td>2 (3.60)</td>
</tr>
</tbody>
</table>

\(^1\) The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

\(^2\) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV Sensor

<table>
<thead>
<tr>
<th>Input</th>
<th>Range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV Sensor</td>
<td>-10 ... +70</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>mV Sensor</td>
<td>-100 ... +1100</td>
<td>20</td>
<td>400</td>
</tr>
</tbody>
</table>

The digital accuracy is the accuracy after the analog/digital conversion including linearity 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 0.1 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum of the digital jitter and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Selection and Ordering Data

Temperature transmitter
SITRANS TR300
for mounting on a standard DIN rail, two-wire system, 4 ... 20 mA, HART, with electrical isolation, with documentation on CD

• Without explosion protection
• With explosion protection to ATEX

Order No.

<table>
<thead>
<tr>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7NG3033-0JN00</td>
</tr>
<tr>
<td>7NG3033-1JN00</td>
</tr>
</tbody>
</table>

Further designs

Please add “-Z” to Order No. and specify Order code(s)

Customer-specific setting of operating data (specify operating data in plain text) with test protocol (5 measuring points)
SIL 2 (functional safety)

<table>
<thead>
<tr>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y01(^1)</td>
</tr>
<tr>
<td>C11</td>
</tr>
<tr>
<td>C20</td>
</tr>
</tbody>
</table>

Order code

CD for measuring instruments for temperature
with documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software

HART modem
• With RS 232 connection
• With USB connection

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MF4997-1DA</td>
</tr>
<tr>
<td>7MF4997-1DB</td>
</tr>
</tbody>
</table>

SIMATIC PDM operating software

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E00364512</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E00364512</td>
</tr>
</tbody>
</table>

1) Y01: Please specify all data that does not correspond to factory settings (see below).
D) Subject to export regulations AL: N, ECCN: EAR99H.

Power supply units see “SITRANS I supply units and isolation amplifiers”.

Factory setting:

• 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

Input Range Min. measured span Digital accuracy

Resistance 0 ... 390 5 0.05
Resistance 0 ... 2200 25 0.25

1) Y01: Please specify all data that does not correspond to factory settings (see below).
D) Subject to export regulations AL: N, ECCN: EAR99H.
SITRANS T measuring instruments for temperature
Transmitters for rail mounting

SITRANS TR300
two-wire system, universal, HART

Dimensional drawings

SITRANS TR300, dimensions in mm (inch)

Schematics

Assignments
1 (+) and 2 (-) Test terminals (Test) for measurement of the output current with a multimeter
3 (+) and 4 (-) Power supply U_{aux}, Output current I_{out}
5, 6, 7 and 8 Sensor assignment, see schematics

SITRANS TR300, pin assignment
SITRANS TR300, sensor connection assignment

<table>
<thead>
<tr>
<th>Resistance thermometer</th>
<th>Resistance</th>
<th>Thermocouple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-wire system ¹)</td>
<td>Two-wire system ¹)</td>
<td>Cold junction compensation Internal/fixed value</td>
</tr>
<tr>
<td>Three-wire system</td>
<td>Three-wire system</td>
<td>Cold junction compensation with external Pt100 in two-wire system ¹)</td>
</tr>
<tr>
<td>Four-wire system</td>
<td>Four-wire system</td>
<td>Cold junction compensation with external Pt100 in three-wire system</td>
</tr>
</tbody>
</table>

¹) Programmable line resistance for the purpose of correction.

<table>
<thead>
<tr>
<th>Voltage measurement</th>
<th>Current measurement</th>
<th>Test terminals</th>
<th>Power supply/4 ... 20 mA (Uaux)</th>
</tr>
</thead>
</table>

SITRANS TR300, sensor connection assignment
SITRANS T measuring instruments for temperature
Transmitter for field mounting with temperature sensor

**SITRANS TF2**
Digital display thermometer

---

### Overview

The temperature transmitter SITRANS TF2 integrates three elements in one device:
- a Pt100 resistance thermometer in a stainless steel protective tube,
- a stainless steel housing with a high degree of protection, and
- a built-in transmitter with LCD and three keys for parameterization.

It is used to indicate and monitor the temperature measured at the point of installation.

The SITRANS TF2 is available in an axial and a radial version.

### Benefits

- Robust stainless steel housing with two connection versions
- High measuring accuracy
- Precise display with a resolution of 1/100 °C in the highest measuring range
- Measuring ranges from -50 to +200 °C (-58 ... +392 °F) parameterizable
- Customer-specific lengths and materials possible for the protective tube
- Stainless steel protective tube with high resistance to chemicals
- Signaling of limit violation in the LCD as well as with a red LED

### Application

The SITRANS TF2 is used for indicating and monitoring a temperature variable at the point of installation. Applications are all process engineering branches, e.g.:
- Chemical industry
- Energy industry
- Long-distance heating
- Water supply
- Sewage works
- Food industry
- Steelworks and the cement industry
- Pharmaceutical industry
- Biotechnology

---

### Design

The SITRANS TF2 has a stainless steel housing (diam. 80 mm) with protective glass. The stainless steel protective tube with screw socket contains the temperature sensor Pt100. By using stainless steel for the protective tube it displays high chemical resistance, which means that the temperature sensor is well protected against external effects.

The protective tube is supplied as standard in lengths of 170 mm or 260 mm; a customer-specific version is also possible. Similarly, the protective tube can be supplied in the material of the customer’s choice.

At the rear of the housing is the electrical connection for the voltage supply using a current loop of 4 to 20 mA. The connection is made with plug connectors to EN 175301-803A.

At the front of the housing is the 5-digit display behind a glass cover. Underneath the display are the 3 keys for parameterizing the SITRANS TF2. Above the display are a green and a red LED for indicating the operating status.

The SITRANS TF2 is available in two versions (see “Dimensional drawings”):
- In the radial version (type A) the display is fitted in parallel with the protective tube. The display can be rotated by up to ±120° relative to the protective tube.
- In the axial version (type B) the display is at right angles to the protective tube. The display can be rotated by 360° relative to the protective tube.

### Function

**Mode of operation**

The outside lying temperature sensor Pt100 is supplied with current from the constant current course \( I_k \). A temperature-related voltage drop is thus created over the sensor.

The voltage drop is converted on the analog/digital converter (A/D) into a digital signal.

In the microcontroller (\( \mu C \)) the digital signal is linearized and evaluated in accordance with the saved in the EEPROM. The processed data are shown in the display.

In addition the values are converted on the digital/analog converter (D/A) and the voltage/current transformer (U/I) into a temperature-linear current signal \( I_A \) (4 to 20 mA).
Display
The SITRANS TF2 has a 5-digit display behind a glass cover. The following data are shown on the display:
• measured temperature
• unit (°C, °F, °R or K and mA or %)
• limit violation, indicated by LED and arrow symbols in the display

Settings
The SITRANS TF2 is set using the 3 input keys behind the glass cover underneath the display.
The key ‘M’ is used to selected the operating mode. Following modes of operation are available:
• Measured value
• Password
• Unit of measurement
• Start of scale and end
• Upper and lower limit value
• Offset
• Output current calibration
• Upper and lower current saturation limit
• Electrical damping
The other two keys are used to set the values in the individual operating modes.

Monitoring
Two LED indicators are fitted above the display to monitor the set range and the status:
• The green LED signals that the measured temperature lies within the set limits.
• The red LED lights up when the measured temperature lies outside the set limits and when there is an error.

Technical specifications

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Resistance thermometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Temperature</td>
</tr>
<tr>
<td>Max. measuring range</td>
<td>-50 °C ... +200 °C (-58 ... +392 °F)</td>
</tr>
<tr>
<td>Min. measured span</td>
<td>50 K (90 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>4 ... 20 mA, 2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower current limit</td>
<td>min. 3.6 mA</td>
</tr>
<tr>
<td>Upper current limit</td>
<td>max. 23 mA</td>
</tr>
<tr>
<td>Output protected against</td>
<td>reversed polarity, overvoltage and short-circuiting</td>
</tr>
<tr>
<td>max. load</td>
<td>(UH – 12 V) / 0.023 A</td>
</tr>
<tr>
<td>Voltage measurement</td>
<td>Temperature-linear</td>
</tr>
</tbody>
</table>

| Measuring accuracy       | ≤ (0.45 K + 0.2 % of full-scale value in K + 1 digit in K) |
|                         | (≤ (0.81 °F + 0.2 % of full-scale value in °F + 1 digit in °F) |
| Measuring cycle time     | ≤ 100 ms            |
| Temperature effect       | ≤ 0.15 %/10 K (< ± 0.15 %/18 °F) |
| Power supply effect      | ≤ ±0.01 % of full-scale value/V |
| Vibration influence      | ≤ ±0.05 %/g to 500 Hz in all directions (to IEC 68-2-64) |

<table>
<thead>
<tr>
<th>Rated conditions</th>
<th>Ambient conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ambient temperature</td>
</tr>
<tr>
<td></td>
<td>-25 ... +85 °C (-13 ... +185 °F)</td>
</tr>
<tr>
<td></td>
<td>Temperature range for best readability</td>
</tr>
<tr>
<td></td>
<td>-10 ... +70 °C (+14 ... +158 °F)</td>
</tr>
<tr>
<td></td>
<td>Storage temperature</td>
</tr>
<tr>
<td></td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP65 to EN 60529</td>
</tr>
<tr>
<td>Electromagnetic compatibility</td>
<td>EN 61326/A2 Appendix A (2001)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Displays and controls</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LCD, max. 5 digits, digit height 9 mm (0.354 inch)</td>
</tr>
<tr>
<td>Resolution at max. measuring range</td>
<td>0.01 °C (0.01 °F)</td>
</tr>
<tr>
<td>Decimal point</td>
<td>Freely parameterizable</td>
</tr>
<tr>
<td>Limit values</td>
<td>Freely parameterizable</td>
</tr>
<tr>
<td>Limit violation display</td>
<td>Red LED and message on LCD (↑ symbol / ↓ symbol in case of limit violation in upward/downward direction)</td>
</tr>
<tr>
<td>Parameterization</td>
<td>With 3 keys</td>
</tr>
<tr>
<td>Units</td>
<td>mA or % or Ω or physical variable: °C, °F, °R, K</td>
</tr>
<tr>
<td>Damping</td>
<td>Between 0.1 and 100 s (increment: 0.1 s) freely parameterizable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.7 kg (= 1.54 lb)</td>
</tr>
<tr>
<td>Non-wetted parts materials</td>
<td></td>
</tr>
<tr>
<td>Field housing</td>
<td>Diam. 80 mm (diam. 3.15 inch), stainless steel, mat. No. 1.4016</td>
</tr>
<tr>
<td>Cover</td>
<td>Stainless steel, mat. No. 14016 with glass</td>
</tr>
<tr>
<td>Wetted parts materials</td>
<td>To DIN 43772 form 8 (March 2000), diam. 14 x 1.5 mm (diam. 0.55 x 0.06 inch)</td>
</tr>
<tr>
<td></td>
<td>- Material</td>
</tr>
<tr>
<td></td>
<td>Stainless steel (mat. No. 1.4571/316TI)</td>
</tr>
<tr>
<td></td>
<td>Protective tube screw socket</td>
</tr>
<tr>
<td></td>
<td>G½B to DIN 3852-2 form A or ½&quot;-14 NPT</td>
</tr>
<tr>
<td></td>
<td>- Material</td>
</tr>
<tr>
<td></td>
<td>Stainless steel (mat. No. 1.4571/316TI)</td>
</tr>
<tr>
<td>Measuring insert</td>
<td>Length to fit the ordered protective tube, stainless steel</td>
</tr>
<tr>
<td>Connection of display to the protective tube</td>
<td>radial (type A), can be swiveled by max. ±120° (α)</td>
</tr>
<tr>
<td></td>
<td>axial (type B), can be swiveled by max. ±360°</td>
</tr>
<tr>
<td>Length of the protective tube(Uₚ)</td>
<td>see Ordering data</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Using 2-pole plug connector made of plastic with M16x1.5-cable entry to EN 175301-803A or ½&quot;-14 NPT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Terminal voltage on temperature transmitter (Uₚ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 ... 30 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating limits</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>max. 40 bar (580 psi)</td>
</tr>
</tbody>
</table>
SITRANS T measuring instruments for temperature

Transmitter for field mounting with temperature sensor

**SITRANS TF2**
Digital display thermometer

### Selection and ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 NG 3 1 4 0 -</td>
<td></td>
</tr>
</tbody>
</table>

Temperature transmitter SITRANS TF2, field device
Temperature transmitter with LCD in stainless steel housing, degree of protection IP65, stainless steel protective tube, resistance thermometer with Pt100 sensor, measuring range -50 ... +200 °C (-58 ... +392 °F), local parameterization, output signal 4 ... 20 mA

**Display/cable entry**
- Radial version (type A), parallel to protective tube/M16x1.5
- Axial version (type B), at right angles to protective tube/M16x1.5
- Radial version (type A), parallel to protective tube/½"-NPT
- Axial version (type B), at right angles to protective tube/½"-NPT

**Process connection**
- Connection shank G½B
- Connection shank ½"-14 NPT
- Other version (on request) add Order code and plain text: connection shank: ...

**Length of the protective tube (U1)**
- 170 mm (6.70 inch)
- 260 mm (10.24 inch)
- 4.5" (114 mm)
- 7.5" (190 mm)
- 10.5" (266 mm)
- Other version (on request) add Order code and plain text: length: ...

**Material of the protective tube**
- Stainless steel (mat. No. 1.4571/316Ti)
- Other version (on request) add Order code and plain text: mat. No.: ...

Available ex stock

---

### Additional data

- Measuring range to be set Y01: .................
- Measuring point label made of stainless steel, please specify inscription in plain text.

### Schematics

SITRANS TF2, connection diagram

### Dimensional drawings

SITRANS TF2, dimensions in mm (inches)
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.
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. 9 or www.siemens.com/wirelesshart.
Detailed information on IE/WSN-PA LINK can be found in the FI 01 catalogue Sec. 9 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.
SITRANS T measuring instruments for temperature
Transmitter for field mounting with temperature sensor

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.
- Remotely from the Pt100 sensor, which is connected to the transmitter via a cable.

### Input
- **Sensor**
  - Sensor type: Pt100 as per IEC 751/DIN EN 60751
  - Connection: 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
- **Accuracy**
  - < 0.5 % of the measuring range or 0.5 °C
- **Long-term drift**
  - < 0.035 % of the measuring range in first year
- **Ambient temperature effect**
  - < 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
- Max. permissible temperature at transmitter for directly mounted Pt100
- IP65/NEMA 4
- 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
  - 20 ≤ f ≤ 2000 Hz
  - 0.01 g²/Hz
- **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
- **Cable between transmitter and sensor element**
  - ≤ 3 m für two-, three- or four-wire connections
  - Cable resistance < 1 Ω (setting range in mΩ 0...9999)

### Displays and controls
- **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 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
- **Classification according to pressure equipment directive (PED 97/23/EC)**
  - This device does not fall under the pressure equipment directive:
### Selection and ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MP1110-0A00</td>
<td>SITRANS TF280 WirelessHART Temperature transmitter</td>
</tr>
</tbody>
</table>

(Required battery not included with delivery, see accessories)

### Connections/cable entry
- **Cable gland M20x1.5**
- **Sensor pipe with Pt100, G½” male thread, pre-mounted and connected**

### Display
- Digital display, visible

### Enclosure
- Die-cast aluminum

### Explosion protection
- Not included

### Antenna
- Variable, attached to device

### Further designs

Please add ".Z" to Order No. and specify Order code(s) and plain text.

- **Measuring point number (TAG Nr.):**
  - max. 16 digits entered in plain text
  - **Y15: ....................**

- **Measuring point message:**
  - max. 27 characters entered in plain text
  - **Y16: ....................**

### Accessories

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MP1990-0AA00</td>
</tr>
<tr>
<td>7MF4997-1AC</td>
</tr>
<tr>
<td>7MF4997-1AJ</td>
</tr>
<tr>
<td>7MF4997-1BB</td>
</tr>
<tr>
<td>7MF4997-1BE</td>
</tr>
<tr>
<td>7MP1990-0BA00</td>
</tr>
<tr>
<td>7MP1990-0BB00</td>
</tr>
<tr>
<td>7MF4997-1DA</td>
</tr>
<tr>
<td>7MF4997-1DB</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Available ex stock*

1) Available soon
SITRANS TF280 WirelessHART temperature transmitter with Pt100, dimensions in mm (inch)
SITRANS TF280 WirelessHART temperature transmitter, dimensions in mm (inch)
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, 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
- Type of protection IP67
- Test terminals for direct read-out of the output signal without breaking the current loop
- Can be mounted elsewhere if the measuring point
  - is not easily accessible
  - 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.
- SIL 2 (with order code C20)

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 even 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 TH200. 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 or Ω and/or V signal, is amplified and linearized. Sensor and output side are electrically isolated. An internal cold junction is integrated for measurements with thermocouples.

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 model 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.

Operating principle: SITRANS TF with an integrated transmitter and digital display
<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Parameterizable (see table &quot;Digital measuring errors&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Min. measured span</td>
<td>5 ... 25 °C (see table &quot;Digital measuring errors&quot;)</td>
</tr>
<tr>
<td>Sensor type (thermocouples)</td>
<td>Characteristic</td>
<td>Resistance-linear or special characteristic</td>
</tr>
<tr>
<td>• Type B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Type U</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Resistance-based sensors

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Sensor type</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Resistance-based, potentiometers</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor current</th>
<th>Response time</th>
<th>Open-circuit monitoring</th>
<th>Short-circuit monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>No balancing required</td>
<td>≤ 0.45 mA</td>
<td>Can be switched off</td>
<td>Can be switched off (value is adjustable)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Connection</th>
<th>Cold junction compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameterizable (see table &quot;Digital measuring errors&quot;)</td>
<td>1 thermocouple (TC)</td>
<td>With integrated Pt100 resistance thermometer</td>
</tr>
</tbody>
</table>

### Thermocouple

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Sensor type</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Type B to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type C to ASTM 988</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type D to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type E to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type J to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type K to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type L to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type N to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type R to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type S to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type T to DIN IEC 584</td>
<td>°C or °F</td>
</tr>
<tr>
<td></td>
<td>Type U to DIN IEC 43710</td>
<td>°C or °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Min. measured span</th>
<th>Cold junction temperature can be set as fixed value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. 50 ... 100 °C (90 ... 180 °F) (see table &quot;Digital measuring errors&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

### mV Sensor

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Sensor type</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>DC voltage source (DC voltage source possible over an externally connected resistor)</td>
<td>mV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload capacity of the input</td>
<td>≤ 1.5 ... +3.5 V DC</td>
<td>2 mV or 20 mV</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Voltage-linear or spec. characteristic</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open-circuit monitoring</th>
<th>Can be switched off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-circuit monitoring</td>
<td>Can be switched off (value is adjustable)</td>
</tr>
</tbody>
</table>

### Technical specifications

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload capacity of the input</td>
<td>≤ 1.5 ... +3.5 V DC</td>
<td>2 mV or 20 mV</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Voltage-linear or spec. characteristic</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open-circuit monitoring</th>
<th>Can be switched off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-circuit monitoring</td>
<td>Can be switched off (value is adjustable)</td>
</tr>
</tbody>
</table>
SITRANS T measuring instruments for temperature
Transmitter for field mounting/field indicator

**SITRANS TF - Transmitter, two-wire system and Field indicator for 4 to 20 mA**

### 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

### Output
- **Output signal:** 4 ... 20 mA, 2-wire
- **Communication with SITRANS TH300:** to HART Rev. 5.9

### Digital display
- **Digital display (optional):** in current loop
- **Display:** max. 5 digits
- **Digit height:** 9 mm (0.35”)
- **Display range:** -99999 ... +99999
- **Units:** Any (max. 5 char.)
- **Setting:** With 3 keys
- **Load voltage:** 2.1 V

### Measuring accuracy
- **Digital measuring errors:** See table "Dig. measuring errors"
- **Reference conditions**
  - **Auxiliary power supply:** 24 V ± 1 %
  - **Load:** 500 Ω
  - **Storage temperature:** 23 °C (73.4 °F)
  - **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)
- **Temperature effect:** < 0.1 % of max. span/10 °C (18 °F)
- **Power supply effect:** < 0.001 % of span/V
- **Effect of load impedance:** < 0.002 % of span/100 Ω
- **Long-term drift**
  - in the first month: < 0.02 % of max. span
  - after one year: < 0.2 % of max. span
  - after 5 years: < 0.3 % of max. span

### Rated conditions
- **Ambient temperature:** -40 ... +85 °C (-40 ... +185 °F)
- **Storage temperature:** -40 ... +85 °C (-40 ... +185 °F)
- **Condensation:** Permissible
- **Electromagnetic compatibility:** According to EN 61326 and NAMUR NE21
- **Degree of protection to EN 60529:** IP67

### Design
- **Approx. weight:** Approx. 1.5 kg (3.3 lb), without options
- **Dimensions:** See “Dimensional drawings”
- **Enclosure material:** Die-cast aluminum, low in copper, GD-AISI 12 or stainless steel, poly-ester-based lacquer, stainless steel rating plate
- **Electrical connection, sensor connection:** Screw terminals, cable inlet via M20 x 1.5 or ½-14 NPT threaded gland
- **Mounting bracket (optional):** Steel, galvanized and chrome-plated or stainless steel

### Power supply
- **Without digital display:** 11 ... 35 V DC (30 V with Ex)
- **With digital display:** 13.1 ... 35 V DC (30 V with Ex)
- **Electrically isolated:** Between input and output
- **Test voltage:** \( U_{\text{eff}} = 1 \text{kV}, 50 \text{Hz}, 1 \text{min} \)

### Certificate and approvals
- **Explosion protection ATEX**
  - "Intrinsically-safe" type of protection
    - **With digital indicator:** II 2 (1) G EEx ia IIC T4
    - **Without digital indicator:** II 2 (1) G EEx ia IIC T6
    - **EC type test certificate:** ZELM 99 ATEX 0007
  - "Operating equipment that is non-sparking and has limited energy for zone 2" type of protection
    - **EC type test certificate:** ZELM 99 ATEX 0007
  - **Flame-proof enclosure/ type of protection**
    - **EC type test certificate:** II 2 G EEx d IIC T5/T6

- **Certification and approvals**
  - **Software**
    - **XP / I / 1/BCD / T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X**
    - **DIP / II, III / 1 / EFG / T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X**
    - **NI / I / 2 / ABCD / T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X**
    - **S / II, III / 2 / FG / T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X**

### Hardware and software requirements
- **For the parameterization software SIPROM T for SITRANS TH200**
  - **Personal computer**
    - **PC with CD-ROM drive and USB/RS 232 interface**
    - **PC operating system** Windows 98, NT, 2000, XP
- **For the parameterization software SIMATIC PDM for SITRANS TH300**
  - See chapter 9, “Software”, SIMATIC PDM

### Communication
- **Load for HART connection:** 230 ... 1100 Ω
- **Two-core shielded:** ≤ 3.0 km (1.86 mi)
- **Multi-core shielded:** ≤ 1.5 km (0.93 mi)
- **Protocol:** HART protocol, version 5.x

### 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
Digital measuring errors

Resistance thermometer

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C (°F)</td>
<td>°C (°F)</td>
<td>°C (°F)</td>
</tr>
<tr>
<td>according to IEC 60751</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pt25</td>
<td>-200 ... + 850</td>
<td>10 (18)</td>
<td>0,2 (0.36)</td>
</tr>
<tr>
<td>Pt50</td>
<td>-200 ... + 850</td>
<td>10 (18)</td>
<td>0,15 (0.27)</td>
</tr>
<tr>
<td>Pt100 ... Pt200</td>
<td>-200 ... + 850</td>
<td>10 (18)</td>
<td>0,1 (0.18)</td>
</tr>
<tr>
<td>Pt500</td>
<td>-200 ... + 850</td>
<td>10 (18)</td>
<td>0,15 (0.27)</td>
</tr>
<tr>
<td>Pt1000</td>
<td>-200 ... + 350</td>
<td>10 (18)</td>
<td>0,15 (0.27)</td>
</tr>
<tr>
<td>according to JIS C1604-81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pt25</td>
<td>-200 ... + 649</td>
<td>10 (18)</td>
<td>0,2 (0.36)</td>
</tr>
<tr>
<td>Pt50</td>
<td>-200 ... + 649</td>
<td>10 (18)</td>
<td>0,15 (0.27)</td>
</tr>
<tr>
<td>Pt100 ... Pt200</td>
<td>-200 ... + 649</td>
<td>10 (18)</td>
<td>0,1 (0.18)</td>
</tr>
<tr>
<td>Pt500</td>
<td>-200 ... + 649</td>
<td>10 (18)</td>
<td>0,15 (0.27)</td>
</tr>
<tr>
<td>Pt1000</td>
<td>-200 ... + 350</td>
<td>10 (18)</td>
<td>0,15 (0.27)</td>
</tr>
<tr>
<td>Ni 25 ... Ni1000</td>
<td>-60 ... + 250</td>
<td>10 (18)</td>
<td>0,1 (0.18)</td>
</tr>
</tbody>
</table>

Resistance-based sensors

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ω</td>
<td>Ω</td>
<td>Ω</td>
</tr>
<tr>
<td>Resistance</td>
<td>0 ... 390</td>
<td>5</td>
<td>0,05</td>
</tr>
<tr>
<td>Resistance</td>
<td>0 ... 2200</td>
<td>25</td>
<td>0,25</td>
</tr>
</tbody>
</table>

Thermocouple elements

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C (°F)</td>
<td>°C (°F)</td>
<td>°C (°F)</td>
</tr>
<tr>
<td>Type B</td>
<td>0 ... 1200 (32 ... 1998)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type C (W5)</td>
<td>0 ... 2300 (32 ... 4172)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type D (W3)</td>
<td>0 ... 2300 (32 ... 4172)</td>
<td>100 (180)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type E</td>
<td>-200 ... +1000 (32 ... 1832)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type J</td>
<td>-200 ... +1200 (32 ... 1832)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type K</td>
<td>-200 ... +1370 (32 ... 1832)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type L</td>
<td>-200 ... +900 (32 ... 1652)</td>
<td>50 (90)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type R</td>
<td>-50 ... +1760 (32 ... 3200)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type S</td>
<td>-50 ... +1760 (32 ... 3200)</td>
<td>100 (180)</td>
<td>2 (3.60)</td>
</tr>
<tr>
<td>Type T</td>
<td>-200 ... +400 (32 ... 752)</td>
<td>40 (72)</td>
<td>1 (1.80)</td>
</tr>
<tr>
<td>Type U</td>
<td>-200 ... +600 (32 ... 1112)</td>
<td>50 (90)</td>
<td>2 (3.60)</td>
</tr>
</tbody>
</table>

1) The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).
2) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensors

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>Min. measured span</th>
<th>Digital accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mV</td>
<td>mV</td>
<td>μV</td>
</tr>
<tr>
<td>mV sensors</td>
<td>-10 ... +70</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>mV sensors</td>
<td>-100 ... +1100</td>
<td>20</td>
<td>400</td>
</tr>
</tbody>
</table>

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 0.1 % 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).
SITRANS T measuring instruments for temperature
Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and
- Field indicator for 4 to 20 mA

Dimensional drawings

SITRANS TF, dimensions in mm (inches)

1  Sensor connection (screwed gland M20x1.5 or ½-14 NPT)
2  Blanking plug
3  Electrical connection (screwed gland M20x1.5 or ½-14 NPT)
4  Terminal side, output signal
5  Terminal side, sensor
6  Protective cover (without function)
7  Mounting bracket (option) with clamp for securing to a vertical or horizontal pipe
8  Cover with window for digital display

© Siemens AG 2010
SITRANS T measuring instruments for temperature
Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and - Field indicator for 4 to 20 mA

Selection and Ordering data

Order No. 7NG313...

Accessories

Modem for SITRANS TH200 incl. parameterization software T
- with USB interface 7NG3092-8KU
- with RS 232 interface 7NG3092-8KM

CD for measuring instruments for temperature
with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)

HART modem
- with RS 232 interface 7MF4997-1DA
- with USB interface 7MF4997-1DB

SIMATIC PDM parameterization software also for SITRANS TH300

Mounting bracket and securing parts
- made of steel for 7NG313.-..B.. 7MF4997-1AC
- made of steel for 7NG313.-..C.. 7MF4997-1AB
- made of stainless steel for 7NG313.-..B.. 7MF4997-1AJ
- made of stainless steel for 7NG313.-..C.. 7MF4997-1AH

Digital indicator1)
7MF4997-1BS

Connection board A5E02226423

Enclosure
- die-cast aluminium A
- stainless steel precision casting E

Connections/cable inlet
- screwed glands M20x1.5 B
- screwed glands ½-14 NPT C

Digital indicator
- without 0
- with 1

Mounting bracket and securing parts
- without 0
- made of steel 1
- made of stainless steel 2

Further designs
Please add “Z” to Order No. and specify Order code(s) and plain text.

Customer-specific setting of operating data

Y01 2)

Inspection on measuring-point label
- measuring range (max. 27 characters) Y22 3)
- meas. point description (max. 16 char.) Y23 3)
- measuring point text (max. 27 char.) Y24 3)

Test protocol (5 measuring points) C11 4)

SIL 2 (functional safety) C20 5)

1) It is not possible to upgrade devices with Ex protection.
2) Y01: Please specify all data that does not correspond to factory settings (see above) (e.g. Y01 = thermocouple element type K; internal cold junction: 0...800 °C; fault current 5.6 mA).
3) Y22, Y23, Y24: If no order is placed for Y01, these data are only noted on the measuring point label and are not programmed in the transmitter.
4) Can only be ordered together with Y01.
5) Only with 7NG3135-... and 7NG3136-...

Selection and Ordering data

Order No.

Temperature transmitter in field housing
Two-wire system 4 ... 20 mA, with electrical isolation, with documentation on CD-ROM

Integrated transmitter
- SITRANS TH200, programmable
  - without Ex protection 5 0
  - with EEx ia 5 1
  - with EEx nAL for zone 2 5 2
  - total device SITRANS TF EEx d 5 4
  - total device SITRANS TF according to FM (XP, DIP, NI, S) 5 5
- SITRANS TH300, communication capability according to HART V 5.9
  - without Ex-protection 6 0
  - with EEx ia 6 1
  - with EEx nAL for zone 2 6 2
  - total device SITRANS TF EEx d 6 4
  - total device SITRANS TF according to FM (XP, DIP, NI, S) 6 5

SITRANS TF field indicator
for 4 ... 20 mA signals, with documentation on CD-ROM

Enclosure
- die-cast aluminium A
- stainless steel precision casting E

Connections/cable inlet
- screwed glands M20x1.5 B
- screwed glands ½-14 NPT C

Digital indicator
- without 0
- with 1

Mounting bracket and securing parts
- without 0
- made of steel 1
- made of stainless steel 2

Further designs
Please add “Z” to Order No. and specify Order code(s) and plain text.

Customer-specific setting of operating data

Y01 2)

Inspection on measuring-point label
- measuring range (max. 27 characters) Y22 3)
- meas. point description (max. 16 char.) Y23 3)
- measuring point text (max. 27 char.) Y24 3)

Test protocol (5 measuring points) C11 4)

SIL 2 (functional safety) C20 5)

1) Without cable gland.
2) Y01: Please specify all data that does not correspond to factory settings (see above) (e.g. Y01 = thermocouple element type K; internal cold junction: 0...800 °C; fault current 5.6 mA).
3) Y22, Y23, Y24: If no order is placed for Y01, these data are only noted on the measuring point label and are not programmed in the transmitter.
4) Can only be ordered together with Y01.
5) Only with 7NG3135-... and 7NG3136-...
SITRANS T measuring instruments for temperature
Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and
- Field indicator for 4 to 20 mA

Schematics

Resistance thermometer

Resistance

Thermocouple

Two-wire system

Three-wire system

Four-wire system

Generation of average value / difference

Cold junction compensation

Internal/fixed value

Cold junction compensation with external Pt100 in two-wire system

Cold junction compensation with external Pt100 in three-wire system

Generation of average value / difference with internal cold junction compensation

Voltage measurement

Current measurement

1) Programmable line resistance for the purpose of correction.

SITRANS TF, sensor connection assignment
# Overview

**Our field devices for heavy industrial use**

- FOUNDATION fieldbus
- PROFIBUS PA

The SITRANS TF temperature transmitter works where others can’t cope.

## Benefits

- For universal use as a transmitter for resistance thermometers, thermocouple elements, Ω or mV signals
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP67
- Can be mounted elsewhere if the measuring point
  - is not easily accessible
  - 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 even 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

**General**
- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- Electrically isolated
- Version for use in hazardous areas
- Special characteristic
- Sensor redundancy

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 T measuring instruments for temperature
Transmitter for field mounting with temperature sensor

SITRANS TF fieldbus transmitter

System communication

![System communication diagram]

Technical specifications

<table>
<thead>
<tr>
<th>Input</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog/digital conversion</td>
<td>• Measurement rate: &lt; 50 ms&lt;br&gt;• Resolution: 24-bit&lt;br&gt;Resistance thermometer&lt;br&gt;Pt25 ... Pt1000 to IEC 60751/JIS C 1604&lt;br&gt;• Measuring range: -200 ... +850 °C (-328 ... +1562 °F)&lt;br&gt;Ni25 ... Ni1000 to DIN 43760&lt;br&gt;• Measuring range: -60 ... +250 °C (-76 ... +482 °F)&lt;br&gt;Cu10 ... Cu1000, α = 0.00427&lt;br&gt;• Measuring range: -50 ... +200 °C (-58 ... +392 °F)&lt;br&gt;Line resistance per sensor cable Max. 50 Ω&lt;br&gt;Nominal 0.2 mA&lt;br&gt;Sensor current&lt;br&gt;• Sensor fault detection: Yes&lt;br&gt;• Sensor break detection: Yes&lt;br&gt;• Sensor short-circuit detection: Yes, &lt; 15 Ω&lt;br&gt;Resistance-based sensors&lt;br&gt;Measuring range&lt;br&gt;Line resistance per sensor cable Max. 50 Ω&lt;br&gt;Nominal 0.2 mA&lt;br&gt;Sensor fault detection&lt;br&gt;• Sensor break detection: Yes&lt;br&gt;• Sensor short-circuit detection: Yes, &lt; 15 Ω&lt;br&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter time (programmable)</td>
<td>0 ... 60 s&lt;br&gt;Update time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thermocouple</th>
<th>Measuring range</th>
</tr>
</thead>
</table>
| Type B       | 400 ... 1820 °C (752 ... 3308 °F)<br>-100 ... +1000 °C (-148 ... +1832 °F)<br>-100 ... +1000 °C (-148 ... +1832 °F)<br>-100 ... +1200 °C (-148 ... +2192 °F)<br>-180 ... +1300 °C (-292 ... +2372 °F)<br>-50 ... +1760 °C (-58 ... +3200 °F)<br>-50 ... +1760 °C (-58 ... +3200 °F)<br>-200 ... +400 °C (-328 ... +752 °F)<br>-200 ... +900 °C (-328 ... +1652 °F)<br>-200 ... +600 °C (-328 ... +1112 °F)<br>to ASTM E988-90<br>Type W3 | 0 ... +2300 °C (32 ... +4172 °F)<br>Type W5 | 0 ... +2300 °C (32 ... +4172 °F)<br>External cold junction compensation | -40 ... +135 °C (-40 ... +275 °F)<br>Sensor fault detection<br>• Sensor break detection: Yes<br>• Sensor short-circuit detection: Yes, < 3 mV<br>• Sensor current in the event of open-circuit monitoring 4 μA<br>mV sensor - voltage input<br>Measuring range | -800 ... +800 mV<br>Input resistance | 10 MΩ

Reference conditions

- Warming-up time: 30 s
- Signal-to-noise ratio: Min. 60 dB
- Calibration condition: 20 ... 28 °C (68 ... 82 °F)

Conditions of use

- Ambient conditions
  - Permissible ambient temperature: -40 ... +85 °C (-40 ... +185 °F)
  - Permissible storage temperature: -40 ... +85 °C (-40 ... +185 °F)
- Relative humidity: ≤ 98 %, with condensation

Insulation resistance

- Test voltage: 500 V AC for 60 s
- Continuous operation: 50 V AC/75 V DC

Electromagnetic Compatibility

- NAMUR: NE21
- EN 61326-1, EN 61326-2-5

Design

- Weight: Approx. 1.5 kg (3.3 lb) without options
- Dimensions: See "Dimensional drawings"
- Enclosure materials: • Die-cast aluminium, low in copper, GD-AlSi 12 or stainless steel
  • Polyester-based lacquer for GD AlSi 12 enclosure
  • Stainless steel rating plate
- Electrical connection, sensor connection
  - Screw terminals
  - Cable inlet via M20 x 1.5 or ½-14 NPT screwed gland
  - Bus connection with M12 plug (optional)
- Mounting bracket (optional): Steel, galvanized and chrome-plated or stainless steel
- Degree of protection: IP67 to EN 60529

Auxiliary power supply

- Power supply
  - Standard, Ex "d", Ex "nA", Ex "nL", XP, NI: 10.0 ... 32 V DC
  - Ex "ia", Ex "ib": 10.0 ... 30 V DC
  - In FISCO/FNICO installations: 10.0 ... 17.5 V DC
- Power consumption: < 11 mA
- Max. increase in power consumption in the event of a fault: < 7 mA

Certificates and approvals

- Explosion protection: FM for USA
  - Type of protection: XP, DIP, NI and S (version 7NG313x-5xxx)
  - FM approval: FM 3017742
    - Ex "ia", Ex "ib": 10.0 ... 30 V DC
    - In FISCO/FNICO installations: 10.0 ... 17.5 V DC
  - FF protocol
    - FF design specifications
      - Basic or LAS
      - ITK 4.6
      - 2 x analog and 1 x PID

Communication

- PROFIBUS PA connection
  - Protocol: A&D profile, Version 3.0
  - Address (for delivery): 126
  - Function blocks: 2 x analog
- FOUNDATION fieldbus connection
  - Protocol: FF protocol
  - Functionality: Basic or LAS
  - Version: ITK 4.6
  - 2 x analog
  - 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
- PROFINET Ident No.

For SITRANS TH400 FF

- Sensor: Pt100 (IEC)
- Type of connection: 3-wire circuit
- Unit: °C
- Failure mode: Last valid value
- Filter time: 0 s
- Node address: 22

© Siemens AG 2010
SITRANS T measuring instruments for temperature
Transmitter for field mounting with temperature sensor

Selection and ordering data

<table>
<thead>
<tr>
<th>Integrated transmitter</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS TH400 with PROFIBUS PA</td>
<td>7NG313.x-0.0</td>
</tr>
<tr>
<td>- without Ex protection</td>
<td>70</td>
</tr>
<tr>
<td>- with EEx ia (ATEX)</td>
<td>71</td>
</tr>
<tr>
<td>- with EEx nAL for zone 2 (ATEX)</td>
<td>72</td>
</tr>
<tr>
<td>- total device SITRANS TF EEx d1)</td>
<td>74</td>
</tr>
<tr>
<td>- total device SITRANS TF according to FM (XP, DIP, NI, S)2)</td>
<td>75</td>
</tr>
<tr>
<td>SITRANS TH400, with FOUNDATION fieldbus</td>
<td>80</td>
</tr>
<tr>
<td>- without Ex protection</td>
<td>81</td>
</tr>
<tr>
<td>- with EEx ia (ATEX)</td>
<td>82</td>
</tr>
<tr>
<td>- with EEx nAL for zone 2 (ATEX)</td>
<td>84</td>
</tr>
<tr>
<td>- total device SITRANS TF EEx d1)</td>
<td>85</td>
</tr>
</tbody>
</table>

Enclosure
- die-cast aluminium
- stainless steel precision casting

Connections/cable inlet
- screwed glands M20x1.5
- screwed gland s ½-14 NPT

Mounting bracket and fastening parts
- none
- made of steel
- stainless steel

Further designs
Please add “-Z” to Order No. and specify Order code(s) and plain text.

Customer-specific operating data
Inscription on measuring point label
- Measuring point number/TAG (max. 32 char.)
- Measuring point description (max. 32 char.)
- Bus address

Test report (5 measuring points)

Bus connection
- M12 plug (metal), without mating connector
- M12 plug (metal), with mating connector

1) Without cable gland.
2) Y01: Please specify all data that does not correspond to factory settings (see above) (e.g. Y01 = thermocouple element type K, internal cold junction, PA address: 15).
3) Y15, Y23, Y25: If no order is placed for Y01, these data are only noted on the measuring point label and are not programmed in the transmitter.
4) Can only be ordered together with Y01 (it is essential to specify the measuring range).
5) Not available for explosion protection EEx d or XP.

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

Selection and ordering data

Order No.

Temperature transmitter in field enclosure
with fieldbus communication and electrical isolation, with documentation on CD

Integrated transmitter
- SITRANS TH400 with PROFIBUS PA
  - without Ex protection
  - with EEx ia (ATEX)
  - with EEx nAL for zone 2 (ATEX)
  - total device SITRANS TF EEx d1) (available soon)
- SITRANS TH400, with FOUNDATION fieldbus
  - without Ex protection
  - with EEx ia (ATEX)
  - with EEx nAL for zone 2 (ATEX)
  - total device SITRANS TF EEx d1) (available soon)

Enclosure
- die-cast aluminium
- stainless steel precision casting

Connections/cable inlet
- screwed glands M20x1.5
- screwed gland s ½-14 NPT

Mounting bracket and fastening parts
- none
- made of steel
- stainless steel

Further designs
Please add “-Z” to Order No. and specify Order code(s) and plain text.

Customer-specific operating data
Inscription on measuring point label
- Measuring point number/TAG (max. 32 char.)
- Measuring point description (max. 32 char.)
- Bus address

Test report (5 measuring points)

Bus connection
- M12 plug (metal), without mating connector
- M12 plug (metal), with mating connector

1) Without cable gland.
2) Y01: Please specify all data that does not correspond to factory settings (see above) (e.g. Y01 = thermocouple element type K, internal cold junction, PA address: 15).
3) Y15, Y23, Y25: If no order is placed for Y01, these data are only noted on the measuring point label and are not programmed in the transmitter.
4) Can only be ordered together with Y01 (it is essential to specify the measuring range).
5) Not available for explosion protection EEx d or XP.

Selection and ordering data

Order No.

Temperature transmitter in field enclosure
with fieldbus communication and electrical isolation, with documentation on CD

Integrated transmitter
- SITRANS TH400 with PROFIBUS PA
  - without Ex protection
  - with EEx ia (ATEX)
  - with EEx nAL for zone 2 (ATEX)
  - total device SITRANS TF EEx d1) (available soon)
- SITRANS TH400, with FOUNDATION fieldbus
  - without Ex protection
  - with EEx ia (ATEX)
  - with EEx nAL for zone 2 (ATEX)
  - total device SITRANS TF EEx d1) (available soon)

Enclosure
- die-cast aluminium
- stainless steel precision casting

Connections/cable inlet
- screwed glands M20x1.5
- screwed gland s ½-14 NPT

Mounting bracket and fastening parts
- none
- made of steel
- stainless steel

Further designs
Please add “-Z” to Order No. and specify Order code(s) and plain text.

Customer-specific operating data
Inscription on measuring point label
- Measuring point number/TAG (max. 32 char.)
- Measuring point description (max. 32 char.)
- Bus address

Test report (5 measuring points)

Bus connection
- M12 plug (metal), without mating connector
- M12 plug (metal), with mating connector

1) Without cable gland.
2) Y01: Please specify all data that does not correspond to factory settings (see above) (e.g. Y01 = thermocouple element type K, internal cold junction, PA address: 15).
3) Y15, Y23, Y25: If no order is placed for Y01, these data are only noted on the measuring point label and are not programmed in the transmitter.
4) Can only be ordered together with Y01 (it is essential to specify the measuring range).
5) Not available for explosion protection EEx d or XP.
SITRANS T measuring instruments for temperature
Transmitter for field mounting with temperature sensor

Dimensional drawings

SITRANS TF with TH400, dimensions in mm (inches)

1. Sensor connection (screwed gland M20x1.5 or ½-14 NPT)
2. Blanking plug
3. Electrical connection (screwed plug M20x1.5 or ½-14 NPT), optional M12 plug
4. Terminal side, bus connection
5. Terminal side, sensor
6. Protective cover (without function)
7. Mounting bracket (optional) with clamp securing to a vertical or horizontal pipe
SITRANS T measuring instruments for temperature
Transmitter for field mounting with temperature sensor

SITRANS TF
fieldbus transmitter

Schematics

Resistance thermometer

Thermocouple

Resistance

Two-wire system 1) Internal cold junction compensation

Three-wire system Cold junction compensation with external Pt100 in two-wire system 1)

Four-wire system Cold junction compensation with external Pt100 in three-wire system

Mean-value/differential or redundancy generation 2 x two-wire system 1)

Mean value, differential or redundancy generation with internal cold junction compensation

Mean-value/differential or redundancy generation 1 sensor in two-wire system 1)

Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system 1)

Mean value, differential or redundancy generation 1 sensor in three-wire system

Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in three-wire system

Mean value, differential or redundancy generation 1 resistor in two-wire system 1)

Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system 1)

Mean value, differential or redundancy generation 1 resistor in three-wire system

Voltage measurement

One voltage source Measurement of mean value, differential and redundancy with 2 voltage sources

1) Programmable line resistance for the purpose of correction.

SITRANS TF with TH400, sensor connection assignment
### SITRANS F flowmeters

#### 4/2 Product overview

**Introduction**
- Criteria for selection of flowmeter
- Communication solutions

**SITRANS F M (electromagnetic)**
- System information
  - Transmitters
    - MAG 5000/6000
    - MAG 6000 /6000 I Ex d e
  - Flow sensors
    - MAG 1100
    - MAG 1100 F
    - MAG 5100 W
    - MAG 3100
- Transmitter TRANSMAG 2 with sensor 911/E
- Battery-operated water meter MAG 8000/MAG 8000 CT

**SITRANS F C (coriolis)**
- System information
  - Transmitters
    - MASS 6000 IP67 compact/remote
    - MASS 6000 for 19" insert/19" wall mounting
    - MASS 6000 Ex d compact/remote
    - SIFLOW FC070
  - Flow sensors
    - MASS 2100 DI 1.5
    - SITRANS FC300
    - MASS 2100 DI 3 to DI 40
    - SITRANS F C MC2

**SITRANS F US (ultrasonic)**
- In-line flowmeters
  - System information SITRANS F US
    - Ultrasonic flowmeters
      - Transmitters
        - FUS060
        - FUS080
      - Flowmeters
        - SONO 3300/FUS060
        - SONO 3100/FUS060
        - SONOKIT (with FUS060 or FUS080)
        - FUS380 standard
        - FUE380 with approval
        - Energy calculator FUE950
        - Flowmeter FUS880 (retrofit kit)
        - Accessories and spare parts for older flowmeter systems type F US SONOFLO

---

You can download all instructions, catalogs and certificates for SITRANS F free of charge at the following Internet address:

www.siemens.com/sitransf
## Overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog</th>
<th>Software for parameterization</th>
</tr>
</thead>
</table>
| **SITRANS F M electromagnetic flowmeters - Pulsed DC magnetic flowmeter** | Designed in robust IP67 polyamide enclosures for compact or remote mounting. 19" back of panel and front of panel enclosure program. Transmitter MAG 5000/6000  
- Superior signal resolution for optimum turn down ratio  
- Comprehensively self-diagnostic, for error indication and logging  
- Multi-lingual display and keypad interface  
- Custody transfer approval: PTB, OIML R 75, OIML R 117, OIML R 49 and MI-001 | 4/31     | SIMATIC PDM                   |
| Designed in robust die-cast aluminium enclosure for demanding applications and where explosion proof protection is necessary. Transmitter MAG 6000 /6000 I Ex d | Remote and compact mounting with all sensors  
- Explosion proof design: ATEX II 2(1)(2) GD and FM Class 1, Div. 2  
- Multi-lingual display and touchpad keypad  
- Comprehensively self-diagnostic | 4/42     | SIMATIC PDM                   |
| Designed for the general industry environment. The obstructionless performance of this sensor is unaffected by the suspended solids, viscosity and temperature challenges. Flow sensor MAG 1100 | Metering tube DN 2 ... DN100 (1/12" ... 4") flangeless design.  
- Corrosion-resistant AISI 316 stainless steel housing.  
- Highly resistant liner ceramic or PFA and electrodes fitting most extreme process media.  
- Temperature rating up to 200 °C (390 °F)  
- ATEX II 2(1) GD approval version  
- FM Class, 1 Div 2 | 4/47     |                               |
| Specially designed for the food & beverage and pharmaceutical industry. Flow sensor MAG 1100 F | AISI 316 stainless steel enclosure  
- Hygienic seal, 3A and EHEDG  
- Easy to clean  
- Supplied with connections according to your specification  
- ATEX II 2(1) GD approval version  
- FM class 1 Div 2 | 4/55     |                               |
| Designed for all water and waste applications in water plants and industrial applications. Flow sensor MAG 5100 W | Metering tube DN 25 ... DN 1200 (DN 2000) (1" ... 48" (78"))  
- Hard Rubber or EPDM lining  
- Integral grounding electrodes as standard  
- Increased low flow accuracy for water leak detection  
- Drinking water approvals and custody transfer approvals, OIML R 49, MI-001 and PTB | 4/65     |                               |
<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog page</th>
<th>Software for parameterization</th>
</tr>
</thead>
</table>
| The MAG 3100 series with its flexibility in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media. | **Flow sensor MAG 3100**  
- For a wide range of pipe dimensions: DN 15 ... DN 2000 (½" ... 78")  
- Wide range of liner and electrode materials  
- High-temperature version for application with temperatures up to 180 °C (355 °F)  
- High-pressure solutions  
- Approved according to PTB, OIML R 75, OIML R 117, CSA/FM and ATEX | 4/74                      |                                 |
| Designed for heavy-duty applications like pulp & paper stock over 3%; heavy mining slurries and mining slurries with magnetic particles. | **Transmitter TRANSMAG 2**  
- Magnetic flowmeter with a very strong pulsed AC magnetic field  
- PROFIBUS PA or HART communication  
- Self-test function | 4/91                      | SIMATIC PDM                    |
| Designed for heavy-duty applications like pulp & paper stock over 3%; heavy mining slurries and mining slurries with magnetic particles. | **Flow sensor 911/E**  
- Metering tube: DN 15 ... DN 1000 (½" ... 40")  
- Metering tube liner: Hard Rubber, Linatex, Neoprene, PTFE and Novolak  
- Integral smartPLUG for storing of calibration values  
- Temperature of medium: -20 ... +150 °C (-4 ... +300 °F) | 4/91                      |                                 |
| Battery-operated electromagnetic water meter for water applications within abstraction, distribution network, revenue metering and irrigation. | **Water meter MAG 8000**  
- Battery-operated water meter  
- Metering tube DN 25 ... DN 1200 (1" ... 48")  
- Remote and compact installation IP68/ NEMA 6P enclosure  
- Custody transfer approval: OIML R 49 and MI-001  
- Drinking water approvals | 4/100                     | SIMATIC PDM and Flow Tool       |

**SITRANS F M electromagnetic flowmeters - High-power AC magnetic flowmeter**

**SITRANS F M electromagnetic flowmeters - Battery-operated watermeter**
<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS F C mass flowmeters</strong></td>
<td>Measurement of liquids and gases. Measurement of mass flow, density, temperature and fraction e.g. °Brix or °Plato.</td>
<td>Flow sensors MASS 2100 (Single tube design) and FC300</td>
<td>4/149, 4/153</td>
</tr>
<tr>
<td></td>
<td>- Flow from 0.1 ... 52 000 kg/h (114 640 lb/h)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Pipe material: W 1.4435 (316L); W 2.4602 Hastelloy C22</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Accuracy, typically: - Flow: ≤ 0.1% of flow rate - Density: ≤ 0.0005 g/cm³</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Liquid temp./pressure: -50 ... +180°C (-58 ... +356 °F) / Up to 410 bar (5946 psi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Approved according to ATEX EEx ia IIC T3 ... T6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measurement of liquids and gases. Measurement of mass flow, density, temperature and fraction e.g. °Brix or °Plato.</td>
<td>Flow sensor MC2 (Dual tube design)</td>
<td>4/168</td>
</tr>
<tr>
<td></td>
<td>- Standard MC2 - DN 50, DN 65, DN 80, DN 100 and DN 150 - Flow from 0 ... 510 000 kg/h (112 400 lb/h) - Tube material: W 1.4571 (316Ti) and Hastelloy C4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Hygienic MC2 - Approvals: EHEDG - DN 20, DN 25, DN 40, DN 50, DN 65 and DN 80 - Flow from 0 ... 113 600 kg/h (250 000 lb/h) - Tube material: W 1.4435 (316L) - Connectors: DIN 11851, DIN 32676 and DIN 11864-2A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Accuracy: ≤ 0.15% of rate - Density: ≤ 0.001 g/cm³ - Liquid temp.: -50 ... +180°C (-58 ... +356 °F) - Pressure: &lt; 100 bar (1450 psi) - Approvals: ATEX EEx em [ib] IIC T2 ... T6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measurement of liquids and gases. Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato</td>
<td>Transmitters MASS 6000 (IP67, 19”, Ex d) and SIFLOW FC070</td>
<td>4/129, 4/145</td>
</tr>
<tr>
<td></td>
<td>- 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. - Easy retrofitting of communication modules (AOM) - Approved according to ATEX [EEx ia] IIC / EEx de [ia/ib] IIC T6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## SITRANS F US ultrasonic in-line flowmeters

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS060 is a time based transmitter designed for ultrasonic flowmetering in pipes for the F US in-line industry series up to DN 4000</td>
<td>SITRANS FUS060 transmitter - Die cast aluminium 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</td>
<td>4/188</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>SITRANS FUS080 is a time based transmitter designed for ultrasonic flowmetering in pipes for the FUS380 and FUE380 series up to DN 1200</td>
<td>SITRANS FUS080 transmitter - Battery or mains powered - Easy one-button operation - Bidirectional measuring - Modbus communication - Robust poyamide enclosure</td>
<td>4/193</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>The main application for SONO 3300 ultrasonic flowmeters is to measure the volume flow of: - Water and treated waste water - Oil and liquefied gases - Hot water/cooling systems</td>
<td>SONO 3300/FUS060 - ATEX approved - DN 50 … DN 300 (2” … 12”) steel pipes - 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 transducer are highly protected from aggressive environment by stainless steel pipes</td>
<td>4/199</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>The main application for SONO 3100 ultrasonic flowmeters is to measure the volume flow of: - Water and treated waste water - Oil and liquefied gases - Liquid cryogenic application - District heating systems</td>
<td>SONO 3100/FUS060 - DN 100 … DN 1200 (4” … 48”) - Pipe in carbon or stainless steel - Transducers can be replaced under pressure - FUS060 transmitter for separate mounting - ATEX-approved - Measure of all liquids less than 350 Cst, conductive or non-conductive - No pressure drop - 4-track on request - Special material on request</td>
<td>4/204</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>Installation of one, two or four transducer sets in existing concrete or steel pipes.</td>
<td>SONOKIT - FUS060 or FUS080 transmitter for separate mounting - DN 100 … DN 4000 (4” … 160”) - Control and display unit - Temperature of medium: -20 … +200 °C (-4 … +395 °F) - Installation on empty pipes or pipes under pressure (hot-tap installation)</td>
<td>4/212</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>Application</td>
<td>Description</td>
<td>Catalog page</td>
<td>Software for parameterization</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>--------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td><strong>Battery or mains-powered ultrasonic flowmeter for use within water-based district heating, cooling systems and utility.</strong> The FUS380 can also be used for water irrigation systems. SITRANS FUS380/FUE380 are designed to work with the SITRANS FUE950 energy calculator</td>
<td>FUS380/FUE380 • FUS380/FUE380: DN 50 ... DN 1200 (2&quot; ... 48&quot;) • FUE380: Approved for custody transfer according to EN 1434 Class 2, OIML R 75 and MID • 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</td>
<td>4/223, 4/229</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>Universal thermal energy calculator for district heating and cooling applications.</td>
<td>SITRANS FUE950 • Battery or mains powered • 24 months memory • Up to 2 slots for plug-in modules as data output, extra input, M-Bus, RS 232 • Complete set with temperature sensors and pockets • Meets the requirements of EN 1434</td>
<td>4/239</td>
<td></td>
</tr>
<tr>
<td><strong>Battery-operated ultrasonic retrofit flowmeter for water applications within irrigation. Installation of one or two transducer sets in existing PVC or concrete pipes.</strong></td>
<td>SITRANS FUS880 • MID custody transfer approval • Irrigation flowmeter FUS880 • Battery or mains-powered • DN 200 ... DN 1200 (8&quot; ... 48&quot;) • Wetted transducer technology • Remote installation IP67</td>
<td>4/249</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td><strong>Accessories and spare parts for older flowmeter systems type SITRANS F US SONOFLO</strong></td>
<td>Spare parts for sensors and transmitters of older flowmeter type SONOFLO: E.g. transducer type SONO 3200, coaxial cables, SONO 3000 transmitter spare parts, SENSORPROM</td>
<td>4/254</td>
<td></td>
</tr>
</tbody>
</table>

**SITRANS F US ultrasonic clamp-on flowmeters**

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The thickness gauge can be used in any field application where there is a need for flow measurement. Including but not limited to:</strong> • Water and waste water • Energy measurement • Oil and gas industries</td>
<td><strong>Thickness gauge</strong> The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipes. • Materials include steel, aluminium, titanium, plastics and ceramics • Measurements shown in millimeter or inches • Simple-to-read 4-digit LCD display • Weighs 150 g (5.3 oz) • Battery operation for 250 h</td>
<td>4/257</td>
</tr>
<tr>
<td><strong>Dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the:</strong> • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Processing Industry</td>
<td>SITRANS FUS1010 General purpose • Basic function dedicated meter • 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</td>
<td>4/269</td>
</tr>
</tbody>
</table>
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

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 performance 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

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

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
### Product overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated hydrocarbon flowmeters are ideal for crude oil, refined petroleum or liquefied gas. There are three application areas:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity compensated volumetric flowmeters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard volume (Net) mass flowmeters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface detectors/density meters</td>
<td>SITRANS FUH1010 Oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volumetric flowmeters output viscosity compensated gross volume to external RTU's or flow computers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass flowmeters output standard volume (net) mass flow, API, liquid identification, density, interface &amp; pig detection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface Detectors are used for liquid identification and API density output, but do not output flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous area approvals: FM, CSA, ATEX</td>
<td>4/293</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 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 barg (145 psig)  |
| Standard volume or mass flow output for fixed gas compositions  |
| Analog input for pressure and temperature compensation  |
| Hazardous area approvals: FM, CSA, ATEX | 4/300 |

| Dedicated flowmeter is a basic option for many clean liquid applications in the:  |
| Water Industry |
| Wastewater Industry |
| HVAC & Power Industries |
| Processing Industry | SITRANS FUS1020 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 locations approvals: UL, C-UL, CE | 4/307 |

### Continuous measurement - Open channel flow

<table>
<thead>
<tr>
<th>High accuracy ultrasonic flow monitor for open channels to complete system studies</th>
<th>OCM III</th>
</tr>
</thead>
<tbody>
<tr>
<td>High accuracy on unique or non-standard weirs and flumes</td>
<td></td>
</tr>
<tr>
<td>AC and DC operation.</td>
<td></td>
</tr>
<tr>
<td>Automatically switches to battery operation for uninterrupted power.</td>
<td></td>
</tr>
<tr>
<td>Low-power remote monitoring</td>
<td>4/319</td>
</tr>
</tbody>
</table>

### Application

| 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 | 4/322 |
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

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Electromagnetic</th>
<th>Coriolis</th>
<th>Ultrasonic (In-line)</th>
<th>Ultrasonic (clamp-on)</th>
<th>Vortex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Liquid (conductive)</td>
<td>Liquid or gas</td>
<td>Liquid</td>
<td>Liquid or gas</td>
<td>Steam/vapor, gases, liquid</td>
</tr>
<tr>
<td>Nominal diameter</td>
<td>DN 2 … 2000 (0.08” … 78”)</td>
<td>1.5 … 150 mm (0.06” … 6”)</td>
<td>DN 50 … 4000 (2” … 160”) optional down to DN 15 (¼”)</td>
<td>6.4 mm … 9.14 m (0.25”…360”)</td>
<td>DN 15 … 300 (⅜” … 12”)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>°C (°F)</td>
<td>-40 … +200 (-40 … +392)</td>
<td>-50 … +180 (-58 … +356)</td>
<td>-200 … +250 (-328 … +482)</td>
<td>-40 … +120 (-40 … +250)</td>
</tr>
<tr>
<td>Max. pressure</td>
<td>bar (psi)</td>
<td>160 (2 320), optional higher</td>
<td>Up to 410 (Up to 5 950)</td>
<td>40 (580) optionally 430 (6 235)</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Accuracy</td>
<td>%</td>
<td>± 0.2 or ± 0.4</td>
<td>± 0.1 or ± 0.15</td>
<td>± 0.5 … ± 2</td>
<td>0.5 … 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>%</td>
<td>0.1/0.2</td>
<td>0.05</td>
<td>0.25</td>
<td>0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s)</td>
</tr>
<tr>
<td>Dynamic response range</td>
<td>1:100</td>
<td>1:100</td>
<td>1:100</td>
<td>1:100</td>
<td>1:25</td>
</tr>
<tr>
<td>Start-of-scale value</td>
<td>m/s (ft/s)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0.1 (0.33)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Full-scale value</td>
<td>± 36/120</td>
<td>10 (32.8)</td>
<td>10 (32.8)</td>
<td>± 12/40</td>
<td>10 (32.8)</td>
</tr>
<tr>
<td>Measured values</td>
<td>• Volume flow</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Sound velocity</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Sound amplitude</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Density</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Mass flow</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Bidirectional measurement</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Use</td>
<td>• For custody transfer</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• As batching system</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• In viscosity range</td>
<td>mPa⋅s (cp)</td>
<td>0.1 … 100 000 (0.1 … 100 000)</td>
<td>0 … 100 000 (0 … 100 000)</td>
<td>0 … 350 (0 … 350)</td>
</tr>
<tr>
<td>Power supply</td>
<td>Mains or battery</td>
<td>Mains</td>
<td>Mains or battery</td>
<td>90…240 V AC, 50…60 Hz, 15 VA or 9…36 V DC, 10 W</td>
<td>2-wire</td>
</tr>
</tbody>
</table>
# SITRANS F flowmeters

## Introduction

### Communication solutions

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>HART</th>
<th>PROFIBUS PA</th>
<th>PROFIBUS DP</th>
<th>FOUNDATION Fieldbus H1</th>
<th>DeviceNet</th>
<th>Modbus RTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F M MAG 5000</td>
<td>1) 2) 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 6000</td>
<td>1) 2) 4) 5)</td>
<td>1) 5) 6) 7)</td>
<td>1) 5) 6) 7)</td>
<td>2) 4) 5)</td>
<td>5)</td>
<td>1) 5) 10)</td>
</tr>
<tr>
<td>SITRANS F M MAG 8000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 5000/6000 CT&lt;sup&gt;8)&lt;/sup&gt;</td>
<td>1) 2) 4) 5)</td>
<td>1) 5) 6) 7)</td>
<td>1) 5) 6) 7)</td>
<td>2) 4) 5)</td>
<td>5)</td>
<td>1) 5) 10)</td>
</tr>
<tr>
<td>SITRANS F M MAG 6000 I</td>
<td>1) 2) 4) 5)</td>
<td>1) 5) 6) 7)</td>
<td>1) 5) 6) 7)</td>
<td>2) 4) 5)</td>
<td>5)</td>
<td>1) 5) 10)</td>
</tr>
<tr>
<td>SITRANS F M MAG 6000 I Ex d</td>
<td>1) 2) 4) 5)</td>
<td>1) 5) 6) 7)</td>
<td>1) 5) 6) 7)</td>
<td>2) 4) 5)</td>
<td>5)</td>
<td>1) 5) 10)</td>
</tr>
<tr>
<td>SITRANS F M Transmag 2</td>
<td>1) 4)</td>
<td>1) 6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 8000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **1)** 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.
<sup>9)</sup> All wall mount models
<sup>10)</sup> RS485
<sup>11)</sup> IrDA (Infrared)
<sup>12)</sup> Connected to ET200M PROFIBUS interface
**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.

- **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 R49 water meter standards and has the MCERTS certificate.

- **High-powered flowmeters** are used for difficult applications where other flowmeters can’t stand up to the task. This flowmeter can handle liquids and heavy slurries in industries such as mining, cement and pulp & paper.
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 flowmeter 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 of 5 μS/cm. 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 and 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.
Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-selector.automation.siemens.com

<table>
<thead>
<tr>
<th>Industry</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/MAG 8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water / waste water</td>
<td></td>
<td>X</td>
<td>XXX</td>
<td>X</td>
<td>XXX</td>
<td>XXX</td>
<td>XX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td>XXX</td>
<td>XXX</td>
<td>X</td>
<td>X</td>
<td>XXX</td>
<td>XX</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>X</td>
<td>X</td>
<td>XX</td>
<td>XXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food &amp; beverage</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>XXX</td>
<td>X</td>
<td>X</td>
<td>XXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mining, aggregates &amp; cement</td>
<td>XXX</td>
<td>X</td>
<td>X</td>
<td>XX</td>
<td>XXX</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>X</td>
<td>XX</td>
<td>XX</td>
<td>XXX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Design                            |         |            |            |            |          |             |             |       |                     |
| 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 (5")                       | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 20 (3/4")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 25 (1")                       | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 32 (1/2")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 40 (1½")                      | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 50 (2")                       | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 63 (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 500 (18")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 630 (2½")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 800 (3")                      | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 1000 (4")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 1250 (5")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 1500 (6")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 1600 (6½")                    | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 1800 (7½")                    | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |
| DN 2000 (8")                     | ●       | ●          | ●          | ●          | ●        | ●           | ●          | ●     |                     |

● = available, X = can be used, XX = often used, XXX = most often used
### Process connection

<table>
<thead>
<tr>
<th>Wafer design</th>
<th>Sanitary process connections</th>
<th>Flanges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>●</td>
</tr>
</tbody>
</table>

### Flange norms

<table>
<thead>
<tr>
<th>Norm</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/MAG 8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1092-1</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>ANSI B 16.5 class 150</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>ANSI B 16.5 class 300</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>AWWA class D</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>AS 2129</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>AS 4087, PN 16</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>AS 4087, PN 21</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>AS 4087, PN 35</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>JIS 10K</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>JIS 20K</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Pressure rating

<table>
<thead>
<tr>
<th>Rating</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/MAG 8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 6</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PN 10</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PN 16</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PN 25</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PN 40</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PN 63</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PN 100</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Accuracy

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/MAG 8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2%</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>0.4%</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>0.5%</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Grounding electrodes, incl. 2)

<table>
<thead>
<tr>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/MAG 8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Cable glands

<table>
<thead>
<tr>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/MAG 8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

= available

1) Pressure may be limited by the liner material chosen

2) Not for PTFE and FFA liner and tantalum/platinum electrodes and PN 100.

3) On request
### Materials / Temperature:

<table>
<thead>
<tr>
<th>Liner Material / Max. Temperatures</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR Hard Rubber: 70 °C (158 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>EPDM: 70 °C (158 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Neoprene: 70 °C (158 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PTFE: 100 °C (212 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PTFE: 130 °C (266 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PTFE: 180 °C (356 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ebonite Hard Rubber: 95 °C (203 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Linatex: 70 °C (158 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ceramic: 150 °C (302 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ceramic: 200 °C (392 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PFA: 100 °C (212 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PFA: 150 °C (302 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Novolak: 130 °C (266 °F)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Electrodes:

<table>
<thead>
<tr>
<th>Electrodes</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/S AISI 316 Ti</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Platinum</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Titanium</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Tantalum</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Flange/housing material:

<table>
<thead>
<tr>
<th>Carbon Steel</th>
<th>MAG 3100</th>
<th>MAG 3100 HT</th>
<th>MAG 3100 P</th>
<th>MAG 5100 W</th>
<th>MAG 1100</th>
<th>MAG 1100 HT</th>
<th>MAG 1100 F</th>
<th>911/E</th>
<th>MAG 8000/8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel / Carbon Steel</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Polished Stainless Steel</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

● = Available

4) 150 °C (302 °F)
5) ATEX: 180 °C (356 °F)
7) 70 °C (158 °F)
## Approvals (Order as specials except for MAG 8000 CT version):

<table>
<thead>
<tr>
<th>Custody transfer</th>
<th>Cold water - MI 001 (EU)</th>
<th>Cold water - DANAK TS 22.36.001</th>
<th>Cold water pattern approval - OIML R 49 (Denmark)</th>
<th>Cold water pattern approval PTB (Germany)</th>
<th>Heat meter pattern approval - OIML R 75 (Denmark)</th>
<th>Hot water pattern approval - PTB (Germany)</th>
<th>Other media than water pattern approval - OIML R 117 (Denmark)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAG 3100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 3100 HT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 3100 P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 5100 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 1100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 1100 HT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 1100 P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6510</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6520</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6580</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME65110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME65120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6140</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6510</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6610</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7ME6620</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hazardous areas

- ATEX - 2 GD Zone 1
- FM Class 1, Zone 1
- CSA Class 1, Zone 1
- IEC Ex Zone 1
- FM - class 1, div 2 / Zone 2
- CSA - class 1, div 2 / Zone 2

### Hygienic

- EHEDG
- 3A

### Drinking water

- WRAS (WRc) - (UK)
- ANSI / NSF 61 (US)
- ACS (FR) EPDM liner
- Belgaqua (B) EPDM liner
- DVGW-W270 (D) EPDM liner
- Mcert (UK environmental)

### Other

- GOSS / GOST (Russia )
- CRN (Canada)
- Other national approvals, see internet

### Verificator compatible

- = available

1) Only PFA liner.
2) Only for MAG 5000 and MAG 6000 transmitters.
3) Only DN 50 ... 300/2" ... 12".
4) EPDM liner
5) Only EPDM with Hastelloy electrodes
6) Pending
7) EPDM or PTFE liner with AISI 316 or Hastelloy electrodes.

---

Please see Product selector on the Internet, because some constrains might be related to some of the features: [www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)
Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-selector.automation.siemens.com

<table>
<thead>
<tr>
<th>Industry</th>
<th>MAG 5000</th>
<th>MAG 6000</th>
<th>MAG 6000 I</th>
<th>MAG 6000 +</th>
<th>MAG 8000/8000 CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water/waste water</td>
<td>XXX</td>
<td>XXX</td>
<td>XX</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chemical</td>
<td>X</td>
<td>XX</td>
<td>XX</td>
<td>XXX</td>
<td>X</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>X</td>
<td>XXX</td>
<td>XX</td>
<td>XXX</td>
<td>X</td>
</tr>
<tr>
<td>Food &amp; beverage</td>
<td>XX</td>
<td>XXX</td>
<td>XX</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td>Mining, aggregates &amp; cement</td>
<td>XXX</td>
<td>X</td>
<td>XX</td>
<td>X</td>
<td>XXX</td>
</tr>
<tr>
<td>HPI</td>
<td>X</td>
<td>X</td>
<td>XX</td>
<td>XX</td>
<td>X</td>
</tr>
<tr>
<td>Other</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

| Design                    | ●        | ●        | ●          | ●          | ●                |
|                          | ●        | ●        | ●          | ●          | ●                |
|                          | ●        | ●        | ●          | ●          | ●                |
|                          | ●        | ●        | ●          | ●          | ●                |
|                          | ●        | ●        | ●          | ●          | ●                |

| Enclosure transmitter     | Polyamide, IP67 | ●        | ●          | ●          | ●                |
|                          | Die-cast aluminium | ●        | ●          | ●          | ●                |
|                          | Stainless steel   | ●        | ●          | ●          | ●                |
|                          | 19" rack           | ●        | ●          | ●          | ●                |
|                          | Back of panel      | ●        | ●          | ●          | ●                |
|                          | Panel mounting     | ●        | ●          | ●          | ●                |
|                          | IP67 wall mounting | ●        | ●          | ●          | ●                |

| Accuracy                  | 0.2%      | ●        | ●          | ●          | ●                |
|                          | 0.4%      | ●        | ●          | ●          | ●                |
|                          | 0.5%      | ●        | ●          | ●          | ●                |

| Communication             | HART      | ●        | ●          | ●          | ●                |
|                          | PROFIBUS PA | ●        | ●          | ●          | ●                |
|                          | PROFIBUS DP | ●        | ●          | ●          | ●                |
|                          | FOUNDATION Fieldbus H1 | ●        | ●          | ●          | ●                |
|                          | DeviceNet  | ●        | ●          | ●          | ●                |
|                          | MODBUS RTU/RS 485 | ●        | ●          | ●          | ●                |
|                          | Encoder interface module (Sensus protocol) for Itron 200WP radio | ●        | ●          | ●          | ●                |

| Batching                 | ●        | ●        | ●          | ●          | ●                |

| Cable glands             | M20       | ●        | ●          | 3)         | ●                |
|                          | ½" NPT    | ●        | ●          | ●          | ●                |

● = available, X = can be used, XX = often used, XXX = most often used
1) IP68 enclosure
2) Modbus RTU also as serial RS232
3) M25
For more national approvals please check our internet page  
Practical examples of ordering

SITRANS F M compact installation

<table>
<thead>
<tr>
<th>Sensor</th>
<th>7ME6310-3TC11-1JA1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe size</td>
<td>DN 100</td>
</tr>
<tr>
<td>Liner</td>
<td>Neoprene</td>
</tr>
<tr>
<td>Electrodes</td>
<td>SS 316</td>
</tr>
<tr>
<td>Flanges</td>
<td>EN 1092-1, PN 16</td>
</tr>
<tr>
<td>Transmitter</td>
<td>MAG 6000, Polyamide, 115 ... 230 V AC</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.2 % ± 1 mm/s</td>
</tr>
<tr>
<td>Supply</td>
<td>230 V AC</td>
</tr>
</tbody>
</table>

Example

MAG 6000 transmitter + MAG 3100 sensor = MAG 6000 compact mounted on a MAG 3100 sensor

Note:
MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer’s place.

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering

SITRANS F M remote installation

<table>
<thead>
<tr>
<th>Sensor</th>
<th>7MES310-3TC11-1AA1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe size</td>
<td>DN 100</td>
</tr>
<tr>
<td>Liner</td>
<td>Neoprene</td>
</tr>
<tr>
<td>Electrodes</td>
<td>SS 316</td>
</tr>
<tr>
<td>Flanges</td>
<td>EN 1092-1, PN 16</td>
</tr>
<tr>
<td>Transmitter</td>
<td>7ME6920-1AA10-0AA0</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.2 % ± 1 mm/s</td>
</tr>
<tr>
<td>Supply</td>
<td>230 V AC</td>
</tr>
</tbody>
</table>

Wall mounting kit: FDK-085U1018
Cable kit with sensor cable and electrode cable: A5E01181647
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 with 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 \( v \) 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).
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 “crosstalk” 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.

### Certificate Details

**Description**

- SITRANS F M Verificator
  - 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 50 Hz
  - 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 60 Hz

**Note:**

It is mandatory to have the Verificator return to the factory once a year for check and re-verification.
**Technical specifications**

**Flowmeter Calibration and traceability**

To ensure continuous accurate measurement, flowmeters must be calibrated. All measuring instrumentation, used in the calibration of the flowmeters, has either been calibrated by a UKAS or DANAK accredited laboratory or has been calibrated against certified master sensors. This provides an unbroken chain of measurement-traceability to national standards.

Siemens Flow Instruments can provide accredited calibration in the flow range from 0.0001 m³/h to 4350 m³/h.

**Flowmeter uncertainty**

The accreditation bodies DANAK and UKAS have 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 world wide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit.
### Reference conditions

**Reference conditions (ISO 9104 and DIN EN 29104)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature medium</td>
<td>20 °C ± 5 K (68 °F ± 9 °F)</td>
</tr>
<tr>
<td>Temperature ambient</td>
<td>20 °C ± 5 K (68 °F ± 9 °F)</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>$U_n \pm 1%$</td>
</tr>
<tr>
<td>Warming-up time</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Incorporation in conductive pipe section</td>
<td></td>
</tr>
<tr>
<td>• Inlet section</td>
<td>$10 \times \text{DN (DN } \leq 1200/48&quot;)$</td>
</tr>
<tr>
<td></td>
<td>$5 \times \text{DN (DN } &gt; 1200/48&quot;)$</td>
</tr>
<tr>
<td>• Outlet section</td>
<td>$5 \times \text{DN (DN } \leq 1200/48&quot;)$</td>
</tr>
<tr>
<td></td>
<td>$3 \times \text{DN (DN } &gt; 1200/48&quot;)$</td>
</tr>
<tr>
<td>Flow conditions</td>
<td>Fully developed flow profile</td>
</tr>
</tbody>
</table>

### Additions in the event of deviations from reference conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td>As pulse output ($\pm 0.1%$ of actual flow + 0.05% FSO)</td>
</tr>
<tr>
<td>Effect of ambient temperature</td>
<td>$&lt; 0.003%/\text{K act.}$</td>
</tr>
<tr>
<td>• Display / frequency / pulse output</td>
<td>$&lt; 0.005%/\text{K act.}$</td>
</tr>
<tr>
<td>Effect of supply voltage</td>
<td>$&lt; 0.005%$ of measuring value on 1% change</td>
</tr>
<tr>
<td>Repeatability</td>
<td>$\pm 0.1%$ of actual flow for $v \geq 0.5 \text{ m/s (1.5 ft/s)}$ and conductivity $&gt; 10 \mu\text{S/cm}$</td>
</tr>
</tbody>
</table>

### Certificates

- **EN 10204 2.1**  Certificate of conformity, stating that the delivered parts are made of the material quality that was ordered
- **EN 10204 2.2**  Test report certificate, a non batch specific material analysis of the ordered material
- **EN 10204 3.1**  Material analysis certificate, a batch specific analysis of the material issued by an independent inspector
### 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
- **Applicable standard**: EN 50170 vol. 2
- **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 Ω at frequencies from 3 ... 20 MHz
- **Cable capacity**: < 30 pF per meter
- **Core diameter**: > 0.34 mm², corresponds to AWG 22
- **Resistance**: < 110 Ω 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
- **Applicable standard**: 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_B]**: 14 mA
- **Fault current [I_FDE]**: 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 mm² (AWG 18)
- **Loop resistance**: 44 Ω/km
- **Impedance**: 100 Ω ± 20%
- **Wave attenuation at 39 kHz**: 3 dB/km
- **Capacitive asymmetry**: 2 nF/km
- **Bus termination**: Passive line termination at both
- **Max. bus length**: Up to 1.9 km. Extendable by repeaters

### 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:

<table>
<thead>
<tr>
<th>Input (Master view)</th>
<th>Parameter</th>
<th>MAG 6000/MAG 6000 I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Volume flow</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraction A&lt;sup&gt;1&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Fraction B&lt;sup&gt;1&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Pct Fraction A&lt;sup&gt;1&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Totalizer 1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Totalizer 2&lt;sup&gt;2&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch progress&lt;sup&gt;2&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch setpoint</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch compensation</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch status</td>
<td></td>
<td>(running ...)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output (Master view)</th>
<th>Set Totalizer 1+2</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Mode Totalizer 1+2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch control</td>
<td>(start, stop ...)</td>
<td>✓</td>
</tr>
<tr>
<td>Batch setpoint</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch compensation</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Requires a SENSORPROM containing valid fraction data.
<sup>2</sup> Value returned is dependent on the BATCH function. When ON, Batch progress is returned. When OFF, TOTALIZER 2 is returned.

### IS (Intrinsic Safety) data
- **Required sensor electronics**: Compact or remote mounted SITRANS F M MAG 6000 I Ex d
- **FISCO**
  - Max. U_I: 17.5 V
  - Max. I_I: 380 mA
  - Max. P_I: 5.32 V
  - Max. L_I: 0 μH
  - Max. C_I: 0 nF

### FISCO cable requirements
- **Loop resistance R_C**: 15 ... 150 Ω/km
- **Loop inductance L_C**: 0.4 ... 1 mH/km
- **Capacitance C_C**: 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
Selection of sensor

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 m³/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

- \( v = 1273.24 \cdot \frac{Q}{DN^2} \) or \( v : [\text{m/s}] \), \( Q : [\text{l/s}] \), \( DN : [\text{mm}] \)
- \( v = 353.68 \cdot \frac{Q}{DN^2} \) or \( v : [\text{m/s}] \), \( Q : [\text{m}^3/\text{h}] \), \( DN : [\text{mm}] \)

Link to "Sizing program":
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**

\[
 v = 0.408 \cdot \frac{Q}{\text{(Pipe I.D.)}^2} \quad \text{or} \quad v = 283.67 \cdot \frac{Q}{\text{(Pipe I.D.)}^2}
\]

Units: \(v: \text{[ft/s]}, \quad Q: \text{[GPM]}, \quad \text{Pipe I.D.: [inch]}

\(v: \text{[ft/s]}, \quad Q: \text{[MGD]}, \quad \text{Pipe I.D.: [inch]}

Link to "Sizing program":
**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

- Install in vertical pipes with upward flow direction
  - Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.

- Install in U-tubes when pipe is partially filled

- Install 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.

- Do not install in pipelines which can run empty
Measuring abrasive liquids and liquids containing particles
Recommended installation is in a vertical/inclined pipe to minimize the wear and deposits in the sensor.

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)
- Built-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 and PFA), MAG 5100 W: with earthing electrodes in conductive and non-conductive pipes (no further action necessary)

MAG 1100, MAG 3100 (PTFE and PFA): without earthing electrodes in conductive pipes (MAG 1100 use graphite gasket)
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 vacuum 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° 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") (d1/d2 = 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.
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)

<table>
<thead>
<tr>
<th>Conductivity of medium $[\mu \text{S/cm}]$</th>
<th>Cabel length $[\text{m}]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5$</td>
<td>$5$</td>
</tr>
<tr>
<td>$10$</td>
<td>$100$</td>
</tr>
<tr>
<td>$20$</td>
<td>$200$</td>
</tr>
<tr>
<td>$50$</td>
<td>$300$</td>
</tr>
</tbody>
</table>

Minimum conductivity of medium (using special electrode cable)

<table>
<thead>
<tr>
<th>Conductivity of medium $[\mu \text{S/cm}]$</th>
<th>Cable length $[\text{m}]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5$</td>
<td>$50$</td>
</tr>
<tr>
<td>$10$</td>
<td>$100$</td>
</tr>
<tr>
<td>$20$</td>
<td>$200$</td>
</tr>
<tr>
<td>$50$</td>
<td>$300$</td>
</tr>
</tbody>
</table>

Note
For detection of empty sensor the minimum sensor conductivity must always be $\geq 20 \, \mu \text{S/cm}$ and the maximum length of electrode cable when remotely mounted is 50 m (150 ft). Special shield cable must be used.

For DN 2, DN 3 or for remote mounting in Ex applications special cable cannot be used, empty sensor cannot be detected and the conductivity must be $\geq 30 \, \mu \text{S/cm}$. For remote mounted CT installations the maximum cable length is 200 m (600 ft).
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 \(\pm 0.4 \% \pm 1 \text{ mm/s (incl. sensor)}\)
  - MAG 6000: Max. measuring error \(\pm 0.2 \% \pm 1 \text{ mm/s (incl. sensor, see also sensor specifications)}\) and with additional features such as: "plug & play" insert 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
- Custody transfer approval: PTB, OIML R 75, OIML R 117, OIML R 49 and MI-001,
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, MODBUS RTU/RS485, 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 & 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” 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
Technical 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 x 10^14 Ω

Input

Digital input
11 ... 30 V DC, R_1 = 4.4 kΩ
• Activation time
50 ms
• Current
I_{11 V DC} = 2.5 mA, I_{30 V DC} = 7 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 (unidirectional)

Pulse (active)
DC 24 V, 30 mA, 1 kΩ ≤ R ≤ 10 kΩ, short-circuit-protected (power supplied from flowmeter)

Pulse (passive)
DC 3 ... 30 V, max. 110 mA, 200 Ω ≤ R ≤ 10 kΩ (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 galvanically isolated

Max. measuring error (incl. sensor 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:
-20 ... +60 °C (-4 ... +140 °F)
Blind version:
-20 ... +60 °C (-4 ... +140 °F)

• Storage
-40 ... +70 °C (-40 ... +158 °F)

Mechanical load

Compact version
18 ... 1000 Hz, 3,17 g rms, sinusoidal in all directions to IEC 68-2-36

19” insert
1 ... 800 Hz, 1 g, sinusoidal in all directions to IEC 68-2-36

Degree of protection

Compact version
IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH2O 30 min.)
IP20/NEMA 1 to IEC 529 and DIN 40050

Design

Enclosure material
Fiber glass reinforced polyamide; optional (IP67 only):
AISI 316 stainless steel

19” insert
Standard 19” insert of aluminum/steel (DIN 41494), width: 21 TE, height: 3 HE

Back of panel
IP20/NEMA 1; Aluminum

Panel mounting
IP20/NEMA 1 (prepared for IP65/NEMA 2 display side); ABS plastic

Wall mounting
IP66/NEMA 4X; ABS plastic

Dimensional drawings

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
• 11 ... 24 V AC: 17 VA
• 11 ... 24 V AC: 9 VA, I_{ST} = 380 mA, I_{ST} = 8 A (30 ms)
• 12 V DC: 11 W, I_{ST} = 920 mA, I_{ST} = 4 A (250 ms)

Power consumption

• 115 ... 230 V AC: 17 VA
• 24 V AC: 9 VA, I_{ST} = 380 mA, I_{ST} = 8 A (30 ms)

Certificates and approvals

Custody transfer approval (MAG 5000/6000 CT)
Cold water: MI-001, PTB/OIML R 49 (pattern approval DE/DK)
Hot water: PTB and DANAK OIML R 75 (pattern approval DE/DK) (MAG 6000 CT)
Other media than water (milk, beer etc.): PTB and DANAK OIML R 117 (pattern approval DE/DK) (MAG 6000 CT)

Communication

Standard
• MAG 5000
• MAG 6000

Without serial communication or HART as option
Prepared for client mounted add-on modules

Optional (MAG 6000 only)
HART, MODBUS RTU/RS485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP as add-on modules

• MAG 5000/6000 CT
No communication modules approved
Safety barrier (e/ia)

<table>
<thead>
<tr>
<th>Application</th>
<th>For use with MAG 5000/6000 19&quot; and MAG 1100 Ex ATEX/MAG 3100 Ex ATEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex approval</td>
<td>MAG 1100 Ex [EEx e ia] IIB ATEX</td>
</tr>
<tr>
<td></td>
<td>MAG 3100 Ex [EEx e ia] IIC ATEX</td>
</tr>
<tr>
<td>Cable parameter</td>
<td>• Electrode</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IIC</td>
</tr>
<tr>
<td></td>
<td>IIB</td>
</tr>
<tr>
<td></td>
<td>IIA</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>• During operation</td>
</tr>
<tr>
<td></td>
<td>• During storage</td>
</tr>
<tr>
<td>Enclosure</td>
<td>• Material</td>
</tr>
<tr>
<td></td>
<td>• Width</td>
</tr>
<tr>
<td></td>
<td>• Height</td>
</tr>
<tr>
<td></td>
<td>• Rating</td>
</tr>
<tr>
<td></td>
<td>• Mechanical load</td>
</tr>
<tr>
<td>EMC performance</td>
<td>• Emission</td>
</tr>
<tr>
<td></td>
<td>• Immunity</td>
</tr>
</tbody>
</table>

Electrode cleaning unit for MAG 5000 or 6000 in 19" insert version

The purpose of electrode cleaning is to remove unwanted deposits on the electrodes in water applications by applying either a DC or AC voltage to the electrodes. AC cleaning is used in waste water applications to remove fatty deposits on the electrodes by warming up the electrode. DC cleaning is used in district heating applications to eliminate electrically conductive deposits.

Application for use with transmitters MAG 5000 and 6000 19" to clean the electrodes on sensors MAG 1100 or MAG 3100

• Must not be used with intrinsically safe ATEX sensors
• Not to be used with sensors with Hastelloy and Tantalum electrodes

Available on request
## Selection and Ordering Data

### Transmitter MAG 5000

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter MAG 5000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide</td>
<td>7ME6910-1AA30-0AA0</td>
</tr>
<tr>
<td>Transmitter MAG 5000 Display for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide</td>
<td>7ME6910-1AA30-1AA0</td>
</tr>
<tr>
<td>Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer; IP67/NEMA 4X/6, fibre glass reinforced polyamide</td>
<td>7ME6910-1AA30-1AB0</td>
</tr>
<tr>
<td>Transmitter MAG 5000 for 19&quot; rack and wall mounting</td>
<td>7ME6910-2CA30-1AA0</td>
</tr>
</tbody>
</table>

### Transmitter MAG 6000

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter MAG 6000 Blind for compact and wall mounting, IP67/NEMA 4X/6, fibre glass reinforced polyamide</td>
<td>7ME6920-1AA30-0AA0</td>
</tr>
<tr>
<td>Transmitter MAG 6000 for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide</td>
<td>7ME6920-1AA30-1AA0</td>
</tr>
<tr>
<td>Transmitter MAG 6000 for compact and wall mounting; IP67/NEMA 4X/6, AISI 316 stainless steel (only for sensor with SS terminal box)</td>
<td>7ME6920-1QA30-0AA0</td>
</tr>
<tr>
<td>Transmitter MAG 6000 SV, 19&quot; insert, in IP66/NEMA 4X, ABS plastic enclosure, excitation frequency 44 Hz for Batch application DN ≤ 25/1&quot;</td>
<td>7ME6920-2EB30-1AA0</td>
</tr>
</tbody>
</table>

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.

---

© Siemens AG 2010
Communication modules for MAG 6000

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART (not for MAG 6000 I)</td>
<td>FDK-085U0226</td>
</tr>
<tr>
<td>MODBUS RTU/RS485</td>
<td>FDK-085U0234</td>
</tr>
<tr>
<td>PROFINET PA Profile 3</td>
<td>FDK-085U0236</td>
</tr>
<tr>
<td>PROFINET DP Profile 3</td>
<td>FDK-085U0237</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>FDK-085U0229</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>A5E02054250</td>
</tr>
</tbody>
</table>

Accessories for MAG 5000 and MAG 6000

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall mounting unit for IP67/NEMA 4X/6 version, wall bracket, terminal box in polyamide</td>
<td>FDK-085U1018</td>
</tr>
<tr>
<td>• 4 x M20 cable glands</td>
<td>FDK-085U1053</td>
</tr>
<tr>
<td>• 4 x ½” NPT cable glands</td>
<td></td>
</tr>
<tr>
<td>Cable for standard electrode or coil, 3 x 1.5 mm² / 18 gage with shield PVC</td>
<td></td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>FDK-083F0121</td>
</tr>
<tr>
<td>• 20 m (65 ft)</td>
<td>FDK-083F0210</td>
</tr>
<tr>
<td>• 40 m (130 ft)</td>
<td>FDK-083F0211</td>
</tr>
<tr>
<td>• 60 m (200 ft)</td>
<td>FDK-083F0212</td>
</tr>
<tr>
<td>• 100 m (330 ft)</td>
<td>FDK-083F0213</td>
</tr>
<tr>
<td>• 150 m (500 ft)</td>
<td>FDK-083F0305</td>
</tr>
<tr>
<td>• 200 m (650 ft)</td>
<td>FDK-083F0305</td>
</tr>
<tr>
<td>• 500 m (1650 ft)</td>
<td>FDK-083F0305</td>
</tr>
<tr>
<td>Electrode cable for empty pipe or low conductivity, double shielded, 3 x 0.25 mm²</td>
<td></td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>FDK-083F3020(3)</td>
</tr>
<tr>
<td>• 20 m (65 ft)</td>
<td>FDK-083F3095(3)</td>
</tr>
<tr>
<td>• 40 m (130 ft)</td>
<td>FDK-083F3094(3)</td>
</tr>
<tr>
<td>• 60 m (200 ft)</td>
<td>FDK-083F3093(3)</td>
</tr>
<tr>
<td>• 100 m (330 ft)</td>
<td>FDK-083F3092(3)</td>
</tr>
<tr>
<td>• 150 m (500 ft)</td>
<td>FDK-083F3056(3)</td>
</tr>
<tr>
<td>• 200 m (650 ft)</td>
<td>FDK-083F3057(3)</td>
</tr>
<tr>
<td>• 500 m (1650 ft)</td>
<td>FDK-083F3058(3)</td>
</tr>
<tr>
<td>Low-noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm²</td>
<td></td>
</tr>
<tr>
<td>• 2 m (6.6 ft)</td>
<td>A5E02272692</td>
</tr>
<tr>
<td>• 5 m (16.5 ft)</td>
<td>A5E02272723</td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>A5E02272730</td>
</tr>
</tbody>
</table>

D) Subject to export regulations AL: N, ECCN: EAR99H.
F) Subject to export regulations AL: 9I9999, ECCN: N.

© Siemens AG 2010
### Transmitter MAG 5000/6000

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel mounting enclosure for 19&quot; insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting</td>
<td>FDK-083F5030</td>
</tr>
<tr>
<td>Panel mounting enclosure for 19&quot; insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting</td>
<td>FDK-083F5031</td>
</tr>
<tr>
<td>Back of panel mounting enclosure for 19&quot; insert (21 TE); IP20/NEMA 1 enclosure in aluminium</td>
<td>FDK-083F5032</td>
</tr>
<tr>
<td>Back of panel mounting enclosure for 19&quot; insert (42 TE); IP20/NEMA 1 enclosure in aluminium</td>
<td>FDK-083F5033</td>
</tr>
<tr>
<td>IP66/NEMA 4X, wall mounting enclosure for 19&quot; inserts (without backplates)</td>
<td></td>
</tr>
<tr>
<td>• 21 TE</td>
<td>FDK-083F5037</td>
</tr>
<tr>
<td>• 42 TE</td>
<td>FDK-083F5038</td>
</tr>
<tr>
<td>Front cover (7TE)</td>
<td>FDK-083F4525</td>
</tr>
</tbody>
</table>

#### Back plates (if wall enclosure IP66 is used as part)

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall unit enclosure IP66, 12 ... 24 V, 115 ... 230 V</td>
<td></td>
</tr>
<tr>
<td>• Transmitter</td>
<td>A5E02559813</td>
</tr>
<tr>
<td>• Transmitter ia/e and safety barrier</td>
<td>A5E02559814</td>
</tr>
<tr>
<td>• Transmitter ia/ib and safety barrier (only for sensors produced before October 2007)</td>
<td>A5E02559812</td>
</tr>
<tr>
<td>• Transmitter and cleaning unit</td>
<td>A5E02559815</td>
</tr>
</tbody>
</table>

#### Spare parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection plate (for polyamide terminalbox)</td>
<td></td>
</tr>
<tr>
<td>• 12 ... 24 V</td>
<td>A5E02559817</td>
</tr>
<tr>
<td>• 115 ... 230 V</td>
<td>A5E02559816</td>
</tr>
<tr>
<td>Connection plate (for stainless steel terminalbox)</td>
<td></td>
</tr>
<tr>
<td>• 12 ... 24 V</td>
<td>A5E02604280</td>
</tr>
<tr>
<td>• 115 ... 230 V</td>
<td>A5E02604272</td>
</tr>
</tbody>
</table>

### Sun Shields for MAG 5000/6000 transmitters

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun lid for MAG 5000/6000 transmitter (Frame and lid)</td>
<td>A5E02328485</td>
</tr>
<tr>
<td>Sun shield for remote MAG 5000/6000 transmitters</td>
<td>A5E01209496</td>
</tr>
<tr>
<td>Sun Shield for compact MAG 5000/6000 transmitters on MAG 3100 (DN 15 ... 2000 (⅛&quot; ... 78&quot;) or MAG 5100 (DN 150 ... 1200 (6&quot; ... 48&quot;))</td>
<td>A5E01209500</td>
</tr>
</tbody>
</table>
**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**

Dimensions in mm (inch)

Weight incl. back print 0.8 kg /1.8 lbs
Transmitter MAG 5000/6000

Transmitter, wall mounting IP66/NEMA 4X, 21 TE

Dimensions in mm (inch)

Weight excl. transmitter: 2.3 kg (5.0 lbs)

Transmitter, wall mounting IP66/NEMA 4X, 42 TE

Dimensions in mm (inch)

Weight excl. transmitter: 2.9 kg (7.0 lbs)
Transmitter, panel front IP20/NEMA 1, 21 TE

Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

Transmitter, panel front IP20/NEMA 1, 42 TE

Weight excl. transmitter: 1.6 kg (3.5 lbs)

Dimensions in mm (inch)
**Transmitter MAG 5000/6000**

*Transmitter, back of panel IP20/NEMA 1, 21 TE*

Dimensions in mm (inch)

![Dimensions Diagram](image1)

Weight: 0.7 kg (1.6 lbs)

*Transmitter, back of panel IP20/NEMA 1, 42 TE*

Dimensions in mm (inch)

![Dimensions Diagram](image2)

Weight: 0.9 kg (2.0 lbs)
**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 μF 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.

---

**Power supply**
Transmitter

![Power supply diagram]

**Outputs**

- **Current output (Powered from transmitter)**
  - 0/4 - 20 mA
  - Load ≤ 800 Ω

- **Passive output (External powered)**
  - Vx 3 ... 30 V
  - max. 110 mA

- **Digital output**
  - PLC-Digital input

- **Active output (Powered from transmitter)**
  - 24 V max. 30 mA
  - Counter or PLC-Digital input

**Relay output**

- Relay
  - 24 V DC/1A
  - 42 V AC/2A

**Digital input**

- 11 ... 30 V DC

**Sensor connection**

- Electrode cable
- Coil cable
- Shield

1) Note: Special cable with individual wire shields (shown as dotted lines) are only required when using empty pipe function or long cables.
Overview

The SITRANS F M MAG 6000 I/6000 I Ex d transmitter is designed for the demands in the process industry. The robust die cast aluminium 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 ATEX 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/RS485 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

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

Technical 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 x 10^{14} \Omega |

Input

| Digital input | DC 11 ... 30 V, Ri = 4.4 k\Omega |
| Activation time | 50 ms |
| Current | I_{11 \text{V DC}} = 2.5 mA, I_{30 \text{V DC}} = 7 mA |

Output

| Current output | Signal range 0 ... 20 mA or 4 ... 20 mA (active/passive) |
| Load | < 560 \Omega |
| 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 ... 30 V DC, max 110 mA (30 mA Ex version), 200 \Omega \leq R_{i} \leq 10 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

| Galvanic isolation | All inputs and outputs are galvanic isolated |

Max. measuring error

| MAG 6000 I/MAG 6000 I Ex d (incl. sensor) | \pm 0.2 \% \pm 1 mm/s |

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

The MAG 6000 I/6000 I Ex d 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 fulfill 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.
SITRANS F flowmeters  SITRANS F M

Transmitter MAG 6000 I/6000 I Ex d e

<table>
<thead>
<tr>
<th>Cable entries</th>
<th>Remote installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAG 6000 I</td>
<td>2 x M25 (for supply/output) and 2 x M16 (for sensor connection) or 2 x ½&quot; NPT (for supply/output) and 2 x M16 (for sensor connection)</td>
</tr>
<tr>
<td>MAG 6000 I Ex ATEX 2G D</td>
<td>2 x M20 (for supply/output) and 2 x M16 (for sensor connection)</td>
</tr>
</tbody>
</table>

Communication

Non ATEX versions

- HART, MODBUS RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP add-on modules

ATEX 2G D

- HART, PROFIBUS PA, FOUNDATION Fieldbus H1 available as integrated version

Selection and Ordering data

Order No. 7 ME 6 9 3 0 - 2 BA - 1 A

Supply voltage

- 115 ... 230 V AC, 50 ... 60 Hz; 18 ... 90 V DC
- ATEX 2G D, 18 ... 30 V DC
- ATEX 2G D, 115 ... 230 V AC, 50 ... 60 Hz

Ex approval

- None ATEX; FM/CSA class 1 div 2
- ATEX 2G D (For ATEX sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340)

Communication

- None (add-on modules can be ordered separately, see below)
- HART
- PROFIBUS PA Profile 3
- PROFIBUS DP Profile 3 (not ATEX version)
- MODBUS RTU/RS 485 (not ATEX version)
- FOUNDATION Fieldbus H1

Cable gland entries

- Metric
- ½" NPT
- Short lead time (details in PMD)

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

Further design

- Please add “-Z” to Order No. and specify Order code(s) and plain text.
- Tag name plate, stainless steel fixed with SS wire (add plain text)
- Tag name plate, plastic (self adhesive)
- Other, post-production requirements (add plain text)

Communication modules for MAG 6000 I (All standard outputs can still be used)

Description

- HART (only for MAG 6000 I/Ex)
- MODBUS RTU/RS485
- PROFIBUS PA Profile 3
- PROFIBUS DP Profile 3
- DeviceNet
- FOUNDATION Fieldbus H1

- Short lead time (details in PMD)

© Siemens AG 2010
### Accessories MAG 6000 I / MAG 6000 I Ex d e

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable for standard electrode or coil, 3 x 1.5 mm²/18 gage with shield PVC</td>
<td></td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>FDK-083F0121</td>
</tr>
<tr>
<td>• 20 m (65 ft)</td>
<td>FDK-083F0210</td>
</tr>
<tr>
<td>• 40 m (130 ft)</td>
<td>FDK-083F0211</td>
</tr>
<tr>
<td>• 60 m (200 ft)</td>
<td>FDK-083F0212</td>
</tr>
<tr>
<td>• 100 m (330 ft)</td>
<td>FDK-083F0213</td>
</tr>
<tr>
<td>• 150 m (500 ft)</td>
<td>FDK-083F3052</td>
</tr>
<tr>
<td>• 200 m (650 ft)</td>
<td>FDK-083F3053</td>
</tr>
<tr>
<td>• 500 m (1650 ft)</td>
<td>FDK-083F3054</td>
</tr>
<tr>
<td>Electrode cable for empty pipe or low conductivity, double shielded, 3 x 0.25 mm² (cannot be used for Ex applications)</td>
<td></td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>FDK-083F3020</td>
</tr>
<tr>
<td>• 20 m (65 ft)</td>
<td>FDK-083F3095</td>
</tr>
<tr>
<td>• 40 m (130 ft)</td>
<td>FDK-083F3094</td>
</tr>
<tr>
<td>• 60 m (200 ft)</td>
<td>FDK-083F3093</td>
</tr>
<tr>
<td>• 100 m (330 ft)</td>
<td>FDK-083F3092</td>
</tr>
<tr>
<td>• 150 m (500 ft)</td>
<td>FDK-083F3056</td>
</tr>
<tr>
<td>• 200 m (650 ft)</td>
<td>FDK-083F3057</td>
</tr>
<tr>
<td>• 500 m (1650 ft)</td>
<td>FDK-083F3058</td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>• 5 m (16 ft)</td>
<td>A5E02296329</td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>A5E01181647</td>
</tr>
<tr>
<td>• 15 m (49 ft)</td>
<td>A5E02296464</td>
</tr>
<tr>
<td>• 20 m (65 ft)</td>
<td>A5E01181656</td>
</tr>
<tr>
<td>• 25 m (82 ft)</td>
<td>A5E02296490</td>
</tr>
<tr>
<td>• 30 m (98 ft)</td>
<td>A5E02296494</td>
</tr>
<tr>
<td>• 40 m (130 ft)</td>
<td>A5E01181686</td>
</tr>
<tr>
<td>• 50 m (164 ft)</td>
<td>A5E02296498</td>
</tr>
<tr>
<td>• 60 m (200 ft)</td>
<td>A5E01181689</td>
</tr>
<tr>
<td>• 100 m (330 ft)</td>
<td>A5E01181691</td>
</tr>
<tr>
<td>• 150 m (500 ft)</td>
<td>A5E01181699</td>
</tr>
<tr>
<td>• 200 m (650 ft)</td>
<td>A5E01181703</td>
</tr>
<tr>
<td>• 500 m (1650 ft)</td>
<td>A5E01181705</td>
</tr>
<tr>
<td>Low noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm²</td>
<td></td>
</tr>
<tr>
<td>• 2 m (6.6 ft)</td>
<td>A5E02272692</td>
</tr>
<tr>
<td>• 5 m (16.5 ft)</td>
<td>A5E02272723</td>
</tr>
<tr>
<td>• 10 m (33 ft)</td>
<td>A5E02272730</td>
</tr>
</tbody>
</table>

*Short lead time (details in PMD)*
## Complete spare part PCB unit

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAG 6000 I (Not ATEX)</td>
<td>FDK-08SU3123</td>
</tr>
</tbody>
</table>
| MAG 6000 I Ex d 18 ... 30 V DC Spare PCB unit for use with ATEX sensors with increased safety e  
  (For ATEX sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340)  
  (For 7ME6330 > DN300)                                                      | A5E01013340   |
| MAG 6000 I Ex d 115 ... 230 V AC Spare PCB unit for use with ATEX sensors with increased safety e  
  (For ATEX sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340)  
  (For 7ME6330 > DN300)                                                      | A5E01013127   |
| Ex d version 18 ... 30 V DC for sensors with intrinsic safety ib 7ME633 and 7ME613  
  (For sensors ≤ DN 300 (12”): 7ME6130, 7ME6150 and 7ME6330)                 | FDK-08SU3124  |
| Ex d version 115 ... 230 V AC for sensors with intrinsic safety ib 7ME633 and 7ME613  
  (For sensors ≤ DN 300 (12”): 7ME6130, 7ME6150 and 7ME6330)                 | FDK-08SU3125  |

Please use online Product selector to get latest updates.

Product selector link: [www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering

### Dimensional drawings

**Dimensions in mm (inch), weight: 6 kg (13.5 lbs)**

- **Transmitter MAG 6000 I/6000 I Ex d e**

---

© Siemens AG 2010
SITRANS F flowmeters
SITRANS F M
Transmitter MAG 6000 I/6000 I Ex d e

Schematics

Transmitter

Power supply

Ex 18 - 30 V DC
Ex 115 - 230 V AC
Non Ex 18-90 V DC/ 115-230 V DC

Active current output
(Powered from transmitter)
Factory setting non Ex

Passive current output
(External powered)
Factory setting Ex

Output

0/4 - 20 mA
Load ≤ 560 Ω

4-20 mA
Load ≤ 560 Ω

Vx 3-30 V max. 110 mA

PLC-Digital Input

Relay output

Relay

24 V DC/1 A
42 V AC/2 A

Digital input

11-30 V DC Input

Sensor connection

Electrode cable

Coil cable

min. 4 mm² (only ATEX versions)
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 1 Div 2

Mode of operation

The flow measuring principle is based on Faraday’s law of electromagnetic induction were the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.
### Technical specifications

<table>
<thead>
<tr>
<th>Version</th>
<th>MAG 1100</th>
<th>MAG 1100 HT (High temperature)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measuring principle</strong></td>
<td>Electromagnetic induction</td>
<td>Electromagnetic induction</td>
</tr>
<tr>
<td><strong>Excitation frequency</strong></td>
<td>DN 2 ... 65 (1/12&quot; ... 2½&quot;) : 12.5 Hz/15 Hz</td>
<td>DN 15 ... 50 (½&quot; ... 2&quot;) : 12.5 Hz/15 Hz</td>
</tr>
<tr>
<td></td>
<td>DN 80, 100 (3&quot;, 4&quot;) : 6.25 Hz/7.5 Hz</td>
<td>DN 80, 100 (3&quot;, 4&quot;) : 6.25 Hz/7.5 Hz</td>
</tr>
<tr>
<td><strong>Process connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nominal size</strong></td>
<td>MAG 1100 (Ceramic)</td>
<td>MAG 1100 (PFA)</td>
</tr>
<tr>
<td></td>
<td>DN 2 ... DN 100 (1/12&quot; ... 4&quot;)</td>
<td>DN 10 ... DN 100 (3/8&quot; ... 4&quot;)</td>
</tr>
<tr>
<td><strong>Mating flanges</strong></td>
<td>EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent</td>
<td>EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent</td>
</tr>
<tr>
<td><strong>Option</strong></td>
<td>G½&quot; / NPT ½&quot; pipe connection adapters</td>
<td></td>
</tr>
<tr>
<td><strong>Rated operating conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
</tr>
<tr>
<td></td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
</tr>
<tr>
<td><strong>Temperature of medium</strong></td>
<td>-20 ... +150 °C (-4 ... +302 °F)</td>
<td>-20 ... +200 °C (-4 ... +392 °F)</td>
</tr>
<tr>
<td></td>
<td>-20 ... +150 °C (-4 ... +302 °F)</td>
<td>-20 ... +180 °C (-4 ... +356 °F)</td>
</tr>
<tr>
<td></td>
<td>-30 ... +130 °C (-20 ... +266 °F)</td>
<td>Suitable for steam sterilization at 150 °C (302 °F)</td>
</tr>
<tr>
<td><strong>Temperature shock</strong></td>
<td>MAG 1100 (Ceramic)</td>
<td>MAG 1100 (PFA)</td>
</tr>
<tr>
<td></td>
<td>DN 2, 3 (1/12&quot;, 1/8&quot;)</td>
<td>MAX. ±100 °C (210 °F) momentarily</td>
</tr>
<tr>
<td></td>
<td>DN 6, 10, 15, 25: Max. ΔT ≤ 80 °C/min (1/2&quot;, 3/8&quot;, ½&quot;, 1&quot;)</td>
<td>MAG 1100 (Ceramic)</td>
</tr>
<tr>
<td></td>
<td>DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½&quot;, 2&quot;, 2½&quot;) Max. ΔT ≤ 128 °F/min</td>
<td>MAG 1100 (PFA)</td>
</tr>
<tr>
<td></td>
<td>DN 80, 100: Max. ΔT ≤ 60 °C/min (3&quot;, 4&quot;) Max. ΔT ≤ 108 °F/min</td>
<td></td>
</tr>
<tr>
<td><strong>Operating pressure</strong></td>
<td>MAG 1100 (Ceramic)</td>
<td>MAG 1100 (PFA)</td>
</tr>
<tr>
<td></td>
<td>DN 2 ... 65: 40 bar (1/12&quot; ... 2½&quot;: 580 psi)</td>
<td>20 bar (290 psi)</td>
</tr>
<tr>
<td></td>
<td>DN 80: 37.5 bar (3&quot;, 540 psi)</td>
<td>Vacuum: 0.02 bar abs (0.3 psi abs)</td>
</tr>
<tr>
<td></td>
<td>DN 100: 30 bar (4&quot;: 435 psi)</td>
<td>Vacuum: 0.02 bar abs (0.3 psi abs)</td>
</tr>
<tr>
<td></td>
<td>Vacuum: 1 x 10⁻⁶ bar abs (1.5 x 10⁻⁵ psi abs)</td>
<td>Vacuum: 1 x 10⁻⁶ bar abs (1.5 x 10⁻⁵ psi abs)</td>
</tr>
<tr>
<td></td>
<td>20 bar (290 psi)</td>
<td>20 bar (290 psi)</td>
</tr>
<tr>
<td><strong>Mechanical load</strong></td>
<td>MAG 1100 (Ceramic)</td>
<td>MAG 1100 (PFA)</td>
</tr>
<tr>
<td></td>
<td>18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36</td>
<td>18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36</td>
</tr>
<tr>
<td></td>
<td>Sensor: 3.17 grms</td>
<td>Sensor: 3.17 grms</td>
</tr>
<tr>
<td></td>
<td>Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 grms</td>
<td>Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 grms</td>
</tr>
<tr>
<td></td>
<td>Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 grms</td>
<td>For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.</td>
</tr>
<tr>
<td><strong>Enclosure rating (not for ATEX)</strong></td>
<td>IP67 to EN 60529 (NEMA 4X), 1 mH₂O for 30 min</td>
<td>IP67 to EN 60529 (NEMA 4X), 1 mH₂O for 30 min</td>
</tr>
<tr>
<td><strong>EMC</strong></td>
<td>89/336 EEC</td>
<td>89/336 EEC</td>
</tr>
</tbody>
</table>

1) Conditions are also dependent on liner characteristics.
## Version and Specifications

<table>
<thead>
<tr>
<th>Version</th>
<th>MAG 1100</th>
<th>MAG 1100 HT (High temperature)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>See Dimensional drawings</td>
<td>See Dimensional drawings</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Enclosure</td>
<td>Stainless steel AISI 316L (1.4404)</td>
<td>Stainless steel AISI 316L (1.4404)</td>
</tr>
<tr>
<td>• Terminal box</td>
<td>Fibre glass reinforced polyamide (not for ATEX)</td>
<td>Stainless steel AISI 316 (1.4436)</td>
</tr>
<tr>
<td>• Option</td>
<td>Stainless steel AISI 316 (1.4436)</td>
<td></td>
</tr>
<tr>
<td><strong>Fixing studs</strong></td>
<td>Stainless steel AISI 304 (1.4301), Number and size to EN 1092-1:2001</td>
<td>Stainless steel AISI 304 (1.4301), Number and size to EN 1092-1:2001</td>
</tr>
<tr>
<td><strong>Gaskets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Standard</td>
<td>EPDM (max. 150 °C, PN 40 (max. 300 °F, 600 psi)</td>
<td>Graphite (max. 200 °C, PN 40 (max. 390 °F, 600 psi)</td>
</tr>
<tr>
<td>• Option</td>
<td>Graphite (max. 200 °C, PN 40 (max. 390 °F, 600 psi)</td>
<td>PTFE (max. 130 °C, PN 25 (max. 270 °F, 300 psi)</td>
</tr>
<tr>
<td><strong>Pipe connection adapters:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 2, 3, 6 and 10 (1/12&quot;, 1/8&quot;, ¼&quot; and 3/8&quot;)</td>
<td>Stainless steel, AISI 316</td>
<td>Stainless steel, AISI 316</td>
</tr>
<tr>
<td>• MAG 1100 (Ceramic)</td>
<td>DN 2, 3 (1/12&quot;, 1/8&quot;), Zirconium oxide (ZrO₂) (ceramic)</td>
<td>DN 15 ... 100 (½&quot; ... 4&quot;), Aluminium oxide Al₂O₃</td>
</tr>
<tr>
<td>• MAG 1100 (PFA)</td>
<td>DN 6 ... 100 (¼&quot; ... 4&quot;), Aluminium oxide Al₂O₃</td>
<td>Reinforced PFA (not for ATEX)</td>
</tr>
<tr>
<td><strong>Electrodes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MAG 1100 (Ceramic)</td>
<td>DN10 ... 100 (3/8&quot; ... 4&quot;) : Platinum with gold / Titanium brazing alloy</td>
<td>Platinum with gold / Titanium brazing alloy</td>
</tr>
<tr>
<td>• MAG 1100 (PFA)</td>
<td>DN 2 ... 6 (1/12&quot; ... ¼&quot;) : Platinum</td>
<td></td>
</tr>
<tr>
<td>• MAG 1100 (PFA)</td>
<td>DN 10 ... 15 (3/8&quot; ... ½&quot;), Hastelloy C276</td>
<td></td>
</tr>
<tr>
<td>• MAG 1100 (PFA)</td>
<td>DN 25 ... 100 (1&quot; ... 4&quot;), Hastelloy C22</td>
<td></td>
</tr>
<tr>
<td><strong>Cable entries</strong></td>
<td>Remote installation 2 x M20 or 2 x ½ NPT</td>
<td>Remote installation 2 x M20 or 2 x ½ NPT</td>
</tr>
<tr>
<td>• Remote installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Compact installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MAG 5000/MAG 6000: 4 x M20 or 4 x ½&quot; NPT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MAG 6000i: 2 x M25 (for supply/output)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MAG 6000i Ex d: 2 x M25 (for supply/output)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Certificates and approvals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calibration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard production calibration, calibration report shipped with sensor.</td>
<td>Zero-point 2 x 25 %, 2 x 90 %</td>
<td>Zero-point 2 x 25 %, 2 x 90 %</td>
</tr>
<tr>
<td>Ex approvals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PED – 97/23 EC and CRN (PFA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATEX sensor or Compact with MAG 6000 I Ex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM Class 1 div 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensor with/without MAG 5000/6000/6000 I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAG 1100 (PFA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM Class 1 div 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensor with/without MAG 5000/6000/6000 I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custody transfer approval (MAG 5000/6000 CT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cold water pattern approval PTB (Germany)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Hot water pattern approval PTB (Germany)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Heat meter pattern approval - OIML R75 (Denmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Other media than water pattern approval - OIML R117 (Ceramic liner) (Denmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Hot water pattern approval PTB (Germany)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Heat meter pattern approval - OIML R75 (Denmark)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For technical specification for transmitter - please see transmitter pages.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Diameter</th>
<th>EPDM gaskets included</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 2 (1/12&quot;)</td>
<td>1 D</td>
<td>7 ME 6 1 1 0 - A0</td>
</tr>
<tr>
<td>DN 3 (1/8&quot;)</td>
<td>1 H</td>
<td></td>
</tr>
<tr>
<td>DN 6 (¼&quot;)</td>
<td>1 M</td>
<td></td>
</tr>
<tr>
<td>DN 10 (3/8&quot;)</td>
<td>1 R</td>
<td></td>
</tr>
<tr>
<td>DN 15 (5/8&quot;)</td>
<td>1 V</td>
<td></td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>2 D</td>
<td></td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>2 R</td>
<td></td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>2 Y</td>
<td></td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>3 F</td>
<td></td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>3 M</td>
<td></td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>3 T</td>
<td></td>
</tr>
</tbody>
</table>

**Liner material**

- PFA - DN 10 ... 100 (3/8" ... 4") (not for ATEX) 1
- Ceramic 2

**Electrode material**

- Hastelloy C (only with PFA liner) 1
- Platinum (only with ceramic liner) 2

**Transmitter**

- Sensor for remote transmitter (order transmitter separately) A
- Sensor ATEX 2G D for remote transmitter (order transmitter separately) B
- MAG 6000 I, Aluminium 18 ... 90 V DC, 115 ... 230 AC C
- MAG 6000 I, Aluminium 18 ... 30 V DC, ATEX 2G D D
- MAG 6000 I, Aluminium 115 ... 230 V AC, ATEX 2G D E
- MAG 6000 Polyamide, 11 ... 30 V DC/11 ... 24 V AC H
- 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 A
- HART B
- PROFIBUS PA Profile 3 (not for ATEX) F
- PROFIBUS DP Profile 3 (not for ATEX) G
- MODBUS RTU/RS 485 (not for ATEX) E
- FOUNDATION Fieldbus H1 J
- FOUNDATION Fieldbus H1 (not MAG 6000/MAG 6000 I) K

**Cable glands/terminal box**

- Metric: Polyamide terminal box or 6000 I compact 1
- ½" 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

---

**Additional information**

**Please add “-Z” to Order No. and specify Order code(s) and plain text.**

- **Customer specific converter setup**
  - Order code: Y20
  - Tag name plate, stainless steel fixed with SS wire (add plain text)
  - Tag name plate, plastic (self adhesive)
  - Order code: Y17
  - Y18
  - Factory certificate according to EN 10204-2.1
  - Order code: C15
  - C14
  - Factory certificate according to EN 10204-2.2
  - Order code: Y40
  - Y41

- **Sensor cables wired (specify cable order no.)**
  - Sensor for remote transmitter’s junction box potted to IP68 with wired cable (specify cable order no.) (not for ATEX sensors)
  - Order code: Y99

**Other postproduction requirements (add desired text)**

**Additional calibrations**

- Matched pair - (Standard production calibration where sensor and transmitter is calibrated together) On request
- Customer specified calibration up to 10 point On request
- Customer witnessed calibration Any of above calibration On request

---

**Description**

- Potting kit for terminal box of SITRANS F M sensors for IP68/NEMA 6P (Not ATEX)  FDK-085U0220

---

1) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on pi.kne.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)
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-selector.automation.siemens.com
### Accessories for MAG 1100 sensor

#### Pipe connection ½” external thread
- For DN 2 ... 10 (1/12” ... 3/8”) sensor
  - 2 pipe connections, 2 EPDM gaskets, 12 pcs M4 x 12 screws
  - ½” G, ISO 7-1 tappered thread, SS 316
  - ½” G, ISO 7-1 tappered thread, Hastelloy C
  - ½” NPT thread, SS 316
  - ½” NPT thread, Hastelloy C

For DN 2 ... 10 (1/12” ... 3/8”) sensor
- 2 PVDF pipe connections (Max. 70 °C, PN 8 bar/max 158 °F, 116 PSI), 1 grounding ring, 1 earthing wire, 3 PTFE gaskets, 6 pcs. M4 x 12 and 6 pcs. M4 x 20 screws

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” G, ISO 7-1 tappered thread PVDF incl. grounding ring Hastelloy C22</td>
<td>FDK-083G3265</td>
</tr>
<tr>
<td>½” NPT thread PVDF incl. grounding ring Hastelloy C22</td>
<td>FDK-083G3264</td>
</tr>
</tbody>
</table>

#### EPDM gaskets
- 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”)
  - DN 15 (½”)
  - DN 25 (1”)
  - DN 40 (1½”)
  - DN 50 (2”)
  - DN 65 (2½”)
  - DN 80 (3”)
  - DN 100 (4”)

#### 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 2 ... 10 (1/12” ... 3/8”)
  - DN 15 (½”)
  - DN 25 (1”)
  - DN 40 (1½”)
  - DN 50 (2”)
  - DN 65 (2½”)
  - DN 80 (3”)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083G0156F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0157F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0159F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0161F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0162F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0163F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0164F)</td>
<td>A5E011816F)</td>
</tr>
<tr>
<td>FDK-083G0165F)</td>
<td>A5E011816F)</td>
</tr>
</tbody>
</table>

#### 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”)
  - DN 65 (2½”)
  - DN 80 (3”)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083G3116</td>
<td>A5E01018395</td>
</tr>
<tr>
<td>FDK-083G3117</td>
<td>A5E01018400</td>
</tr>
<tr>
<td>FDK-083G3119</td>
<td>A5E01018395</td>
</tr>
<tr>
<td>FDK-083G3121</td>
<td>A5E01018395</td>
</tr>
<tr>
<td>FDK-083G3122</td>
<td>A5E01018395</td>
</tr>
<tr>
<td>FDK-083G3123</td>
<td>A5E01018395</td>
</tr>
<tr>
<td>FDK-083G3124</td>
<td>A5E01018395</td>
</tr>
<tr>
<td>FDK-083G3125</td>
<td>A5E01018395</td>
</tr>
</tbody>
</table>

#### Grounding ring SS
- Material: AISI 316 (mat. no. 1.4436); each set includes: 1 grounding ring, 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”)
  - DN 50 (2”)
  - DN 65 (2½”)
  - DN 80 (3”)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083G0116</td>
<td>FDK-083G0117</td>
</tr>
<tr>
<td>FDK-083G0119</td>
<td>FDK-083G0121</td>
</tr>
<tr>
<td>FDK-083G0122</td>
<td>FDK-083G0123</td>
</tr>
<tr>
<td>FDK-083G0124</td>
<td>FDK-083G0125</td>
</tr>
</tbody>
</table>

#### Studs and nuts
- Material: AISI 304 (mat. no. 1.4305)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083G0226</td>
<td>FDK-083G0226</td>
</tr>
</tbody>
</table>

### Accessories for MAG 1100 sensor

#### Grounding ring (Hastelloy C)
- Material: Hastelloy C22; each set includes: 1 grounding ring, 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”)
  - DN 50 (2”)
  - DN 65 (2½”)
  - DN 80 (3”)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083G3256</td>
<td>FDK-083G3257</td>
</tr>
<tr>
<td>FDK-083G3259</td>
<td>FDK-083G3261</td>
</tr>
<tr>
<td>FDK-083G3262</td>
<td>FDK-083G3263</td>
</tr>
<tr>
<td>FDK-083G3264</td>
<td>FDK-083G3265</td>
</tr>
</tbody>
</table>

#### Grounding ring (Tantalum)
- Material: Tantalum; each set includes: 1 grounding ring, 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”)
  - DN 50 (2”)
  - DN 65 (2½”)
  - DN 80 (3”)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01181599F)</td>
<td>A5E01181606F)</td>
</tr>
<tr>
<td>A5E01181610F)</td>
<td>A5E01181613F)</td>
</tr>
<tr>
<td>A5E01181615F)</td>
<td>A5E01181616F)</td>
</tr>
<tr>
<td>A5E01181619F)</td>
<td>A5E01181622F)</td>
</tr>
</tbody>
</table>

#### Studs and nuts
- Material: AISI 304 (mat. no. 1.4305)
  - DN 100 (4”)

<table>
<thead>
<tr>
<th>Material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083G0226</td>
<td>FDK-083G0226</td>
</tr>
</tbody>
</table>

Short lead time (details in PMD)

F) Subject to export regulations AL: 9I999, ECCN: N.
### Dimensional drawings

**Sensor MAG 1100, compact/remote**

![Dimensional drawings](image)

**Dimensions in mm (inch)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>161</td>
<td>186</td>
<td>315</td>
<td>340</td>
<td>48.7</td>
<td>17.3</td>
<td>34</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>161</td>
<td>186</td>
<td>315</td>
<td>340</td>
<td>48.7</td>
<td>17.3</td>
<td>34</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>6</td>
<td>161</td>
<td>186</td>
<td>315</td>
<td>340</td>
<td>48.7</td>
<td>17.3</td>
<td>34</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>10</td>
<td>161</td>
<td>186</td>
<td>315</td>
<td>340</td>
<td>48.7</td>
<td>17.3</td>
<td>34</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>15</td>
<td>161</td>
<td>186</td>
<td>315</td>
<td>340</td>
<td>48.7</td>
<td>17.3</td>
<td>40</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>25</td>
<td>169</td>
<td>201</td>
<td>354</td>
<td>425</td>
<td>98.5</td>
<td>268</td>
<td>56</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>40</td>
<td>179</td>
<td>221</td>
<td>375</td>
<td>450</td>
<td>93.3</td>
<td>358</td>
<td>75</td>
<td></td>
<td>3.4</td>
</tr>
<tr>
<td>65</td>
<td>188</td>
<td>239</td>
<td>393</td>
<td>500</td>
<td>106.3</td>
<td>438</td>
<td>90</td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td>80</td>
<td>198</td>
<td>258</td>
<td>412</td>
<td>590</td>
<td>120.9</td>
<td>566</td>
<td>112</td>
<td></td>
<td>5.5</td>
</tr>
<tr>
<td>100</td>
<td>204</td>
<td>270</td>
<td>424</td>
<td>130.0</td>
<td>160.0</td>
<td>625</td>
<td>124</td>
<td></td>
<td>7.0</td>
</tr>
<tr>
<td>1/12</td>
<td>6.34</td>
<td>7.33</td>
<td>12.40</td>
<td>13.39</td>
<td>1.92</td>
<td>0.88</td>
<td>3.4</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>1/8</td>
<td>6.34</td>
<td>7.33</td>
<td>12.40</td>
<td>13.39</td>
<td>1.92</td>
<td>0.12</td>
<td>1.34</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>¼</td>
<td>6.34</td>
<td>7.33</td>
<td>12.40</td>
<td>13.39</td>
<td>1.92</td>
<td>0.24</td>
<td>1.34</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>3/8</td>
<td>6.34</td>
<td>7.33</td>
<td>12.40</td>
<td>13.39</td>
<td>1.92</td>
<td>0.39</td>
<td>1.34</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>½</td>
<td>6.34</td>
<td>7.33</td>
<td>12.40</td>
<td>13.39</td>
<td>1.92</td>
<td>0.59</td>
<td>1.34</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>1</td>
<td>6.66</td>
<td>7.92</td>
<td>12.72</td>
<td>13.94</td>
<td>2.50</td>
<td>0.98</td>
<td>1.68</td>
<td></td>
<td>8.6</td>
</tr>
<tr>
<td>1½</td>
<td>7.05</td>
<td>8.70</td>
<td>13.11</td>
<td>14.76</td>
<td>3.31</td>
<td>1.57</td>
<td>1.86</td>
<td></td>
<td>9.2</td>
</tr>
<tr>
<td>2</td>
<td>7.40</td>
<td>9.41</td>
<td>13.47</td>
<td>15.47</td>
<td>4.00</td>
<td>1.97</td>
<td>1.98</td>
<td></td>
<td>9.2</td>
</tr>
<tr>
<td>2½</td>
<td>7.80</td>
<td>10.16</td>
<td>13.82</td>
<td>16.22</td>
<td>4.76</td>
<td>2.56</td>
<td>2.06</td>
<td></td>
<td>10.5</td>
</tr>
<tr>
<td>3</td>
<td>8.03</td>
<td>10.63</td>
<td>14.06</td>
<td>16.70</td>
<td>5.24</td>
<td>3.15</td>
<td>3.25</td>
<td></td>
<td>11.0</td>
</tr>
<tr>
<td>4</td>
<td>8.54</td>
<td>11.65</td>
<td>14.57</td>
<td>17.72</td>
<td>6.26</td>
<td>3.94</td>
<td>4.22</td>
<td></td>
<td>12.6</td>
</tr>
</tbody>
</table>

1) 14.5 mm/0.571" shorter when the AISI terminal box is used (Ex or high temperature 200 °C (390 °F) version)
2) With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb).
3) With MAG 6000 I weight is increased with 5.5 kg (12.1 lbs).
4) A2 is 3 mm (0.12") shorter than A1.
The total build-in length "L" [mm]/[inch] before assembling depends on the gasket selected

<table>
<thead>
<tr>
<th>Size</th>
<th>EPDM</th>
<th>Graphite</th>
<th>PTFE (Teflon)</th>
<th>Without gasket</th>
<th>Earthing ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
</tr>
<tr>
<td>2 ... 10</td>
<td>64</td>
<td>2.52</td>
<td>66</td>
<td>2.60</td>
<td>70</td>
</tr>
<tr>
<td>15</td>
<td>65</td>
<td>2.62</td>
<td>66</td>
<td>2.60</td>
<td>70</td>
</tr>
<tr>
<td>25</td>
<td>80</td>
<td>3.15</td>
<td>81</td>
<td>3.19</td>
<td>85</td>
</tr>
<tr>
<td>40</td>
<td>95</td>
<td>3.74</td>
<td>96</td>
<td>3.78</td>
<td>100</td>
</tr>
<tr>
<td>60</td>
<td>2</td>
<td>105</td>
<td>4.13</td>
<td>106</td>
<td>4.17</td>
</tr>
<tr>
<td>80</td>
<td>130</td>
<td>5.12</td>
<td>131</td>
<td>5.15</td>
<td>135</td>
</tr>
<tr>
<td>100</td>
<td>3</td>
<td>155</td>
<td>6.10</td>
<td>156</td>
<td>6.14</td>
</tr>
<tr>
<td>200</td>
<td>4</td>
<td>185</td>
<td>7.28</td>
<td>186</td>
<td>7.31</td>
</tr>
</tbody>
</table>

1) 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", ¼" and 3/8") are prepared for assembly with the ½" pipe connections. Dimensions in mm (inch)

The length "L" varies dependent on the gasket choice.

<table>
<thead>
<tr>
<th>Without gasket</th>
<th>EPDM</th>
<th>Graphite</th>
<th>Teflon</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
</tr>
<tr>
<td>150</td>
<td>5.9</td>
<td>150</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Important note:
For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.
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
- Internal product wetted surface finish Ra of ≤ 0.80 μm (32 μin)
- 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 were 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/RS485, HART, FOUNDATION Fieldbus H1, DeviceNet.

Technical specifications

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Electromagnetic induction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excitation frequency</td>
<td>DN 10...65 (¼” ... 2½”): 12.5 Hz/15 Hz</td>
</tr>
<tr>
<td></td>
<td>DN 80...100 (3”, 4”): 6.25 Hz/7.5 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process nominal size</th>
<th>Hygienic adapters available for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 10 ... DN 100 (3/8” ... 4”)</td>
<td>• Direct welding onto pipe</td>
</tr>
<tr>
<td>Process connection</td>
<td>• Clamp fitting</td>
</tr>
<tr>
<td></td>
<td>• Threaded fitting</td>
</tr>
</tbody>
</table>

Rated operating conditions

Ambient conditions

- Sensor
- Sensor ATEX
- Compact transmitter MAG 5000/6000
- Transmitter MAG 6000 I Ex d
- Compact transmitter MAG 5000 I Ex d

Temperature of medium

- MAG 1100 F (Ceramic)
- MAG 1100 F (PFA)

Temperature shock

- MAG 1100 F
  - Duration ≤ 1 min, followed by 10 min rest

Operating pressure

- MAG 1100 F (Ceramic)
- MAG 1100 F (PFA)

Vacuum: 1 x 10⁻⁶ barabs (1.5 x 10⁻⁵ psiabs)

MAG 1100 F (PFA)
- Max. ± 100 °C (210 °F) momentarily

MAG 1100 F (Ceramic)
- Max. ± 100 °C (210 °F) momentarily

Vacuum: 0.02 barabs (0.3 psiabs)

DN 80 ... DN 100: CO₂ pressure max. 7 bar (101.5 psi)

¹ Conditions are also dependent on liner characteristics
## Accessories

### Weld-in adapter
Adapter for welding onto dairy pipe

- DN 10, 15, 25, 40 and 50 (3/8", ½", 1", 1½", and 2"
- DN 80 and DN 100 (3" and 4"

### Clamp adapter

<table>
<thead>
<tr>
<th>DN</th>
<th>Description</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>DN 10, 15, 25, 40 and 50 (3/8&quot;, ½&quot;, 1&quot;, 1½&quot;, and 2&quot;)</td>
<td>200 psi</td>
</tr>
<tr>
<td>16</td>
<td>DN 65, 80 and 100 (2½&quot;, 3&quot; and 4&quot;)</td>
<td>300 psi</td>
</tr>
</tbody>
</table>

### Thread adapter

<table>
<thead>
<tr>
<th>DN</th>
<th>Description</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>DN 10, 15, 25, and 40 (3/8&quot;, ½&quot;, 1&quot;, and 1½&quot;)</td>
<td>600 psi</td>
</tr>
<tr>
<td>25</td>
<td>DN 50, 65, 80 and 100 (2&quot;, 2½&quot;, 3&quot; and 4&quot;)</td>
<td>350 psi</td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>Material</th>
<th>Stainless steel AISI 316/Stainless steel AISI 304 (ISO 2852)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket</td>
<td>FKM/FPM with stainless steel insert (AISI 304) (-20 °C to +150 °C)</td>
</tr>
<tr>
<td></td>
<td>EPDM (-20 °C to +150 °C)</td>
</tr>
</tbody>
</table>

### Note
When combined sensor and adapter, the operating pressure is the lower rated of the pair.

---

**Flow sensor MAG 1100 F**

### Mechanical load
18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36

- Sensor: 3.17 grms
- Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms
- Sensor with compact MAG 6000 I/MAG 6000 I Ex mounted transmitter: 1.14 grms

For compact installation with the MAG 6000 I/MAG 6000 I Ex transmitter to be supported to avoid tension on sensor part.

### Enclosure rating
IP67 to EN 60529 (NEMA 4X), 1m H2O for 30 min

### EMC
89/336 EEC

### Design

#### Weight
See Dimensional drawings

#### Material

**Enclosure**
- MAG 1100 F: Stainless steel AISI 316L (1.4404)
- Standard: Fibre glass reinforced polyamide
- Option: Stainless steel AISI 316 (1.4436)
- Ex ATEX (remote version only): Stainless steel AISI 316 (1.4436)

**Terminal box**
- MAG 1100 F (PFA): Reinforced PFA (teflon) (not for ATEX)

#### Liner

**MAG 1100 F**
- Ceramic: Aluminium oxide Al2O3 (ceramics)
- PFA: Reinforced PFA (teflon)

**Electrodes**
- MAG 1100 F (Ceramic): Platinum with gold / Titanium brazing alloy
- MAG 1100 F (PFA): Hastelloy C276, Hastelloy C22

#### Cable entries
- MAG 1100 F (Ceramic): 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 6000I: 2 x M25 (for supply/output)
  - MAG 6000I Ex: 2 x M25 (for supply/output)

#### Certificates and approvals

**Calibration**
- Standard Production calibration, calibration report shipped with sensor
- Ex ATEX approvals for sensor or compact with Mag 6000 I Ex
- Sensor with/without MAG 5000/6000/6000 I
- MAG 1100 F (PFA): 3A (sensor with Polyamide terminal box with EPDM gasket), transmitter not part of the approval
- FM Class 1 div 2
- EHEDG certified (use EPDM P-seal)

**Conforms to**
PED – 97/23/EC and CRN (PFA)
- FDA
- Cold water pattern approval PTB (Germany)
- Hot water pattern approval PTB (Germany)
- Other media than water pattern approval- OIML R117 (Ceramic liner/Denmark)

---

© Siemens AG 2010
### Selection and Ordering data

#### Sensor SITRANS F M MAG 1100 F

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 10 (3/8&quot;)</td>
<td>1R</td>
<td>1V</td>
<td>2D</td>
</tr>
<tr>
<td>DN 15 (½&quot;)</td>
<td>1V</td>
<td>2D</td>
<td>3F</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>2D</td>
<td>3F</td>
<td>3M</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>2D</td>
<td>3F</td>
<td>3T</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>2D</td>
<td>3F</td>
<td>3T</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>3F</td>
<td>3M</td>
<td>3T</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>3F</td>
<td>3M</td>
<td>3T</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>3F</td>
<td>3M</td>
<td>3T</td>
</tr>
</tbody>
</table>

#### Process connections

- No adapters (specials see accessories)
- Weld in
  - DIN 11850
  - BS 4825-1
  - Tri-Clamp®
- Clamp type
  - DIN 32676
  - BS 4825-3
  - Tri-Clamp®
- Threaded type
  - DIN 11851
  - SMS 1145

#### Liner material

- PFA (not for ATEX)
- Ceramic

#### Gasket material

- EPDM flat gasket (FDA) (only with PFA liner)
- FPM/FKM (FDA) (only with ceramic liner)
- EPDM-P gasket (only for PFA) FDA, EHEDG certified, 3A pending

#### Electrode material

- Hastelloy C (only with PFA liner)
- Platinum (only with ceramic liner)

#### Transmitter

- Sensor for remote transmitter (order transmitter separately) 3A
  - Sensor ATEX 2G D for remote transmitter (order transmitter separately) 3A
  - MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC
  - MAG 6000 I, Aluminium 18 ... 30 V DC, ATEX 2G D
  - MAG 6000 I, Aluminium 115 ... 230 V AC, ATEX 2G D
  - 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 ATEX) (only MAG 6000/MAG 6000 I)
  - MODBUS RT/UR 385 (not for ATEX) (only MAG 6000/MAG 6000 I)
  - FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)

### Selection and Ordering data

#### Cable glands/terminal box

- Metric: Polyamide terminal box or 6000 I compact
  - ½" NPT: Polyamide terminal box or 6000 I compact
- Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)
  - ½" NPT: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)

- Short lead time (details in PMD)

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

#### Additional information

Please add “-Z” to Order No. and specify Order code(s) and plain text.

- Customer-specific converter setup
  - Tag name plate, stainless steel fixed with SS wire (add plain text)
  - Tag name plate, plastic (self adhesive)
  - Factory certificate according to EN 10204-2.1
  - Factory certificate according to EN 10204-2.2
  - Sensor cables wired (specify cable order no.)
  - Sensor for remote transmitter’s junction box potted to IP68 with wired cable (specify cable order no.) (not for ATEX sensors)
  - Other postproduction requirements (add desired text)
  - Additional calibrations
    - Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)
    - Customer specified calibration up to 10 point
    - Customer witnessed calibration

#### Order code

- Y20
- Y17
- Y18
- C15
- C14
- Y40
- Y41
- Y99

### Additional information

- Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on pk.khe.siemens.de/index.aspx?Nr=17460 and send together with the order.
  - (Size dependent restriction on maximum flow rates may apply)

- 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-selector.automation.siemens.com

- Please also see www.siemens.com/SITRANSF ordering for practical examples of ordering
### Accessories

**Weld in connection fittings for MAG 1100 F with P gaskets**

Only for sensors with PFA liner.

- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

#### DIN 11850

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D₀ (mm)</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>25</td>
<td>29</td>
</tr>
<tr>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>100</td>
<td>104</td>
</tr>
</tbody>
</table>

Accessories: A5E02054630, A5E02054633, A5E02054634, A5E02054635, A5E02054637, A5E02054638, A5E02054640, A5E02054643, A5E02054644, A5E02054646

---

**ISO 2037 (SMS3008)**

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D₀ (mm)</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>25</td>
<td>25.6</td>
</tr>
<tr>
<td>28</td>
<td>28.6</td>
</tr>
<tr>
<td>38</td>
<td>38.6</td>
</tr>
<tr>
<td>40</td>
<td>40.6</td>
</tr>
<tr>
<td>51</td>
<td>51.6</td>
</tr>
<tr>
<td>63.5</td>
<td>64.1</td>
</tr>
<tr>
<td>76.1</td>
<td>76.7</td>
</tr>
<tr>
<td>101.6</td>
<td>102.5</td>
</tr>
</tbody>
</table>

Accessories: A5E02054630, A5E02054633, A5E02054634, A5E02054635, A5E02054637, A5E02054638, A5E02054640, A5E02054643, A5E02054644, A5E02054646

---

**Tri-Clamp® (BS 4825-1)**

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D₀ (mm)</td>
</tr>
<tr>
<td>10</td>
<td>12.7</td>
</tr>
<tr>
<td>15.9</td>
<td>19.05</td>
</tr>
<tr>
<td>25</td>
<td>25.4</td>
</tr>
<tr>
<td>38</td>
<td>38.1</td>
</tr>
<tr>
<td>51</td>
<td>50.8</td>
</tr>
<tr>
<td>63.5¹</td>
<td>63.5</td>
</tr>
<tr>
<td>76.1</td>
<td>76.2</td>
</tr>
<tr>
<td>102.6¹</td>
<td>101.6</td>
</tr>
</tbody>
</table>

Accessories: A5E02199113, A5E02199114, A5E02199115, A5E02199116, A5E02199117, A5E02199118, A5E02199119, A5E02199120

---

**Clamp-type connection fittings for MAG 1100 F with P gaskets**

Only for sensors with PFA liner.

- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

#### DIN 32676

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D₀ (mm)</td>
</tr>
<tr>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td>25</td>
<td>50.5</td>
</tr>
<tr>
<td>38</td>
<td>50.5</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
</tr>
<tr>
<td>63.5</td>
<td>77.5</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
</tr>
<tr>
<td>101.6</td>
<td>119</td>
</tr>
</tbody>
</table>

Accessories: A5E02211143, A5E02211144, A5E02211145, A5E02211146, A5E02211147, A5E02211148, A5E02211151, A5E02211152, A5E02211153

---

**ISO 2852 (SMS 3016, BS 4825-3)**

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D₀ (mm)</td>
</tr>
<tr>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td>25</td>
<td>50.5</td>
</tr>
<tr>
<td>33.7</td>
<td>50.5</td>
</tr>
<tr>
<td>38</td>
<td>50.5</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
</tr>
<tr>
<td>63.5</td>
<td>77.5</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
</tr>
<tr>
<td>101.6</td>
<td>119</td>
</tr>
</tbody>
</table>

Accessories: A5E02211143, A5E02211144, A5E02211145, A5E02211146, A5E02211147, A5E02211148, A5E02211151, A5E02211152, A5E02211153

---

**Tri-Clamp®**

- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

#### DIN 32676

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D₀ (mm)</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>25</td>
<td>50.5</td>
</tr>
<tr>
<td>38</td>
<td>50.5</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
</tr>
<tr>
<td>63.5</td>
<td>77.5</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
</tr>
<tr>
<td>101.6</td>
<td>119</td>
</tr>
</tbody>
</table>

Accessories: A5E02213596, A5E02213597, A5E02213598, A5E02213599, A5E02213600, A5E02213601, A5E02213602, A5E02213603

---

**Tri-Clamp®** is a registered trademark of Ladish Co.

* ◦ Short lead time (details in PMD)

Do: outer diameter
Di: inner diameter

¹ For BS4825-1 see ISO 2037

---

© Siemens AG 2010
## Accessories

**Order No.**

### Threaded type connection fittings for MAG 1100 F with P gaskets

- Only for sensors with PFA liner.
- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

<table>
<thead>
<tr>
<th>DIN 11851</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adapter</strong></td>
<td><strong>Sensor</strong></td>
</tr>
<tr>
<td>DN (mm)</td>
<td>D_o (mm)</td>
</tr>
<tr>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>25</td>
<td>52</td>
</tr>
<tr>
<td>32</td>
<td>58</td>
</tr>
<tr>
<td>40</td>
<td>65</td>
</tr>
<tr>
<td>50</td>
<td>78</td>
</tr>
<tr>
<td>65</td>
<td>95</td>
</tr>
<tr>
<td>80</td>
<td>110</td>
</tr>
<tr>
<td>100</td>
<td>130</td>
</tr>
</tbody>
</table>

**Accessories**

**Order No.**

### SMS 1145

<table>
<thead>
<tr>
<th><strong>Adapter</strong></th>
<th><strong>Sensor</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>D_o (mm)</td>
</tr>
<tr>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>38</td>
<td>60</td>
</tr>
<tr>
<td>51</td>
<td>70</td>
</tr>
<tr>
<td>63.5</td>
<td>85</td>
</tr>
<tr>
<td>76</td>
<td>98</td>
</tr>
</tbody>
</table>

D_o: outer diameter
D_i: inner diameter

© Siemens AG 2010
### Accessories

**Weld in connection fittings for MAG 1100 F with flat gaskets**

For sensors with ceramic and PFA liner.
- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

**DIN 11850**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Adapter DN (mm)</th>
<th>D_o (mm)</th>
<th>D_i (mm)</th>
<th>DN (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>13</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>19</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>23</td>
<td>20</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>25</td>
<td>29</td>
<td>26</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>32</td>
<td>35</td>
<td>32</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>41</td>
<td>38</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td>53</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>65</td>
<td>70</td>
<td>66</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>80</td>
<td>85</td>
<td>81</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>104</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**ISO 2037 (SMS3008)**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Adapter DN (mm)</th>
<th>D_o (mm)</th>
<th>D_i (mm)</th>
<th>DN (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>13</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>19</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>25.6</td>
<td>22.6</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>28</td>
<td>28.6</td>
<td>25.6</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>38</td>
<td>38.6</td>
<td>35.6</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>40.6</td>
<td>37.6</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>51</td>
<td>51.6</td>
<td>48.6</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>63.5</td>
<td>64.1</td>
<td>60.3</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>76.1</td>
<td>76.7</td>
<td>72.9</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>101.6</td>
<td>102.5</td>
<td>97.6</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>114.3</td>
<td>115.6</td>
<td>110.3</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Tri-Clamp® (BS 4825-1)**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Adapter DN (mm)</th>
<th>D_o (mm)</th>
<th>D_i (mm)</th>
<th>DN (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>12.7</td>
<td>9.4</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15.9</td>
<td>19.05</td>
<td>15.75</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>25.4</td>
<td>22.1</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>38</td>
<td>38.1</td>
<td>34.8</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>51</td>
<td>50.8</td>
<td>47.5</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>63.5</td>
<td>63.5</td>
<td>60.2</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>76.1</td>
<td>76.2</td>
<td>72.9</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>102</td>
<td>101.6</td>
<td>97.38</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Tri-Clamp® is a registered trademark of Ladish Co.**

- Short lead time (details in PMD)

### Accessories

**Clamp-type connection fittings for MAG 1100 F with flat gaskets**

For sensors with ceramic and PFA liner.
- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

**DIN 32676**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Adapter DN (mm)</th>
<th>D_o (mm)</th>
<th>D_i (mm)</th>
<th>DN (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>34</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>34</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>50.5</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>38</td>
<td>50.5</td>
<td>35.6</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
<td>48.6</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>63.5</td>
<td>77.5</td>
<td>60.3</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
<td>72.9</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>101.6</td>
<td>119</td>
<td>97.6</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>114.3</td>
<td>119</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**ISO 2852 (SMS 3016, BS 4825-3)**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Adapter DN (mm)</th>
<th>D_o (mm)</th>
<th>D_i (mm)</th>
<th>DN (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>34</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>34</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>50.5</td>
<td>26</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>33.7</td>
<td>50.5</td>
<td>31.3</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>38</td>
<td>50.5</td>
<td>35.6</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
<td>48.6</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>63.5</td>
<td>77.5</td>
<td>60.3</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
<td>72.9</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>101.6</td>
<td>119</td>
<td>97.6</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Tri-Clamp®**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Adapter DN (mm)</th>
<th>D_o (mm)</th>
<th>D_i (mm)</th>
<th>DN (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>25</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>25</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>50.5</td>
<td>22.6</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>38</td>
<td>50.5</td>
<td>35.6</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
<td>48.6</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>63.5</td>
<td>77.5</td>
<td>60.3</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
<td>72.9</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>101.6</td>
<td>119</td>
<td>97.6</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Tri-Clamp® is a registered trademark of Ladish Co.**

- Short lead time (details in PMD)

D_o: outer diameter
D_i: inner diameter

1) For BS4825-1 see ISO 2037
## Accessories

### Threaded type connection fittings for MAG 1100 F with flat gaskets

For sensors with ceramic and PFA liner.

- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

### DIN 11851

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>( D_o ) (mm)</td>
<td>( D_i ) (mm)</td>
</tr>
<tr>
<td>10</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>20</td>
<td>44</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
<td>52</td>
<td>26</td>
</tr>
<tr>
<td>32</td>
<td>58</td>
<td>32</td>
</tr>
<tr>
<td>40</td>
<td>65</td>
<td>38</td>
</tr>
<tr>
<td>50</td>
<td>78</td>
<td>50</td>
</tr>
<tr>
<td>65</td>
<td>95</td>
<td>66</td>
</tr>
<tr>
<td>80</td>
<td>110</td>
<td>81</td>
</tr>
<tr>
<td>100</td>
<td>130</td>
<td>100</td>
</tr>
</tbody>
</table>

### ISO 2853

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>( D_o ) (mm)</td>
<td>( D_i ) (mm)</td>
</tr>
<tr>
<td>25</td>
<td>37</td>
<td>22.6</td>
</tr>
<tr>
<td>38</td>
<td>51</td>
<td>35.6</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
<td>48.6</td>
</tr>
<tr>
<td>63.5</td>
<td>78</td>
<td>60.3</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
<td>72.9</td>
</tr>
<tr>
<td>101.6</td>
<td>118</td>
<td>97.6</td>
</tr>
</tbody>
</table>

### BS 4825-4

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Sensor</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN (mm)</td>
<td>( D_o ) (mm)</td>
<td>( D_i ) (mm)</td>
</tr>
<tr>
<td>25</td>
<td>37</td>
<td>22.6</td>
</tr>
<tr>
<td>38</td>
<td>51</td>
<td>35.6</td>
</tr>
<tr>
<td>51</td>
<td>64</td>
<td>48.6</td>
</tr>
<tr>
<td>63.5</td>
<td>78</td>
<td>60.3</td>
</tr>
<tr>
<td>76.1</td>
<td>91</td>
<td>72.9</td>
</tr>
<tr>
<td>101.6</td>
<td>126</td>
<td>97.6</td>
</tr>
</tbody>
</table>

*Short lead time (details in PMD)*
## Spare parts for MAG 1100 F

<table>
<thead>
<tr>
<th>Gaskets</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2 pcs., between flow sensor and adapter)</td>
<td></td>
</tr>
<tr>
<td>MAG 1100 F (PFA) - P gaskets</td>
<td></td>
</tr>
<tr>
<td>Rubber: EPDM (FDA)</td>
<td></td>
</tr>
<tr>
<td>DN 10</td>
<td>A5E02055286</td>
</tr>
<tr>
<td>DN 15</td>
<td>A5E02055287</td>
</tr>
<tr>
<td>DN 25</td>
<td>A5E02055290</td>
</tr>
<tr>
<td>DN 40</td>
<td>A5E02055291</td>
</tr>
<tr>
<td>DN 50</td>
<td>A5E02055292</td>
</tr>
<tr>
<td>DN 65</td>
<td>A5E02055293</td>
</tr>
<tr>
<td>DN 80</td>
<td>A5E02055295</td>
</tr>
<tr>
<td>DN 100</td>
<td>A5E02055297</td>
</tr>
<tr>
<td>MAG 1100 F (ceramic) - flat gaskets</td>
<td></td>
</tr>
<tr>
<td>Rubber: FKM/FPM (FDA)</td>
<td></td>
</tr>
<tr>
<td>DN 10</td>
<td>A5E00915707</td>
</tr>
<tr>
<td>DN 15</td>
<td>A5E00915764</td>
</tr>
<tr>
<td>DN 25</td>
<td>A5E00915771</td>
</tr>
<tr>
<td>DN 40</td>
<td>A5E00915773</td>
</tr>
<tr>
<td>DN 50</td>
<td>A5E00915775</td>
</tr>
<tr>
<td>DN 65</td>
<td>A5E00915780</td>
</tr>
<tr>
<td>DN 80</td>
<td>A5E00915782</td>
</tr>
<tr>
<td>DN 100</td>
<td>A5E00915784F)</td>
</tr>
<tr>
<td>MAG 1100 F (PFA) - flat gaskets</td>
<td></td>
</tr>
<tr>
<td>Rubber: EPDM (FDA)</td>
<td></td>
</tr>
<tr>
<td>DN 10</td>
<td>FDK-083G2206</td>
</tr>
<tr>
<td>DN 15</td>
<td>FDK-083G2207</td>
</tr>
<tr>
<td>DN 25</td>
<td>FDK-083G2209</td>
</tr>
<tr>
<td>DN 40</td>
<td>FDK-083G2211</td>
</tr>
<tr>
<td>DN 50</td>
<td>FDK-083G2212</td>
</tr>
<tr>
<td>DN 65</td>
<td>FDK-083G2213</td>
</tr>
<tr>
<td>DN 80</td>
<td>FDK-083G2214</td>
</tr>
<tr>
<td>DN 100</td>
<td>FDK-083G2215</td>
</tr>
<tr>
<td>Rubber: NBR</td>
<td></td>
</tr>
<tr>
<td>DN 10</td>
<td>FDK-083G2216</td>
</tr>
<tr>
<td>DN 15</td>
<td>FDK-083G2217</td>
</tr>
<tr>
<td>DN 25</td>
<td>FDK-083G2219</td>
</tr>
<tr>
<td>DN 40</td>
<td>FDK-083G2221</td>
</tr>
<tr>
<td>DN 50</td>
<td>FDK-083G2222</td>
</tr>
<tr>
<td>DN 65</td>
<td>FDK-083G2223</td>
</tr>
<tr>
<td>DN 80</td>
<td>FDK-083G2224</td>
</tr>
<tr>
<td>DN 100</td>
<td>FDK-083G2225</td>
</tr>
</tbody>
</table>

* Short lead time (details in PMD)
### Dimensional drawings

**Sensor MAG 1100 F compact/remote**

![Dimensional drawings](image-url)

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.

**Table of Dimensions**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>64</td>
<td>161</td>
<td>315</td>
<td>193.7</td>
<td>344.7</td>
<td>64.0</td>
<td>10</td>
<td>10</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>64</td>
<td>161</td>
<td>315</td>
<td>193.7</td>
<td>344.7</td>
<td>64.0</td>
<td>15</td>
<td>16</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>79</td>
<td>169</td>
<td>323</td>
<td>207.5</td>
<td>359.0</td>
<td>77.5</td>
<td>25</td>
<td>26</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>94</td>
<td>179</td>
<td>333</td>
<td>228.0</td>
<td>379.0</td>
<td>91.0</td>
<td>40</td>
<td>38</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>104</td>
<td>188</td>
<td>342</td>
<td>247.7</td>
<td>398.7</td>
<td>119.0</td>
<td>50</td>
<td>50</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>131</td>
<td>197.5</td>
<td>351</td>
<td>262.6</td>
<td>413.6</td>
<td>130.0</td>
<td>65</td>
<td>66</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>156</td>
<td>204</td>
<td>367</td>
<td>281.0</td>
<td>432.0</td>
<td>155.0</td>
<td>80</td>
<td>81</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>186</td>
<td>217</td>
<td>370</td>
<td>308.0</td>
<td>459.0</td>
<td>183.0</td>
<td>100</td>
<td>100</td>
<td>10.0</td>
<td></td>
</tr>
</tbody>
</table>

**Table of Dimensions (inch)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>2.52</td>
<td>6.34</td>
<td>12.40</td>
<td>7.62</td>
<td>13.57</td>
<td>2.52</td>
<td>0.39</td>
<td>0.39</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>½</td>
<td>2.52</td>
<td>6.34</td>
<td>12.40</td>
<td>7.62</td>
<td>13.57</td>
<td>2.52</td>
<td>0.59</td>
<td>0.63</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3.11</td>
<td>6.66</td>
<td>12.72</td>
<td>8.17</td>
<td>14.13</td>
<td>3.05</td>
<td>0.98</td>
<td>1.02</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>1½</td>
<td>3.70</td>
<td>7.05</td>
<td>13.11</td>
<td>8.98</td>
<td>14.92</td>
<td>3.58</td>
<td>1.57</td>
<td>1.50</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4.09</td>
<td>7.40</td>
<td>13.47</td>
<td>9.75</td>
<td>15.70</td>
<td>4.68</td>
<td>1.97</td>
<td>1.97</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>2½</td>
<td>5.16</td>
<td>7.78</td>
<td>13.82</td>
<td>10.34</td>
<td>16.28</td>
<td>5.12</td>
<td>2.56</td>
<td>2.60</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6.14</td>
<td>8.03</td>
<td>14.06</td>
<td>11.06</td>
<td>17.01</td>
<td>6.10</td>
<td>3.15</td>
<td>3.19</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>7.32</td>
<td>8.54</td>
<td>14.57</td>
<td>12.13</td>
<td>18.07</td>
<td>7.20</td>
<td>3.94</td>
<td>3.94</td>
<td>22.0</td>
<td></td>
</tr>
</tbody>
</table>

¹ With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb)
² With MAG 6000 I weight is increased with 5.5 kg (12.1 lbs)
³ A₂ is 3 mm (0.12”) shorter than A₁

14.5 mm (0.571”) shorter when the AISI terminal box is used (always ATEX version)
Flow sensor MAG 1100 F compact/separate – build-in length

<table>
<thead>
<tr>
<th>DN</th>
<th>Inch</th>
<th>A</th>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3/8</td>
<td>99</td>
<td>3.90</td>
<td>146</td>
<td>5.75</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>½</td>
<td>99</td>
<td>3.90</td>
<td>146</td>
<td>5.75</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>113</td>
<td>4.45</td>
<td>161</td>
<td>6.34</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>1½</td>
<td>126</td>
<td>4.96</td>
<td>176</td>
<td>6.93</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>154</td>
<td>6.06</td>
<td>186</td>
<td>7.32</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>2½</td>
<td>165</td>
<td>6.50</td>
<td>223</td>
<td>8.78</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>200</td>
<td>7.87</td>
<td>258</td>
<td>10.16</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>225</td>
<td>8.86</td>
<td>288</td>
<td>11.34</td>
<td></td>
</tr>
</tbody>
</table>

1) The total build-in length “L” is independent of the adapter type selected.

© Siemens AG 2010
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 25 to DN 1200 / 2000 (1” 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
- Drinking water EPDM liner with approvals
- Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design (Order No. 7ME6520, DN 50 to 300 mm (2” to 12”).
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Custody transfer approvals
- Build-in length according to ISO 13359
- 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 R49 and verified according to MI-001 for DN 50 (2”) to DN 300 (12”).
  - Pattern approval OIML R 49 (Denmark, Germany)
  - conforms to ISO 4064 and EN 14154
  - MI-001 Custody Transfer approval for billing (EU)
- 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.

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 were 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, MODBUS RTU/RS485.
# Technical specifications

## Product characteristic

<table>
<thead>
<tr>
<th>Targeted towards the EU water markets and low-flow applications</th>
<th>Targeted towards the Non-EU water markets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design and nominal size</strong></td>
<td></td>
</tr>
<tr>
<td>Full bore sensor: DN 25 ... 40 (1” ... 1½”)</td>
<td>Full bore sensor: DN 25 ... 2000 (1” ... 78”)</td>
</tr>
<tr>
<td>Coned sensor: DN 50 ... 300 (2” ... 12”)</td>
<td></td>
</tr>
<tr>
<td>Full bore sensor: DN 350 ... 1200 (14” ... 48”)</td>
<td></td>
</tr>
<tr>
<td><strong>Measuring principle</strong></td>
<td></td>
</tr>
<tr>
<td>Electromagnetic induction</td>
<td>Electromagnetic induction</td>
</tr>
<tr>
<td><strong>Excitation frequency (Mains supply: 50/60 Hz)</strong></td>
<td></td>
</tr>
<tr>
<td>DN 25 ... 65 (1” ... 2½”): 12.5 Hz/15 Hz</td>
<td>DN 25 ... 65 (1” ... 2½”): 12.5 Hz/15 Hz</td>
</tr>
<tr>
<td>DN 80 ... 150 (3” ... 6”): 6.25 Hz/7.5 Hz</td>
<td>DN 80 ... 150 (3” ... 6”): 6.25 Hz/7.5 Hz</td>
</tr>
<tr>
<td>DN 200 ... 300 (8” ... 12”): 3.125 Hz/3.75 Hz</td>
<td>DN 200 ... 1200 (8” ... 48”): 3.125 Hz/3.75 Hz</td>
</tr>
<tr>
<td>DN 350 ... 1200 (14” ... 48”): 1.5625 Hz/1.875 Hz</td>
<td>DN 1400 ... 2000 (64” ... 78”): 1.5625 Hz/1.875 Hz</td>
</tr>
<tr>
<td><strong>Process connection</strong></td>
<td></td>
</tr>
<tr>
<td>Flanges</td>
<td></td>
</tr>
<tr>
<td>• EN 1092-1</td>
<td></td>
</tr>
<tr>
<td>- PN 10 (145 psi): DN 200 ... 300 (8” ... 12”)</td>
<td>- Raised face (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions)</td>
</tr>
<tr>
<td>- PN 10 (145 psi): DN 350 ... 1200 (14” ... 48”)</td>
<td>- PN 6 (67 psi): DN 1400 ... 2000 (54” ... 78”)</td>
</tr>
<tr>
<td>- Raised face flanges</td>
<td>- PN 10 (145 psi): DN 200 ... 2000 (8” ... 78”)</td>
</tr>
<tr>
<td>- PN 16 (232 psi): DN 350 ... 1200 (14” ... 48”)</td>
<td>- PN 16 (232 psi): DN 65 ... 600 (2½” ... 24”)</td>
</tr>
<tr>
<td>- Raised face flanges</td>
<td>- PN 40 (580 psi): DN 25 ... 50 (1” ... 2”)</td>
</tr>
<tr>
<td>- PN 40 (580 psi): DN 25 ... 40 (1” ... 1½”)</td>
<td></td>
</tr>
<tr>
<td><strong>Rated Operation conditions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td></td>
</tr>
<tr>
<td>-40 ... +70 °C (-40 ... +158 °F)</td>
<td>-20 ... +70 °C (-4 ... +158 °F)</td>
</tr>
<tr>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
</tr>
<tr>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
</tr>
<tr>
<td>Operating pressure (Abs)</td>
<td></td>
</tr>
<tr>
<td>[abs. bar] (Maximum operating pressure depending on flange standard, decreases with increasing operating temperature)</td>
<td></td>
</tr>
<tr>
<td>DN 25 ... 40 (1” ... 1½”): 0.01 ... 40 bar (0.15 ... 580 psi)</td>
<td>DN 25 ... 50 (1” ... 2½”): 0.01 ... 40 bar (0.15 ... 580 psi)</td>
</tr>
<tr>
<td>DN 50 ... 300 (2” ... 12”)</td>
<td>DN 65 ... 1200 (2½” ... 48”)</td>
</tr>
<tr>
<td>0.03 ... 20 bar (0.44 ... 290 psi)</td>
<td>0.01 ... 16 bar (0.15 ... 232 psi)</td>
</tr>
<tr>
<td>DN 350 ... 1200 (14” ... 48”): 0.01 ... 16 bar (0.15 ... 232 psi)</td>
<td>DN 1400 ... 2000 (54” ... 78”): 0.01 ... 10 bar (0.15 ... 145 psi)</td>
</tr>
<tr>
<td><strong>Enclosure rating</strong></td>
<td></td>
</tr>
<tr>
<td>• Standard</td>
<td>IP67 to EN 60529 / NEMA 4X/6 (1 mH₂O for 30 min)</td>
</tr>
<tr>
<td>IP68 to EN 60529 / NEMA 4P (10 mH₂O continuously)</td>
<td>IP67 to EN 60529 / NEMA 4X/6 (1 mH₂O for 30 min)</td>
</tr>
<tr>
<td>• Option</td>
<td>IP68 to EN 60529 / NEMA 6P (10 mH₂O continuously)</td>
</tr>
<tr>
<td>Pressure drop at 3 m/s (10 ft/s)</td>
<td>As straight pipe</td>
</tr>
<tr>
<td>DN 25 ... 40 (1” ... 1½”): As straight pipe</td>
<td></td>
</tr>
<tr>
<td>DN 50 ... 300 (2” ... 12”)</td>
<td>1.5 x PN (where applicable)</td>
</tr>
<tr>
<td>Max. 25 mbar (0.36 psi)</td>
<td></td>
</tr>
<tr>
<td>DN 350 ... 1200 (14” ... 48”): As straight pipe</td>
<td></td>
</tr>
<tr>
<td>Test pressure</td>
<td></td>
</tr>
<tr>
<td>1.5 x PN (where applicable)</td>
<td>1.5 x PN (where applicable)</td>
</tr>
<tr>
<td>Mechanical load</td>
<td></td>
</tr>
<tr>
<td>18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36</td>
<td>18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36</td>
</tr>
<tr>
<td>Sensor: 3.17 grms</td>
<td>Sensor: 3.17 grms</td>
</tr>
<tr>
<td>Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms</td>
<td>Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms</td>
</tr>
<tr>
<td>Sensor with compact MAG 6000 I mounted transmitter: 1.14 grms</td>
<td>Sensor with compact MAG 6000 I mounted transmitter: 1.14 grms</td>
</tr>
</tbody>
</table>

**Note:** The above specifications are subject to change without notice.
1) 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:
1) Meters used in networks for the supply, distribution and discharge of water.
2) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.
3) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment.
4) Any meter mounted on a ship or mobile offshore platform.

**MAG 5100 W 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 (Order 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
# SITRANS F flowmeters

## SITRANS F M

### Flow sensor MAG 5100 W

MAG 5100 W 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:

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 [m³/h]</td>
<td>20</td>
<td>31.25</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
</tr>
<tr>
<td><strong>Q3 [m³/h]</strong></td>
<td>16</td>
<td>25</td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>1.02</td>
<td>1.6</td>
<td>2.6</td>
<td>4.03</td>
<td>6.4</td>
<td>10.24</td>
<td>16</td>
<td>25.6</td>
<td>40.32</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.64</td>
<td>1.00</td>
<td>1.60</td>
<td>2.52</td>
<td>4.0</td>
<td>6.4</td>
<td>10.0</td>
<td>16.0</td>
<td>25.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong> Q3/Q1</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>20</td>
<td>31.25</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
</tr>
<tr>
<td><strong>Q3 [m³/h]</strong></td>
<td>16</td>
<td>25</td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.41</td>
<td>0.63</td>
<td>1.02</td>
<td>1.6</td>
<td>2.54</td>
<td>4.06</td>
<td>6.35</td>
<td>10.2</td>
<td>16.0</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.25</td>
<td>0.40</td>
<td>0.63</td>
<td>1.00</td>
<td>1.59</td>
<td>2.54</td>
<td>3.97</td>
<td>6.35</td>
<td>10.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong> Q3/Q1</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>20</td>
<td>31.25</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
</tr>
<tr>
<td><strong>Q3 [m³/h]</strong></td>
<td>16</td>
<td>25</td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.32</td>
<td>0.50</td>
<td>0.80</td>
<td>1.20</td>
<td>2.00</td>
<td>3.20</td>
<td>5.0</td>
<td>8.0</td>
<td>12.6</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.20</td>
<td>0.31</td>
<td>0.50</td>
<td>0.75</td>
<td>1.25</td>
<td>2.00</td>
<td>3.13</td>
<td>5.0</td>
<td>7.90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong> Q3/Q1</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
<td>1250</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Q3 [m³/h]</strong></td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
<td>1000</td>
<td>1600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.40</td>
<td>0.63</td>
<td>1.00</td>
<td>1.60</td>
<td>2.50</td>
<td>4.00</td>
<td>6.3</td>
<td>10.0</td>
<td>16.0</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.25</td>
<td>0.39</td>
<td>0.63</td>
<td>1.00</td>
<td>1.56</td>
<td>2.50</td>
<td>3.94</td>
<td>6.3</td>
<td>10.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong> Q3/Q1</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
<td>1250</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Q3 [m³/h]</strong></td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
<td>1000</td>
<td>1600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.32</td>
<td>0.50</td>
<td>0.80</td>
<td>1.28</td>
<td>2.00</td>
<td>3.20</td>
<td>5.0</td>
<td>8.0</td>
<td>12.8</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.20</td>
<td>0.32</td>
<td>0.50</td>
<td>0.80</td>
<td>1.25</td>
<td>2.00</td>
<td>3.15</td>
<td>5.0</td>
<td>8.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong> Q3/Q1</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
<td>1250</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Q3 [m³/h]</strong></td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
<td>1000</td>
<td>1600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.26</td>
<td>0.40</td>
<td>0.64</td>
<td>1.02</td>
<td>1.60</td>
<td>2.56</td>
<td>4.0</td>
<td>6.4</td>
<td>10.24</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.16</td>
<td>0.25</td>
<td>0.40</td>
<td>0.64</td>
<td>1.00</td>
<td>1.60</td>
<td>2.52</td>
<td>4.0</td>
<td>6.4</td>
</tr>
</tbody>
</table>

The Label is placed on the side of the encapsulation. An example of the product label is shown below:
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Sensor SITRANS F M MAG 5100 W</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hastelloy electrodes, carbon steel flanges, EU water markets and low flow applications</td>
<td>7 ME 6 5 2 0 - 1 2</td>
</tr>
</tbody>
</table>

#### Diameter

- 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")
- 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")
- (42")
- (44")
- DN 1200 (48")

#### Flange norm and pressure rating

- to EN 1092-1
  - PN 10 (DN 200 ... 1200/8" ... 48")
  - PN 16 (DN 50 ... 1200/2" ... 48")
  - PN 16, non PED (DN 700 ... 1200/28" ... 48")
  - PN 40 (DN 25 ... 40/1" ... 1½")
- to ANSI B16.5
  - class 150 (1" ... 24")
  - to AWWA C-207
  - Class D (28" ... 48")
- to AS 4087
  - PN 16 (DN 50 ... 1200/2" ... 48")

#### Liner material

- EPDM
- NBR Hard Rubber

#### Transmitter

- Sensor for remote transmitter (Order transmitter separately)
  - MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC
  - MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC
  - 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

#### 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)

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

<table>
<thead>
<tr>
<th>Sensor SITRANS F M MAG 5100 W</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hastelloy electrodes, carbon steel flanges, EU water markets and low flow applications</td>
<td>7 ME 6 5 2 0 - 1 2</td>
</tr>
</tbody>
</table>

#### Cable glands/terminal box

- Metric/Polyamid terminal box or 6000 l compact
  - ½" NPT/Polyamid terminal box or 6000 l compact
  - Short lead time (details in PMD)

### Additional information

Please add “Z” to Order No. and specify Order code(s) and plain text.

- Factory certificate according to EN 10204-2.2: C14
- Factory certificate according to EN 10204-2.1: C15
- Approval/Verification (M-001 : DN 50-300, EPDM liner, EN 1092-1 PN10 & PN16 flanges with MAG 6000 CT):
  - Without verification according to OIML 49: P10
  - MI001 Q3/Q1 = 25: P11
  - MI001 Q3/Q1 = 63: P12
  - MI001 Q3/Q1 = 80: P13
  - MI001 Q3/Q1 = 160: P16
  - MI001 Q3/Q1 = 200: P17
  - MI001 Q3/Q1 = 250: P18
- 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 order no.): Y40
- Sensor for remote transmitter’s junction box potted to IP68 with wired cable (specify cable order no.): Y41
- Other postproduction requirements (add desired text): Y99
- Additional Calibrations:
  - Matched pair - (Standard production calibration where sensor and transmitter are calibrated together): On request
  - Customer specified calibration up to 10 point: On request
  - Customer witnessed calibration: On request

1) 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.

#### Description

- Potting kit for terminal box of SITRANS F M sensors for IP68/NEMA 6P (Not for ATEX): FDK-085U0220
- Short lead time (details in PMD)

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 l 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-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.
### Selection and Ordering data

#### Sensor SITRANS F M MAG 5100 W

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25 (1&quot;)</td>
<td>2D</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>2R</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>2Y</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>3F</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>3M</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>3T</td>
</tr>
<tr>
<td>DN 125 (5&quot;)</td>
<td>4B</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>4H</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>4P</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>4V</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>5D</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>5R</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>5Y</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>6F</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>6P</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>6Y</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>7D</td>
</tr>
<tr>
<td>DN 750 (30&quot;)</td>
<td>7H</td>
</tr>
<tr>
<td>DN 800 (32&quot;)</td>
<td>7M</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>7R</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>7U</td>
</tr>
<tr>
<td>(42&quot;)</td>
<td>7V</td>
</tr>
<tr>
<td>(44&quot;)</td>
<td>8B</td>
</tr>
<tr>
<td>DN 1200 (48&quot;)</td>
<td>8F</td>
</tr>
<tr>
<td>DN 1400 (54&quot;)</td>
<td>8K</td>
</tr>
<tr>
<td>DN 1500 (60&quot;)</td>
<td>8P</td>
</tr>
<tr>
<td>DN 1600 (66&quot;)</td>
<td>8T</td>
</tr>
<tr>
<td>DN 1800 (72&quot;)</td>
<td>8Y</td>
</tr>
<tr>
<td>DN 2000 (78&quot;)</td>
<td>8Y</td>
</tr>
</tbody>
</table>

#### Flange norm and pressure rating

- to EN 1092-1
  - PN 6 (DN 1400 ... 2000 (54" ... 78"))
  - PN 10 (DN 200 ... 2000 (8" ... 78"))
  - PN 16 (DN 65 ... 600 (2½" ... 24"))
  - PN 16, non PED (DN 700 ... 1200/28" ... 48")
  - PN 40 (DN 25 ... 50 (1" ... 2"))

- to ANSI B16.5
  - class 150 (1" ... 24")
  - Class D (28" ... 78")

- to AS 4087
  - PN 16 (DN 50 ... 1200 (2" ... 48"))

- to JIS
  - B 2222:2004 K10 (1" ... 24")

#### Flange material

- Carbon steel flanges ASTM A 105

#### Liner material

- Ebonite Hard Rubber

#### Electrode material

- Hastelloy

---

### Additional information

**Customer-specific converter setup**

- Factory certificate according to EN 10204-2.2
- Factory certificate according to EN 10204-2.1
- Tag name plate, stainless steel fixed with SS wire
- Tag name plate, plastic (self-adhesive)
- Customer-specific converter setup
- Sensor cables wired (specify cable order no.)
- Sensor for remote transmitter’s junction box potted to IP68 with wired cable (specify cable order no.)
- Other postproduction requirements (add desired text)

**Description**

- Potting kit for terminal box of SITRANS F M sensors for IP68/NEMA 6P (Not for ATEX)

---

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.

Please use online Product selector to get latest updates.

Product selector link: www.pia-selector.automation.siemens.com

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering.
### Nominal size

<table>
<thead>
<tr>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
<th>[mm]</th>
<th>[inch]</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>½</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>7.9</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>187</td>
<td>7.4</td>
<td>187</td>
<td>7.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>7.9</td>
</tr>
<tr>
<td>40</td>
<td>1½</td>
<td>197</td>
<td>7.8</td>
<td>197</td>
<td>7.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>7.9</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>188</td>
<td>7.4</td>
<td>205</td>
<td>8.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>7.9</td>
</tr>
<tr>
<td>65</td>
<td>2½</td>
<td>194</td>
<td>7.6</td>
<td>212</td>
<td>8.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>7.9</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>200</td>
<td>7.9</td>
<td>222</td>
<td>8.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>7.9</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>207</td>
<td>8.1</td>
<td>242</td>
<td>9.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>9.8</td>
</tr>
<tr>
<td>125</td>
<td>5</td>
<td>217</td>
<td>8.5</td>
<td>255</td>
<td>10.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>9.8</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>232</td>
<td>9.1</td>
<td>276</td>
<td>10.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td>11.8</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
<td>257</td>
<td>10.1</td>
<td>304</td>
<td>12.0</td>
<td>350</td>
<td>13.8</td>
<td>350</td>
<td>13.8</td>
<td>350</td>
<td>13.8</td>
<td>350</td>
<td>13.8</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>284</td>
<td>11.2</td>
<td>332</td>
<td>13.1</td>
<td>450</td>
<td>17.7</td>
<td>450</td>
<td>17.7</td>
<td>450</td>
<td>17.7</td>
<td>450</td>
<td>17.7</td>
</tr>
<tr>
<td>300</td>
<td>12</td>
<td>310</td>
<td>12.2</td>
<td>357</td>
<td>14.1</td>
<td>500</td>
<td>19.7</td>
<td>500</td>
<td>19.7</td>
<td>500</td>
<td>19.7</td>
<td>500</td>
<td>19.7</td>
</tr>
<tr>
<td>400</td>
<td>16</td>
<td>407</td>
<td>16.0</td>
<td>387</td>
<td>15.2</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
</tr>
<tr>
<td>450</td>
<td>18</td>
<td>438</td>
<td>17.2</td>
<td>418</td>
<td>16.5</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
</tr>
<tr>
<td>500</td>
<td>20</td>
<td>463</td>
<td>18.2</td>
<td>443</td>
<td>17.4</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
</tr>
<tr>
<td>600</td>
<td>24</td>
<td>514</td>
<td>20.2</td>
<td>494</td>
<td>19.4</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
<td>600</td>
<td>23.6</td>
</tr>
<tr>
<td>700</td>
<td>28</td>
<td>564</td>
<td>22.2</td>
<td>544</td>
<td>21.4</td>
<td>700</td>
<td>27.6</td>
<td>700</td>
<td>27.6</td>
<td>700</td>
<td>27.6</td>
<td>700</td>
<td>27.6</td>
</tr>
<tr>
<td>750</td>
<td>30</td>
<td>591</td>
<td>23.3</td>
<td>571</td>
<td>22.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>750</td>
<td>29.5</td>
</tr>
<tr>
<td>800</td>
<td>32</td>
<td>616</td>
<td>24.3</td>
<td>606</td>
<td>23.9</td>
<td>800</td>
<td>31.5</td>
<td>800</td>
<td>31.5</td>
<td>800</td>
<td>31.5</td>
<td>800</td>
<td>31.5</td>
</tr>
<tr>
<td>900</td>
<td>36</td>
<td>663</td>
<td>26.1</td>
<td>653</td>
<td>25.7</td>
<td>900</td>
<td>35.4</td>
<td>900</td>
<td>35.4</td>
<td>900</td>
<td>35.4</td>
<td>900</td>
<td>35.4</td>
</tr>
<tr>
<td>1000</td>
<td>40</td>
<td>714</td>
<td>28.1</td>
<td>704</td>
<td>27.7</td>
<td>1000</td>
<td>39.4</td>
<td>1000</td>
<td>39.4</td>
<td>1000</td>
<td>39.4</td>
<td>1000</td>
<td>39.4</td>
</tr>
<tr>
<td>1200</td>
<td>48</td>
<td>765</td>
<td>30.1</td>
<td>755</td>
<td>29.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1100</td>
<td>43.3</td>
</tr>
<tr>
<td>1400</td>
<td>54</td>
<td>820</td>
<td>32.3</td>
<td>810</td>
<td>31.9</td>
<td>1200</td>
<td>47.2</td>
<td>1200</td>
<td>47.2</td>
<td>1200</td>
<td>47.2</td>
<td>1200</td>
<td>47.2</td>
</tr>
<tr>
<td>1500</td>
<td>60</td>
<td>892</td>
<td>34.6</td>
<td>882</td>
<td>34.1</td>
<td>1400</td>
<td>55.1</td>
<td>1400</td>
<td>55.1</td>
<td>1400</td>
<td>55.1</td>
<td>1400</td>
<td>55.1</td>
</tr>
<tr>
<td>1600</td>
<td>66</td>
<td>972</td>
<td>38.2</td>
<td>962</td>
<td>37.9</td>
<td>1500</td>
<td>59.1</td>
<td>1500</td>
<td>59.1</td>
<td>1500</td>
<td>59.1</td>
<td>1500</td>
<td>59.1</td>
</tr>
<tr>
<td>1800</td>
<td>72</td>
<td>1025</td>
<td>40.4</td>
<td>1015</td>
<td>40.0</td>
<td>1600</td>
<td>63.0</td>
<td>1600</td>
<td>63.0</td>
<td>1600</td>
<td>63.0</td>
<td>1600</td>
<td>63.0</td>
</tr>
<tr>
<td>2000</td>
<td>78</td>
<td>1123</td>
<td>44.2</td>
<td>1113</td>
<td>43.8</td>
<td>1800</td>
<td>70.9</td>
<td>1800</td>
<td>70.9</td>
<td>1800</td>
<td>70.9</td>
<td>1800</td>
<td>70.9</td>
</tr>
</tbody>
</table>

- not available

1) PN 6 only in size DN 1400 … DN 2000 (54” … 78”)

**Order No. 7ME6520**
- EPDM or NBR lining
- DN 25 ... 40 (1” ... 1½”)
- DN 350 ... 1200 (14” ... 48”)

**Order No. 7ME6580**
- Ebonite lining
- DN 25 ... 2000 (1” ... 78”)

---

© Siemens AG 2010

**SITRANS F flowmeters**

**SITRANS F M**

**Flow sensor MAG 5100 W**

---

**Dimensional drawings**

![Dimensional drawings](image-url)

Order No. 7ME6520
- EPDM or NBR lining
- DN 25 ... 40 (1” ... 1½”)
- DN 350 ... 1200 (14” ... 48”)

Order No. 7ME6580
- Ebonite lining
- DN 25 ... 2000 (1” ... 78”)

---

**Nominal size**

- **A**
- **L**

**Order No. 7ME6520**
- NBR or EPDM lining

**Order No. 7ME6580**
- Ebonite liner

PN 6 [1]
- PN 10
- PN 16
- PN 16 non PED
- PN 40
- Class 150 / AWWA
- JIS 10K
- AS

---

**[image-url]**

**[image-url]**

---

© Siemens AG 2010
### Flow sensor MAG 5100 W

#### MAG 5100 W / 6000 L Compact

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>A</th>
<th>Order No. 7ME6520 NBR or EPDM liner</th>
<th>Order No. 7ME6580 Ebonite liner</th>
<th>L</th>
<th>PN 10</th>
<th>PN 16</th>
<th>PN 16 non PED</th>
<th>PN 40</th>
<th>Class 150/ AWWA</th>
<th>JIS 10K</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
<td>[mm]</td>
<td>[inch]</td>
</tr>
<tr>
<td>15</td>
<td>½</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>187</td>
<td>7.4</td>
<td>187</td>
<td>7.4</td>
<td>340</td>
<td>13.4</td>
<td>338</td>
<td>13.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>40</td>
<td>1½</td>
<td>197</td>
<td>7.8</td>
<td>197</td>
<td>7.8</td>
<td>350</td>
<td>13.8</td>
<td>348</td>
<td>13.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>188</td>
<td>7.4</td>
<td>205</td>
<td>8.1</td>
<td>351</td>
<td>13.8</td>
<td>356</td>
<td>14.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>65</td>
<td>2½</td>
<td>194</td>
<td>7.6</td>
<td>212</td>
<td>8.3</td>
<td>347</td>
<td>13.7</td>
<td>363</td>
<td>14.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>200</td>
<td>7.9</td>
<td>222</td>
<td>8.7</td>
<td>353</td>
<td>13.9</td>
<td>373</td>
<td>14.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>207</td>
<td>8.1</td>
<td>242</td>
<td>9.5</td>
<td>360</td>
<td>14.2</td>
<td>393</td>
<td>15.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>125</td>
<td>5</td>
<td>217</td>
<td>8.5</td>
<td>255</td>
<td>10.0</td>
<td>370</td>
<td>14.6</td>
<td>406</td>
<td>16.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>232</td>
<td>9.1</td>
<td>276</td>
<td>10.9</td>
<td>385</td>
<td>15.3</td>
<td>427</td>
<td>16.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
<td>257</td>
<td>10.1</td>
<td>320</td>
<td>12.6</td>
<td>410</td>
<td>16.1</td>
<td>455</td>
<td>17.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>284</td>
<td>11.2</td>
<td>352</td>
<td>13.9</td>
<td>437</td>
<td>17.2</td>
<td>485</td>
<td>19.1</td>
<td>450</td>
<td>17.7</td>
</tr>
<tr>
<td>300</td>
<td>12</td>
<td>310</td>
<td>12.2</td>
<td>387</td>
<td>14.1</td>
<td>463</td>
<td>18.2</td>
<td>548</td>
<td>21.5</td>
<td>500</td>
<td>19.7</td>
</tr>
<tr>
<td>400</td>
<td>16</td>
<td>407</td>
<td>16.0</td>
<td>387</td>
<td>15.2</td>
<td>560</td>
<td>22.1</td>
<td>538</td>
<td>21.2</td>
<td>600</td>
<td>23.6</td>
</tr>
<tr>
<td>450</td>
<td>18</td>
<td>438</td>
<td>17.2</td>
<td>418</td>
<td>16.5</td>
<td>591</td>
<td>23.3</td>
<td>589</td>
<td>22.4</td>
<td>650</td>
<td>23.6</td>
</tr>
<tr>
<td>500</td>
<td>20</td>
<td>463</td>
<td>18.2</td>
<td>443</td>
<td>17.4</td>
<td>616</td>
<td>24.3</td>
<td>594</td>
<td>23.4</td>
<td>680</td>
<td>23.8</td>
</tr>
<tr>
<td>600</td>
<td>24</td>
<td>514</td>
<td>20.2</td>
<td>494</td>
<td>19.4</td>
<td>667</td>
<td>26.3</td>
<td>645</td>
<td>25.4</td>
<td>750</td>
<td>23.6</td>
</tr>
<tr>
<td>700</td>
<td>28</td>
<td>564</td>
<td>22.2</td>
<td>544</td>
<td>21.4</td>
<td>717</td>
<td>28.2</td>
<td>695</td>
<td>27.4</td>
<td>800</td>
<td>27.6</td>
</tr>
<tr>
<td>800</td>
<td>30</td>
<td>591</td>
<td>23.3</td>
<td>571</td>
<td>22.5</td>
<td>744</td>
<td>29.3</td>
<td>722</td>
<td>28.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>900</td>
<td>32</td>
<td>616</td>
<td>24.3</td>
<td>606</td>
<td>23.9</td>
<td>779</td>
<td>30.7</td>
<td>757</td>
<td>29.8</td>
<td>900</td>
<td>31.5</td>
</tr>
<tr>
<td>1000</td>
<td>36</td>
<td>653</td>
<td>26.1</td>
<td>653</td>
<td>25.7</td>
<td>826</td>
<td>32.5</td>
<td>804</td>
<td>31.7</td>
<td>900</td>
<td>35.4</td>
</tr>
<tr>
<td>1200</td>
<td>40</td>
<td>714</td>
<td>28.1</td>
<td>704</td>
<td>27.7</td>
<td>871</td>
<td>34.5</td>
<td>868</td>
<td>35.7</td>
<td>1000</td>
<td>39.4</td>
</tr>
<tr>
<td>1400</td>
<td>44</td>
<td>763</td>
<td>31.1</td>
<td>750</td>
<td>29.7</td>
<td>1028</td>
<td>40.5</td>
<td>958</td>
<td>38.5</td>
<td>1200</td>
<td>47.2</td>
</tr>
<tr>
<td>1600</td>
<td>48</td>
<td>800</td>
<td>32.4</td>
<td>810</td>
<td>31.9</td>
<td>1058</td>
<td>42.7</td>
<td>1081</td>
<td>43.7</td>
<td>1600</td>
<td>57.2</td>
</tr>
<tr>
<td>1800</td>
<td>52</td>
<td>900</td>
<td>36.0</td>
<td>912</td>
<td>34.8</td>
<td>1274</td>
<td>50.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>56</td>
<td>912</td>
<td>37.8</td>
<td>923</td>
<td>36.5</td>
<td>1374</td>
<td>51.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-: not available

© Siemens AG 2010
### Weight

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>Order No. 7ME6520 NBR or EPDM liner</th>
<th>Order No. 7ME6580 Ebonite liner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PN 10</td>
<td>PN 16</td>
</tr>
<tr>
<td>[mm]</td>
<td>[inch]</td>
<td>[kg]</td>
</tr>
<tr>
<td>25</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>40</td>
<td>1½</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>65</td>
<td>2½</td>
<td>10.7</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>11.6</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>15.2</td>
</tr>
<tr>
<td>125</td>
<td>5</td>
<td>20.4</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
<td>48</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>64</td>
</tr>
<tr>
<td>300</td>
<td>12</td>
<td>76</td>
</tr>
<tr>
<td>350</td>
<td>14</td>
<td>104</td>
</tr>
<tr>
<td>400</td>
<td>16</td>
<td>119</td>
</tr>
<tr>
<td>450</td>
<td>18</td>
<td>136</td>
</tr>
<tr>
<td>500</td>
<td>20</td>
<td>163</td>
</tr>
<tr>
<td>600</td>
<td>24</td>
<td>236</td>
</tr>
<tr>
<td>700</td>
<td>28</td>
<td>270</td>
</tr>
<tr>
<td>750</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>800</td>
<td>32</td>
<td>346</td>
</tr>
<tr>
<td>900</td>
<td>36</td>
<td>432</td>
</tr>
<tr>
<td>1000</td>
<td>40</td>
<td>513</td>
</tr>
<tr>
<td>1200</td>
<td>48</td>
<td>643</td>
</tr>
<tr>
<td>1400</td>
<td>54</td>
<td>1592</td>
</tr>
<tr>
<td>1500</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>1600</td>
<td>66</td>
<td>2110</td>
</tr>
<tr>
<td>1800</td>
<td>72</td>
<td>2560</td>
</tr>
<tr>
<td>2000</td>
<td>78</td>
<td>3640</td>
</tr>
</tbody>
</table>

- Not available

With transmitter MAG 5000 and MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lbs), with MAG 6000 I, weight is increased by 5.5 kg (12.1 lb).
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 (½” to 78”)
- Stock program of MAG 3100P (7ME6340) secures short delivery time
- Wide pressure range: PN 6 to PN 100 ANSI Class 150 / 300, AS 2129 / AS 4087. 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 & distribution
- Oil & gas / HPI
- Water & waste water

**Mode of operation**

The flow measuring principle is based on Faraday's law of electromagnetic induction were 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/RS485.
Pressure-temperature curve to EN (DIN) flanges, material A 105 carbon steel

Pressure-temperature curve to EN (DIN) flanges ANSI 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 exact data please refer to the PED requirements.
## Technical specifications

### MAG 3100 P

**Product characteristic**
- **Nominal size**
  - DN 15 ... DN 300 (½” ... 12”)
- **Measuring principle**
  - Electromagnetic induction
- **Excitation frequency** (Mains supply: 50 Hz/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

**Process connection**
- **Flanges**
  - EN 1092-1, raised face
    - DN 15 ... 50 (½” ... 2”): PN 40 (580 psi)
    - DN 65 ... 300 (2½” ... 12”): PN 16 (232 psi)
    - DN 200 ... 300 (8” ... 12”): PN 10 (145 psi)
  - ANSI B16.5 (~BS 1560), raised face
    - ½” ... 12”: Class 150 (20 bar (290 psi))

**Rated operation conditions**
- **Ambient temperature**
  - -40 ... +100 ºC (-40 ... +212 °F)
  - -20 ... +60 ºC (-4 ... +140 ºC)

### MAG 3100

**Product characteristic**
- **Nominal size**
  - DN 15 ... DN 2000 (½” ... 78”)
- **Measuring principle**
  - Electromagnetic induction
- **Excitation frequency**
  - DN 15 ... 65 (½” ... 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**
  - EN 1092-1, raised face
    - 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)
  - ANSI B16.5 (~BS 1560), raised face
    - ½” ... 24”: Class 150 (20 bar (290 psi))
  - Other flanges and pressure ratings on request

**Rated operation conditions**
- **Ambient temperature**
  - -40 ... +100 ºC (-40 ... +212 ºF)
  - -20 ... +60 ºC (-4 ... +140 ºC)

### MAG 3100 HT (High Temperature)

**Product characteristic**
- **Nominal size**
  - DN 15 ... DN 300 (½” ... 12”)
- **Measuring principle**
  - Electromagnetic induction
- **Excitation frequency**
  - 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 1400 ... 2000 (54” ... 78”): 1.5625 Hz/1.875 Hz

**Process connection**
- **Flanges**
  - EN 1092-1, raised face
    - DN 15 ... 50 (½” ... 2”): PN 40 (580 psi)
    - DN 65 ... 300 (2½” ... 12”): PN 16 (232 psi)
    - DN 200 ... 2000 (8” ... 78”): PN 10 (145 psi)
  - ANSI B16.5 (~BS 1560), raised face
    - ½” ... 24”: Class 150 (20 bar (290 psi))
  - Other flanges and pressure ratings on request

**Rated operation conditions**
- **Ambient temperature**
  - -10 ... +60 ºC (-14 ... +140 ºF)

### Table E

- AS 2129, raised face
  - ½” ... 24”: Class 150 (20 bar (290 psi))
  - ½” ... 24”: Class 150 (20 bar (290 psi))

- Other flanges and pressure ratings on request

---

© Siemens AG 2010
## Version

<table>
<thead>
<tr>
<th>MAG 3100 P</th>
<th>MAG 3100</th>
<th>MAG 3100 HT (High Temperature)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating pressure</strong> (abs. bar)</td>
<td>Neoprene 0.01 ... 100 bar (0.15 ... 1450 psi)</td>
<td>Neoprene 0.01 ... 100 bar (0.15 ... 1450 psi)</td>
</tr>
<tr>
<td>PFA</td>
<td>EPDM 0.01 ... 40 bar (0.15 ... 580 psi)</td>
<td>Linatex® (rubber) -40 ... +70 °C (-40 ... +158 °F) for temperatures below -20 °C (-4 °F) AISI 304 or 316 flanges must be used</td>
</tr>
<tr>
<td>- DN 25 ... 100 (1” ... 4”): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)</td>
<td>Linatex® 0.01 ... 40 bar (0.15 ... 580 psi)</td>
<td>Ebonite 0.01 ... 100 bar (0.15 ... 1450 psi)</td>
</tr>
</tbody>
</table>

### Enclosure rating

- IP67/NEMA 4X/6 to EN 60529, 1 mH₂O for 30 min
- Option: IP68/NEMA 6P to EN 60529, 10 mH₂O cont. (not for ATEX)

### Pressure drop at 3 m/s

- As straight pipe

### Test pressure

- 1.5 x PN (where applicable)

### Mechanical load

- 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36
- Sensor: 3.17 grms
- Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms
- Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 grms

### Temperature of medium

- PTFE -20 ... +130 °C (-4 ... +266 °F)
- PFA -20 ... +150 °C (-4 ... +300 °F)
- Neoprene 0 ... +70 °C (32 ... 158 °F)
- EPDM -10 ... +70 °C (14 ... 158 °F)
- Linatex® (rubber) -40 ... +70 °C (-40 ... +158 °F)
- Ebonite 0 ... 95 °C (32 ... 203 °F)
- PTFE -20 ... +100 °C (-4 ... +212 °F)
- PFA -20 ... +100 °C (-4 ... +212 °F)
- Neoprene 0 ... +70 °C (32 ... 158 °F)
- EPDM -10 ... +70 °C (14 ... 158 °F)
- Linatex® (rubber) -40 ... +70 °C (-40 ... +158 °F)
- Ebonite 0 ... 95 °C (32 ... 203 °F)
- PTFE -20 ... +100 °C (-4 ... +212 °F)
- PFA -20 ... +100 °C (-4 ... +212 °F)

### Design

<table>
<thead>
<tr>
<th>Flange and housing material</th>
<th>Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 μm)</th>
<th>Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 μm) or AISI 304 (1.4301) flanges and carbon steel housing, with corrosion resistant two component epoxy coating (min. 150 μm) or AISI 316 L (1.4404) flanges and housing, polished</th>
<th>Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 μm) or AISI 304 (1.4301) flanges and carbon steel housing, with corrosion resistant two component epoxy coating (min. 150 μm) or AISI 316 L (1.4404) flanges and housing, polished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring pipe material</td>
<td>AISI 304 (1.4301)</td>
<td>AISI 304 (1.4301)</td>
<td>AISI 304 (1.4301)</td>
</tr>
<tr>
<td>Electrode material</td>
<td>Hastelloy C276 (PFA: Hastelloy C22)</td>
<td>Hastelloy C276 (PFA: Hastelloy C22)</td>
<td>Hastelloy C276 (PFA: Hastelloy C22)</td>
</tr>
<tr>
<td>-grounding Electrode material</td>
<td>No grounding electrodes</td>
<td>Material as measuring electrodes: Exceptions - see ordering data</td>
<td>No grounding electrodes</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
## Technical specification for transmitter - please see transmitter pages.

1) 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:

1) Meters used in networks for the supply, distribution and discharge of water.
2) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.
3) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment.
4) Any meter mounted on a ship or mobile offshore platform.

### Version

<table>
<thead>
<tr>
<th>Version</th>
<th>MAG 3100 P</th>
<th>MAG 3100</th>
<th>MAG 3100 HT (High Temperature)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design (continued)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal box (remote version only)</td>
<td>• Standard fibre glass reinforced polyamide&lt;br&gt; • Option Stainless steel AISI 316 (1.4436)&lt;br&gt; • Ex ATEX (remote version only) Stainless steel AISI 316 (1.4436)</td>
<td>• Standard fibre glass reinforced polyamide&lt;br&gt; • Option Stainless steel AISI 316 (1.4436)&lt;br&gt; • Ex ATEX (remote version only) Stainless steel AISI 316 (1.4436)</td>
<td>• Stainless steel AISI 316 (1.4436)&lt;br&gt; • Ex ATEX (remote version only) Stainless steel AISI 316 (1.4436)</td>
</tr>
<tr>
<td>Cable entries</td>
<td>• Remote installation 2 x M20 or 2 x ½” NPT&lt;br&gt; • Compact installation&lt;br&gt; - MAG 5000/MAG 6000: 4 x M20 or 4 x ½” NPT&lt;br&gt; - MAG 6000 I: 2 x M25 (for supply/output)&lt;br&gt; - MAG 6000 I Ex: d: 2 x M25 (for supply/output)</td>
<td>• Remote installation 2 x M20 or 2 x ½” NPT&lt;br&gt; • Compact installation&lt;br&gt; - MAG 5000/MAG 6000: 4 x M20 or 4 x ½” NPT&lt;br&gt; - MAG 6000 I: 2 x M25 (for supply/output)&lt;br&gt; - MAG 6000 I Ex: d: 2 x M25 (for supply/output)</td>
<td>• Remote installation 2 x M20 or 2 x ½” NPT</td>
</tr>
</tbody>
</table>

### Certificates and approvals

### Calibration

- Standard production calibration, calibration report shipped with sensor
- Conforms to PED (All EN1092-1 flanges conforms to PED) – 97/23 EC
- Material certificate EN 10204 3.1
- Ex approvals
- ATEX 2G D sensor
- • DN 15 ... 300: EEx d e ia IIC T3 - T6<br> • DN 350 ... 2000 EEx e ia IIC T4 - T6<br> • FM Class 1 zone 1<br> • CSA Class 1 zone 1<br> • IEC Ex de ia IIC T3-T6<br> • Ex Id A21 IP67<br> • Non ATEX sensors<br> • FM Class 1 Div 2<br> • CSA Class 1, Div 2
- Drinking water approvals
- EPDM lining:
  - WRAS (WRc, BS6920 cold water, GB)<br>  - NSF/ANSI Standard 61 (Cold water, US)<br>  - ACS listed (F)<br>  - DVGW W270 (D)<br>  - Belgaqua (B)<br>  - MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes)
- Custody transfer (CT) (≤ DN2000) (only together with MAG 5000/6000 CT), order as special
- Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)<br> Heat meter pattern approval - OIML R 75 (Denmark)<br> Hot water pattern approval - PTB (Germany)<br> Other media than water - OIML R 117 (Denmark)<br> Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)<br> Heat meter pattern approval - OIML R 75 (Denmark)<br> Hot water pattern approval - PTB (Germany)<br> Other media than water - OIML R 117 (Denmark)<br> Heat meter pattern approval - OIML R 75 (Denmark)<br> Hot water pattern approval - PTB (Germany)
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Sensor SITRANS F M MAG 3100 P (Short delivery time)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td></td>
</tr>
<tr>
<td>DN 15 (½”)</td>
<td>1 V</td>
</tr>
<tr>
<td>DN 25 (1”)</td>
<td>2 D</td>
</tr>
<tr>
<td>DN 40 (1½”)</td>
<td>2 R</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>2 Y</td>
</tr>
<tr>
<td>DN 65 (2½”)</td>
<td>3 F</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>3 M</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>3 T</td>
</tr>
<tr>
<td>DN 125 (5”)</td>
<td>4 B</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>4 H</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>4 P</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>4 V</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>5 D</td>
</tr>
</tbody>
</table>

Flange norm and pressure rating

- **EN 1092-1**
- **PN 10** (DN 200 … 300 (8” … 12”))
- **PN 16** (DN 65 … 300 (2½” … 12”))
- **PN 40** (DN 15 … 50 (½” … 2”))
- **ANSI B 16.5**
  - **Class 150 (½” … 12”)**

Liner material

- **PTFE** (130 °C (266 °F))
  - **1 V**
- **PFA** (150 °C (302 °F)) (DN 25, 50, 80, 100 (1”, 2”, 3”, 4”))
  - **3 F**
- **130 °C (266 °F) (DN 50, 100)**
  - **7 M**

Electrode material

- **Hastelloy C276** (PFA: Hastelloy C22)
  - **2 H**

Transmitter

- Sensor for remote transmitter (Order transmitter separately)
  - **A**
- Sensor ATEX 2G D for remote transmitter (Order transmitter separately)
  - **B**
- **MAG 6000 I, Aluminium, 18 ... 90 V DC, 115 ... 230 V AC**
  - **C**
- **MAG 6000 I, Aluminium, 18 ... 30 V DC, ATEX 2G D**
  - **D**
- **MAG 6000 I, Aluminium, 115 ... 230 V AC, ATEX 2G D**
  - **E**
- **MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 AC**
  - **F**
- **MAG 6000, Polyamide, 115 ... 230 V AC**
  - **G**
- **MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC**
  - **H**
- **MAG 5000, Polyamide, 115 ... 230 V AC**
  - **I**

Communication

- **No communication, add-on possible**
  - **A**
- **HART**
  - **B**
- **PROFIBUS PA Profile 3**
  - **C**
- **PROFIBUS DP Profile 3 (not for ATEX)**
  - **D**
- **MODBUS RTU/RS 485 (not for ATEX)**
  - **E**
- **FOUNDATION Fieldbus H1**
  - **F**

Cable glands/terminal box

- **Metric: Polyamide terminal box or 6000 I compact**
  - **1 V**
- **½” NPT: Polyamide terminal box or 6000 I compact**
  - **2 D**
- **Metric SS terminal box (mandatory for stainless steel MAG 6000 transmitter)**
  - **3 M**
- **½” NPT SS terminal box (mandatory for stainless steel MAG 6000 transmitter)**
  - **4 H**
### Selection and Ordering data

**Sensor SITRANS F M MAG 3100**

**Order No.:** 7 ME 6 310 -

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15 (½&quot;) (PTFE liner only)</td>
<td>1 V</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>2 D</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>2 Y</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>2 F</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>3 F</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>3 M</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>3 T</td>
</tr>
<tr>
<td>DN 125 (5&quot;)</td>
<td>4 B</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>4 H</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>4 P</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>4 V</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>5 D</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>5 K</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>5 R</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>5 Y</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>6 F</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>6 P</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>6 Y</td>
</tr>
<tr>
<td>DN 750 (30&quot;) (AWWA and AS 2129 only)</td>
<td>7 H</td>
</tr>
<tr>
<td>DN 800 (33&quot;)</td>
<td>7 M</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>7 R</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>7 T</td>
</tr>
<tr>
<td>DN 1050 (42&quot;) (AWWA only)</td>
<td>7 U</td>
</tr>
<tr>
<td>DN 1100 (44&quot;) (AWWA only)</td>
<td>7 V</td>
</tr>
<tr>
<td>DN 1200 (48&quot;)</td>
<td>8 B</td>
</tr>
<tr>
<td>DN 1400 (54&quot;)</td>
<td>8 F</td>
</tr>
<tr>
<td>DN 1500 (60&quot;)</td>
<td>8 K</td>
</tr>
<tr>
<td>DN 1600 (66&quot;)</td>
<td>8 P</td>
</tr>
<tr>
<td>DN 1800 (72&quot;)</td>
<td>8 T</td>
</tr>
<tr>
<td>DN 2000 (78&quot;)</td>
<td>8 Y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flange norm and pressure rating</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1092-1</td>
<td>A</td>
</tr>
<tr>
<td>PN 6 (DN 65 ... 2000 (2½&quot; ... 78&quot;))</td>
<td>B</td>
</tr>
<tr>
<td>PN 10 (DN 200 ... 2000 (8&quot; ... 78&quot;))</td>
<td>C</td>
</tr>
<tr>
<td>PN 16 (DN 65 ... 1200 (2½&quot; ... 48&quot;))</td>
<td>D</td>
</tr>
<tr>
<td>PN 16, non PED (DN 700 ... 2000 (28&quot; ... 78&quot;))</td>
<td>E</td>
</tr>
<tr>
<td>PN 25 (DN 200 ... 600 (8&quot; ... 24&quot;))</td>
<td>F</td>
</tr>
<tr>
<td>PN 40 (DN 15 ... 600 (½&quot; ... 24&quot;))</td>
<td>G</td>
</tr>
<tr>
<td>PN 63 (DN 50 ... 300 (2&quot; ... 12&quot;)), not PTFE or PFA</td>
<td>H</td>
</tr>
<tr>
<td>PN 100 (DN 25 ... 300 (1&quot; ... 12&quot;)), not PTFE or PFA</td>
<td>I</td>
</tr>
<tr>
<td>ANSI B16.5</td>
<td>J</td>
</tr>
<tr>
<td>Class 150 (½&quot; ... 24&quot;)</td>
<td>K</td>
</tr>
<tr>
<td>Class 300 (½&quot; ... 24&quot;)</td>
<td>L</td>
</tr>
<tr>
<td>AWWA C207</td>
<td>M</td>
</tr>
<tr>
<td>Class D (28&quot; ... 78&quot;)</td>
<td>N</td>
</tr>
<tr>
<td>AS</td>
<td>P</td>
</tr>
<tr>
<td>2129, table E</td>
<td>Q</td>
</tr>
<tr>
<td>4087, PN 16 (DN 50 ... 1200 (2&quot; ... 48&quot;))</td>
<td>R</td>
</tr>
<tr>
<td>4087, PN 21 (DN 50 ... 600 (2&quot; ... 24&quot;))</td>
<td>S</td>
</tr>
<tr>
<td>JIS B 2220-2004</td>
<td>T</td>
</tr>
<tr>
<td>K10 (1&quot; ... 24&quot;)</td>
<td>U</td>
</tr>
<tr>
<td>K20 (1&quot; ... 24&quot;)</td>
<td>V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flange material</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon steel flanges ASTM A 105</td>
<td>1</td>
</tr>
<tr>
<td>Stainless steel flanges, AISI 304</td>
<td>2</td>
</tr>
<tr>
<td>Stainless steel flanges and sensor body, AISI 316L, polished</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liner material</td>
<td></td>
</tr>
<tr>
<td>Neoprene</td>
<td>1</td>
</tr>
<tr>
<td>EPDM</td>
<td>2</td>
</tr>
<tr>
<td>PTFE (DN ≤ 300, PN ≤ 50 bar / ≤ 12&quot;, PN ≤ 725 psi)</td>
<td>3</td>
</tr>
<tr>
<td>PTFE (DN ≤ 600, PN ≤ 40 bar / ≤ 14&quot; ≤ DN ≤ 24&quot;, PN ≤ 580 psi)</td>
<td>4</td>
</tr>
<tr>
<td>Ebonite</td>
<td>4</td>
</tr>
<tr>
<td>Linatex (PN ≤ 40 bar (580 psi) DN ≤ 600 (24&quot;))</td>
<td>5</td>
</tr>
<tr>
<td>PFA (DN 25, 50, 80, 100 (1&quot;, 2&quot;, 3&quot;, 4&quot;)) (PN ≤ 40 bar (580 psi))</td>
<td>7</td>
</tr>
</tbody>
</table>

| Electrode material      |           |
| Grounding electrodes not for PTFE/PFA liner or Pressure PN 100 |           |
| AISI 316 Ti             | 1         |
| Hastelloy C276 (PFA liner: Hastelloy C22) | 2         |
| Platinum (DN ≤ 300/12") (no grounding electrodes) | 3         |
| Titanium (not PFA liner) | 4         |
| Talontum (DN ≤ 600 (24")) (no grounding electrodes) | 5         |

| Transmitter with display |           |
| Sensor for remote transmitter (Order transmitter separately) | A         |
| Sensor ATEX 2G D for remote transmitter (Order transmitter separately) | B         |
| MAG 6000 l, Alu. 18 ... 90 V DC, 115 ... 230 V AC | C         |
| MAG 6000 l Alu. 18 ... 30 V DC, ATEX 2G D | D         |
| MAG 6000 l Alu. 115 ... 230 V, ATEX 2G D | E         |
| MAG 6000 Polyamide, 11 ... 30 V DC / 11 ... 24 V AC | F         |
| MAG 6000, Polyamide, 115 ... 230 V AC | H         |
| MAG 5000, Polyamide, 11 ... 30 V DC / 11 ... 24 V AC | J         |
| MAG 5000, Polyamide, 115 ... 230 V AC | K         |

| Communication           |           |
| No communication, add-on possible | A         |
| HART                    | B         |
| PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) | C         |
| PROFIBUS DP Profile 3 (not for ATEX) (only MAG 6000/MAG 6000 I) | D         |
| MODBUS RTU/RS 485 (not for ATEX) (only MAG 6000/MAG 6000 I) | E         |
| FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) | F         |

| Cable glands/terminal box |           |
| Metric: Polyamide terminal box or 6000 l compact ½" NPT | 1         |
| Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter) ½" NPT | 2         |
| Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter) ½" NPT | 3         |

◆ Short lead time (details in PMD)

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.

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.
Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potting kit for terminal box of SITRANS F M sensors for IP68/NEMA 6P (not for ATEX)</td>
<td>FDK-085U0220</td>
</tr>
</tbody>
</table>

Additional information

Please add “-Z” to Order No. and specify Order code(s) and plain text.

- Factory certificate according to EN 10204-2.2: C14
- Factory certificate according to EN 10204-2.1: C15
- 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 order no.): Y40
- Sensor for remote transmitter’s junction box potted to IP68 with wired cable (specify cable order 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
- Customer specified calibration up to 10 point: On request
- CT verification and authority seal according to: Cold water pattern approval – DANAK TS 22.36.001, PTB (Denmark and Germany): On request
- Customer witnessed calibration: On request

1) 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)

Please use online Product selector to get latest updates.

Product selector link: www.pia-selector.automation.siemens.com

MAG 5000/6000 transmitters and sensors are packed in separate boxes, then 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.
# SITRANS F flowmeters

## SITRANS F M

### Flow sensor MAG 3100

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor SITRANS F M</strong> MAG 3100 HT (High Temperature)</td>
<td>7 ME 6 3 2 0 -</td>
</tr>
<tr>
<td><strong>Flange norm and pressure rating</strong></td>
<td></td>
</tr>
<tr>
<td>EN 1092-1</td>
<td></td>
</tr>
<tr>
<td>PN 10 (DN 200 ... 300 (8&quot; ... 12&quot;))</td>
<td>B</td>
</tr>
<tr>
<td>PN 16 (DN 65 ... 300 (2½&quot; ... 12&quot;))</td>
<td>C</td>
</tr>
<tr>
<td>PN 25 (DN 200 ... 300 (8&quot; ... 12&quot;))</td>
<td>E</td>
</tr>
<tr>
<td>PN 40 (DN 15 ... 300 (½&quot; ... 12&quot;))</td>
<td>F</td>
</tr>
<tr>
<td>ANSI B16.5</td>
<td></td>
</tr>
<tr>
<td>Class 150 (½” ... 12”)</td>
<td>J</td>
</tr>
<tr>
<td>Class 300 (½” ... 12”)</td>
<td>K</td>
</tr>
<tr>
<td><strong>Flange material</strong></td>
<td></td>
</tr>
<tr>
<td>Carbon steel flanges ASTM A 105</td>
<td>1</td>
</tr>
<tr>
<td>Stainless steel flanges, AISI 304</td>
<td>2</td>
</tr>
<tr>
<td>Stainless steel flanges and sensor body, AISI 316L, polished</td>
<td>3</td>
</tr>
<tr>
<td><strong>Liner material</strong></td>
<td></td>
</tr>
<tr>
<td>PTFE (130 °C (266 °F))</td>
<td>2</td>
</tr>
<tr>
<td>PTFE including type E protection rings AISI 316 (180 °C (356 °F))</td>
<td>3</td>
</tr>
<tr>
<td>PFA (150 °C (302 °F)) (DN 25, 50, 80, 100 (1”, 2”, 3”, 4”))</td>
<td>7</td>
</tr>
<tr>
<td><strong>Electrode material</strong></td>
<td></td>
</tr>
<tr>
<td>AISI 316 Ti</td>
<td>1</td>
</tr>
<tr>
<td>Hastelloy C276 (PFA liner: Hastelloy C22)</td>
<td>2</td>
</tr>
<tr>
<td>Titanium (not for PFA)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Transmitter with display</strong></td>
<td></td>
</tr>
<tr>
<td>Sensor for remote transmitter (Order transmitter separately)</td>
<td>A</td>
</tr>
<tr>
<td>Sensor ATEX 2G D for remote transmitter (Order transmitter separately)</td>
<td>B</td>
</tr>
<tr>
<td>MAG 6000 I, Alu. 18 ... 50 V DC, 115 ... 230 V AC</td>
<td>C</td>
</tr>
<tr>
<td>MAG 6000 I, Alu. 18 ... 30 V DC, ATEX 2G D</td>
<td>D</td>
</tr>
<tr>
<td>MAG 6000 I, Alu. 115 ... 230 V AC, ATEX 2G D</td>
<td>E</td>
</tr>
<tr>
<td>MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC</td>
<td>F</td>
</tr>
<tr>
<td>MAG 6000, Polyamide, 115 ... 230 V AC</td>
<td>G</td>
</tr>
<tr>
<td>MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC</td>
<td>H</td>
</tr>
<tr>
<td>MAG 5000, Polyamide, 115 ... 230 V AC</td>
<td>I</td>
</tr>
</tbody>
</table>

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor SITRANS F M</strong> MAG 3100 HT (High Temperature)</td>
<td>7 ME 6 3 2 0 -</td>
</tr>
<tr>
<td><strong>Flange norm and pressure rating</strong></td>
<td></td>
</tr>
<tr>
<td>EN 1092-1</td>
<td></td>
</tr>
<tr>
<td>PN 10 (DN 200 ... 300 (8&quot; ... 12&quot;))</td>
<td>B</td>
</tr>
<tr>
<td>PN 16 (DN 65 ... 300 (2½&quot; ... 12&quot;))</td>
<td>C</td>
</tr>
<tr>
<td>PN 25 (DN 200 ... 300 (8&quot; ... 12&quot;))</td>
<td>E</td>
</tr>
<tr>
<td>PN 40 (DN 15 ... 300 (½&quot; ... 12&quot;))</td>
<td>F</td>
</tr>
<tr>
<td><strong>Flange material</strong></td>
<td></td>
</tr>
<tr>
<td>Carbon steel flanges ASTM A 105</td>
<td>1</td>
</tr>
<tr>
<td>Stainless steel flanges, AISI 304</td>
<td>2</td>
</tr>
<tr>
<td>Stainless steel flanges and sensor body, AISI 316L, polished</td>
<td>3</td>
</tr>
<tr>
<td><strong>Electrode material</strong> (no grounding electrodes)</td>
<td></td>
</tr>
<tr>
<td>AISI 316 Ti</td>
<td>1</td>
</tr>
<tr>
<td>Hastelloy C276 (PFA liner: Hastelloy C22)</td>
<td>2</td>
</tr>
<tr>
<td>Titanium (not for PFA)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Communication

- No communication, add-on possible
- 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

<table>
<thead>
<tr>
<th>Size</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; NPT, Polyamide terminal box or 6000 I compact</td>
<td>1</td>
</tr>
<tr>
<td>1/2&quot; NPT, Polyamide terminal box or 6000 I compact</td>
<td>2</td>
</tr>
<tr>
<td>Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)</td>
<td>3</td>
</tr>
<tr>
<td>Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)</td>
<td>4</td>
</tr>
</tbody>
</table>

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.

### Additional information

Please add “-Z” to Order No. and specify Order code(s) and plain text.

- 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 order no.): Y40
- Other postproduction requirements (add desired text): Y99

### Additional calibrations

- Matched pair - (Standard production calibration where sensor and transmitter is calibrated together): On request
- Customer specified calibration up to 10 point: On request
- CT verification and authority seal according to: Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany): On request
- Customer witnessed calibration: On request

**Ordering**

On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on https://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

Please use online Product selector to get latest updates.

**Product selector link:**

[www.pia-selector.automation.siemens.com](http://www.pia-selector.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.
### Selection and Ordering data

#### MAG 3100 Type C Grounding and protection rings

AISI 304 ground and protection rings **type C** for all liners except PTFE and PFA

#### Size: ANSI

<table>
<thead>
<tr>
<th>Size</th>
<th>Class 150</th>
<th>Class 300</th>
<th>JIS K10</th>
<th>JIS K20</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>FDK-083N8361</td>
<td>FDK-083N8361</td>
<td>FDK-083N8361</td>
<td>FDK-083N8361</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>FDK-083N8362</td>
<td>FDK-083N8362</td>
<td>FDK-083N8362</td>
<td>FDK-083N8362</td>
</tr>
<tr>
<td>2&quot;</td>
<td>FDK-083N8344</td>
<td>FDK-083N8344</td>
<td>FDK-083N8344</td>
<td>FDK-083N8344</td>
</tr>
<tr>
<td>2½&quot;</td>
<td>FDK-083N8345</td>
<td>FDK-083N8345</td>
<td>FDK-083N8345</td>
<td>FDK-083N8345</td>
</tr>
<tr>
<td>3&quot;</td>
<td>FDK-083N8347</td>
<td>FDK-083N8347</td>
<td>FDK-083N8347</td>
<td>FDK-083N8347</td>
</tr>
<tr>
<td>4&quot;</td>
<td>FDK-083N8025</td>
<td>FDK-083N8025</td>
<td>FDK-083N8025</td>
<td>FDK-083N8025</td>
</tr>
<tr>
<td>5&quot;</td>
<td>FDK-083N8011</td>
<td>FDK-083N8011</td>
<td>FDK-083N8011</td>
<td>FDK-083N8011</td>
</tr>
<tr>
<td>6&quot;</td>
<td>FDK-083N8008</td>
<td>FDK-083N8008</td>
<td>FDK-083N8008</td>
<td>FDK-083N8008</td>
</tr>
<tr>
<td>10&quot;</td>
<td>FDK-083N8002</td>
<td>FDK-083N8002</td>
<td>FDK-083N8002</td>
<td>FDK-083N8002</td>
</tr>
<tr>
<td>12&quot;</td>
<td>FDK-083N8009</td>
<td>FDK-083N8009</td>
<td>FDK-083N8009</td>
<td>FDK-083N8009</td>
</tr>
<tr>
<td>16&quot;</td>
<td>FDK-083N8010</td>
<td>FDK-083N8010</td>
<td>FDK-083N8010</td>
<td>FDK-083N8010</td>
</tr>
</tbody>
</table>

#### Size: AWWA C207

<table>
<thead>
<tr>
<th>Size</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>28&quot;</td>
<td>FDK-083N8302</td>
</tr>
<tr>
<td>30&quot;</td>
<td>FDK-083N8366</td>
</tr>
<tr>
<td>32&quot;</td>
<td>FDK-083N8305</td>
</tr>
<tr>
<td>36&quot;</td>
<td>FDK-083N8308</td>
</tr>
<tr>
<td>40&quot;</td>
<td>FDK-083N8311</td>
</tr>
<tr>
<td>42&quot;</td>
<td>FDK-083N8394</td>
</tr>
<tr>
<td>44&quot;</td>
<td>FDK-083N8395</td>
</tr>
<tr>
<td>48&quot;</td>
<td>FDK-083N8314</td>
</tr>
<tr>
<td>54&quot;</td>
<td>FDK-083N8470</td>
</tr>
<tr>
<td>60&quot;</td>
<td>FDK-083N8474</td>
</tr>
<tr>
<td>66&quot;</td>
<td>FDK-083N8478</td>
</tr>
<tr>
<td>72&quot;</td>
<td>FDK-083N8482</td>
</tr>
<tr>
<td>78&quot;</td>
<td>FDK-083N8486</td>
</tr>
</tbody>
</table>
# SITRANS F flowmeters

## SITRANS F M

### Flow sensor MAG 3100

#### Selection and Ordering data

**MAG 3100, 3100 HT, MAG 3100 P** Type E grounding and protection ring

1 pc. AISI 316 grounding and protection rings type E for PTFE liners.

**Note:**

For MAG 3100 HT High temperature version 7ME6320... for PTFE 180 °C versions, grounding ring type E is included and factory mounted.

<table>
<thead>
<tr>
<th>Size ANSI</th>
<th>Class 150 Order No.</th>
<th>Class 300 Order No.</th>
<th>JIS K10 Order No.</th>
<th>JIS K20 Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>½”</td>
<td>FDK-083N8365</td>
<td>FDK-083N8365</td>
<td>FDK-083N8271</td>
<td>FDK-083N8271</td>
</tr>
<tr>
<td>1”</td>
<td>FDK-083N8272</td>
<td>FDK-083N8272</td>
<td>FDK-083N8278</td>
<td>FDK-083N8283</td>
</tr>
<tr>
<td>1½”</td>
<td>FDK-083N8279</td>
<td>FDK-083N8279</td>
<td>FDK-083N8287</td>
<td>FDK-083N8287</td>
</tr>
<tr>
<td>2”</td>
<td>FDK-083N8283</td>
<td>FDK-083N8283</td>
<td>FDK-083N8282</td>
<td>FDK-083N8282</td>
</tr>
<tr>
<td>2½”</td>
<td>FDK-083N8287</td>
<td>FDK-083N8287</td>
<td>FDK-083N8285</td>
<td>FDK-083N8285</td>
</tr>
<tr>
<td>3”</td>
<td>FDK-083N8291</td>
<td>FDK-083N8291</td>
<td>FDK-083N8288</td>
<td>FDK-083N8288</td>
</tr>
<tr>
<td>4”</td>
<td>FDK-083N8118</td>
<td>FDK-083N8119</td>
<td>FDK-083N8116</td>
<td>FDK-083N8116</td>
</tr>
<tr>
<td>5”</td>
<td>FDK-083N8122</td>
<td>FDK-083N8122</td>
<td>FDK-083N8121</td>
<td>FDK-083N8121</td>
</tr>
<tr>
<td>6”</td>
<td>FDK-083N8126</td>
<td>FDK-083N8127</td>
<td>FDK-083N8125</td>
<td>FDK-083N8125</td>
</tr>
<tr>
<td>8”</td>
<td>FDK-083N8370</td>
<td>FDK-083N8370</td>
<td>FDK-083N8130</td>
<td>FDK-083N8130</td>
</tr>
<tr>
<td>10”</td>
<td>FDK-083N8140</td>
<td>FDK-083N8141</td>
<td>FDK-083N8137</td>
<td>FDK-083N8137</td>
</tr>
<tr>
<td>12”</td>
<td>FDK-083N8148</td>
<td>FDK-083N8149</td>
<td>FDK-083N8144</td>
<td>FDK-083N8144</td>
</tr>
<tr>
<td>14”</td>
<td>FDK-083N8157</td>
<td>FDK-083N8158</td>
<td>FDK-083N8152</td>
<td>FDK-083N8152</td>
</tr>
<tr>
<td>16”</td>
<td>FDK-083N8165</td>
<td>FDK-083N8166</td>
<td>FDK-083N8154</td>
<td>FDK-083N8154</td>
</tr>
<tr>
<td>18”</td>
<td>FDK-083N8173</td>
<td>FDK-083N8174</td>
<td>FDK-083N8163</td>
<td>FDK-083N8163</td>
</tr>
<tr>
<td>20”</td>
<td>FDK-083N8182</td>
<td>FDK-083N8183</td>
<td>FDK-083N8180</td>
<td>FDK-083N8180</td>
</tr>
<tr>
<td>24”</td>
<td>FDK-083N8190</td>
<td>FDK-083N8191</td>
<td>FDK-083N8187</td>
<td>FDK-083N8187</td>
</tr>
</tbody>
</table>

Protection of PTFE liner use 2 pcs.

Grounding of PTFE lined flowmeter use 1 pc.
## Selection and Ordering data

**MAG 3100, MAG 3100 HT, MAG 3100 P type E grounding and protecting ring**

1 pc. Hastelloy C276 grounding and protection ring *type E* for PTFE liners

<table>
<thead>
<tr>
<th>DN</th>
<th>PN 6 Order No.</th>
<th>PN 16 Order No.</th>
<th>PN 40 Order No.</th>
<th>Size</th>
<th>ANSI Class 150 Order No.</th>
<th>ANSI Class 300 Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15</td>
<td></td>
<td></td>
<td>FDK-083N8487</td>
<td>⅛”</td>
<td>FDK-083N8487</td>
<td>FDK-083N8487</td>
</tr>
<tr>
<td>DN 25</td>
<td></td>
<td></td>
<td>FDK-083N8488</td>
<td>1”</td>
<td>FDK-083N8489</td>
<td>FDK-083N8489</td>
</tr>
<tr>
<td>DN 40</td>
<td></td>
<td></td>
<td>FDK-083N8490</td>
<td>1¼”</td>
<td>FDK-083N8491</td>
<td>FDK-083N8491</td>
</tr>
<tr>
<td>DN 50</td>
<td>FDK-083N8494</td>
<td></td>
<td>FDK-083N8492</td>
<td>2”</td>
<td>FDK-083N8493</td>
<td>FDK-083N8493</td>
</tr>
<tr>
<td>DN 65</td>
<td>FDK-083N8498</td>
<td>FDK-083N8495</td>
<td>FDK-083N8496</td>
<td>2⅛”</td>
<td>FDK-083N8497</td>
<td>FDK-083N8497</td>
</tr>
<tr>
<td>DN 80</td>
<td>FDK-083N8503</td>
<td>FDK-083N8499</td>
<td>FDK-083N8500</td>
<td>3”</td>
<td>FDK-083N8501</td>
<td>FDK-083N8502</td>
</tr>
<tr>
<td>DN 100</td>
<td></td>
<td>FDK-083N8504</td>
<td>FDK-083N8505</td>
<td>4”</td>
<td>FDK-083N8506</td>
<td>FDK-083N8507</td>
</tr>
</tbody>
</table>

## Selection and Ordering data

**MAG 3100, MAG 3100 HT, MAG 3100 P Grounding rings: Flat rings**

1 pc. AISI 316 grounding flat ring for all liners (not PTFE 180 °C)

<table>
<thead>
<tr>
<th>DN</th>
<th>PN 10 Order No.</th>
<th>PN 16 Order No.</th>
<th>PN 40 Order No.</th>
<th>Size</th>
<th>ANSI Class 150 Order No.</th>
<th>ANSI Class 300 Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15</td>
<td></td>
<td></td>
<td>A5E01191968F)</td>
<td>⅛”</td>
<td>A5E01191968F)</td>
<td>A5E01150378F)</td>
</tr>
<tr>
<td>DN 25</td>
<td></td>
<td></td>
<td>A5E01150880F)</td>
<td>1”</td>
<td>A5E01150022F)</td>
<td>A5E01191961F)</td>
</tr>
<tr>
<td>DN 40</td>
<td></td>
<td></td>
<td>A5E01191952F)</td>
<td>1¼”</td>
<td>A5E01191961F)</td>
<td>A5E01191961F)</td>
</tr>
<tr>
<td>DN 50</td>
<td></td>
<td>A5E01191940F)</td>
<td>A5E01191940F)</td>
<td>2”</td>
<td>A5E01151121F)</td>
<td>A5E01151194F)</td>
</tr>
<tr>
<td>DN 65</td>
<td>A5E01152876F)</td>
<td>A5E01191954F)</td>
<td>A5E01191954F)</td>
<td>2⅛”</td>
<td>A5E01191962F)</td>
<td>A5E01151194F)</td>
</tr>
<tr>
<td>DN 80</td>
<td>A5E01152876F)</td>
<td>A5E01191956F)</td>
<td>A5E01191956F)</td>
<td>3”</td>
<td>A5E01152910F)</td>
<td>A5E01153422F)</td>
</tr>
<tr>
<td>DN 100</td>
<td>A5E01158875F)</td>
<td>A5E01191957F)</td>
<td>A5E01191957F)</td>
<td>4”</td>
<td>A5E01159146F)</td>
<td>A5E01159628F)</td>
</tr>
<tr>
<td>DN 125</td>
<td>A5E01191941F)</td>
<td>A5E01191941F)</td>
<td>A5E01191941F)</td>
<td>5”</td>
<td>A5E01191963F)</td>
<td>A5E01191964F)</td>
</tr>
<tr>
<td>DN 150</td>
<td>A5E01191943F)</td>
<td>A5E01191943F)</td>
<td>A5E01191943F)</td>
<td>6”</td>
<td>A5E01191964F)</td>
<td>A5E01191964F)</td>
</tr>
<tr>
<td>DN 200</td>
<td>A5E01191951F)</td>
<td>A5E01191951F)</td>
<td>A5E01191951F)</td>
<td>8”</td>
<td>A5E01191965F)</td>
<td>A5E01191965F)</td>
</tr>
<tr>
<td>DN 250</td>
<td>A5E01191950F)</td>
<td>A5E01191950F)</td>
<td>A5E01191950F)</td>
<td>10”</td>
<td>A5E01191966F)</td>
<td>A5E01191966F)</td>
</tr>
<tr>
<td>DN 300</td>
<td>A5E01191949F)</td>
<td>A5E01191949F)</td>
<td>A5E01191949F)</td>
<td>12”</td>
<td>A5E01191967F)</td>
<td>A5E01191967F)</td>
</tr>
</tbody>
</table>
### Selection and Ordering data

**MAG 3100, MAG 3100 HT, MAG 3100 P**

Grounding rings: Flat rings

1 pc. Hastelloy C276 grounding **flat ring** for all liners (not PTFE 180 °C)

| DN   | PN 10 | PN 16 | PN 40 | Size | ANSI  
|------|-------|-------|-------|------|--------
|      | Order No. | Order No. | Order No. |   | Class 150 | Class 300 |
| DN 15 | A5E01191981(f) | A5E01191982(f) | A5E01191983(f) | ½" | A5E01191989(f) | A5E01150379(f) |
| DN 25 | A5E01191984(f) | A5E01191985(f) | A5E01191986(f) | 1" | A5E01191990(f) | A5E01150379(f) |
| DN 40 | A5E01150028(f) | A5E01150030(f) | A5E01150032(f) | 1½" | A5E01191990(f) | A5E01150379(f) |
| DN 50 | A5E01150922(f) | A5E01150923(f) | A5E01150924(f) | 2" | A5E01151124(f) | A5E01151197(f) |
| DN 65 | A5E01150925(f) | A5E01150926(f) | A5E01150927(f) | 2½" | A5E01191991(f) | A5E01151197(f) |
| DN 80 | A5E01150288(f) | A5E01150289(f) | A5E01150290(f) | 3" | A5E01152913(f) | A5E01151197(f) |
| DN 100 | A5E01150031(f) | A5E01150032(f) | A5E01150033(f) | 4" | A5E01150950(f) | A5E01151197(f) |
| DN 125 | A5E01191971(f) | A5E01191972(f) | A5E01191973(f) | 5" | A5E01191992(f) | A5E01151197(f) |
| DN 150 | A5E01191974(f) | A5E01191975(f) | A5E01191976(f) | 6" | A5E01191993(f) | A5E01151197(f) |
| DN 200 | A5E01191978(f) | A5E01191979(f) | A5E01191980(f) | 8" | A5E01191994(f) | A5E01191995(f) |
| DN 250 | A5E01150882(f) | A5E01150883(f) | A5E01150884(f) | 10" | A5E01191996(f) | A5E01191995(f) |
| DN 300 | A5E01151129(f) | A5E01151130(f) | A5E01151131(f) | 12" | A5E01191997(f) | A5E01191995(f) |

### Selection and Ordering data

**MAG 3100, MAG 3100 HT, MAG 3100 P**

Grounding rings: Flat rings

1 pc. Tantalum grounding **flat ring** for all liners (not PTFE 180 °C)

| DN   | PN 16 | PN 40 | Size | ANSI  
|------|-------|-------|------|--------
|      | Order No. | Order No. |   | Class 150 | Class 300 |
| DN 15 | A5E01192007(f) | A5E01192008(f) | ½" | A5E01192010(f) | A5E01150381(f) |
| DN 25 | A5E01150883(f) | A5E01150884(f) | 1" | A5E01192011(f) | A5E01150381(f) |
| DN 40 | A5E01150028(f) | A5E01150030(f) | 1½" | A5E01150032(f) | A5E01150381(f) |
| DN 50 | A5E01150922(f) | A5E01150923(f) | 2" | A5E01151124(f) | A5E01151199(f) |
| DN 65 | A5E01150925(f) | A5E01150926(f) | 2½" | A5E01151125(f) | A5E01151199(f) |
| DN 80 | A5E01150288(f) | A5E01150289(f) | 3" | A5E01152913(f) | A5E01151199(f) |
| DN 100 | A5E01150031(f) | A5E01150032(f) | 4" | A5E01150950(f) | A5E01151199(f) |

* F) Subject to export regulations AL: 9I999, ECCN: N.
Dimensional drawings

MAG 3100, MAG 3100 HT, MAG 3100 P sensor with compact or remote transmitter

Dimensions in mm (inch)

**Metric**

<table>
<thead>
<tr>
<th>DN</th>
<th>A¹</th>
<th>A¹/A²</th>
<th>B</th>
<th>D₁</th>
<th>L²</th>
<th>EN 1092-1-201</th>
<th>ANSI 16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>PN 6, 10</td>
<td>PN 16/ PN 16 non PED</td>
</tr>
<tr>
<td>15</td>
<td>187</td>
<td>338</td>
<td>59</td>
<td>104</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>187</td>
<td>338</td>
<td>59</td>
<td>104</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>40</td>
<td>197</td>
<td>348</td>
<td>82</td>
<td>124</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>205</td>
<td>356</td>
<td>72</td>
<td>139</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>65</td>
<td>212</td>
<td>363</td>
<td>72</td>
<td>154</td>
<td>200</td>
<td>200/-</td>
<td>-</td>
</tr>
<tr>
<td>80</td>
<td>222</td>
<td>373</td>
<td>72</td>
<td>174</td>
<td>200</td>
<td>200/-</td>
<td>-</td>
</tr>
<tr>
<td>100</td>
<td>242</td>
<td>393</td>
<td>85</td>
<td>214</td>
<td>250</td>
<td>250/-</td>
<td>-</td>
</tr>
<tr>
<td>125</td>
<td>255</td>
<td>406</td>
<td>85</td>
<td>239</td>
<td>250</td>
<td>250/-</td>
<td>-</td>
</tr>
<tr>
<td>150</td>
<td>276</td>
<td>427</td>
<td>85</td>
<td>282</td>
<td>300</td>
<td>300/-</td>
<td>-</td>
</tr>
<tr>
<td>200</td>
<td>304</td>
<td>455</td>
<td>137</td>
<td>338</td>
<td>350</td>
<td>350/-</td>
<td>-</td>
</tr>
<tr>
<td>250</td>
<td>332</td>
<td>483</td>
<td>157</td>
<td>393</td>
<td>450</td>
<td>450/-</td>
<td>-</td>
</tr>
<tr>
<td>300</td>
<td>357</td>
<td>508</td>
<td>157</td>
<td>444</td>
<td>500</td>
<td>500/-</td>
<td>-</td>
</tr>
<tr>
<td>350</td>
<td>362</td>
<td>513</td>
<td>270</td>
<td>451</td>
<td>550</td>
<td>550/-</td>
<td>-</td>
</tr>
<tr>
<td>400</td>
<td>387</td>
<td>538</td>
<td>270</td>
<td>502</td>
<td>600</td>
<td>600/-</td>
<td>-</td>
</tr>
<tr>
<td>450</td>
<td>418</td>
<td>569</td>
<td>310</td>
<td>563</td>
<td>600</td>
<td>600/-</td>
<td>-</td>
</tr>
<tr>
<td>500</td>
<td>443</td>
<td>594</td>
<td>350</td>
<td>614</td>
<td>600</td>
<td>600/-</td>
<td>-</td>
</tr>
<tr>
<td>600</td>
<td>494</td>
<td>645</td>
<td>320</td>
<td>715</td>
<td>600</td>
<td>600/-</td>
<td>750</td>
</tr>
<tr>
<td>700</td>
<td>544</td>
<td>696</td>
<td>450</td>
<td>816</td>
<td>700</td>
<td>875/700</td>
<td>-</td>
</tr>
<tr>
<td>750</td>
<td>571</td>
<td>722</td>
<td>556</td>
<td>869</td>
<td>-</td>
<td>-/-</td>
<td>-</td>
</tr>
<tr>
<td>800</td>
<td>606</td>
<td>757</td>
<td>560</td>
<td>927</td>
<td>800</td>
<td>1000/800</td>
<td>-</td>
</tr>
<tr>
<td>900</td>
<td>653</td>
<td>804</td>
<td>630</td>
<td>1052</td>
<td>900</td>
<td>1125/900</td>
<td>-</td>
</tr>
<tr>
<td>1000</td>
<td>704</td>
<td>906</td>
<td>670</td>
<td>1136</td>
<td>1000</td>
<td>1250/1000</td>
<td>-</td>
</tr>
<tr>
<td>1050</td>
<td>704</td>
<td>906</td>
<td>670</td>
<td>1136</td>
<td>-</td>
<td>-/-</td>
<td>-</td>
</tr>
<tr>
<td>1100</td>
<td>755</td>
<td>906</td>
<td>770</td>
<td>1238</td>
<td>-</td>
<td>-/-</td>
<td>-</td>
</tr>
<tr>
<td>1200</td>
<td>810</td>
<td>961</td>
<td>792</td>
<td>1348</td>
<td>1200</td>
<td>1500/1200</td>
<td>-</td>
</tr>
<tr>
<td>1400</td>
<td>925</td>
<td>1076</td>
<td>1000</td>
<td>1675</td>
<td>1400</td>
<td>-/1400</td>
<td>-</td>
</tr>
<tr>
<td>1500</td>
<td>972</td>
<td>1123</td>
<td>1020</td>
<td>1672</td>
<td>1500</td>
<td>-/1500</td>
<td>-</td>
</tr>
<tr>
<td>1600</td>
<td>1025</td>
<td>1176</td>
<td>1130</td>
<td>1915</td>
<td>1600</td>
<td>-/1600</td>
<td>-</td>
</tr>
<tr>
<td>1800</td>
<td>1123</td>
<td>1274</td>
<td>1250</td>
<td>1974</td>
<td>1800</td>
<td>-/1800</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>1223</td>
<td>1374</td>
<td>1375</td>
<td>2174</td>
<td>2000</td>
<td>-/2000</td>
<td>-</td>
</tr>
</tbody>
</table>
### SITRANS F flowmeters

#### SITRANS F M

**Flow sensor MAG 3100**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[kg]</td>
</tr>
<tr>
<td>15</td>
<td>200</td>
<td>-</td>
<td>200</td>
<td>200</td>
<td>-</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>200</td>
<td>-</td>
<td>200</td>
<td>200</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>200</td>
<td>-</td>
<td>200</td>
<td>240</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>200</td>
<td>-</td>
<td>200</td>
<td>240</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>200[^5]</td>
<td>-</td>
<td>200</td>
<td>272</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>250</td>
<td>-</td>
<td>250</td>
<td>310</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>250</td>
<td>-</td>
<td>250</td>
<td>335</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>300</td>
<td>-</td>
<td>300</td>
<td>300</td>
<td>1.2</td>
<td>6</td>
<td>2</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>350</td>
<td>-</td>
<td>350</td>
<td>350</td>
<td>1.2</td>
<td>8</td>
<td>2</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>450</td>
<td>-</td>
<td>450</td>
<td>450</td>
<td>1.2</td>
<td>8</td>
<td>2</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>500</td>
<td>-</td>
<td>500</td>
<td>500</td>
<td>1.6</td>
<td>8</td>
<td>2</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>550</td>
<td>-</td>
<td>550</td>
<td>550</td>
<td>1.6</td>
<td>8</td>
<td>-</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>600</td>
<td>-</td>
<td>600</td>
<td>600</td>
<td>1.6</td>
<td>10</td>
<td>-</td>
<td>125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>600</td>
<td>-</td>
<td>600</td>
<td>640</td>
<td>1.6</td>
<td>10</td>
<td>-</td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>600[^6]</td>
<td>-</td>
<td>600</td>
<td>680</td>
<td>1.6</td>
<td>10</td>
<td>-</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>600[^7]</td>
<td>-</td>
<td>600</td>
<td>800</td>
<td>1.6</td>
<td>10</td>
<td>-</td>
<td>287</td>
<td></td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>700[^8]</td>
<td>700</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>330</td>
<td></td>
<td></td>
</tr>
<tr>
<td>750</td>
<td>750[^8]</td>
<td>750</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>800[^8]</td>
<td>800</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>900[^8]</td>
<td>900</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>530</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>1000[^9]</td>
<td>1000</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>660</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050</td>
<td>-</td>
<td>1050</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>660</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>1100[^9]</td>
<td>1100</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>1140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>1200[^9]</td>
<td>1200</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>1180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>-</td>
<td>1400</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>1600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>-</td>
<td>1500</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2460</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>-</td>
<td>1600</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2525</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td>-</td>
<td>1800</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2930</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>-</td>
<td>2000</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3665</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) 14.5 mm 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) TC = Type C grounding ring, TE = Type E grounding ring (Included and factory mounted on high temperature 180 °C (356 °F) PTFE sensor), TF = Flat type grounding rings

4) Weights are approx. (for PN 16) without transmitter

5) PN 35 DN 80 = 272 mm

6) PN 35 DN 500 = 680 mm

7) PN 35 DN 600 = 750 mm

8) A2 is 3 mm shorter than A1

9) Not AS 4087 PN 21 or PN 35 - not available

D = Outside diameter of flange, see flange tables
## MAG 3100, MAG 3100 HT, MAG 3100 P sensor with compact or remote transmitter

**MAG 3100, MAG 3100 HT, MAG 3100 P sensor with compact or remote transmitter**

### Imperial

<table>
<thead>
<tr>
<th>Size</th>
<th>A²</th>
<th>A₃/A₄</th>
<th>B</th>
<th>D₁</th>
<th>L²</th>
<th>EN 1092-1-201</th>
<th>ANSI 16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 6, 10</td>
<td>PN 16/ PN 16 non PED</td>
<td>PN 25</td>
<td>PN 40</td>
<td>PN 63</td>
<td>PN 100</td>
<td>Class 150</td>
<td>Class 300</td>
</tr>
<tr>
<td>[in.]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
</tr>
<tr>
<td>½</td>
<td>7.36</td>
<td>13.31</td>
<td>2.32</td>
<td>4.09</td>
<td>-</td>
<td>-</td>
<td>7.87</td>
</tr>
<tr>
<td>1</td>
<td>7.36</td>
<td>13.31</td>
<td>2.32</td>
<td>4.09</td>
<td>-</td>
<td>-</td>
<td>7.87</td>
</tr>
<tr>
<td>1½</td>
<td>7.76</td>
<td>13.70</td>
<td>3.23</td>
<td>4.88</td>
<td>-</td>
<td>-</td>
<td>7.87</td>
</tr>
<tr>
<td>2</td>
<td>8.07</td>
<td>14.01</td>
<td>2.83</td>
<td>5.47</td>
<td>-</td>
<td>-</td>
<td>7.87</td>
</tr>
<tr>
<td>2½</td>
<td>8.35</td>
<td>14.29</td>
<td>2.83</td>
<td>6.06</td>
<td>7.87</td>
<td>7.87/-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>9.53</td>
<td>15.47</td>
<td>3.35</td>
<td>8.43</td>
<td>9.84/-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>10.04</td>
<td>15.98</td>
<td>3.35</td>
<td>9.41</td>
<td>9.84/-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>10.87</td>
<td>16.81</td>
<td>5.39</td>
<td>11.10</td>
<td>11.81/-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>13.07</td>
<td>19.02</td>
<td>6.18</td>
<td>15.47</td>
<td>17.72/-</td>
<td>-</td>
<td>17.72</td>
</tr>
<tr>
<td>12</td>
<td>14.05</td>
<td>20.00</td>
<td>6.18</td>
<td>17.48</td>
<td>19.69/-</td>
<td>-</td>
<td>19.69</td>
</tr>
<tr>
<td>28</td>
<td>21.42</td>
<td>27.36</td>
<td>17.72</td>
<td>32.13</td>
<td>27.56/-</td>
<td>-</td>
<td>27.56</td>
</tr>
<tr>
<td>30</td>
<td>22.48</td>
<td>28.43</td>
<td>21.89</td>
<td>34.21</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>32</td>
<td>23.86</td>
<td>29.80</td>
<td>22.05</td>
<td>36.50</td>
<td>31.50</td>
<td>39.37/-</td>
<td>-</td>
</tr>
<tr>
<td>36</td>
<td>25.71</td>
<td>31.65</td>
<td>24.80</td>
<td>40.63</td>
<td>35.43</td>
<td>44.29/-</td>
<td>-</td>
</tr>
<tr>
<td>40</td>
<td>27.72</td>
<td>35.67</td>
<td>26.36</td>
<td>44.72</td>
<td>39.37</td>
<td>49.21/-</td>
<td>-</td>
</tr>
<tr>
<td>42</td>
<td>27.72</td>
<td>35.67</td>
<td>26.36</td>
<td>44.72</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>44</td>
<td>29.72</td>
<td>35.67</td>
<td>30.31</td>
<td>48.74</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>48</td>
<td>31.89</td>
<td>37.83</td>
<td>31.18</td>
<td>53.07</td>
<td>47.24</td>
<td>59.06/-</td>
<td>-</td>
</tr>
<tr>
<td>54</td>
<td>36.42</td>
<td>42.36</td>
<td>39.37</td>
<td>65.94</td>
<td>55.12</td>
<td>65.12/-</td>
<td>-</td>
</tr>
<tr>
<td>60</td>
<td>38.27</td>
<td>44.21</td>
<td>40.15</td>
<td>65.83</td>
<td>59.06</td>
<td>59.06/-</td>
<td>-</td>
</tr>
<tr>
<td>66</td>
<td>40.35</td>
<td>46.30</td>
<td>44.49</td>
<td>75.39</td>
<td>62.99</td>
<td>76.29/-</td>
<td>-</td>
</tr>
<tr>
<td>72</td>
<td>44.21</td>
<td>50.16</td>
<td>49.21</td>
<td>77.72</td>
<td>70.87</td>
<td>70.87/-</td>
<td>-</td>
</tr>
<tr>
<td>78</td>
<td>48.15</td>
<td>54.09</td>
<td>54.13</td>
<td>85.59</td>
<td>78.74</td>
<td>78.74/-</td>
<td>-</td>
</tr>
</tbody>
</table>

1) 14.5 mm 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) TC = Type C grounding ring, TE = Type E grounding ring (Included and factory mounted on high temperature 180 °C (356 °F) PTFE sensor), TF = Flat type grounding rings
4) Weights are approx. (for PN 16) without transmitter
5) PN 35 DN 80 = 272 mm
6) PN 35 DN 500 = 689 mm
7) PN 35 DN 600 = 750 mm
8) A₂ is 3 mm shorter than A₁
9) Not AS 4087 PN 21 or PN 35

D = Outside diameter of flange, see flange tables
### Flow sensor MAG 3100

<table>
<thead>
<tr>
<th>Size</th>
<th>AS 2129 E</th>
<th>AS 4087</th>
<th>AWWA</th>
<th>JIS K10</th>
<th>JIS K20</th>
<th>TC</th>
<th>TE</th>
<th>TP</th>
<th>Wgt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[in.]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[lb]</td>
<td>[lb]</td>
<td>[lb]</td>
<td>[lb]</td>
</tr>
<tr>
<td>1/2</td>
<td>7.00</td>
<td>-</td>
<td>7.00</td>
<td>7.00</td>
<td>-</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>9</td>
</tr>
<tr>
<td>1</td>
<td>7.00</td>
<td>-</td>
<td>7.00</td>
<td>7.00</td>
<td>-</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>11</td>
</tr>
<tr>
<td>1 1/2</td>
<td>7.00</td>
<td>-</td>
<td>7.00</td>
<td>9.44</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>7.00</td>
<td>-</td>
<td>7.00</td>
<td>9.44</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>20</td>
</tr>
<tr>
<td>2 1/2</td>
<td>7.00</td>
<td>-</td>
<td>7.00</td>
<td>10.70</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>7.00</td>
<td>-</td>
<td>7.00</td>
<td>10.70</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>9.00</td>
<td>-</td>
<td>9.00</td>
<td>12.00</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>35</td>
</tr>
<tr>
<td>6</td>
<td>9.00</td>
<td>-</td>
<td>9.00</td>
<td>13.18</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>11.00</td>
<td>-</td>
<td>11.00</td>
<td>11.81</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>13.77</td>
<td>-</td>
<td>13.77</td>
<td>13.77</td>
<td>0.05</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>88</td>
</tr>
<tr>
<td>12</td>
<td>17.71</td>
<td>-</td>
<td>17.71</td>
<td>17.71</td>
<td>0.05</td>
<td>0.31</td>
<td>0.31</td>
<td>0.31</td>
<td>132</td>
</tr>
<tr>
<td>14</td>
<td>19.68</td>
<td>-</td>
<td>19.68</td>
<td>19.68</td>
<td>0.06</td>
<td>0.31</td>
<td>0.31</td>
<td>0.31</td>
<td>176</td>
</tr>
<tr>
<td>16</td>
<td>21.65</td>
<td>-</td>
<td>21.65</td>
<td>21.65</td>
<td>0.06</td>
<td>0.31</td>
<td>0.31</td>
<td>0.31</td>
<td>242</td>
</tr>
<tr>
<td>18</td>
<td>23.62</td>
<td>-</td>
<td>23.62</td>
<td>23.62</td>
<td>0.06</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>275</td>
</tr>
<tr>
<td>20</td>
<td>23.62</td>
<td>-</td>
<td>23.62</td>
<td>26.77</td>
<td>0.06</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>385</td>
</tr>
<tr>
<td>24</td>
<td>23.62</td>
<td>-</td>
<td>31.49</td>
<td>31.49</td>
<td>0.06</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>440</td>
</tr>
<tr>
<td>28</td>
<td>27.56</td>
<td>27.56</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>728</td>
<td>-</td>
<td>-</td>
<td>728</td>
</tr>
<tr>
<td>30</td>
<td>-</td>
<td>29.62</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>794</td>
<td>-</td>
<td>-</td>
<td>794</td>
</tr>
<tr>
<td>32</td>
<td>31.50</td>
<td>31.50</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>992</td>
<td>-</td>
<td>-</td>
<td>992</td>
</tr>
<tr>
<td>36</td>
<td>35.43</td>
<td>35.43</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1168</td>
<td>-</td>
<td>-</td>
<td>1168</td>
</tr>
<tr>
<td>40</td>
<td>39.37</td>
<td>39.37</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1455</td>
<td>-</td>
<td>-</td>
<td>1455</td>
</tr>
<tr>
<td>42</td>
<td>-</td>
<td>39.37</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1455</td>
<td>-</td>
<td>-</td>
<td>1455</td>
</tr>
<tr>
<td>44</td>
<td>43.31</td>
<td>43.31</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2513</td>
<td>-</td>
<td>-</td>
<td>2513</td>
</tr>
<tr>
<td>48</td>
<td>47.24</td>
<td>47.24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2601</td>
<td>-</td>
<td>-</td>
<td>2601</td>
</tr>
<tr>
<td>54</td>
<td>-</td>
<td>55.12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3528</td>
<td>-</td>
<td>-</td>
<td>3528</td>
</tr>
<tr>
<td>60</td>
<td>-</td>
<td>59.06</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5423</td>
<td>-</td>
<td>-</td>
<td>5423</td>
</tr>
<tr>
<td>66</td>
<td>-</td>
<td>63.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5566</td>
<td>-</td>
<td>-</td>
<td>5566</td>
</tr>
<tr>
<td>72</td>
<td>-</td>
<td>70.87</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6460</td>
<td>-</td>
<td>-</td>
<td>6460</td>
</tr>
<tr>
<td>78</td>
<td>-</td>
<td>78.74</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8080</td>
<td>-</td>
<td>-</td>
<td>8080</td>
</tr>
</tbody>
</table>

1) 0.571 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) TC = Type C grounding ring, TE = Type E grounding ring (Included and factory mounted on high temperature 180 °C (356 °F) PTFE sensor), TF = Flat type grounding rings
4) Weights are for ANSI 150 without transmitter
5) PN 35 DN 80 = 10.70 inch
6) PN 35 DN 500 = 26.77 inch
7) PN 35 DN 600 = 29.53 inch
8) A2 is 0.06" shorter than A1
   - not available
D = Outside diameter of flange, see flange tables
Overview

SITRANS F M TRANSMAG 2 is a pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters. This makes it ideal for difficult applications like:

- High concentrated paper stock > 3%
- Heavy mining slurries
- Mining slurries with magnetic particles.

TRANSMAG 2 is used with the SITRANS F M 911/E sensor, available with diameters of DN 15 to DN 1000.

Benefits

- Fast signal processing with 16-bit technology
- Automatic recognition of sensor type and calibration data as result of SmartPLUG
- PROFIBUS PA (profile 2.0) / HART communication
- Simple menu operation with two-line display
- Self-monitoring functions
- Internal simulator (for all input and output functions)
- Monitoring of sensor using magnetizing current and reference voltage as well as wet electrode function
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output
- Optional passive switch input for resetting the counter values or for switching off the measuring equipment (PZR)
- With pulsed alternating field for minimum conductivity of $\geq 1 \mu$S/cm, on request 0.1 $\mu$S/cm depending on medium
- Fully-welded steel enclosure
- Liners available in hard rubber, PTFE, Linatex, Neoprene or Novolak

Application

The main applications of the SITRANS F M transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp & Paper Industry
- Mining Industry

Design

The complete flowmeter consists of a flow sensor and an associated transmitter from the SITRANS F M TRANSMAG 2 for pulsed alternating field. These are available as remote version. They operate according to Faraday's law of induction where an electric voltage is induced in a conductor moving through a magnetic field.

Function

**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 fulfill 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 TRANSMAG 2 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
## Technical specifications

### Transmitter TRANSMAG 2 with sensor 911/E

<table>
<thead>
<tr>
<th><strong>Measuring principle</strong></th>
<th>Electromagnetic with pulsed alternating field (PAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Magnetic field excitation</strong></td>
<td>Automatic power supply synchronization</td>
</tr>
<tr>
<td><strong>- 50 Hz AC power supply</strong></td>
<td>Bipolar (16.7 Hz) Bipolar with prepulse (10 Hz) Unipolar (8.3 Hz)</td>
</tr>
<tr>
<td><strong>- 60 Hz AC power supply</strong></td>
<td>Bipolar (20 Hz) Bipolar with prepulse (12 Hz) Unipolar (10 Hz)</td>
</tr>
</tbody>
</table>

### Accuracy under reference conditions

<table>
<thead>
<tr>
<th>Measuring tolerance of pulse output</th>
<th>≤ ±0.5% of measured value ±0.0012 m/s (0.0039 ft/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With v &gt; 0.25 m/s (0.82 ft/s)</td>
<td>±0.0025 m/s (0.0082 ft/s)</td>
</tr>
<tr>
<td>With v &lt; 0.25 m/s (0.82 ft/s)</td>
<td>As pulse output plus ±0.1% conversion error ±20 μA</td>
</tr>
</tbody>
</table>

| Repeatability | 0.2% of measured value |

### Reference conditions

- **Process temperature**: 25 °C ± 5 °C (77 °F ± 9 °F)
- **Ambient temperature**: 25 °C ± 5 °C (77 °F ± 9 °F)
- **Warm-up time**: Min. 30 min
- **Inlet pipe section**: ≥ 10 x DN
- **Outlet pipe section**: ≥ 5 x DN
- **Medium**: Water without gaseous or solid components

### Outputs

- **Electrical isolation**: Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding
- **Current output**: 0/4 ... 20 mA
- **Signal**
  - **Upper limit**: 0/4 ... 20 mA, selectable
  - **Failure**: 20 ... 22.5 mA, optional 3.6; 20 or 24 mA
- **Load**
  - **Output**: max. 600 Ω, max. load voltage 15 V DC
  - **For HART communication**: ≥ 250 Ω
- **Communication**
  - **Protocol**: Via analog output with PC coupling module or HART communicator
  - **HART, version 5.1**
- **Digital output**
  - **Signal**: Configurable as active or passive signals
  - **Output**
    - **Active signal**: 24 V DC, ≤ 24 mA, R<sub>s</sub> = 170 Ω
    - **Passive signal**: Open collector, max. 30 V DC, 200 mA

### Output configuration

- **Pulse**
  - **Pulse significance**: ≤ 5000 pulses/s
  - **Pulse width**: ≥ 0.1 ms
  - **Limit frequency**: ≤ 10000 Hz
  - **Limits**: Limits for flow and quantity, flow direction, alarm
- **Digital output 2 (relay)**
  - **Relay**
    - **Setting**: NC or NO function
    - **Rating**: Max. 5 W, max. 50 V AC/DC, max. 200 mA
    - **Limits for flow and quantity, flow direction, alarm**
- **Digital input (optional to digital output 2)**
  - **Input function configurable as high-active or low-active**
  - **Signal voltage**

### For PROFIBUS devices

- **PROFIBUS PA**
  - **PROFIBUS devices 7ME5034-1…**
  - **Communication**
  - **Layer 1 and 2 according to PROFIBUS PA**
  - **Transmission according to IEC 1158-2**
  - **Layer 7 (protocol layer) according to PROFIBUS PA and DP V1 (EN 50170)**
  - **Device class B, device profile 2.0**
  - **Max. 4 simultaneous C2 connections**
  - **Bus voltage**: 9 ... 32 V DC permissible
  - **Current consumption from bus**: 10 mA; limited to ≤ 15 mA in event of fault by electrical current limitation

### Rated operating conditions

- **Ambient temperature**
  - **Operation**: -20 ... +60 °C (-4 ... +140 °F)
  - **Display module**: 0 ... 50 °C (32 ... 122 °F)
  - **Storage**: -25 ... +80 °C (-13 ... +176 °F)
  - **Degree of protection**: IP67/NEMA 4X
  - **Electromagnetic compatibility (EMC)**
  - **Emitted interference**: To EN 61326 for use in industrial areas
  - **Noise immunity**: To EN 61326 for use in industrial areas
  - **NAMUR NE21 for use in residential areas**

© Siemens AG 2010

© Siemens AG 2010
Notes on pressure equipment directive

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) and ST52-5 (1.0570). The minimum temperature is defined at -20 °C (-4 °F) for the flange material 1.4571/316Ti.

### Classification according to pressure equipment directive (PED 97/23/EC)

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Nominal pressure</th>
<th>Permissible media</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>(inches)</td>
<td>PN (MWP psi)</td>
<td></td>
</tr>
<tr>
<td>15 ... 25</td>
<td>(½&quot; ... 1&quot;)</td>
<td>10 ... 40</td>
<td>145 ... 580</td>
</tr>
<tr>
<td>32 ... 100</td>
<td>(1¼&quot; ... 4&quot;)</td>
<td>10</td>
<td>145</td>
</tr>
<tr>
<td>32 ... 50</td>
<td>(1¼&quot; ... 2&quot;)</td>
<td>16</td>
<td>232</td>
</tr>
<tr>
<td>32 ... 40</td>
<td>(1¼&quot; ... 1½&quot;)</td>
<td>25</td>
<td>363</td>
</tr>
<tr>
<td>100 ... 350</td>
<td>(4&quot; ... 12&quot;)</td>
<td>10</td>
<td>145</td>
</tr>
<tr>
<td>65 ... 200</td>
<td>(2½&quot; ... 8&quot;)</td>
<td>16</td>
<td>232</td>
</tr>
<tr>
<td>50 ... 125</td>
<td>(2&quot; ... 5&quot;)</td>
<td>25</td>
<td>363</td>
</tr>
<tr>
<td>32 ... 80</td>
<td>(1¼&quot; ... 3&quot;)</td>
<td>40</td>
<td>580</td>
</tr>
<tr>
<td>350 ... 600</td>
<td>(14&quot; ... 24&quot;)</td>
<td>10</td>
<td>145</td>
</tr>
<tr>
<td>250 ... 600</td>
<td>(10&quot; ... 24&quot;)</td>
<td>16</td>
<td>232</td>
</tr>
<tr>
<td>150 ... 600</td>
<td>(6&quot; ... 24&quot;)</td>
<td>25</td>
<td>363</td>
</tr>
<tr>
<td>100 ... 600</td>
<td>(4&quot; ... 24&quot;)</td>
<td>40</td>
<td>580</td>
</tr>
</tbody>
</table>
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 μV 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.
**Transmitter TRANSMAG 2 with sensor 911/E**

### Accessories

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating/Display module</td>
<td>7ME5933-0AC00</td>
</tr>
<tr>
<td>Electronics cover with glass plate (non Ex)</td>
<td>7ME5933-0AC01</td>
</tr>
<tr>
<td>Cover for sensor cable and gasket</td>
<td>7ME5933-0AC02</td>
</tr>
<tr>
<td>Cover for mains supply/communication</td>
<td>7ME5933-0AC03</td>
</tr>
<tr>
<td>Standard wall mounting bracket</td>
<td>7ME5933-0AC04</td>
</tr>
<tr>
<td>Special wall-/pipe mounting bracket kit</td>
<td>7ME5933-0AC05</td>
</tr>
<tr>
<td>Safety clamp for electronic cover with glass plate</td>
<td>7ME5933-0AC06</td>
</tr>
<tr>
<td>M20 cable gland set for power and output connection</td>
<td>A5E02246350</td>
</tr>
<tr>
<td>1/2” NPT cable gland set for sensor connection</td>
<td>A5E02246396</td>
</tr>
<tr>
<td>M16 x 1.5 cable gland set for sensor connection</td>
<td>A5E02246369</td>
</tr>
</tbody>
</table>

**Selection and Ordering data**

**Order No.**

- **SITRANS F M electromagnetic transmitter TRANSMAG 2**
  - for alternating field, remote version, 110 ... 230 V AC
  - 7ME5034 - AAA1 - AAA0

**Output/communication**

- 4 ... 20 mA with HART protocol
- PROFIBUS PA connection
- 4 ... 20 mA with HART protocol, digital input

**Operator display and keypad**

- Without
- With

**Cable glands**

- M20/M16 x 1.5
- 1/2” NPT

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**

- Please add “-Z” to Order No. and specify Order code(s) and plain text.

- **Additional information**

  - Strengthened mounting bracket for wall and pipeline installation
  - Measuring range, specify in plain text:
    - Y01: 0 to ... m³/h
  - Pulse significance, specify in plain text:
    - Y02: 0 to ... pulses/l
  - Setting of digital outputs, specify in plain text:
    - Y03: Setting of digital outputs: ...
  - Measuring-point number (max. 8 characters), specify in plain text:
    - Y15: ...........
  - Measuring-point description (max. 16 characters), specify in plain text:
    - Y16: ...........
  - Stainless steel tag plate
  - Special design specify in plain text, state quotation

**Type/description**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Operating/Display module</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME5933-0AC00</td>
<td>Operating/Display module</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Electronics cover with glass plate (non Ex)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME5933-0AC01</td>
<td>Electronics cover with glass plate (non Ex)</td>
</tr>
</tbody>
</table>

**Cable glands**

- M20/M16 x 1.5
- 1/2” NPT
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Flowsensor SITRANS F M 911/E remote version</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal diameter</td>
<td>7 ME 5 6 1 0 -</td>
</tr>
<tr>
<td>DN 15 (½”)</td>
<td>1 V</td>
</tr>
<tr>
<td>DN 25 (1”)</td>
<td>2 D</td>
</tr>
<tr>
<td>DN 40 (1¼”)</td>
<td>2 R</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>3 F</td>
</tr>
<tr>
<td>DN 65 (2¼”)</td>
<td>3 M</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>4 B</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>4 T</td>
</tr>
<tr>
<td>DN 125 (5”)</td>
<td>5 K</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>5 R</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>6 F</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>6 Y</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>7 D</td>
</tr>
<tr>
<td>DN 350 (14”)</td>
<td>7 H</td>
</tr>
<tr>
<td>DN 400 (16”)</td>
<td>7 M</td>
</tr>
<tr>
<td>DN 450 (18”)</td>
<td>7 T</td>
</tr>
<tr>
<td>DN 500 (20”)</td>
<td>8 F</td>
</tr>
<tr>
<td>DN 600 (24”)</td>
<td>8 Y</td>
</tr>
<tr>
<td>DN 700 (28”)</td>
<td>9 D</td>
</tr>
<tr>
<td>DN 750 (30”)</td>
<td>9 H</td>
</tr>
<tr>
<td>DN 800 (32”)</td>
<td>9 M</td>
</tr>
<tr>
<td>DN 900 (36”)</td>
<td>9 T</td>
</tr>
<tr>
<td>DN 1000 (40”)</td>
<td>10 R</td>
</tr>
</tbody>
</table>

### Additional information

- Two earthing (grounding) electrodes made of mat. No. 1.4571/316Ti: A02
- Two earthing (grounding) electrodes made of Hastelloy C4/2.4610: A04
- Two earthing (grounding) electrodes made of Titanium head: A05
- Two earthing (grounding) electrodes made of Titanium: 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
- Silicone-free materials: Y04
- Tag name plate, stainless steel, add plain text: Y17
- Other postproduction requirements, add plain text: Y99

### Flange norm and pressure rating

- EN 1092-1, PN 10 (DN 200 ... 1000 (8” ... 40”)): B
- EN 1092-1, PN 16 (DN 65 ... 2000 (2½” ... 40”)): C
- EN 1092-1, PN 25 (DN 200 ... 600 (8” ... 24”)): E
- EN 1092-1, PN 40 (DN 15 ... 600 (½” ... 24”)): F
- ANSI B16.5, Class 150 (½” ... 24”), max 19.6 bar (285 psi) at 20 °C (68 °F): A
- ANSI B16.5, Class 300 (½” ... 24”), max 51.1 bar (741 psi) at 20 °C (68 °F): J
- AWWA C207 Class D (28” ... 40”): K
- JIS K 10 K (½” ... 24”): R

### Flange material

- Mid steel flanges 1.0460/1.0570 (1): 1
- Stainless steel flanges, AISI 316 Ti / 1.4571 (3): 3

### Liner material

- Neoprene (1): 1
- PTFE (without protection washers) (3): 3
- Hardrubber (4): 4
- Linatex (5): 5
- Novolak (sealing material FFKM) (6): 6

### Electrode material

- AISI 316 Ti (mat. No. 1.4571/316 Ti) (1): 1
- Hastelloy C4 (mat. No. 2.4610) (2): 2
- Platinum head with shaft (mat. No. 1.4571/316Ti) (3): 3
- Titanium (4): 4
- Tantalum (5): 5

### Cable glands/terminal box

- Metric: Polyamide terminal box (1): 1
- ½” NPT: Polyamide terminal box (2): 2

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

<table>
<thead>
<tr>
<th>SITRANS F M electromagnetic flowmeter</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection rings for flow sensor 911E (per pair)</td>
<td>7 M E 5 9 1 2 -</td>
</tr>
<tr>
<td>Liner</td>
<td>1</td>
</tr>
<tr>
<td>Hard rubber/soft rubber</td>
<td>1</td>
</tr>
<tr>
<td>Novolak</td>
<td>7</td>
</tr>
<tr>
<td>PTFE</td>
<td>0</td>
</tr>
<tr>
<td>Nominal diameter</td>
<td></td>
</tr>
<tr>
<td>for PTFE, material 1.4571/316 Ti</td>
<td></td>
</tr>
<tr>
<td>DN 15 (½”)</td>
<td>AA</td>
</tr>
<tr>
<td>DN 20 (¾”)</td>
<td>BA</td>
</tr>
<tr>
<td>DN 25 (1”)</td>
<td>CA</td>
</tr>
<tr>
<td>DN 32 (1¼”)</td>
<td>DA</td>
</tr>
<tr>
<td>DN 40 (1½”)</td>
<td>EA</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>FA</td>
</tr>
<tr>
<td>DN 65 (2½”)</td>
<td>GA</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>HA</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>JA</td>
</tr>
<tr>
<td>DN 125 (5”)</td>
<td>KA</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>LA</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>MA</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>NA</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>PA</td>
</tr>
<tr>
<td>DN 350 (14”)</td>
<td>QA</td>
</tr>
<tr>
<td>DN 400 (16”)</td>
<td>RA</td>
</tr>
<tr>
<td>DN 500 (20”)</td>
<td>SA</td>
</tr>
<tr>
<td>DN 600 (24”)</td>
<td>TA</td>
</tr>
<tr>
<td>DN 700 (28”)</td>
<td>UA</td>
</tr>
<tr>
<td>DN 800 (32”)</td>
<td>VA</td>
</tr>
<tr>
<td>DN 900 (36”)</td>
<td>WA</td>
</tr>
<tr>
<td>DN 1000 (40”)</td>
<td>XA</td>
</tr>
<tr>
<td>Other nominal diam.: specify in plain text</td>
<td></td>
</tr>
<tr>
<td>for Hard/Soft rubber, Novolak material</td>
<td></td>
</tr>
<tr>
<td>1.471/316 Ti</td>
<td></td>
</tr>
<tr>
<td>DN 15 (½”)</td>
<td>AB</td>
</tr>
<tr>
<td>DN 20 (¾”)</td>
<td>BB</td>
</tr>
<tr>
<td>DN 25 (1”)</td>
<td>CB</td>
</tr>
<tr>
<td>DN 32 (1¼”)</td>
<td>DB</td>
</tr>
<tr>
<td>DN 40 (1½”)</td>
<td>EB</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>FB</td>
</tr>
<tr>
<td>DN 65 (2½”)</td>
<td>GB</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>HB</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>JB</td>
</tr>
<tr>
<td>DN 125 (5”)</td>
<td>KB</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>LB</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>MB</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>NB</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>PB</td>
</tr>
<tr>
<td>DN 350 (14”)</td>
<td>QB</td>
</tr>
<tr>
<td>DN 400 (16”)</td>
<td>RB</td>
</tr>
<tr>
<td>DN 500 (20”)</td>
<td>SB</td>
</tr>
<tr>
<td>DN 600 (24”)</td>
<td>TB</td>
</tr>
<tr>
<td>Other nominal diam.: specify in plain text</td>
<td></td>
</tr>
<tr>
<td>Flange design</td>
<td></td>
</tr>
<tr>
<td>Flange to DIN</td>
<td>1</td>
</tr>
<tr>
<td>Flange to ANSI</td>
<td>2</td>
</tr>
<tr>
<td>Flange to JIS</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional information

- Please add “-Z” to Order No. and specify Order code(s) and plain text.
- Tag plate of stainless steel
  - Y30 - tag number (max. 16 digits, specify in plain text: Y17 Y99
  - Special design, specify quotation No./date in plain text

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS F M electromagnetic flowmeter</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthing rings for flow sensor 911E (per unit)</td>
<td>7 M E 5 9 0 2 -</td>
</tr>
<tr>
<td>Liner</td>
<td>1</td>
</tr>
<tr>
<td>Hard rubber/soft rubber</td>
<td>1</td>
</tr>
<tr>
<td>Novolak</td>
<td>7</td>
</tr>
<tr>
<td>PTFE</td>
<td>0</td>
</tr>
<tr>
<td>Nominal diameter</td>
<td></td>
</tr>
<tr>
<td>Material 1.4571/316 Ti</td>
<td></td>
</tr>
<tr>
<td>DN 15 (½”)</td>
<td>AA</td>
</tr>
<tr>
<td>DN 20 (¾”)</td>
<td>BA</td>
</tr>
<tr>
<td>DN 25 (1”)</td>
<td>CA</td>
</tr>
<tr>
<td>DN 32 (1¼”)</td>
<td>DA</td>
</tr>
<tr>
<td>DN 40 (1½”)</td>
<td>EA</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>FA</td>
</tr>
<tr>
<td>DN 65 (2½”)</td>
<td>GA</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>HA</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>JA</td>
</tr>
<tr>
<td>DN 125 (5”)</td>
<td>KA</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>LA</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>MA</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>NA</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>PA</td>
</tr>
<tr>
<td>DN 350 (14”)</td>
<td>QA</td>
</tr>
<tr>
<td>DN 400 (16”)</td>
<td>RA</td>
</tr>
<tr>
<td>DN 500 (20”)</td>
<td>SA</td>
</tr>
<tr>
<td>DN 600 (24”)</td>
<td>TA</td>
</tr>
<tr>
<td>DN 700 (28”)</td>
<td>UA</td>
</tr>
<tr>
<td>DN 800 (32”)</td>
<td>VA</td>
</tr>
<tr>
<td>DN 900 (36”)</td>
<td>WA</td>
</tr>
<tr>
<td>DN 1000 (40”)</td>
<td>XA</td>
</tr>
<tr>
<td>Other nominal diam.: specify in plain text</td>
<td></td>
</tr>
<tr>
<td>Material Hastelloy C4/2.4610</td>
<td></td>
</tr>
<tr>
<td>DN 15 (½”)</td>
<td>AB</td>
</tr>
<tr>
<td>DN 20 (¾”)</td>
<td>BB</td>
</tr>
<tr>
<td>DN 25 (1”)</td>
<td>CB</td>
</tr>
<tr>
<td>DN 32 (1¼”)</td>
<td>DB</td>
</tr>
<tr>
<td>DN 40 (1½”)</td>
<td>EB</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>FB</td>
</tr>
<tr>
<td>DN 65 (2½”)</td>
<td>GB</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>HB</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>JB</td>
</tr>
<tr>
<td>DN 125 (5”)</td>
<td>KB</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>LB</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>MB</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>NB</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>PB</td>
</tr>
<tr>
<td>DN 350 (14”)</td>
<td>QB</td>
</tr>
<tr>
<td>DN 400 (16”)</td>
<td>RB</td>
</tr>
<tr>
<td>DN 500 (20”)</td>
<td>SB</td>
</tr>
<tr>
<td>DN 600 (24”)</td>
<td>TB</td>
</tr>
<tr>
<td>Other nominal diam.: specify in plain text</td>
<td></td>
</tr>
<tr>
<td>Flange design</td>
<td></td>
</tr>
<tr>
<td>Flange to DIN</td>
<td>1</td>
</tr>
<tr>
<td>Flange to ANSI</td>
<td>2</td>
</tr>
<tr>
<td>Flange to JIS</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional information

- Please add “-Z” to Order No. and specify Order code(s) and plain text.
- Special design, specify quotation No./date in plain text Y99
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**

**Power supply**

- Power supply L/N
- PE conductor
- 100 ... 230 V AC ±15%
- 47-63 Hz
- 0/4 ... 20 mA
- Load 600 Ω
- max. 15 V
- PROFIBUS

**Digital output 1**

- active 24 V DC max. 24 mA
- Ri 170 Ω
- Passive open collector max. 30 V DC 200 mA

**Digital output 2 (Relay)**

- NC/NO max. 5 W
- UC 50 V 200 mA

**Digital input**

- High +11 to 30 V
- Low -30 to -5 V

**Sensor connection**

- Magnetic field current 1
- Magnetic field current 2

**Smart plug connections**

- Supply (+6 V)
- Ground (0 V)
- Electrode connect

**Electrode connect**

- Electr. 1 (EL 1)
- Electr. 2 (EL 2)

**Reference coil**

- Ref. 1
- Ref. 2
SITRANS F M flow sensor 911/E, remote version, dimensions in mm (inches)

Build-in length 911/E [in mm and inches]

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>DN 15</th>
<th>DN 20</th>
<th>DN 25</th>
<th>DN 32</th>
<th>DN 40</th>
<th>DN 50</th>
<th>DN 65</th>
<th>DN 80</th>
<th>DN 100</th>
<th>DN 125</th>
<th>DN 150</th>
<th>DN 200</th>
<th>DN 250</th>
<th>DN 300</th>
<th>DN 350</th>
<th>DN 400</th>
<th>DN 500</th>
<th>DN 600</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>270</td>
<td>280</td>
<td>330</td>
<td>340</td>
<td>370</td>
<td>410</td>
<td>470</td>
<td>500</td>
<td>550</td>
<td>600</td>
<td>650</td>
<td>780</td>
<td>8.0</td>
<td>8.5</td>
<td>11.0</td>
<td>11.5</td>
<td>25.0</td>
<td>34</td>
</tr>
</tbody>
</table>

Dimensions of sensor housing

<table>
<thead>
<tr>
<th>Housing width C</th>
<th>281</th>
<th>285</th>
<th>291</th>
<th>298</th>
<th>314</th>
<th>326</th>
<th>345</th>
<th>371</th>
<th>408</th>
<th>411</th>
<th>441</th>
<th>453</th>
<th>492</th>
<th>533</th>
<th>553</th>
<th>578</th>
<th>688</th>
<th>727</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height H with</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height H2 with</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>remote version</td>
<td>7.38</td>
<td>7.68</td>
<td>8.38</td>
<td>9.06</td>
<td>9.44</td>
<td>9.90</td>
<td>10.56</td>
<td>11.13</td>
<td>11.73</td>
<td>12.18</td>
<td>12.76</td>
<td>15.51</td>
<td>19.37</td>
<td>24.84</td>
<td>31.55</td>
<td>37.88</td>
<td>47.78</td>
<td></td>
</tr>
<tr>
<td>Housing diameter D</td>
<td>5.32</td>
<td>6.65</td>
<td>7.24</td>
<td>9.80</td>
<td>10.79</td>
<td>11.13</td>
<td>12.76</td>
<td>15.51</td>
<td>19.37</td>
<td>24.84</td>
<td>31.55</td>
<td>37.88</td>
<td>47.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of PN10</td>
<td>3.0</td>
<td>4.5</td>
<td>11.0</td>
<td>11.5</td>
<td>25.0</td>
<td>34</td>
<td>38</td>
<td>88</td>
<td>90</td>
<td>90</td>
<td>110</td>
<td>224</td>
<td>230</td>
<td>88</td>
<td>75.0</td>
<td>75.0</td>
<td>176.4</td>
<td></td>
</tr>
<tr>
<td>Version in kg</td>
<td>(17.6)</td>
<td>(18.7)</td>
<td>(24.3)</td>
<td>(25.4)</td>
<td>(55.1)</td>
<td>(57.3)</td>
<td>(61.7)</td>
<td>(83.8)</td>
<td>(149.9)</td>
<td>(176.4)</td>
<td>(198.4)</td>
<td>(242.5)</td>
<td>(330.7)</td>
<td>(300.7)</td>
<td>(182.5)</td>
<td>(224.5)</td>
<td>(370)</td>
<td></td>
</tr>
</tbody>
</table>

1) Tolerance for build-in length: B + 0.0 mm (0.00 inches) / - 4.0 mm (-0.157 inches).
With protection rings or washers for > DN25 + 6.0 mm, > DN200 + 10.0 mm (> 1" + 0.236 inches. > 8" + 0.394 inches)
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
- Bi-directional measurement

Long lasting performance/Low cost of Ownership
- No moving parts means less wear and tear
- 6 years maintenance-free operation in typical revenue application
- Robust construction build for the application

**Application**

MAG 8000 has been developed as a stand alone water meter for applications within:
- Abstraction
- Distribution network
- Revenue and bulk metering
- Irrigation

**Design**

MAG 8000 is designed according to OIML R 49 and CEN EN 14154 water meter standards with focus on minimized power consumption.

The product program consists of
- Basic and advanced version
- A Custody Transfer version for water billing, with type approval after OIML R 49 and verified according to MI-001 for DN 50 to DN 300 (2" to 12") pending up to DN 600 (24")
- 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
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 and MAG 8000 CT can be ordered as a Basic or an Advanced version. Both versions are configured to achieve 6 years battery operation in typical revenue applications.

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 an 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.

<table>
<thead>
<tr>
<th>Features / Version</th>
<th>MAG 8000 Basic</th>
<th>MAG 8000 Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring frequency in</td>
<td>1/15, 1/30 or 1/60 Hz</td>
<td>from 6.25 to 1/60 Hz depending on sensor size</td>
</tr>
<tr>
<td>battery power mode (Manually selected)</td>
<td>2 FW/RV/AI/CA (max. 50 Hz pulse rate)</td>
<td>2 FW/RV/AI/CA (max. 100 Hz pulse rate)</td>
</tr>
<tr>
<td>Output</td>
<td>MAG 8000/MAG 8000CT</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Add-on</td>
<td>Add-on</td>
</tr>
<tr>
<td>Data logger</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Insulation test</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Leakage detection</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Meter utilization</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Statistics</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Tariff</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Settle date (Revenue)</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

In MAG 8000 CT revenue parameters and data are protected against manipulation. Verification and sealings is used to obtain the MI-001 approval (MID).

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 an 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.
### Technical specifications

**Meter**

<table>
<thead>
<tr>
<th>MAG 8000 (7ME6810)</th>
<th>MAG 8000 CT (7ME6820)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accuracy</strong></td>
<td><strong>Standard calibration:</strong> ±0.4% of rate ±2 mm/s&lt;br&gt;<strong>Extended calibration DN 50 ... DN 300 (2&quot; ... 12&quot;): ±0.2 % of rate ±2 mm/s</strong>&lt;br&gt;<strong>OIML R 49 for DN 50 ... DN 300 (2&quot; ... 12&quot;), Class 1 and 2 with turn down up to Q3/Q1 = 400 at Q2/Q1 = 1.6</strong>&lt;br&gt;<strong>MI-001 verification for DN 50 ... DN 300 (2&quot; ... 12&quot;), Class 2 with turn down ratio Q3/Q1 = 250, Q3/Q1 = 200 or Q3/Q1 = 160 at Q2/Q1 = 1.6</strong></td>
</tr>
<tr>
<td><strong>Media conductivity</strong></td>
<td>Clean water &gt; 20 μs/cm</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td><strong>Ambient</strong> -20 ... +60 °C (-4 ... +140 °F)&lt;br&gt;<strong>Media</strong> 0 ... +70 °C (32 ... +158 °F)&lt;br&gt;<strong>Storage</strong> -40 ... +70 °C (-22 ... +158 °F)</td>
</tr>
<tr>
<td><strong>Enclosure rating</strong></td>
<td>IP68/NEMA 6P;&lt;br&gt;Cable glands mounted requires Sylgard potting kit to remain IP68/NEMA 6P, otherwise IP67/NEMA 4 is obtained;&lt;br&gt;Factory-mounted cable provides IP68/NEMA 6P</td>
</tr>
<tr>
<td><strong>Drinking water approvals</strong></td>
<td>• NSF/ANSI Standard 61 (cold water) USA&lt;br&gt;• WRAS (BS 6920 cold water) UK&lt;br&gt;• ACS Listed France&lt;br&gt;• DVGW W270 Germany&lt;br&gt;• Belgaqua (B)&lt;br&gt;• MCERTS (GB)</td>
</tr>
<tr>
<td><strong>Custody transfer approval</strong></td>
<td>• OIML R 49 approval&lt;br&gt;• OIML R 49 and OIML R49 MAA approval&lt;br&gt;• MI-001 approval (Number: DK-0200-MI-001-002)</td>
</tr>
<tr>
<td><strong>Conformity</strong></td>
<td>• PED: 97/23EC&lt;br&gt;• EMC: EN 61000-6-3, EN 61000-6-2, EN 61326-1&lt;br&gt;• CEN EN 14154, ISO 4064&lt;br&gt;• PED: 97/23EC&lt;br&gt;• EMC: EN 61000-6-3, EN 61000-6-2, EN 61326-1</td>
</tr>
<tr>
<td><strong>Sensor version</strong></td>
<td>DN 25 ... 1200 (1&quot; ... 48&quot;)&lt;br&gt;DN 50 ... 600 (2&quot; ... 24&quot;) in preparation up to DN 600</td>
</tr>
<tr>
<td><strong>Measuring principle</strong></td>
<td>Electromagnetic induction&lt;br&gt;Electromagnetic induction</td>
</tr>
</tbody>
</table>
| **Excitation frequency** | **Basic version**<br>**Battery-powered**<br>DN 25 ... 150 (1" ... 6"): 1/15 Hz<br>DN 200 ... 600 (8" ... 24"): 1/30 Hz<br>DN 700 ... 1200 (28" ... 48"): 1/60 Hz<br>**Mains-powered**<br>DN 25 ... 150 (1" ... 6"): 6.25 Hz<br>DN 200 ... 600 (8" ... 24"): 3.125 Hz<br>DN 700 ... 1200 (28" ... 48"): 1.5625 Hz<br>**Advanced version**<br>**Battery-powered**<br>DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime)<br>DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)<br>DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)<br>**Mains-powered**<br>DN 25 ... 150 (1" ... 6"): 6.25 Hz<br>DN 200 ... 600 (8" ... 24"): 3.125 Hz<br>DN 700 ... 1200 (28" ... 48"): 1.5625 Hz<br>**Advanced version**<br>**Battery-powered**<br>DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime)<br>DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)<br>DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)
| **Drinking water approvals** | • NSF/ANSI Standard 61 (cold water) USA<br>• WRAS (BS 6920 cold water) UK<br>• ACS Listed France<br>• DVGW W270 Germany<br>• Belgaqua (B)<br>• MCERTS (GB) |
| **Custody transfer approval** | • OIML R 49 approval<br>• OIML R 49 and OIML R49 MAA approval<br>• MI-001 approval (Number: DK-0200-MI-001-002) |
| **Conformity**       | • PED: 97/23EC<br>• EMC: EN 61000-6-3, EN 61000-6-2, EN 61326-1<br>• CEN EN 14154, ISO 4064<br>• PED: 97/23EC<br>• EMC: EN 61000-6-3, EN 61000-6-2, EN 61326-1 |
| **Sensor version**    | DN 25 ... 1200 (1" ... 48")<br>DN 50 ... 600 (2" ... 24") in preparation up to DN 600 |
| **Measuring principle** | Electromagnetic induction<br>Electromagnetic induction |
| **Excitation frequency** | **Basic version**<br>**Battery-powered**<br>DN 25 ... 150 (1" ... 6"): 1/15 Hz<br>DN 200 ... 600 (8" ... 24"): 1/30 Hz<br>DN 700 ... 1200 (28" ... 48"): 1/60 Hz<br>**Mains-powered**<br>DN 25 ... 150 (1" ... 6"): 6.25 Hz<br>DN 200 ... 600 (8" ... 24"): 3.125 Hz<br>DN 700 ... 1200 (28" ... 48"): 1.5625 Hz<br>**Advanced version**<br>**Battery-powered**<br>DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime)<br>DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)<br>DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)<br>**Mains-powered**<br>DN 25 ... 150 (1" ... 6"): 6.25 Hz<br>DN 200 ... 600 (8" ... 24"): 3.125 Hz<br>DN 700 ... 1200 (28" ... 48"): 1.5625 Hz |
# SITRANS F Flowmeters

## SITRANS F M

**Battery-operated Water Meter**

### MAG 8000/MAG 8000 CT

<table>
<thead>
<tr>
<th><strong>Meter</strong></th>
<th><strong>MAG 8000 (7ME6810)</strong></th>
<th><strong>MAG 8000 CT (7ME6820)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flanges</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 1092-1 (DIN 2501)</td>
<td>DN 25 and DN 40 (1&quot; and 1½&quot;): PN 40 (580 psi)</td>
<td>DN 50 ... 150 (2&quot; ... 6&quot;): PN 16 (232 psi)</td>
</tr>
<tr>
<td></td>
<td>DN 50 ... 150 (2&quot; ... 6&quot;): PN 16 (232 psi)</td>
<td>DN 200 ... 600 (8&quot; ... 24&quot;): PN 10 or PN 16 (145 psi or 232 psi)</td>
</tr>
<tr>
<td>ANSI 16.5 Class 150 lb</td>
<td>1&quot; ... 24&quot;: 20 bar (290 psi)</td>
<td>2&quot; ... 12&quot;: 20 bar (290 psi)</td>
</tr>
<tr>
<td>AWWA C-207</td>
<td>28&quot; ... 48&quot;: PN 10 (145 psi)</td>
<td>up to DN 600 (24&quot;) in preparation</td>
</tr>
<tr>
<td>AS 4087</td>
<td>DN 50 ... 1200 (2&quot; ... 48&quot;): PN 16 (232 psi)</td>
<td>DN 50 ... 300 (2&quot; ... 12&quot;): PN 16 (232 psi)</td>
</tr>
<tr>
<td>Liner</td>
<td>EPDM</td>
<td>EPDM</td>
</tr>
<tr>
<td>Electrode and grounding electrodes</td>
<td>Hastelloy C276</td>
<td>Hastelloy C276</td>
</tr>
<tr>
<td>Grounding straps</td>
<td>Grounding straps are premounted from the factory on each side of the sensor</td>
<td>Grounding straps are premounted from the factory on each side of the sensor</td>
</tr>
</tbody>
</table>

### Transmitter

| **Installation** | Compact (integral) |
| **Remote with factory-mounted cable** | (5, 10, 20 or 30 m) |
| **Enclosure** | Stainless 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 |
| **Flow unit** | | |
| **Europe** | Volume in m³ and flow rate in m³/h |
| **US** | Volume in Gallon and flow rate in GPM |
| **Australia** | Volume in Ml and flow rate as Ml/d |
| **Optional display units** | Volume: m³ x 100, l x 100, G x 1000, MG, CF x 100, CF x 1000, AF, Al, kl |
| Flow: m³/min, m³/d, l/s, l/min, GPS, GPH, GDP, MGD, CFS, CFM, CFH |

### 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
  - RS 485 serial interface with MODBUS RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable
  - Encoder interface module (for Itron 200WP) “Sensus protocol”

### Power supply

- Auto detection of power source with display symbol for operation power:
  - Internal battery pack: 2 D-Cell 3.6 V/33 Ah
  - External battery pack: 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 upgradeable 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)
Technical specifications

Transmitter

Installation MAG 8000/MAG 8000CT
- Integral (compact) or remote with factory mounted cable in 5, 10, 20 or 30 m lengths with IP68/NEMA 6P connectors. Connection is made at the transmitter bottom.

Enclosure
- Stainless 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 (0.24 ... 0.31") is included in the standard delivery)

Display and key
- Display with 8 digits for main information. Index, menu and status symbols for dedicated information
- Key for toggling through the information and reset customer totalizer and call-up function
- Selectable default information and accessible menus:
  - Operator
  - Meter
  - Service
  - Data Logger
  - Statistic and leakage (only Advanced version)
  - Revenue and Tariffs (only Advanced version)
- Totalized information can be displayed with 1, 2, 3 decimals or automatic adjustment for maximum resolution

Flow unit MAG 8000
- Europe std.
  - Volume in m³ and flow rate in m³/h
- US std.
  - Volume in Gallon and flow rate in GPM
- Australian std.
  - Volume in Ml and flow rate as Ml/d
- Other units selectable:
  - Volume: m³ x 100, l x 100, G x 1000, MG, CF x 1000, AF, Al, kl
  - Flow: m³/min, m³/d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH
- Other units are ordered from factory or manually configured on-site by sticking a label on the display and changing the scaling factors

Flow unit MAG 8000 CT
- Europe std.
  - Volume in m³ and flow rate in m³/h

Digital output MAG 8000/MAG 8000CT
- 2 passive outputs (MOS), individually 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 or call-up
- 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
  - RS 485 serial interface with MODBUS RTU (+/-/GND), multi-drop with up to 32 devices with max. 1000 m cable
- MODBUS RTU protocol is an open protocol (further information available on request)
- Serial speed 1200, 2400, 4800, 9600, 19200, 38400 Baud
- Encoder interface (for Itron 200WP) "Sensus protocol" for fixed network

Power supply
- Auto detection of power source with display symbol for operation power:
  - Internal battery pack: 2 D-Cell 3.6 V/33 Ah
  - External battery pack: 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. The power supply has 3 m (9.8 ft) power cable for external connection to mains supply (without cable plug)
### Features

#### Application identification
- Tag number up to 15 characters

#### Time and date
- Real time clock

#### Totalizer
- MAG 8000/ MAG 8000CT
  - 2 totalizer: Forward, Reverse, Bidirectional netflow calculation and free selectable start value.
  - 1 customer totalizer, following totalizer 1 setting and resetable via display key or software with logging of date and time.

#### Measurement
- **Low flow cut-off**: 0.05% of \( Q_n \) (Q3) or free adjustable
- **Empty pipe detection**: Symbolised in display
- **Data logger**: Logging of 26 records: selectable as daily, weekly or monthly logging

#### Alarm
- **Monitoring**: Total hours an alarm has been active
- **Numbers of times the alarm has been activated**
- **First time an alarm appears**
- **Last time the alarm disappears**

#### Fatal faults
- Signal insulation – Flow signal immunity is influenced (only Advanced version)
- Coil current – Fault in driving magnetic sensor field
- Amplifier – Fault in signal circuit
- Check sum – Fault in calculation or handling of data

#### Warning faults
- Low Power – customer selectable battery alarm level or power drop out
- Flow overflow – Flow in sensor exceeds \( Q_{\text{max}} \) (Q4) (125% \( Q_n \) (Q3))
- Pulse overflow on output A and B – Selected pulse volume is too small compared to actual flow rate and max. output pulse rate.
- Consumption – saved data logger consumption exceeds customer selected limit on high or low consumption
- Leakage – Leakage detected based on customer settings (only Advanced version)
- Empty pipe – no water in the pipe/sensor
- Low impedance – measured electrode impedance below customer low impedance level
- Flow limit – actual flow exceeds selected high flow limited

#### Meter status (tamper monitoring of revenue data)
- Changing totalizers 1 and 2
- Changing Tariff totalizer
- Changing Tariff settings
- Changing date and time
- Alarm has been active (see alarm log for details)
- Fault log has been reset
- Hardware parameter protection has been broken
- Meter has been repowered

### 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 consuming elements and available battery 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
  - Electrode impedance to check actual media contact
  - Flow simulation to check pulse and communication signal chain for correct scaling
  - 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
- 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
- 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
- 6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of \( Q_n \) (Q3)

#### Tariff
- 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.
MAG 8000 water meter uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. All measuring instrumentation, used in the calibration of the flowmeters, has either been calibrated by a UKAS or DANAK accredited laboratory or has been calibrated against certified master sensors. This provides an unbroken chain of measurement-traceability to national standards.

Siemens Flow Instruments can provide accredited calibration in the flow range from 0.0001 m³/h to 4350 m³/h.

The accreditation bodies DANAK and UKAS have 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 world wide, including the US (NIST traceability).

The selected calibration determines the accuracy of the meter. A standard calibration results in max. ±0.4 % uncertainty and an extended calibration ±0.2 %. A calibration certificate follows every sensor and calibration data are stored in the meter unit.

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 Pattern approval specification for Class I (1%)

<table>
<thead>
<tr>
<th>Size</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>„R“ Q3/Q1</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
<td>1250</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td>Q3 [m³/h]</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
<td>1000</td>
<td>1600</td>
<td>1600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.40</td>
<td>0.64</td>
<td>1.00</td>
<td>1.60</td>
<td>2.50</td>
<td>4.00</td>
<td>6.40</td>
<td>10.0</td>
<td>16.0</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.25</td>
<td>0.40</td>
<td>0.63</td>
<td>1.00</td>
<td>1.60</td>
<td>2.50</td>
<td>4.00</td>
<td>6.40</td>
<td>10.0</td>
</tr>
</tbody>
</table>

OIML R 49 Pattern approval specification for Class II (2%)

<table>
<thead>
<tr>
<th>Size</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>„R“ Q3/Q1</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>787.5</td>
<td>1250</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td>Q3 [m³/h]</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>630</td>
<td>1000</td>
<td>1600</td>
<td>1600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.25</td>
<td>0.40</td>
<td>0.63</td>
<td>1.00</td>
<td>1.60</td>
<td>2.50</td>
<td>4.00</td>
<td>6.40</td>
<td>10.0</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.16</td>
<td>0.25</td>
<td>0.40</td>
<td>0.63</td>
<td>1.00</td>
<td>1.60</td>
<td>2.50</td>
<td>4.00</td>
<td>6.40</td>
</tr>
</tbody>
</table>

1) The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables below.

**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 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 600.

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 Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table.

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 [m³/h]</td>
<td>18.75</td>
<td>31.25</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>750</td>
</tr>
<tr>
<td>Q3 [m³/h]</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.96</td>
<td>1.60</td>
<td>2.60</td>
<td>4.03</td>
<td>6.40</td>
<td>10.24</td>
<td>16.00</td>
<td>25.60</td>
<td>38.4</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.60</td>
<td>1.00</td>
<td>1.60</td>
<td>2.52</td>
<td>4.00</td>
<td>6.40</td>
<td>10.00</td>
<td>16.00</td>
<td>24.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>„R“ Q3/Q1</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>18.75</td>
<td>31.25</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>750</td>
</tr>
<tr>
<td>Q3 [m³/h]</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.38</td>
<td>0.63</td>
<td>1.02</td>
<td>1.60</td>
<td>2.54</td>
<td>4.06</td>
<td>6.35</td>
<td>10.20</td>
<td>15.24</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.24</td>
<td>0.40</td>
<td>0.63</td>
<td>1.00</td>
<td>1.59</td>
<td>2.54</td>
<td>3.97</td>
<td>6.35</td>
<td>9.52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>50 (2&quot;)</th>
<th>65 (2½&quot;)</th>
<th>80 (3&quot;)</th>
<th>100 (4&quot;)</th>
<th>125 (5&quot;)</th>
<th>150 (6&quot;)</th>
<th>200 (8&quot;)</th>
<th>250 (10&quot;)</th>
<th>300 (12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>„R“ Q3/Q1</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Q4 [m³/h]</td>
<td>18.75</td>
<td>31.25</td>
<td>50</td>
<td>78.75</td>
<td>125</td>
<td>200</td>
<td>312.5</td>
<td>500</td>
<td>750</td>
</tr>
<tr>
<td>Q3 [m³/h]</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>63</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>Q2 [m³/h]</td>
<td>0.31</td>
<td>0.50</td>
<td>0.80</td>
<td>1.20</td>
<td>2.00</td>
<td>3.20</td>
<td>5.00</td>
<td>8.00</td>
<td>12.0</td>
</tr>
<tr>
<td>Q1 [m³/h]</td>
<td>0.19</td>
<td>0.31</td>
<td>0.50</td>
<td>0.75</td>
<td>1.25</td>
<td>2.00</td>
<td>3.13</td>
<td>5.00</td>
<td>7.5</td>
</tr>
</tbody>
</table>
**SITRANS F flowmeters**

**SITRANS F M**

Battery-operated water meter

**MAG 8000/MAG 8000 CT**

---

**Installation conditions**

Please refer to “System information SITRANS F M electromagnetic flowmeters”. MAG 8000 CT has to be mounted in Integral (compact) and horizontal position only, to obtain the MI-001 certification. Battery packs must be installed with the top part in upwards direction to reach maximum capacity.

---

**The Label is placed on the side of the encapsulation.**

An example of the product label is shown below:

**Bonding and grounding**

The sensor body must be grounded using grounding/bonding straps and or grounding rings to protect the flow signal against stray electrical noise and or lightning. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body.

---

**Metal pipelines**

On metal pipelines, connect the straps to both flanges.

---

**Plastic pipelines**

On plastic pipelines 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 pipelines**

A combination of metal and plastic requires straps for metal pipeline and grounding rings for plastic pipeline.

---

**The Label is placed on the side of the encapsulation.**

An example of the product label is shown below:
Output configuration MAG 8000

Pulse volume: Output A/B configured as volume per pulse, the output delivers a pulse when the preset volume has passed the selected direction, calculated on forward/reverse or Net forward/reverse flow. The volume per pulse is freely scalable, from 0.0001 to 10 000 meter-unit per pulse. PR = pulse rate and PF = pulse frequency.

Alarm: The alarm will follow the internal alarm status.

Output configuration MAG 8000 CT

MAG 8000 CT has same output functionality as MAG 8000, due to MI-001 is only forward flow (output A predefined) and output B as Alarm output available.

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).

The effect from other temperatures can be seen from the figure. A variation in temperature from 15 °C to 55 °C (59 to 131 °F) reduces the capacity by 17% in the table from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table.

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.

Battery lifetime (subject to the assumptions mentioned above)

<table>
<thead>
<tr>
<th>Excitation frequency (24 h operation)</th>
<th>1/60 Hz</th>
<th>1/30 Hz</th>
<th>1/15 Hz</th>
<th>1/5 Hz</th>
<th>1.5625 Hz</th>
<th>3.125 Hz</th>
<th>6.25 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two D-Cell battery 33 Ah Internal battery pack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25 ... 200 (1&quot; ... 8&quot;)</td>
<td>8 years</td>
<td>8 years</td>
<td>6 years</td>
<td>40 months</td>
<td>8 months</td>
<td>4 months</td>
<td>2 months</td>
</tr>
<tr>
<td>DN 250 ... 600 (10&quot; ... 24&quot;)</td>
<td>8 years</td>
<td>6 years</td>
<td>4 years</td>
<td>20 months</td>
<td>2 months</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>DN 700 ... 1 200 (28&quot; ... 48&quot;)</td>
<td>6 years</td>
<td>4 years</td>
<td>2 years</td>
<td>1 year</td>
<td>2 months</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Four D-Cell battery 66 Ah External battery pack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25 ... 200 (1&quot; ... 8&quot;)</td>
<td>N/A</td>
<td>10 years</td>
<td>10 years</td>
<td>80 months</td>
<td>16 months</td>
<td>8 months</td>
<td>4 months</td>
</tr>
<tr>
<td>DN 250 ... 600 (10&quot; ... 24&quot;)</td>
<td>N/A</td>
<td>10 years</td>
<td>10 years</td>
<td>40 months</td>
<td>8 months</td>
<td>4 months</td>
<td>NA</td>
</tr>
<tr>
<td>DN 700 ... 1 200 (28&quot; ... 48&quot;)</td>
<td>10 years</td>
<td>8 years</td>
<td>4 years</td>
<td>2 years</td>
<td>4 months</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

External battery pack can be used as battery backup for mains power supply.

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
## Selection and Ordering data

### Order No.

**SITRANS F M MAG 8000 water meter**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25 (1&quot;)</td>
<td>7E6810-2D</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>7E6810-2R</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>7E6810-2Y</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>7E6810-3F</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>7E6810-3M</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>7E6810-3T</td>
</tr>
<tr>
<td>DN 125 (5&quot;)</td>
<td>7E6810-4B</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>7E6810-4H</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>7E6810-4P</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>7E6810-4V</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>7E6810-5D</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>7E6810-5K</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>7E6810-5R</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>7E6810-5Y</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>7E6810-6F</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>7E6810-6P</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>7E6810-6Y</td>
</tr>
<tr>
<td>DN 750 (30&quot;)</td>
<td>7E6810-7D</td>
</tr>
<tr>
<td>DN 800 (32&quot;)</td>
<td>7E6810-7H</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>7E6810-7M</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>7E6810-7B</td>
</tr>
</tbody>
</table>

### Flange norm and pressure rating

- **EN 1092-1**
  - PN 10 (DN 200 ... 1200 (8" ... 48"))
  - PN 16 (DN 50 ... 1200 (2" ... 48"))
  - PN 16 none PED (DN 700 ... 1200 (28" ... 48"))
- **ANSI B16.5**
- **AWWA C-207**
- **AS4087**
  - PN 16 (DN 50 ... 1200 (2" ... 48"))

### Sensor version

- **EPDM liner and Hastelloy electrodes**

### Calibration

- Standard ± 0.4% of rate ± 2 mm/s
- Extended ± 0.2% of rate ± 2 mm/s DN 50 ... 300 (2" ... 12")

### Region version

- **Europe** (m³/h, m³/h, 50 Hz)
- **USA** (Gallon, GPM, 60 Hz)
- **Australia** (ML, l/h, 50 Hz)

### Transmitter type and installation

- **Basic version integral on sensor**
  - Basic version remote, 5 m (16.4 ft) mounted cable on sensor with IP68/NEMA 6P plugs
  - Do - 10 m (32.8 ft)
  - Do - 20 m (65.6 ft)
  - Do - 30 m (98.4 ft)
- **Advanced version integral on sensor**
- **Advanced version remote, 5 m mounted cable on sensor with IP68/NEMA 6P plugs**
  - Do - 10 m (32.8 ft)
  - Do - 20 m (65.6 ft)
  - Do - 30 m (98.4 ft)

---

## Communication interface

- **No additional "add-on" communication module installed**
  - Serial RS 485 with MODBUS RTU (Terminated as end device)
  - Serial RS 232 with MODBUS RTU
- **Power supply**
  - Internal battery (no battery included)
  - Internal battery pack installed
  - External battery with 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs, no battery included
  - 12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)
  - 115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)

---

## Additional information

Please add "-Z" to Order No. and specify Order code(s) and plain text.

### Flow unit

- l/s
- MGD
- CFS
- l/min
- m³/min
- GPM
- CFM
- l/h
- m³/h
- GPH
- CFH
- GPS
- m³/d
- GPD
- Totalizer
  - 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

---

© Siemens AG 2010
Selection and Ordering data

Order code

<table>
<thead>
<tr>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code(s) and plain text.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>m³</td>
</tr>
<tr>
<td>ml</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>AF</td>
</tr>
<tr>
<td>l x 100</td>
</tr>
<tr>
<td>m³ x 100</td>
</tr>
<tr>
<td>G x 100</td>
</tr>
<tr>
<td>CF x 100</td>
</tr>
<tr>
<td>MG</td>
</tr>
<tr>
<td>G x 1000</td>
</tr>
<tr>
<td>CF x 1000</td>
</tr>
<tr>
<td>Al</td>
</tr>
<tr>
<td>kl</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pulse set up</th>
</tr>
</thead>
<tbody>
<tr>
<td>(default pulse A= forward and pulse B = Alarm)</td>
</tr>
</tbody>
</table>

| A function = RV, reverse flow | L62 |
| A function = FWhet, forward net flow | L63 |
| A function = RVnet, reverse net flow | L64 |
| A function = Off | L65 |
| Volume per pulse A = x 0.0001 | L70 |
| Volume per pulse A = x 0.001 | L71 |
| Volume per pulse A = x 0.01 | L72 |
| Volume per pulse A = x 0.1 | L73 |
| Volume per pulse A = x 1 | L74 |
| 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 | L84 |
| B function = Call up | L85 |
| Volume per pulse B = x 0.0001 | L90 |
| Volume per pulse B = x 0.001 | L91 |
| Volume per pulse B = x 0.01 | L92 |
| Volume per pulse B = x 0.1 | L93 |
| Volume per pulse B = x 1 | L94 |

<table>
<thead>
<tr>
<th>Data logger set up (default month logging)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datalogger Interval = Daily</td>
</tr>
<tr>
<td>Datalogger Interval = Weekly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factory mounted cables</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 m (16.4 ft) pulse cable A+B</td>
</tr>
<tr>
<td>5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device</td>
</tr>
<tr>
<td>20 m (65.6 ft) pulse cable A+B</td>
</tr>
<tr>
<td>20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device</td>
</tr>
<tr>
<td>Brad Harrison micro-change 3 way connector</td>
</tr>
<tr>
<td>Cello 2 channel, input cable 3 m (9.84 ft) with MIL-C-26482 spec. connectors</td>
</tr>
<tr>
<td>SOFREL data logger cable 2 m with connector for SOFREL G3M module</td>
</tr>
</tbody>
</table>
### SITRANS F M

**Battery-operated water meter**

**MAG 8000/MAG 8000 CT**

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS F M</th>
<th>MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 M E 6 8 2 0 -</td>
<td><strong>Diameter</strong></td>
<td></td>
</tr>
<tr>
<td>2 Y</td>
<td>DN 50 (2&quot;)</td>
<td></td>
</tr>
<tr>
<td>3 F</td>
<td>DN 65 (2½&quot;)</td>
<td></td>
</tr>
<tr>
<td>3 M</td>
<td>DN 80 (3&quot;)Q3 150 m³/h (m⁴) without verification or DN 80 (3&quot;)Q3 40 m³/h (m⁴) with MI-001 verification</td>
<td></td>
</tr>
<tr>
<td>3 T</td>
<td>DN 100 (4&quot;)</td>
<td></td>
</tr>
<tr>
<td>4 B</td>
<td>DN 125 (5&quot;)</td>
<td></td>
</tr>
<tr>
<td>4 H</td>
<td>DN 150 (6&quot;)</td>
<td></td>
</tr>
<tr>
<td>4 P</td>
<td>DN 200 (8&quot;)</td>
<td></td>
</tr>
<tr>
<td>4 V</td>
<td>DN 250 (10&quot;)</td>
<td></td>
</tr>
<tr>
<td>5 D</td>
<td>DN 300 (12&quot;)</td>
<td></td>
</tr>
<tr>
<td>5 K</td>
<td>DN 350 (14&quot;)</td>
<td></td>
</tr>
<tr>
<td>5 R</td>
<td>DN 400 (16&quot;)</td>
<td></td>
</tr>
<tr>
<td>5 Y</td>
<td>DN 450 (18&quot;)</td>
<td></td>
</tr>
<tr>
<td>6 F</td>
<td>DN 500 (20&quot;)</td>
<td></td>
</tr>
<tr>
<td>6 P</td>
<td>DN 600 (24&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

#### Flange norm and pressure rating

- **EN 1092-1**
- **PN 16**
- **ANSI B16.5**
- **Class 150**
- **AS4087**
- **PN 16**

#### Approval/Verification

- Without verification according to OIML R 49
  - MI-001 Q3/Q1 = 25
  - MI-001 Q3/Q1 = 63
  - MI-001 Q3/Q1 = 80
  - MI-001 Q3/Q1 = 160
  - MI-001 Q3/Q1 = 200
  - MI-001 Q3/Q1 = 250
  - Without verification according to OIML R 49 (Q3/Q1 = 100)
  - Without verification according to OIML R 49 (Q3/Q1 = 250)

#### Region version

- Europe (m³, m³/h, 50 Hz)
- USA (m³, m³/h, 60 Hz)

#### Transmitter type and installation

- Basic version integral on sensor
- Basic version remote, 5 m (16.4 ft) mounted cable on sensor with IP68/NEMA 6P plugs
- Do - 10 m (32.8 ft)
- Do - 20 m (65.6 ft)
- Do - 30 m (98.4 ft)
- Advanced version integral on sensor
- Advanced version remote, 5 m mounted cable on sensor with IP68/NEMA 6P plugs
- Do - 10 m (32.8 ft)
- Do - 20 m (65.6 ft)
- Do - 30 m (98.4 ft)

#### Communication interface

- No additional "add-on" communication module installed
- Serial RS 485 with MODBUS RTU (Terminated as end device)
- Serial RS 232 with MODBUS RTU
- Encoder interface for ITRON 200WP radio with "Sensus" protocol

#### Power supply

- Internal battery (no battery included)
- Internal battery pack installed
- External battery with 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs, no battery included
- 12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)
- 115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)

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.

---

1. The Diameter DN 700 (28") to DN 1200 (48") is only available as remote 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.
### Selection and Ordering data

**Order code**

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Totalizer</strong></td>
<td></td>
</tr>
<tr>
<td>Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)</td>
<td></td>
</tr>
<tr>
<td>Totalizer 1 = RV, reverse flow</td>
<td>L20</td>
</tr>
<tr>
<td>Totalizer 1 = NET, net flow</td>
<td>L22</td>
</tr>
<tr>
<td>Totalizer 2 = FW, forward flow</td>
<td>L30</td>
</tr>
<tr>
<td>Totalizer 2 = NET, net flow</td>
<td>L31</td>
</tr>
<tr>
<td><strong>Pulse set up</strong> (default pulse A = forward and pulse B = Alarm)</td>
<td></td>
</tr>
<tr>
<td>A function = RV, reverse flow</td>
<td>L62</td>
</tr>
<tr>
<td>A function = FWnet, forward net flow</td>
<td>L63</td>
</tr>
<tr>
<td>A function = RVnet, reverse net flow</td>
<td>L64</td>
</tr>
<tr>
<td>A function = Off</td>
<td>L65</td>
</tr>
<tr>
<td>Volume per pulse A = x 0.001</td>
<td>L71</td>
</tr>
<tr>
<td>Volume per pulse A = x 0.01</td>
<td>L72</td>
</tr>
<tr>
<td>Volume per pulse A = x 0.1</td>
<td>L73</td>
</tr>
<tr>
<td>Volume per pulse A = x 1</td>
<td>L74</td>
</tr>
<tr>
<td>B function = FW, forward flow</td>
<td>L80</td>
</tr>
<tr>
<td>B function = RV, reverse flow</td>
<td>L81</td>
</tr>
<tr>
<td>B function = FWnet, forward net flow</td>
<td>L82</td>
</tr>
<tr>
<td>B function = RVnet, reverse net flow</td>
<td>L83</td>
</tr>
<tr>
<td>B function = Alarm</td>
<td>L84</td>
</tr>
<tr>
<td>B function = Call up</td>
<td>L85</td>
</tr>
<tr>
<td>Volume per pulse B = x 0.001</td>
<td>L91</td>
</tr>
<tr>
<td>Volume per pulse B = x 0.01</td>
<td>L92</td>
</tr>
<tr>
<td>Volume per pulse B = x 0.1</td>
<td>L93</td>
</tr>
<tr>
<td>Volume per pulse B = x 1</td>
<td>L94</td>
</tr>
<tr>
<td><strong>Data logger set up</strong> (default month logging)</td>
<td></td>
</tr>
<tr>
<td>DataloggerInterval = Daily</td>
<td>M31</td>
</tr>
<tr>
<td>DataloggerInterval = Weekly</td>
<td>M32</td>
</tr>
<tr>
<td><strong>Factory mounted cables</strong></td>
<td></td>
</tr>
<tr>
<td>5 m (16.4 ft) pulse cable A+B</td>
<td>M81</td>
</tr>
<tr>
<td>5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device</td>
<td>M82</td>
</tr>
<tr>
<td>20 m (65.6 ft) pulse cable A+B</td>
<td>M84</td>
</tr>
<tr>
<td>20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device</td>
<td>M85</td>
</tr>
<tr>
<td>Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector</td>
<td>M87</td>
</tr>
<tr>
<td>Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors</td>
<td>M89</td>
</tr>
<tr>
<td>5 ft. Encoder interface cable with connector for ITRON 200WP radio</td>
<td>M90</td>
</tr>
<tr>
<td>25 ft. Encoder interface cable with connector for ITRON 200WP radio</td>
<td>M91</td>
</tr>
<tr>
<td>SOFREL data logger cable 2 m with connector for SOFREL GSM module</td>
<td>M92</td>
</tr>
</tbody>
</table>
Battery-operated water meter
MAG 8000/MAG 8000 CT

Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC Flow Tool on CD (Download for free from <a href="http://www.siemens.com/flow">www.siemens.com/flow</a>)</td>
<td>FDK-087L6001</td>
</tr>
<tr>
<td>IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable</td>
<td>FDK-087L4163</td>
</tr>
<tr>
<td>Battery backup for mains power supply, one pc. D-cell (3.6 V, 16.5 Ah)</td>
<td>FDK-087L4201</td>
</tr>
<tr>
<td>Internal battery pack, one set D-cell (3.6 V, 33 Ah) and accessories for replacement</td>
<td>FDK-087L4150</td>
</tr>
<tr>
<td>External battery pack IP68/NEMA 6P with connector, four D-cell (3.6 V, 66 Ah)</td>
<td>FDK-087L4151</td>
</tr>
<tr>
<td>Mains power supply 12 ... 24 V AC/DC with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)</td>
<td>FDK-087L4210</td>
</tr>
<tr>
<td>Mains power supply 115 ... 230 V AC with battery backup up and 3 m (9.8 ft) power cable for external connection (no battery included)</td>
<td>FDK-087L4211</td>
</tr>
<tr>
<td>RS 232 add-on module, point to point communication interface with MODBUS RTU protocol</td>
<td>FDK-087L4212</td>
</tr>
<tr>
<td>RS485 add-on module, multidrop communication interface with MODBUS RTU protocol</td>
<td>FDK-087L4213</td>
</tr>
<tr>
<td>Encoder interface module, with &quot;Sensus&quot; protocol for ITRON 200WP radio, only for use with 7ME6820 route</td>
<td>A5E02475650</td>
</tr>
<tr>
<td>One cable entry 6 ... 8 mm (0.24 ... 0.31 *) M20 brass glands package (1 pc)</td>
<td>FDK-087L4196</td>
</tr>
<tr>
<td>One cable entry 2 ... 5 mm (0.08 ... 0.20 *) M12 brass glands with M20 reduction. Package of 10 pcs</td>
<td>FDK-087L4154</td>
</tr>
</tbody>
</table>

Description

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-087L4155</td>
</tr>
<tr>
<td>FDK-087L4156</td>
</tr>
<tr>
<td>FDK-087L4157</td>
</tr>
<tr>
<td>FDK-087L4158</td>
</tr>
<tr>
<td>FDK-087L4159</td>
</tr>
<tr>
<td>FDK-085U0220</td>
</tr>
<tr>
<td>FDK-087L4165</td>
</tr>
<tr>
<td>FDK-087L4080</td>
</tr>
<tr>
<td>FDK-087L4142</td>
</tr>
</tbody>
</table>

Attention on note 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.

© Siemens AG 2010
MAG 8000 has built in Hastelloy grounding electrodes, when 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) and for the 7ME6880 route (all sizes). 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”.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>A5E01002946</td>
</tr>
<tr>
<td>DN 40</td>
<td>A5E01002947</td>
</tr>
<tr>
<td>DN 50</td>
<td>A5E01002948</td>
</tr>
<tr>
<td>DN 65</td>
<td>A5E01002950</td>
</tr>
<tr>
<td>DN 80</td>
<td>A5E01002952</td>
</tr>
<tr>
<td>DN 100</td>
<td>A5E01002953</td>
</tr>
<tr>
<td>DN 125</td>
<td>A5E01002954</td>
</tr>
<tr>
<td>DN 150</td>
<td>A5E01002955</td>
</tr>
<tr>
<td>DN 200</td>
<td>A5E01002957</td>
</tr>
<tr>
<td>DN 250</td>
<td>A5E01002958</td>
</tr>
<tr>
<td>DN 300</td>
<td>A5E01002962</td>
</tr>
</tbody>
</table>

Short lead time (details in PMD)

Spare parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAG 8000 (Basic version) transmitter compact replacement kit. System number specified by ordering. No battery included.</td>
<td>FDK-087L4166</td>
</tr>
<tr>
<td>MAG 8000 (Basic version) transmitter remote replacement kit. System number specified by ordering. No battery included.</td>
<td>FDK-087L4202</td>
</tr>
<tr>
<td>MAG 8000 (Advanced version) transmitter compact replacement kit. No battery included.</td>
<td>FDK-087L4203</td>
</tr>
<tr>
<td>MAG 8000 (Advanced version) transmitter remote replacement kit. No battery included.</td>
<td>FDK-087L4204</td>
</tr>
<tr>
<td>MAG 8000 (Basic version) transmitter PCB replacement kit</td>
<td>A5E01171569</td>
</tr>
<tr>
<td>MAG 8000 (Advanced version) transmitter PCB replacement kit</td>
<td>FDK-087L4168</td>
</tr>
</tbody>
</table>

Short lead time (details in PMD)

F) Subject to export regulations AL: 9I999, ECCN: N.
## SITRANS F M

### Battery-operated water meter

#### MAG 8000/MAG 8000 CT

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - PG 13.5</td>
<td>FDK-087L4108</td>
</tr>
<tr>
<td>Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - M20</td>
<td>On request</td>
</tr>
<tr>
<td>Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - PG 13.5</td>
<td>FDK-087L4109</td>
</tr>
<tr>
<td>Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - M20</td>
<td>On request</td>
</tr>
<tr>
<td>Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - PG 13.5</td>
<td>FDK-087L4110</td>
</tr>
<tr>
<td>Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - M20</td>
<td>On request</td>
</tr>
<tr>
<td>Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - PG 13.5</td>
<td>FDK-087L4111</td>
</tr>
<tr>
<td>Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - M20</td>
<td>On request</td>
</tr>
</tbody>
</table>
**Dimensional drawings**

**Dimensions in mm (inch)**

<table>
<thead>
<tr>
<th>Nominal DN size</th>
<th>A</th>
<th>L, lengths</th>
<th>Weight1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>_mm (inch)</td>
<td><em>mm (inch)</em></td>
<td><em>mm mm mm</em></td>
<td><em>kg lbs</em></td>
</tr>
<tr>
<td>25 (1)</td>
<td>194 (7.7)</td>
<td>200 7.9</td>
<td>6 13</td>
</tr>
<tr>
<td>40 (1½)</td>
<td>204 (8.1)</td>
<td>200 7.9</td>
<td>9 20</td>
</tr>
<tr>
<td>50 (2)</td>
<td>195 (7.7)</td>
<td>200 7.9</td>
<td>11 25</td>
</tr>
<tr>
<td>65 (2½)</td>
<td>201 (8)</td>
<td>200 7.9</td>
<td>13 29</td>
</tr>
<tr>
<td>80 (3)</td>
<td>207 (8.2)</td>
<td>200 7.9</td>
<td>15 34</td>
</tr>
<tr>
<td>100 (4)</td>
<td>214 (8.5)</td>
<td>250 9.8</td>
<td>17 38</td>
</tr>
<tr>
<td>125 (5)</td>
<td>224 (8.9)</td>
<td>250 9.8</td>
<td>22 50</td>
</tr>
<tr>
<td>150 (6)</td>
<td>239 (9.5)</td>
<td>300 11.8</td>
<td>28 63</td>
</tr>
<tr>
<td>200 (8)</td>
<td>264 (10.5)</td>
<td>350 13.8</td>
<td>50 113</td>
</tr>
<tr>
<td>250 (10)</td>
<td>291 (11.5)</td>
<td>450 17.7</td>
<td>71 160</td>
</tr>
<tr>
<td>300 (12)</td>
<td>317 (12.6)</td>
<td>500 19.7</td>
<td>88 198</td>
</tr>
<tr>
<td>350 (14)</td>
<td>369 (14.6)</td>
<td>550 21.7</td>
<td>127 279</td>
</tr>
<tr>
<td>400 (16)</td>
<td>394 (15.6)</td>
<td>600 23.6</td>
<td>145 318</td>
</tr>
<tr>
<td>450 (18)</td>
<td>425 (16.8)</td>
<td>600 23.6</td>
<td>175 384</td>
</tr>
<tr>
<td>500 (20)</td>
<td>450 (17.8)</td>
<td>600 26.8</td>
<td>225 494</td>
</tr>
<tr>
<td>600 (24)</td>
<td>501 (19.8)</td>
<td>600 32.3</td>
<td>340 747</td>
</tr>
<tr>
<td>700 (28)</td>
<td>544 (21.4)</td>
<td>700 875/700</td>
<td>N/A</td>
</tr>
<tr>
<td>750 (30)</td>
<td>571 (22.5)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>800 (32)</td>
<td>606 (23.9)</td>
<td>800 1000/800</td>
<td>N/A</td>
</tr>
<tr>
<td>900 (36)</td>
<td>653 (25.7)</td>
<td>900 1125/900</td>
<td>N/A</td>
</tr>
<tr>
<td>1000 (40)</td>
<td>704 (27.7)</td>
<td>1000 1250/1000</td>
<td>N/A</td>
</tr>
<tr>
<td>1050 (42)</td>
<td>704 (27.7)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1100 (44)</td>
<td>755 (29.7)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1200 (48)</td>
<td>810 (31.9)</td>
<td>1200 1500/1200</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1) For remote version the sensor weight is reduced with 2 kg (4.5 lb)
Remote version

**External battery pack**

Dimensions in mm (inch), weight 3.5 kg (8 lbs)

**Grounding rings**

Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Internal diameter (d)</th>
<th>Outside diameter (D)</th>
<th>h</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>27</td>
<td>68</td>
<td>143</td>
</tr>
<tr>
<td>DN 40</td>
<td>38</td>
<td>88</td>
<td>163</td>
</tr>
<tr>
<td>DN 50</td>
<td>52</td>
<td>100</td>
<td>175</td>
</tr>
<tr>
<td>DN 65</td>
<td>64</td>
<td>120</td>
<td>195</td>
</tr>
<tr>
<td>DN 80</td>
<td>79</td>
<td>133</td>
<td>208</td>
</tr>
<tr>
<td>DN 100</td>
<td>95</td>
<td>158</td>
<td>233</td>
</tr>
<tr>
<td>DN 125</td>
<td>115</td>
<td>188</td>
<td>263</td>
</tr>
<tr>
<td>DN 150</td>
<td>145</td>
<td>216</td>
<td>336</td>
</tr>
<tr>
<td>DN 200</td>
<td>193</td>
<td>268</td>
<td>343</td>
</tr>
<tr>
<td>DN 250</td>
<td>246</td>
<td>324</td>
<td>399</td>
</tr>
<tr>
<td>DN 300</td>
<td>295</td>
<td>374</td>
<td>449</td>
</tr>
</tbody>
</table>
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).
SITRANS F C coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter is a multi-parameter device offering accurate measurement of mass flow, volume flow, density, temperature and fraction.

**Benefits**

**Greater flexibility**
- Wide product program
- Uniform sensor interface enabling “plug & play” for all transmitters
- Compact or remote installation using the same transmitters and sensors

**Easier commissioning**
All SITRANS F C coriolis flowmeters feature a 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.

**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**
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.

**Application**
Coriolis mass flowmeters are suitable for measuring 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. The coriolis flowmeter is recognized for its high accuracy in a wide turn-down range.

**The main applications of the coriolis flowmeter can be found in all industries, such as:**

**Chemical & pharma**
Detergents, bulk chemicals, pharmaceuticals, acids, alkalis

**Food & beverage**
Dairy products, beer, wine, soft-drinks, plato/brix, fruit juices and pulps, bottling, CO2 dosing, CIP-liquids

**Automotive**
Fuel injection nozzle & pump testing, filling of AC units, engine consumption, paint robots

**Oil & gas**
Filling of gas bottles, furnace control, CNG-dispensers, Test separators, LPG

**Water & waste water**
Dosing of chemicals for water treatment
### Product Information: SITRANS F C

**SITRANS F flowmeters**

**SITRANS F C**

**Coriolis mass flowmeters**

Please see Product selector on the Internet, since some constrains might be related to some of the features.

<table>
<thead>
<tr>
<th>Model</th>
<th>Design</th>
<th>Transmitter enclosure</th>
<th>Communication</th>
<th>Supply Voltage</th>
<th>Pipe Size</th>
<th>Process connection norms and pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASS 2100 DI 1.5</td>
<td>Compact</td>
<td>Polyamide, IP67/NEMA4X</td>
<td>HART</td>
<td>24 V DC</td>
<td>Di 1.5 (1/16&quot;)</td>
<td>NPT ANSI/ASME B.20.1; PN 100</td>
</tr>
<tr>
<td>MASS 2100 DI 3 to DI 40</td>
<td>Remote</td>
<td>Noryl (SIMATIC S7-300), IP20/NEMA 2</td>
<td>PROFIBUS PA</td>
<td>24 V DC/DC</td>
<td>Di 3 (1/8&quot;)</td>
<td>ISO 228/1; PN 100</td>
</tr>
<tr>
<td>FC300 DN 4</td>
<td></td>
<td>Stainless steel IP67/NEMA4X</td>
<td>PROFIBUS DP</td>
<td>115/230 V AC</td>
<td>DN 4 (1/6&quot;)</td>
<td></td>
</tr>
<tr>
<td>MC2 DN 50 to DN 150</td>
<td></td>
<td>19&quot; rack IP20/NEMA2 aluminium</td>
<td>MODBUS RTU / RS 485</td>
<td></td>
<td>DN 6 (¼&quot;)</td>
<td></td>
</tr>
<tr>
<td>MC2 Hygienic DN 25 to DN 80</td>
<td></td>
<td>Back of panel IP20/NEMA2 aluminium</td>
<td>MODBUS RTU / RS 232</td>
<td></td>
<td>DN 15 (½&quot;)</td>
<td></td>
</tr>
<tr>
<td>MASS 6000 IP67</td>
<td></td>
<td>Wall mounting IP66/NEMA4 ABS plastic</td>
<td>FOUNDATION Fieldbus H1</td>
<td></td>
<td>DN 20 (¾&quot;)</td>
<td></td>
</tr>
<tr>
<td>MASS 6000 19&quot; Ex d</td>
<td></td>
<td>Front of panel IP66/NEMA4 ABS plastic</td>
<td>DeviceNet</td>
<td></td>
<td>DN 25 (1&quot;)</td>
<td></td>
</tr>
<tr>
<td>MASS 6000 Ex d</td>
<td></td>
<td></td>
<td></td>
<td>24 V AC</td>
<td>DN 40 (1½&quot;)</td>
<td></td>
</tr>
<tr>
<td>MASS 6000 Ex d</td>
<td></td>
<td></td>
<td></td>
<td>115/230 V AC</td>
<td>DN 50 (2&quot;)</td>
<td></td>
</tr>
<tr>
<td>SIFLOW FC070 Std/Ex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DN 65 (2½&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DN 80 (3&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DN 100 (4&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DN 150 (6&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- ● = available
- 1) Not available for DN 100 and DN 150 sensors.
### System information SITRANS F C

#### Coriolis mass flowmeters

Please see Product selector [www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com) on the Internet, since some constrains might be related to some of the features.

<table>
<thead>
<tr>
<th>MASS 2100 DI 1.5</th>
<th>MASS 2100 DI 3 to DI 40</th>
<th>FC300 DN 4</th>
<th>MC2 DN 50 to DN 150</th>
<th>MC2 Hygienic DN 25 to DN 80</th>
<th>MASS 6000 IP67</th>
<th>MASS 6000 Ex d</th>
<th>SIFLOW FC070 Std/Ex</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME4100</td>
<td>7ME4100, 7ME4200, 7ME4210</td>
<td>7ME4300</td>
<td>7ME4310</td>
<td>7ME4110</td>
<td>7ME4110</td>
<td>7ME4110</td>
<td>7ME4120</td>
</tr>
</tbody>
</table>

### Flange

<table>
<thead>
<tr>
<th>EN 1092-1 PN 40</th>
<th>EN 1092-1 PN 100</th>
<th>ANSI B16.5 Class 150</th>
<th>ANSI B16.5 Class 300</th>
<th>ANSI B16.5 Class 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Dairy

<table>
<thead>
<tr>
<th>DIN 11851 PN 25</th>
<th>DIN 11851 PN 40</th>
<th>DIN 11864-2A</th>
<th>Clamp ISO 2852 PN 16</th>
<th>ISO 2853 PN 16</th>
<th>DIN 32676 Tri-Clamp PN 10/PN 16</th>
<th>Others on request</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Pipe material

<table>
<thead>
<tr>
<th>Stainless steel W1.4435 (316L)</th>
<th>Stainless steel W1.4571 (316 Ti)</th>
<th>Hastelloy C22</th>
<th>Hastelloy C4</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### With heating jacket

<table>
<thead>
<tr>
<th>Internal U - tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
</tr>
</tbody>
</table>

### Pressure rating

<table>
<thead>
<tr>
<th>PN 40</th>
<th>PN 100</th>
<th>High-pressure version&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Accuracy

<table>
<thead>
<tr>
<th>Flow error ≤ 0.1% of rate</th>
<th>Flow error ≤ 0.15% of rate</th>
<th>Flow error ≤ 0.5% of rate</th>
<th>Density error ≤ 0.0005 g/cm³</th>
<th>Density error ≤ 0.001 g/cm³</th>
<th>Density error ≤ 0.0015 g/cm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Cable glands

<table>
<thead>
<tr>
<th>PG 13.5</th>
<th>½” NPT</th>
<th>M20</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

<sup>1</sup> = available
<sup>2</sup> Not available for DN 150 sensor
<sup>3</sup> Not available for DN 100 and DN 150 sensors
<sup>4</sup> Please see technical specifications
<sup>5</sup> DI 3 and DI 6
### Approvals

**Hazardous locations**

<table>
<thead>
<tr>
<th>Location</th>
<th>Approvals</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex II 1G EEEx ia IIC T3(T4) ... T6</td>
<td>ATEX</td>
<td></td>
</tr>
<tr>
<td>Class 1, Div 1, Group A,B,C,D</td>
<td>C-UL</td>
<td>1)</td>
</tr>
<tr>
<td>Class I, Zone 0, Ex ia IIC T3 ... T6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex ia IIC T3/T4 ... T6</td>
<td>ATEX</td>
<td></td>
</tr>
<tr>
<td>Class I, Div 1, Group A,B,C,D</td>
<td>C-UL</td>
<td></td>
</tr>
<tr>
<td>Class I, Zone 0, Ex ia IIC T3 ... T6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 1, Div 2, Groups A,B,C,D</td>
<td>C-UL</td>
<td>2)</td>
</tr>
<tr>
<td>Class I, Zone 2, Aex nC IIC T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I, Zone 2, Ex nC (nL) IIC T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex II (1)G EEEx ia IIC</td>
<td>ATEX</td>
<td></td>
</tr>
<tr>
<td>Class I, Div 1 &amp; 2, Groups A,B,C,D</td>
<td>C-UL</td>
<td>3)</td>
</tr>
<tr>
<td>Class I, Zone 2 &amp; Zone 0, Aex nC (ia) IIC T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I, Zone 2 &amp; Zone 0, Ex nC (ia) IIC T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex II 2G EEEx d e [ia/ib] IIC T6</td>
<td>ATEX</td>
<td></td>
</tr>
<tr>
<td>Ex II (1)G EEEx ia IIC Ex II 3G Ex na II T4</td>
<td>ATEX</td>
<td></td>
</tr>
<tr>
<td>Ex na [ia] IIC T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I, Zone 2, Ex na [ia] IIC T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordinary locations</td>
<td>USL, CNL-Flowmeter</td>
<td>C-UL</td>
</tr>
<tr>
<td>USR, CNR-Flowmeter</td>
<td>C-UL</td>
<td>6)</td>
</tr>
<tr>
<td>USR, CNR-Flowmeter</td>
<td>C-UL</td>
<td>7)</td>
</tr>
<tr>
<td>USL, CNL-Flowmeter</td>
<td>C-UL</td>
<td>8)</td>
</tr>
<tr>
<td>PED</td>
<td>Fluid group 1</td>
<td>PED Directive 97/23/EC</td>
</tr>
<tr>
<td>Category II, Module H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 81 + D</td>
<td>PED Directive 97/23/EC</td>
<td></td>
</tr>
</tbody>
</table>

**CRN**

| Category F OF10769.5C | CRN | |

**Pharma**

| EHEDG | TUM | |

Note: Special conditions for safe use might be specified in certificates or operating instructions.

- **= available**
- 1) Sensor pressure max. 100 bar (1450 psi)
- 2) Only compact version
- 3) Can be placed in zone 2 if mounted in minimum IP65 cabinet
- 4) Can be placed in zone 2 if mounted in minimum IP54 cabinet
- 5) Only Ex version
- 6) 24 V; IP20
- 7) 115 ... 230 V; IP20
- 8) 115 ... 230 V; IP65
- 9) Only Di 25 and Di 40

Please see Product selector www.piaselectors.siemens.com on the Internet, since some constrains might be related to some of the features.
SITRANS F flowmeters

SITRANS F C

System information SITRANS F C

Coriolis mass flowmeters

Function

The flow measuring principle is based on coriolis law of movement. The flowmeter consists of a sensor type MASS 2100/FC300 or MC2 and a transmitter 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 via a "phase locked loop", to ensure a stable output from the 2 pick-ups in the region of 80 to 110 mV.

The temperature of the sensor is measured by a Pt1000, in a wheatstone configuration (4-wire).

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 analog to digital conversion takes place in an ultra-low noise ASIC with 23 bit signal resolution. The signal transfer function is based on a patented DFT technology (Discrete Fourier Transformation). The ASIC is constructed as a state machine gate array, which enables fast signal processing and filtering.

The ASIC has a built-in noise filter, which can be used to improve the meters’ 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.

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 following points are to be considered during installation:

- 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 rigid pipelines. Two supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections.

- To conduct a system zero adjustment, shut-off devices are required in the pipeline.

- When possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

Currents deviations may occur.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

The optimal installation orientation is vertical with the flow upwards.

The optimal installation orientation is vertical with the flow upwards.

Supports

Installation orientation

- MASS 2100/FC300 – sensors
- The optimal installation orientation is horizontal.
- MC2 – sensors
- The optimal installation orientation is vertical with the flow upwards.

Installation orientation

SITRANS F C mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 4X and IP66/NEMA 4. The flowmeter is bidirectional and can be installed in any orientation.

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.

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 4X and IP66/NEMA 4. The flowmeter is bidirectional and can be installed in any orientation.

It is important to ensure that the meter tubings are always completely filled with homogeneous fluid. Otherwise measuring errors may occur.

Currently the USM platform handles all present and future communication protocols, e.g., PROFIBUS DP, PROFIBUS PA, HART, MODBUS, FOUNDATION Fieldbus H1 and DeviceNet.

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 upstream and downstream of the flowmeter.
Installation: straight run requirements
- The mass flowmeter does not require any flow conditioning 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. Advantageous are installations in low pipeline sections, at the bottom of a U-section in the pipeline.
- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining.
- 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. The 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 0.1 to 0.2 bar (0.5 to 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.
- 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. A bypass line is optimal when the process cannot be shut down. 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 or UKAS.

The accreditation bodies DANAK and UKAS have 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.

MASS 2100 sensors and MASS 6000 transmitters

<table>
<thead>
<tr>
<th>Flowmeters SITRANS F C Coriolis mass flowmeters</th>
<th>Actual</th>
<th>5%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>95%</th>
<th>FSO (sensors max. flow rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow conditions</td>
<td>Fully developed flow profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature, medium</td>
<td>20 °C ± 2 K (68 °F ± 3.6 °F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature, ambient</td>
<td>20 °C ± 2 K (68 °F ± 3.6 °F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid pressure</td>
<td>2 ± 1 bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>0.997 g/cm³</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brix</td>
<td>40 °Brix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Uₚ ±1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warming-up time</td>
<td>30 min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>5 m between transmitter and sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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: < ± 0.003% / K act.
- Current output: < ± 0.005% / K act.
- Effect of supply voltage: < 0.005% of measuring value on 1% alteration

System information SITRANS F C

![Graph showing the effect of actual mass flow rate on 95% confidence probability.](image-url)
### SITRANS F C

#### SITRANS F flowmeters

**System information SITRANS F C**

**Coriolis mass flowmeters**

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>FC300</th>
<th>MASS 2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 4 (1/6&quot;)</td>
<td>DI 1.5 (1/16&quot;)</td>
<td>DI 3 (1/8&quot;)</td>
</tr>
<tr>
<td>DI 6 (½&quot;)</td>
<td>DI 15 (½&quot;)</td>
<td>DI 25 (1&quot;)</td>
</tr>
<tr>
<td>DI 40 (1½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of measuring pipes</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mass flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity error</td>
<td>% of rate</td>
<td>0.10</td>
</tr>
<tr>
<td>Repeatability error</td>
<td>% of rate</td>
<td>0.05</td>
</tr>
<tr>
<td>Max. zero point error</td>
<td>[kg/h]</td>
<td>0.010</td>
</tr>
<tr>
<td>Density</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density error</td>
<td>[g/cm³]</td>
<td>0.0015</td>
</tr>
<tr>
<td>Repeatability error</td>
<td>[g/cm³]</td>
<td>0.0002</td>
</tr>
<tr>
<td>Range</td>
<td>[g/cm³]</td>
<td>0 ... 2.9</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>[°C (°F)]</td>
<td>0.5 (1)</td>
</tr>
<tr>
<td>Brix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>[°Brix]</td>
<td>0.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>MC2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor size (standard version)</td>
<td>DN 50 (2&quot;)</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>DN 80 (3&quot;)</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>DN 150 (6&quot;)</td>
</tr>
<tr>
<td>Sensor size (hygienic version)</td>
<td>DN 20 (¾&quot;)</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>DN 40 (1½&quot;)</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td></td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>DN 80 (3&quot;)</td>
</tr>
<tr>
<td>Number of measuring pipes</td>
<td>2</td>
</tr>
<tr>
<td>Mass flow:</td>
<td></td>
</tr>
<tr>
<td>Linearity error</td>
<td>% of rate</td>
</tr>
<tr>
<td>% of rate</td>
<td>0.1</td>
</tr>
<tr>
<td>Max. zero point error</td>
<td>[kg/h (lb/h)]</td>
</tr>
<tr>
<td>Density</td>
<td></td>
</tr>
<tr>
<td>Density error</td>
<td>(Standard) [g/cm³]</td>
</tr>
<tr>
<td>(Extended) [g/cm³]</td>
<td>0.001</td>
</tr>
<tr>
<td>Range</td>
<td>[g/l]</td>
</tr>
<tr>
<td>Repeatability error</td>
<td>[g/l]</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>[°C (°F)]</td>
</tr>
<tr>
<td>Brix</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>[°Brix]</td>
</tr>
</tbody>
</table>

1) Flow and density calibration (1 kg/m³) required.
### Flowmeter uncertainty/specifications

MC2 sensors and MASS 6000 transmitters

<table>
<thead>
<tr>
<th>Flow Capacity (kg/h)</th>
<th>Error [E (%)]</th>
<th>Zero Point Error [Z (kg/h)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 20 (¾&quot;)</td>
<td>5%</td>
<td>50%</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>10%</td>
<td>95%</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>15%</td>
<td>90%</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>20%</td>
<td>85%</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>25%</td>
<td>80%</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>30%</td>
<td>75%</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>35%</td>
<td>70%</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>40%</td>
<td>65%</td>
</tr>
</tbody>
</table>

Flow capacity calculated at 1 bar pressure loss on water at 20 °C

\[
E = \pm \sqrt{(0.15)^2 + \left(\frac{Z \times 100}{q_m}\right)^2}
\]

- E = Error [%]
- Z = Zero point error [kg/h]
- q_m = Mass flow [kg/h]
- Q_{max} at 2 bar pressure loss at 1 g/cm³

![Error in % of actual mass flow rate with 95% confidence](image)
### 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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable standard</td>
<td>EN 50170 vol. 2</td>
</tr>
<tr>
<td>Physical Layer (Transmission technology)</td>
<td>RS 485</td>
</tr>
<tr>
<td>Transmission speed</td>
<td>≤ 1.5 Mbits/s</td>
</tr>
<tr>
<td>Number of stations</td>
<td>Up to 32 per line segment, (maximum total of 126)</td>
</tr>
</tbody>
</table>

**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 Ω at frequencies from 3 ... 20 MHz
- **Cable capacity**: < 30 pF per meter
- **Core diameter**: > 0.34 mm², corresponds to AWG 22
- **Resistance**: < 110 Ω 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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable standard</td>
<td>EN 50170</td>
</tr>
<tr>
<td>Physical Layer (Transmission technology)</td>
<td>IEC-61158-2</td>
</tr>
<tr>
<td>Transmission speed</td>
<td>31.25 Kbits/second</td>
</tr>
<tr>
<td>Number of stations</td>
<td>Up to 32 per line segment, maximum total of 126)</td>
</tr>
<tr>
<td>Max. basic current [(I_{BG})]</td>
<td>14 mA</td>
</tr>
<tr>
<td>Fault current [(I_{FDE})]</td>
<td>0 mA</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>9 ... 32 V (non Ex)</td>
</tr>
</tbody>
</table>

**Preferred cable specification (Type A)**

- **Cable design**: Two wire twisted pair
- **Conductor area (nominal)**: 0.8 mm² (AWG 18)
- **Loop resistance**: 44 Ω/km
- **Impedance**: 100 Ω ± 20%
- **Wave attenuation at 39 kHz**: 3 dB/km
- **Capacitive asymmetry**: 2 nF/km
- **Bus termination**: Passive line termination at both
- **Max. bus length**: Up to 1.9 km. Extendable by repeaters

### IS (Intrinsic Safety) data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required sensor electronics</td>
<td>Compact mounted SITRANS F C MASS 6000 Ex d</td>
</tr>
<tr>
<td>FISCO</td>
<td>Yes</td>
</tr>
<tr>
<td>Max. (U_I)</td>
<td>17.5 V</td>
</tr>
<tr>
<td>Max. (I_I)</td>
<td>380 mA</td>
</tr>
<tr>
<td>Max. (P_I)</td>
<td>5.32 V</td>
</tr>
<tr>
<td>Max. (L_I)</td>
<td>10 μH</td>
</tr>
<tr>
<td>Max. (C_I)</td>
<td>5 nF</td>
</tr>
<tr>
<td>Max. (U_O)</td>
<td>1.3 V</td>
</tr>
<tr>
<td>Max. (I_O)</td>
<td>50 μA</td>
</tr>
</tbody>
</table>

**FISCO cable requirements**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance (R_C)</td>
<td>15 ... 150 Ω/km</td>
</tr>
<tr>
<td>Loop inductance (L_C)</td>
<td>0.4 ... 1 mH/km</td>
</tr>
<tr>
<td>Capacitance (C_C)</td>
<td>80 ... 200 nF/km</td>
</tr>
<tr>
<td>Max. Spur length in IIC and IIB</td>
<td>30 m</td>
</tr>
<tr>
<td>Max. Trunk length in IIC</td>
<td>1 km</td>
</tr>
<tr>
<td>Max. Trunk length in IIB</td>
<td>5 km</td>
</tr>
</tbody>
</table>

**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:

<table>
<thead>
<tr>
<th>Input (Master view)</th>
<th>Parameter</th>
<th>MASS 6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Volume flow</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Fraction A(^1)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Fraction B(^1)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Pct Fraction A(^1)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Totalizer 1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Totalizer 2(^2)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch progress(^2)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch setpoint</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch compensation</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Batch status (running ...)</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output (Master view)</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Totalizer 1+2</td>
<td>✓</td>
</tr>
<tr>
<td>Set Mode Totalizer 1+2</td>
<td>✓</td>
</tr>
<tr>
<td>Batch control (start, stop ...)</td>
<td>✓</td>
</tr>
<tr>
<td>Batch setpoint</td>
<td>✓</td>
</tr>
<tr>
<td>Batch compensation</td>
<td>✓</td>
</tr>
</tbody>
</table>

\(^1\) Requires a SENSORPROM containing valid fraction data.
\(^2\) Value returned is dependent on the BATCH function.
When ON, Batch progress is returned.
When OFF, TOTALIZER 2 is returned.
Overview

MASS 6000 is based on the latest developments within 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 patented 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”

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 4X compact polyamide enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40 (1/8” to 1 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
Technical specifications

<table>
<thead>
<tr>
<th>Measurement of</th>
<th>Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m³, (lbs/ft³)], temperature [°C (°F)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td><strong>Current</strong>&lt;br&gt;Current 0 ... 20 mA or 4 ... 20 mA&lt;br&gt;<strong>Load</strong>&lt;br&gt;Load &lt; 800 Ω&lt;br&gt;<strong>Time constant</strong>&lt;br&gt;Time constant 0 ... 99.9 s adjustable</td>
</tr>
<tr>
<td>Digital output</td>
<td><strong>Frequency</strong>&lt;br&gt;Frequency 0 ... 10 kHz, 50% duty cycle&lt;br&gt;<strong>Time constant</strong>&lt;br&gt;Time constant 0 ... 99.9 s adjustable&lt;br&gt;<strong>Active</strong>&lt;br&gt;Active 24 V DC, 30 mA, 1 KΩ ≤ Rload ≤ 10 KΩ, short-circuit-protected&lt;br&gt;<strong>Passive</strong>&lt;br&gt;Passive 3 ... 30 V DC, max. 110 mA, 1 KΩ ≤ Rload ≤ 10 KΩ</td>
</tr>
<tr>
<td>Relay</td>
<td><strong>Type</strong>&lt;br&gt;Type Change-over relay&lt;br&gt;<strong>Load</strong>&lt;br&gt;Load 42 V/2 A peak&lt;br&gt;<strong>Functions</strong>&lt;br&gt;Functions Error level, error number, limit, flow direction</td>
</tr>
<tr>
<td>Digital input</td>
<td><strong>Functionality</strong>&lt;br&gt;Functionality 11 ... 30 V DC (Ri = 13.6 KΩ)&lt;br&gt;Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>All inputs and outputs are galvanically isolated, isolation voltage 500 V</td>
</tr>
<tr>
<td>Cut-off</td>
<td><strong>Low-flow</strong>&lt;br&gt;Low-flow 0 ... 9.9% of maximum flow</td>
</tr>
<tr>
<td>Limit function</td>
<td><strong>Mass flow, volume flow, fraction, density, sensor temperature</strong></td>
</tr>
<tr>
<td>Totalizer</td>
<td>Two eight-digit counters for forward, net or reverse flow</td>
</tr>
<tr>
<td>Display</td>
<td>• Background illumination with alphanumerical text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1&lt;br&gt;• Reverse flow indicated by negative sign</td>
</tr>
<tr>
<td>Zero point adjustment</td>
<td>Manual via keypad or remote via digital input</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td><strong>Operation</strong>&lt;br&gt;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&lt;br&gt;<strong>Storage</strong>&lt;br&gt;Storage -40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95%)</td>
</tr>
<tr>
<td>Communication</td>
<td>Add-on modules: HART, PROFIBUS PA &amp; DP, MODBUS RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1</td>
</tr>
<tr>
<td>Enclosure</td>
<td><strong>Material</strong>&lt;br&gt;Material Fibre glass reinforced polyamide&lt;br&gt;<strong>Rating</strong>&lt;br&gt;Rating IP67/NEMA 4X to IEC 529 and DIN 40050 (1 m w.g. for 30 min.)&lt;br&gt;<strong>Mechanical load</strong>&lt;br&gt;Mechanical load 18 ... 1000 Hz random, 3.17G rms, in all directions, to IEC 68-2-36</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V version&lt;br&gt;<strong>Supply</strong>&lt;br&gt;Supply 24 V DC/AC, 50 ... 60 Hz&lt;br&gt;<strong>Fluctuation</strong>&lt;br&gt;Fluctuation 18 ... 30 V DC&lt;br&gt;20 ... 30 V AC&lt;br&gt;<strong>Power consumption</strong>&lt;br&gt;Power consumption 10 W&lt;br&gt;230 V version&lt;br&gt;<strong>Supply</strong>&lt;br&gt;Supply 87 ... 253 V AC, 50 ... 60 Hz&lt;br&gt;<strong>Fluxuation</strong>&lt;br&gt;Fluxuation 26 VA&lt;br&gt;<strong>Power consumption</strong>&lt;br&gt;Power consumption T400 mA, T 250 V (IEC 127) - not replaceable by operator&lt;br&gt;<strong>24 V version</strong>&lt;br&gt;Supply T1 A, T 250 V (IEC 127) - not replaceable by operator</td>
</tr>
<tr>
<td>EMC performance</td>
<td>Emission EN/IEC 61000-6-4 (Industry)&lt;br&gt;Immunity EN/IEC 61000-6-2 (Industry)&lt;br&gt;NAMUR Within the value limits according to “Allgemeine Anforderung” with error criteria A in accordance with NE 21</td>
</tr>
<tr>
<td>Environment</td>
<td>Environmental conditions acc. to IEC/EN/UL 61010-1:&lt;br&gt;• Altitude up to 2000 m&lt;br&gt;• POLLUTION DEGREE 2</td>
</tr>
<tr>
<td>Maintenance</td>
<td>The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis</td>
</tr>
<tr>
<td>Cable glands</td>
<td>Two types of cable gland are available in polyamide in the following dimensions: M20 or ½” NPT</td>
</tr>
</tbody>
</table>
Selection and Ordering data

**SITRANS F C MASS 6000 transmitter**
Transmitter for wall mounting with wall mounting bracket, fibre glass reinforced polyamide (1 current output, 1 freq./pulse output, 1 relay output and connection board/PCB)

**Version**
Remote IP67/NEMA 4X enclosure

**Supply voltage**
115/230 V AC, 50 ... 60 Hz
24 V AC/DC

**Display/Keypad**
with display

**Serial communication**
No communication
HART
PROFIBUS PA Profile 3
PROFIBUS DP Profile 3
MODBUS RTU RS 485
DeviceNet
FOUNDATION Fieldbus H1

**Cable glands**
M20
½” NPT

---

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering

**Accessories**

**Cable glands**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2-off</td>
<td>A5E00822490, A5E00822501</td>
</tr>
<tr>
<td>Display and keypad</td>
<td>FDK-085U1039</td>
</tr>
</tbody>
</table>

**Spare parts for compact or remote IP67 version**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASS 6000 transmitter IP67/NEMA 4X Fibre glass reinforced polyamide and without connection board</td>
<td>7ME4110-1AA0-1AA0</td>
</tr>
</tbody>
</table>

---

**Note:** The operating instructions should be ordered as a separate line on the order.

This device is shipped with a Quick Start manual and the SITRANS F literature CD containing operating instructions, quick starts and certificates.

---

© Siemens AG 2010
**SITRANS F flowmeters**

**SITRANS F C**

Transmitter MASS 6000 IP67 compact/remote

### Dimensional drawings

#### Compact

**Dimensions in mm (inch)**

**MASS 2100**

<table>
<thead>
<tr>
<th>Sensor size [Di (inch)]</th>
<th>L3 [mm (inch)]</th>
<th>H3 [mm (inch)]</th>
<th>H5 [mm (inch)]</th>
<th>H5 + H6 [mm (inch)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1/8)</td>
<td>75 (2.95)</td>
<td>62 (2.44)</td>
<td>306 (12.04)</td>
<td>388 (15.28)</td>
</tr>
<tr>
<td>6 (¼)</td>
<td>75 (2.95)</td>
<td>72 (2.83)</td>
<td>316 (12.44)</td>
<td>388 (15.28)</td>
</tr>
<tr>
<td>15 (½)</td>
<td>75 (2.95)</td>
<td>87 (3.43)</td>
<td>326 (12.83)</td>
<td>413 (16.26)</td>
</tr>
<tr>
<td>25 (1)</td>
<td>75 (2.95)</td>
<td>173 (6.81)</td>
<td>330 (13.00)</td>
<td>503 (19.80)</td>
</tr>
<tr>
<td>40 (1½)</td>
<td>75 (2.95)</td>
<td>227 (8.94)</td>
<td>330 (13.00)</td>
<td>557 (21.93)</td>
</tr>
</tbody>
</table>

#### Transmitter wall mounted

**Dimensions in mm (inch)**

**4/132**

#### 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 μF 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.

**Passive output**

Max. 30 V/110 mA

**Active output**

Max. 30 mA

**Counter (plc)**

Max. 30 V AC

**Digital input**

11 ... 30 V DC

**Relay shown in de-energised condition**

**Current output**

0/4 ... 20 mA Load ≤800 Ω

**Relay**

42 V AC/2A

42 V DC/2A
Overview

MASS 6000 is based on the latest developments within 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 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 patented 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 5th-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 IP66/NEMA 4
- Back of panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4

The MASS 6000 19” is available as standard or as ATEX-approved transmitter which is to be mounted in the safe area.
**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
- Un/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 straightforward application and meter troubleshooting

**Technical specifications**

<table>
<thead>
<tr>
<th>Measurement of</th>
<th>Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m³ (lbs/ft³)], temperature [°C (°F)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>0 ... 20 mA or 4 ... 20 mA</td>
</tr>
<tr>
<td>Load</td>
<td>&lt; 800 Ω</td>
</tr>
<tr>
<td>Time constant</td>
<td>0 ... 99.9 s adjustable</td>
</tr>
<tr>
<td>Digital output</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>0 ... 10 kHz, 50% duty cycle</td>
</tr>
<tr>
<td>Time constant</td>
<td>0 ... 30 s adjustable</td>
</tr>
<tr>
<td>Active</td>
<td>24 V DC, 30 mA, 1 KΩ ≤ Rload ≤ 10 KΩ, short-circuit-protected</td>
</tr>
<tr>
<td>Passive</td>
<td>3 ... 30 V DC, max. 110 mA, 1 KΩ ≤ Rload ≤ 10 KΩ</td>
</tr>
<tr>
<td>Relay</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Change-over relay</td>
</tr>
<tr>
<td>Load</td>
<td>42 V/2 A peak</td>
</tr>
<tr>
<td>Functions</td>
<td>Error level, error number, limit, direction</td>
</tr>
<tr>
<td>Digital input</td>
<td></td>
</tr>
<tr>
<td>Functionality</td>
<td>11 ... 30 V DC</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>All inputs and outputs are galvanically isolated, isolation voltage 500 V</td>
</tr>
<tr>
<td>Cut-off</td>
<td></td>
</tr>
<tr>
<td>Low-flow</td>
<td>0 ... 9.9% of maximum flow</td>
</tr>
</tbody>
</table>

| Limit function                  | Mass flow, volume flow, fraction, density, sensor temperature                                   |
| Totalizer                       | Two eight-digit counters for forward, net or reverse flow                                       |
| Display                         |                                                                                                  |
|                                | Background illumination with alphanumerical text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults |
|                                | Reverse flow indicated by negative sign                                                          |
| Zero point adjustment           | Manual 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 & DP, MODBUS RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1    |
| Enclosure 19”                   |                                                                                                  |
| Material                        | Aluminium/steel (DIN 41494)                                                                      |
| Rating                          | IP20/NEMA 1 to IEC 529 and DIN 40050 (1 m w.g. for 30 min.)                                      |
| Mechanical load                 | 18 ... 1000 Hz random, 3.17G rms, in all directions, to IEC 68-2-36                              |
| Supply voltage                  | 87 ... 253 V AC +10% ... -10%, 50 ... 60 Hz                                                      |
|                                | 18 ... 30 V DC or 20 ... 30 V AC                                                                 |
| Power consumption               | 9 VA max.                                                                                        |
|                                | 6 W I<sub>H</sub> = 250 mA, I<sub>ST</sub> = 2 A (30 ms)                                          |
| EMC performance                 |                                                                                                  |
| Emission                        | EN/IEC 61000-6-4 (Industry)                                                                      |
| Immunity                        | EN/IEC 61000-6-2 (Industry)                                                                      |
| Ex approval                     | [EEx 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.|
| Fuse                            | T 400 mA, T 250 V (IEC 127), not replaceable by operator                                        |
| Cable                           |                                                                                                  |
|                                | Max. 300 m                                                                                       |
|                                | C: max. 300 [pF/m]; L<sub>C</sub>/R<sub>C</sub>: max. 100 (μH/Ω)                               |
|                                | The total cable capacity must be max. 200 nF                                                    |
| Cable glands                    | The cable gland is available in polyamide, in dimension: PG 13.5                              |
SITRANS F flowmeters
SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F C MASS 6000 transmitter</td>
<td>7 ME 4 1 1 0 - 2 A</td>
</tr>
<tr>
<td>Enclosure</td>
<td></td>
</tr>
<tr>
<td>19 inch insert IP20/NEMA 1 (rack)</td>
<td>C</td>
</tr>
<tr>
<td>19 inch insert in IP66/NEMA 4 (wall mounting)</td>
<td>E</td>
</tr>
<tr>
<td>Output configuration</td>
<td></td>
</tr>
<tr>
<td>1 current, 1 frequency, 1 relay</td>
<td>A</td>
</tr>
<tr>
<td>3 current, 2 frequency, 2 relay</td>
<td>C</td>
</tr>
<tr>
<td>Supply voltage</td>
<td></td>
</tr>
<tr>
<td>115/230 V AC, 50/60 Hz</td>
<td>1</td>
</tr>
<tr>
<td>24 V AC/DC</td>
<td>2</td>
</tr>
<tr>
<td>Ex Approvals</td>
<td></td>
</tr>
<tr>
<td>Standard (No Ex-approval)</td>
<td>0</td>
</tr>
<tr>
<td>ATEX</td>
<td>1</td>
</tr>
<tr>
<td>UL Class I, Div. 2 (only IP66/NEMA 4 version)</td>
<td>5</td>
</tr>
<tr>
<td>Display/Keypad</td>
<td></td>
</tr>
<tr>
<td>With display</td>
<td>1</td>
</tr>
<tr>
<td>Serial communication (Only possible to connect to MASS 6000 version with 1 current output)</td>
<td></td>
</tr>
<tr>
<td>No communication</td>
<td>A</td>
</tr>
<tr>
<td>HART</td>
<td>B</td>
</tr>
<tr>
<td>PROFIBUS PA Profile 3</td>
<td>C</td>
</tr>
<tr>
<td>PROFIBUS DP Profile 3</td>
<td>D</td>
</tr>
<tr>
<td>MODBUS RTU RS 485</td>
<td>E</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>F</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>G</td>
</tr>
</tbody>
</table>

This device is shipped with a Quick Start manual and the SITRANS F literature CD containing operating instructions, quick starts and certificates.

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).

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering

Accessories

Enclosure

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure in ABS plastic for front panel mounting IP66/NEMA 4, for one 19” transmitter insert (21 TE)</td>
<td>FDK-083F5030</td>
</tr>
<tr>
<td>Enclosure in ABS plastic for front panel mounting IP66/NEMA 4, for two 19” transmitter inserts (42 TE)</td>
<td>FDK-083F5031</td>
</tr>
<tr>
<td>Enclosure in aluminium for back of panel mounting IP20/NEMA 1, for one 19” transmitter insert (21 TE)</td>
<td>FDK-083F5032</td>
</tr>
<tr>
<td>Enclosure in aluminium for back of panel mounting IP20/NEMA 1, for two 19” transmitter inserts (42 TE)</td>
<td>FDK-083F5033</td>
</tr>
<tr>
<td>Front cover (7 TE)</td>
<td>FDK-083F4525</td>
</tr>
</tbody>
</table>

Cable glands

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable glands, screwed entries type PG 13.5 in nickel-plated brass, 2-off</td>
<td>FDK-083G3140</td>
</tr>
<tr>
<td>Cable glands, screwed entries type PG 13.5 in polyamide (100 °C (212 °F)) black, 2-off</td>
<td>FDK-083G0228</td>
</tr>
</tbody>
</table>

Spare parts 19” versions

Enclosure (without PCB, connection board)

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure in ABS plastic for wall mounting IP66/NEMA 4, for one 19” transmitter insert (21 TE)</td>
<td>FDK-083F5037</td>
</tr>
<tr>
<td>Enclosure in ABS plastic for wall mounting IP66/NEMA 4, for two 19” transmitter inserts (42 TE)</td>
<td>FDK-083F5038</td>
</tr>
<tr>
<td>Display only</td>
<td>FDK-085U3349</td>
</tr>
</tbody>
</table>

Add-on module

Note: Only possible to connect to MASS 6000 versions with 1 current output

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART</td>
<td>FDK-085U0226</td>
</tr>
<tr>
<td>PROFIBUS PA Profile 3</td>
<td>FDK-085U0236</td>
</tr>
<tr>
<td>PROFIBUS DP Profile 3</td>
<td>FDK-085U0237</td>
</tr>
<tr>
<td>MODBUS RTU RS 485</td>
<td>FDK-085U0234</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>A5E02054250</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>FDK-085U0229</td>
</tr>
</tbody>
</table>
### Connection boards/PCB for MASS 6000 and MASS 2100 sensors

<table>
<thead>
<tr>
<th>Description</th>
<th>Version</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection board MASS 6000 for 19&quot; rack mounting version</td>
<td>24 V</td>
<td>FDK-083H4272</td>
</tr>
<tr>
<td>Connection board MASS 6000 EEx [ia] IIC for 19&quot; rack mounting version</td>
<td>24 V</td>
<td>FDK-083H4273</td>
</tr>
<tr>
<td>Connection board MASS 6000 for 19&quot; wall mounting version</td>
<td>24 V</td>
<td>FDK-083H4274</td>
</tr>
<tr>
<td>Connection board MASS 6000 EEx [ia] IIC for 19&quot; wall mounting version</td>
<td>24 V</td>
<td>FDK-083H4275</td>
</tr>
</tbody>
</table>

### Connection boards/PCB for MASS 6000 and MC2 sensors

<table>
<thead>
<tr>
<th>Description</th>
<th>Version</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection board MASS 6000 for 19&quot; rack mounting version</td>
<td>24 V</td>
<td>FDK-083H4272</td>
</tr>
<tr>
<td>Connection board MASS 6000 for Ex application(1)\ and 19&quot; rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)</td>
<td>24 V</td>
<td>FDK-083H4294</td>
</tr>
<tr>
<td>Connection board MASS 6000 for 19&quot; wall mounting version</td>
<td>24 V</td>
<td>FDK-083H4274</td>
</tr>
<tr>
<td>Connection board MASS 6000 for Ex application(1,2) and 19&quot; wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)</td>
<td>24 V</td>
<td>FDK-083H4295</td>
</tr>
</tbody>
</table>

\(1\) Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK-083H4294 or FDK-083H4295.

### Wall mounting enclosure for MASS 6000 19" version

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall mounting enclosure for MASS 6000 19&quot; version IP66/NEMA 4 (21 TE) with connection board/PCB for Ex application connected to MC2 Ex sensors</td>
<td>FDK-083H4296</td>
</tr>
</tbody>
</table>
Dimensional drawings

Transmitter 19" insert

Dimensions in mm (inch)

Transmitter 19" wall mounting

Dimensions in mm (inch)

Weight incl. back print: 0.8 kg / 1.8 lbs

Weight excl. transmitter: 2.3 kg (5.0 lbs)
SITRANS F flowmeters
SITRANS F C
Transmitter MASS 6000
for 19" insert/19" wall mounting

Transmitter 19" front of panel

Dimensions in mm (inch)
Transmitter back of panel

Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)
Transmitter back of panel, 42 TE

Weight: 0.7 kg (1.6 lbs)

Dimensions in mm (inch)
Transmitter back of panel

Weight: 0.9 kg (2.0 lbs)

© Siemens AG 2010
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 μF 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.

---

**Diagram of Electrical Connections**

- **Safe area**
  - 115/230 V AC
  - 24 V AC/DC

- **Current output**
  - 0/4 ... 20 mA

- **Relay**
  - 42 V AC/2 A
  - 42 V DC/2 A

- **Passive output**
  - Max. 30 V/110 mA

- **Active output**
  - Max. 30 mA

- **Digital input**
  - 11-30 V DC

- **Extended version**
  - Relay shown in de-energised condition

- **Relay shown in de-energised condition**
  - Relay 2
  - Counter (plc)
Overview

MASS 6000 is based on the latest developments within 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) 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 life-time. 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.

Benefits

- Fully stainless steel flameproof EEx 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 EEx 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 patented 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”
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on a 5th-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.

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 4X as compact and IP66/NEMA 4 as remote
- Supply voltage 24 V AC/DC.
- MASS 6000 Ex d is ATEX approved together with all MASS 2100 sensors
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 flow
- 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 straightforward application and meter troubleshooting

Technical specifications

Measurement of

| Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], °Brix, density [kg/m³ (lbs/ft³)], temperature [°C (°F)] |

Current output

<table>
<thead>
<tr>
<th>Classified EEx ia, selectable as active or passive outputs. Default setting is active mode.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
</tr>
<tr>
<td>0 … 20 mA or 4 … 20 mA</td>
</tr>
<tr>
<td>Load</td>
</tr>
<tr>
<td>&lt; 350 Ω</td>
</tr>
<tr>
<td>Time constant</td>
</tr>
<tr>
<td>0 … 99.9 s adjustable</td>
</tr>
</tbody>
</table>

Current characteristics

<table>
<thead>
<tr>
<th>Active mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>U₀ = 24 V, I₀ = 82 mA, P₀ = 0.5 W, C₀ = 125 nF, L₀ = 2.5 mH</td>
</tr>
<tr>
<td>Passive mode (max input from external barrier)</td>
</tr>
<tr>
<td>Uᵢ = 30 V, Iᵢ = 100 mA, Pᵢ = 0.75 W, Cᵢ = 52 nF, Lᵢ = 100 μH</td>
</tr>
</tbody>
</table>

Digital output

<table>
<thead>
<tr>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 … 10 kHz, 50% duty cycle</td>
</tr>
<tr>
<td>Time constant</td>
</tr>
<tr>
<td>0.1 … 30 s adjustable</td>
</tr>
<tr>
<td>Passive</td>
</tr>
<tr>
<td>6 … 30 V DC, max. 110 mA, 1 KΩ ≤ Rload ≤ 10 KΩ</td>
</tr>
</tbody>
</table>

Output characteristics

<table>
<thead>
<tr>
<th>Active mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not available</td>
</tr>
<tr>
<td>Passive mode (max input from external barrier)</td>
</tr>
<tr>
<td>Uᵢ = 30 V, Iᵢ = 100 mA, Pᵢ = 0.75 W, Cᵢ = 52 nF, Lᵢ = 100 μH</td>
</tr>
</tbody>
</table>

Relay

<table>
<thead>
<tr>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change-over relay</td>
</tr>
<tr>
<td>Load</td>
</tr>
<tr>
<td>30 V/100 mA</td>
</tr>
<tr>
<td>Functionality</td>
</tr>
<tr>
<td>Error level, error number, limit, direction</td>
</tr>
<tr>
<td>Output characteristics</td>
</tr>
<tr>
<td>Uᵢ = 30 V, Iᵢ = 100 mA, Pᵢ = 0.75 W, Cᵢ = 0 nF, Lᵢ = 0 mH</td>
</tr>
</tbody>
</table>

Digital input

| 11 … 30 V DC (Rᵢ = 13.6 KΩ) |

Functionality

| Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output |

Output characteristics

| Uᵢ = 30 V, Iᵢ = 3.45 mA, Pᵢ = 0.10 W, Cᵢ = 0 nF, Lᵢ = 0 mH |

Galvanic isolation

| All inputs and outputs are galvanically isolated, isolation voltage 500 V |

Cut-off

Low-flow

| 0 … 9.9% of maximum flow |

Empty pipe

| Detection of empty sensor |

Density

| 0 … 2.9 g/cm³ |

Totalizer

| Two eight-digit counters for forward, net or reverse flow |

Display

| Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output |
| Reverse flow indicated by negative sign |

Zero point adjustment

| Manual 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

| Uᵢ = 6.88 V, Iᵢ = 330 mA, Pᵢ = 0.57 W, Cᵢ = 20 nF, Lᵢ = 100 μH |
| Passive mode (max input from external barrier) |
| Uᵢ = 10 V, Iᵢ = 200 mA, Pᵢ = 0.5 W, Cᵢ = 0 nF, Lᵢ = 0 μH |

PROFIBUS PA

Active mode

| Not available |
| Passive mode |
| Uᵢ = 17.5 V, Iᵢ = 380 mA, Pᵢ = 5.32 W, Cᵢ = 5 nF, Lᵢ = 10 μH |

FOUNDATION Fieldbus H1

Active mode

| Not available |
| Passive mode |
| Uᵢ = 17.5 V, Iᵢ = 380 mA |

Enclosure

| Stainless steel AISI 316 W 1.4435 |

Material

| • Compact mounted on sensor: IP67/NEMA 4X to IEC 529 and DIN 40050 |
| • Remote mounted: IP66/NEMA 4 to IEC 529 and DIN 40050 |

Rating

| 18 … 1000 Hz random, 1.14 G rms, in all directions, to IEC 68-2-36, Curve E |

Siemens FI 01 · 2010 US Edition
## Technical specifications (continued)

### Supply voltage

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Range</th>
<th>Power Consumption</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V AC</td>
<td>20 ... 30 V AC</td>
<td>6 VA, I&lt;sub&gt;N&lt;/sub&gt; = 250 mA, I&lt;sub&gt;ST&lt;/sub&gt; = 2 A (30 ms)</td>
<td>The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm²</td>
</tr>
<tr>
<td>24 V DC</td>
<td>18 ... 30 V DC</td>
<td>6 VA, I&lt;sub&gt;N&lt;/sub&gt; = 250 mA, I&lt;sub&gt;ST&lt;/sub&gt; = 2 A (30 ms)</td>
<td>The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm²</td>
</tr>
</tbody>
</table>

### EMC performance

<table>
<thead>
<tr>
<th>Emission</th>
<th>Immunity</th>
<th>NAMUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/IEC 61000-6-4 (Industry)</td>
<td>EN/IEC 61000-6-2 (Industry)</td>
<td>Within the value limits according to &quot;Allgemeine Anforderung&quot; with error criteria A in accordance with NE 21</td>
</tr>
</tbody>
</table>

### Ex approval

<table>
<thead>
<tr>
<th>Temperature class:</th>
<th>Process liquid temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&lt;sub&gt;6&lt;/sub&gt;</td>
<td>T &lt; 85 °C (185 °F)</td>
</tr>
<tr>
<td>T&lt;sub&gt;5&lt;/sub&gt;</td>
<td>85 °C &lt; T &lt; 100 °C (185 °F &lt; T &lt; 212 °F)</td>
</tr>
<tr>
<td>T&lt;sub&gt;4&lt;/sub&gt;</td>
<td>100 °C &lt; T &lt; 135 °C (212 °F &lt; T &lt; 275 °F)</td>
</tr>
<tr>
<td>T&lt;sub&gt;3&lt;/sub&gt;</td>
<td>135 °C &lt; T &lt; 180 °C (275 °F &lt; T &lt; 356 °F)</td>
</tr>
</tbody>
</table>

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS F C MASS 6000 transmitter</strong></td>
<td>7 ME 4 1 1 0 -</td>
</tr>
<tr>
<td>Transmitter Ex d for remote mounting inclusive of wall mounting kit</td>
<td>2 8 &lt; &lt; &lt; - 3 7 A</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td></td>
</tr>
<tr>
<td>Ex d SS with 5 m (16.5 ft) cable</td>
<td>G</td>
</tr>
<tr>
<td>Ex d SS with 10 m (32.8 ft) cable</td>
<td>H</td>
</tr>
<tr>
<td>Ex d SS with 25 m (82.0 ft) cable</td>
<td>J</td>
</tr>
<tr>
<td><strong>Output configuration</strong></td>
<td></td>
</tr>
<tr>
<td>1 current, 1 frequency, 1 relay</td>
<td>A</td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>2</td>
</tr>
<tr>
<td>24V AC/DC</td>
<td></td>
</tr>
<tr>
<td><strong>Ex approvals</strong></td>
<td>1</td>
</tr>
<tr>
<td>ATEX</td>
<td></td>
</tr>
<tr>
<td><strong>Display/Keypad</strong></td>
<td>1</td>
</tr>
<tr>
<td>With display</td>
<td></td>
</tr>
<tr>
<td><strong>Serial communication</strong></td>
<td></td>
</tr>
<tr>
<td>No communication</td>
<td>A</td>
</tr>
<tr>
<td>HART</td>
<td>B</td>
</tr>
<tr>
<td>PROFIBUS PA Profile 3</td>
<td>F</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>J</td>
</tr>
<tr>
<td><strong>Cable gland</strong></td>
<td>1</td>
</tr>
<tr>
<td>M20</td>
<td></td>
</tr>
</tbody>
</table>

This device is shipped with a Quick Start manual and the SITRANS F literature CD containing operating instructions, quick starts and certificates.

Note: Only communication modules with Ex approvals are allowed.

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.
## Selection and ordering data

### Spare parts for MASS 6000 Ex d

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASS 6000 Ex d transmitter</td>
<td>7ME4110-1FA21-1AA0</td>
</tr>
<tr>
<td>1 current output</td>
<td></td>
</tr>
<tr>
<td>1 freq./pulse output</td>
<td></td>
</tr>
<tr>
<td>1 relay output</td>
<td></td>
</tr>
<tr>
<td>24 V AC/DC</td>
<td></td>
</tr>
<tr>
<td>Wall mounting kit for remote Ex d</td>
<td></td>
</tr>
<tr>
<td>inclusive of sensor cable of</td>
<td></td>
</tr>
<tr>
<td>• 5 m</td>
<td>FDK-083H0231</td>
</tr>
<tr>
<td>• 10 m</td>
<td>FDK-083H0232</td>
</tr>
<tr>
<td>• 25 m</td>
<td>FDK-083H0233</td>
</tr>
<tr>
<td>Ex d transmitter insert</td>
<td>FDK-083H3061</td>
</tr>
<tr>
<td>Front lid</td>
<td>FDK-085U2373</td>
</tr>
<tr>
<td>Screws and washers between pedestal and sensor</td>
<td>FDK-085U2374</td>
</tr>
<tr>
<td>(4 pcs.), seal (1 pc.)</td>
<td></td>
</tr>
<tr>
<td>Display and keypad</td>
<td>FDK-083H0235</td>
</tr>
</tbody>
</table>

### Add-on module for remote and compact MASS 6000 Ex d

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART</td>
<td>FDK-085U0226</td>
</tr>
<tr>
<td>PROFIBUS PA Profile 3</td>
<td>FDK-085U0236</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>ASE02054250</td>
</tr>
</tbody>
</table>
SITRANS F flowmeters
SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

### Dimensional drawings

**MASS 6000 Ex d compact version**

- **Dimensions in mm (inch):**
  - **Sensor size (Di [inch])**
    - 3 (1/8) 75 (2.95) 62 (2.44) 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)

**Dimensions in mm (inch):**

- **L3 [mm (inch)]:**
  - 28 (1.10)
- **H5 [mm (inch)]:**
  - 10 (0.39)
- **H6 [mm (inch)]:**
  - 40 (1.57)
- **H5 + H6 [mm (inch)]:**
  - 5.91 (0.39)

**Dimensions in mm (inch):**

- **Ø130 (5.12) Ø130 (5.12)**
- **255.1 (10.04) 255.1 (10.04)**

**Weight:** 3 kg (6.6 lbs)

**Dimensions in mm:**

- **Dimensions in mm:**
  - 150 (5.91) 150 (5.91)
  - 100 (3.94) 100 (3.94)
  - 9 (0.35) 9 (0.35)
  - 28 (1.10) 28 (1.10)
  - 20 (0.79) 20 (0.79)
  - 10 (0.39) 10 (0.39)
  - 4xØ09 (4x0.35) 4xØ09 (4x0.35)
  - 2xØ09 (2x0.35) 2xØ09 (2x0.35)

**Dimensions in inch:**

- **Dimensions in inch:**
  - 5.91 (0.39) 5.91 (0.39)
  - 3.94 (0.39) 3.94 (0.39)
  - 0.35 (0.35) 0.35 (0.35)
  - 0.39 (0.39) 0.39 (0.39)

### Schematics

**Electrical connection compact or remote**

- **Transmitter**
  - 18 ... 30 V DC
  - 20 ... 30 V AC
- **Current output**
  - 31
  - 32
- **Relay**
  - 44
  - 45
  - 46
- **Relay shown in de-energised condition**
  - 56
  - 57
  - 58
- **Passive output**
  - Max. 30 V/110 mA
- **Digital input**
  - 77
  - 78
  - 11 ... 30 V DC

- **Terminals for Add on Module for electrical connection:**
  - 91
  - 92
  - 95
  - 96

Please refer to the documentation supplied with the AOM current output.
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

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 masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP 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 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 patented 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

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: 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/batch output, 1 two-stage batch output, 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Two-stage batch controller
- Automatic zero point adjustment with zero point evaluation feed back
- Limit functionality
- Comprehensive status and error reporting
## Technical specifications

### Measurement of
- Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %

### Measurement functions
- **Totalizer 1**: Totalization of mass flow, volume flow, fraction A, fraction B
- **Totalizer 2**: Totalization of mass flow, volume flow, fraction A, fraction B
- **Single and 2-stage batch function**: Batching function with the use of one or two outputs for dosing in high and low speed
- **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.

### Digital input
- **Functions**: Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output
- **High signal**: Nominal voltage: 24 V DC, Lower limit: 15 V DC, Upper limit: 30 V DC, Current: 2 ... 15 mA
- **Low signal**: Nominal voltage: 0 V DC, Lower limit: -3 V DC, Upper limit: 5 V DC, Current: -15 ... 15 mA

### Digital output 1 and 2
- **Functions**: Output 1: Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch. Output 2: Quadrature pulse, quadrature frequency, 2-stage batch
- **Voltage supply**: 3 ... 30 V DC (passive output)
- **Switching current**: Max. 30 mA at 30 V DC
- **Voltage drop**: ≤ 3 V DC at max. current
- **Leakage current**: ≤ 0.4 mA at max. voltage 30 V DC
- **Load resistance**: 1 ... 10 kΩ
- **Switching frequency**: 0 ... 12 kHz 50% duty cycle
- **Functions**: Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch

### Communication
- **MODBUS RS 232C**: Max. baudrate: 115 200 baud, Max. line length: 15 m at 115 200 baud, Signal level: according to EIA-RS 232C
- **MODBUS RS 485**: Max. baudrate: 115 200 baud, Max. line length: 1200 m at 115 200 baud, Signal level: according to EIA-RS 485, Bus termination: Integrated. Can be enabled by inserting wire jumpers.

### Galvanic isolation
- All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V

### Power
- **Supply**: 24 V DC nominal
- **Tolerance**: 20.4 V DC ... 28.8 V DC
- **Consumption**: Max. 6 W
- **Fuse**: T1 A/125 V, not replaceable by operator

### Environment
- **Ambient temperature**:
  - Storage: -40 ... +70 °C (-40 ... +158 °F)
  - Operation: 0 ... 60 °C (32 ... 140 °F)
- **Operation conditions**: Horizontally mounted rail. For vertically mounted rail, the maximum operating temperature is +45 °C (+113 °F).
- **Altitude**: Operation: -1000 ... 2000 m (pressure 795 ... 1080 hPa)

### Enclosure
- **Material**: Noryl, color: anthracite
- **Rating**: IP20/NEMA 2 according to IEC 60529
- **Mechanical load**: According to SIMATIC standards (S7-300 devices)

### Approvals
- **SIFLOW FC070 Standard**: CE, C-UL, ATEX II 3G Ex nA IIC
- **SIFLOW FC070 Ex**: CE, C-UL, UL Haz.Loc., FM, ATEX II 3 G Ex nA II T4 and II (1) G [Ex ia] IIC

### Electromagnetic compatibility
- **Noise immunity according to IEC 61000-6-2, tested according to IEC 61000-4-2, 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6**
- **Emitted interference according to EN 50081-2, tested according to EN 55011, class A, group 1**
- **Requirements of EMC law**
- **NAMUR**: Within the limits according to “Allgemeine Anforderung” with error criteria A in accordance with NE21

### Programming tools
- **SIMATIC S7**: Configuration through backplane P-BUS and PLC program
- **SIMATIC PCS7**: Configuration through backplane P-BUS and PLC/WinCC faceplates
- **SIMATIC PDM**: Through MODBUS port RS 232C and RS 485
# Selection and Ordering Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIFLOW FC070 flow transmitter</td>
<td>7ME4120-2DH20-0EA0</td>
</tr>
<tr>
<td>Remember to order 40 pin front plug connector.</td>
<td></td>
</tr>
<tr>
<td>40 pin front plug with screw contacts</td>
<td>6ES7392-1AM00-0AA0</td>
</tr>
<tr>
<td>SIFLOW FC070 Ex flow transmitter</td>
<td>7ME4120-2DH21-0EA0</td>
</tr>
<tr>
<td>Remember to order 20 pin front plug connector.</td>
<td></td>
</tr>
<tr>
<td>20 pin front plug with screw contacts</td>
<td>6ES7392-1AJ00-0AA0</td>
</tr>
</tbody>
</table>

## Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable with multiplug for connecting MASS 2100 and FC300 sensors</td>
<td></td>
</tr>
<tr>
<td>- 5 m (16.4 ft)</td>
<td>FDK-083H3015</td>
</tr>
<tr>
<td>- 10 m (32.8 ft)</td>
<td>FDK-083H3016</td>
</tr>
<tr>
<td>- 25 m (82 ft)</td>
<td>FDK-083H3017</td>
</tr>
<tr>
<td>- 50 m (164 ft)</td>
<td>FDK-083H3018</td>
</tr>
<tr>
<td>- 75 m (246 ft)</td>
<td>FDK-083H3054</td>
</tr>
<tr>
<td>- 150 m (492 ft)</td>
<td>FDK-083H3055</td>
</tr>
<tr>
<td>Cable without multiplug for connecting MC2 sensors</td>
<td></td>
</tr>
<tr>
<td>- 10 m (32.8 ft)</td>
<td>FDK-083H3001</td>
</tr>
<tr>
<td>- 25 m (82 ft)</td>
<td>FDK-083H3002</td>
</tr>
<tr>
<td>- 75 m (246 ft)</td>
<td>FDK-083H3003</td>
</tr>
<tr>
<td>- 150 m (492 ft)</td>
<td>FDK-083H3004</td>
</tr>
<tr>
<td>SIMATIC S7-300 rail</td>
<td></td>
</tr>
<tr>
<td>The mechanical mounting rack of the SIMATIC S7-300</td>
<td></td>
</tr>
<tr>
<td>- 160 mm (6.3&quot;)</td>
<td>6ES7 390-1AB60-0AA0</td>
</tr>
<tr>
<td>- 482 mm (18.9&quot;)</td>
<td>6ES7 390-1AE80-0AA0</td>
</tr>
<tr>
<td>- 530 mm (20.8&quot;)</td>
<td>6ES7 390-1AF30-0AA0</td>
</tr>
<tr>
<td>- 830 mm (32.7&quot;)</td>
<td>6ES7 390-1AJ30-0AA0</td>
</tr>
<tr>
<td>- 2000 mm (78.7&quot;)</td>
<td>6ES7 390-1BC00-0AA0</td>
</tr>
<tr>
<td>Shield connecting element</td>
<td></td>
</tr>
<tr>
<td>For mounting on S7-300 rail. 80 mm wide with 2 rows for 4 shield terminal elements each (no shield terminal elements included)</td>
<td></td>
</tr>
<tr>
<td>6ES7390-5AA00-0AA0</td>
<td></td>
</tr>
<tr>
<td>Shield terminal element for 1 cable with 3 to 8 mm in dia.</td>
<td></td>
</tr>
<tr>
<td>- 2 pieces</td>
<td>6ES7390-5BA00-0AA0</td>
</tr>
<tr>
<td>Shield terminal element for 1 cable with 4 to 13 mm in dia.</td>
<td></td>
</tr>
<tr>
<td>- 2 pieces</td>
<td>6ES7390-5CA00-0AA0</td>
</tr>
<tr>
<td>SIFLOW FC070 Demo suitcase</td>
<td>A5E01075465</td>
</tr>
<tr>
<td>Power supply</td>
<td>6ES7307-1BA00-0AA0</td>
</tr>
</tbody>
</table>

This device is shipped with a Quick Start manual and the SITRANS F literature CD containing operating instructions, quick starts and certificates.
SITRANS F flowmeters
SITRANS F C
Transmitter SIFLOW FC070

Schematics

SIFLOW FC070, electrical connection

SIFLOW FC070 Ex, electrical connection
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 range 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 range better than 500:1, from 65 kg/h to a few g/h
- Densitometer performance available through a density accuracy better than 0.001 g/cm³ with a repeatability better than 0.0002 g/cm³
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food & 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 & SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 min.
- Intrinsically safe EEx ia design as standard
- Sensor pipe available in high-quality AISI 316L stainless steel W.1.4435 or Hastelloy C22 W.2.4602 offering optimum corrosion resistance
- Dual-drive pick-up and driver construction facilitate ultra low-weight 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 & beverage or pharmaceuti- cal industry, accurate recipe control means everything. The MASS 2100 DI 1.5 has demonstrated superior performance in numerous applications and field trials 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:

<table>
<thead>
<tr>
<th>Chemical industry</th>
<th>Liquid and gas measurement within Miniplant and R&amp;D, dosing of additives and catalysts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosmetic industry</td>
<td>Dosing of essence &amp; fragrances</td>
</tr>
<tr>
<td>Pharmaceutical industry</td>
<td>High-speed dosing and coating of pills, filling of ampuls/injectors</td>
</tr>
<tr>
<td>Food &amp; beverage industry</td>
<td>Dosing of flavourings, colours and additives, density measurement, in-line Measurement of liquid or gaseous CO₂</td>
</tr>
<tr>
<td>Automotive industry</td>
<td>Fuel injection nozzle &amp; pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds</td>
</tr>
</tbody>
</table>

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 or Hastelloy C22 with ¼” NPT or ¼” ISO process connections.

The enclosure is made in stainless steel AISI 316L W.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.
**Function**

The measuring principle is based on coriolis force of movement, 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. 0.1 to 0.2 bar (1.45 to 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 under-pressure 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.

**Technical specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside pipe diameter (sensor consists of one continuous pipe)</td>
<td>1.5 mm (0.06”)</td>
</tr>
<tr>
<td>Pipe wall thickness</td>
<td>0.25 mm (0.010”)</td>
</tr>
<tr>
<td>Mass flow measuring range</td>
<td>0...65 kg/h (0...143 lb/h)</td>
</tr>
<tr>
<td>Density</td>
<td>0...2.9 g/cm³ (0...0.10 lb/inch³)</td>
</tr>
<tr>
<td>Fraction e.g.</td>
<td>0...100 °Brix</td>
</tr>
<tr>
<td>Temperature</td>
<td>-50 ... +125 °C (-58 ... +257 °F)</td>
</tr>
<tr>
<td>High-temperature version</td>
<td>-50 ... +180 °C (-58 ... +356 °F)</td>
</tr>
<tr>
<td>Liquid pressure measuring pipe</td>
<td>230 bar (3336 psi) at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>365 bar (5294 psi) at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Hastelloy C22</td>
<td>W 1.4435 (AISI 316L) stainless steel</td>
</tr>
<tr>
<td>W 2.4602 (Hastelloy C22)</td>
<td></td>
</tr>
<tr>
<td>Enclosure and enclosure material</td>
<td>IP66/NEMA 4 and W 1.4404 (AISI 316L) stainless steel</td>
</tr>
<tr>
<td>Connection thread</td>
<td>ISO 228/1 G¼&quot; male</td>
</tr>
<tr>
<td>ANSI/ASME B1.20.1</td>
<td>¼&quot; NPT male</td>
</tr>
<tr>
<td>Cable connection</td>
<td>Multiple plug connection to sensor 5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm</td>
</tr>
<tr>
<td>Ex-version</td>
<td>EEx ia IIC T3-T6, DEMKO 03 ATEX 135252X</td>
</tr>
<tr>
<td>Weight approx.</td>
<td>2.6 kg (5.73 lb)</td>
</tr>
</tbody>
</table>

1) According to DIN 2413, DIN 17457
2) Housing is not rated for pressure containment.

For accuracy specifications see “System information SITRANS F C”.

**Pressure drop**

\[
\Delta p \quad \text{Viscosity [cSt]}
\]

MASS 2100 DI 1.5 (1/16”), pressure drop for density = 1000 kg/m³
SITRANS F flowmeters
SITRANS F C

Flow sensor MASS 2100 DI 1.5

1) Not possible to order DI 1.5 sensor with heat jacket
Please also see www.siemens.com/SITRANSFordering for practical examples of ordering

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F C Flow sensors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MASS 2100 DI 1.5 (1/16&quot;) sensor, without heating jacket</td>
<td>7 ME 4 1 0 0 -</td>
<td></td>
</tr>
</tbody>
</table>

#### Diameter
- Stainless steel W 1.4435/316L
  - DI 1.5, max. 125 °C (257 °F) 1A
  - DI 1.5, max. 180 °C (356 °F) 1B
  - W 2.4602/Hastelloy C22
    - DI 1.5, max. 125 °C (257 °F) 2A
    - DI 1.5, max. 180 °C (356 °F) 2B

#### Pressure
- PN 100
- PN 230 (316L)
- PN 365 (C22)

#### Process connection/flange
- Pipe thread
  - G ¼" male 10
  - ¼" NPT male 11

#### Configuration
- Standard 1
- Density 2
- Brix/Plato 3
- Fraction (specification required) 9 NO Y

#### Cable
- No cable A
- 5 m (16 ft) cable B
- 10 m (32 ft) cable C
- 25 m (82 ft) cable D
- 50 m (164 ft) cable E
- 75 m (246 ft) cable F
- 150 m (492 ft) cable G

#### Calibration
- Standard calibration 3 flow x 2 points 1
- Standard calibration matched pair 3 flow x 2 points 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

### Additional information

Please add “-Z” to Order 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 (5x2) Y60
- Customer-specified calibration (5x2) Y61
- Customer-specified, matched pair (10x1) Y62
- Customer-specified calibration (10x1) Y63
- Cleaned for oil and grease Y80
- Special version Y99

### Spare parts

- Description | Order No. |
- Multiple plug for cable mounting | FDK-083H5056 |
- 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 |
- 2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified by ordering) | FDK-083H4410 |
- Bracket | ASE02590427 |
SITRANS F flowmeters
SITRANS F C
Flow sensor MASS 2100 DI 1.5

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 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 range 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 range better than 100 : 1
- Densitometer performance available through a density accuracy better than 0.001 g/cm³ (0.000036 lb/inch³) with a repeatability better than 0.0002 g/cm³ (0.0000072 lb/inch³)
- One tube without internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food & 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 & SENSORPROM enable true „plug & play“ installation and commissioning in less than 10 min.
- Intrinsically safe Ex-design ia IIC as standard
- Sensor pipe available in high-quality AISI 316L stainless steel W 1.4435 or Hastelloy C22 W 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.

**The main applications for the SITRANS FC300 DN 4 can be found in:**

- **Chemical industry**
  - Liquid and gas measurement in normal as well as corrosive environments
- **Cosmetic industry**
  - Dosing of essence & fragrances
- **Pharmaceutical industry**
  - High-speed dosing and coating of pills, filling of ampuls/injectors
- **Food & beverage industry**
  - Filling, dosing of flavorings, colors and additives, in-line density measurement
  - Measurement and dosing of liquid or gaseous CO₂
- **Automotive industry**
  - Fuel injection nozzle & 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 or Hastelloy C22 with ¼”-NPT or G¼”-ISO process connections.

The enclosure is made of stainless steel AISI 316L W 1.4409 with a grade of encapsulation of IP66/NEMA4. The enclosure has a very robust design and with an overall size of 130 x 200 x 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 coriolis force of movement, 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 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 is low or the liquid contains solid particles or air bubbles.

Horizontal installation as shown in figure B can be used for liquid applications especially where the flow velocity exceeds 1 m/s.
Flow sensor SITRANS FC300

Vertical installation as shown in figure C 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. 0.1 to 0.2 bar.
- Mount the sensor on a vibration-free and plane wall or steel frame
- Locate the sensor low in the system in order to avoid under-pressure 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)

Horizontal mounting (fig. B)

Liquid or gas (medium to high flow)

<table>
<thead>
<tr>
<th>Technical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor size</strong></td>
</tr>
<tr>
<td><strong>Mass flow</strong></td>
</tr>
<tr>
<td>Measuring range</td>
</tr>
<tr>
<td>Accuracy, mass flow</td>
</tr>
<tr>
<td>Repeatability</td>
</tr>
<tr>
<td>Max. zero point error</td>
</tr>
<tr>
<td><strong>Density</strong></td>
</tr>
<tr>
<td>Density range</td>
</tr>
<tr>
<td>Density error</td>
</tr>
<tr>
<td>Repeatability error</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
</tr>
<tr>
<td>Standard</td>
</tr>
<tr>
<td>High-temperature version</td>
</tr>
<tr>
<td>Temperature error</td>
</tr>
<tr>
<td><strong>Brix</strong></td>
</tr>
<tr>
<td>Measuring range</td>
</tr>
<tr>
<td>Brix error</td>
</tr>
<tr>
<td><strong>Inside pipe diameter</strong></td>
</tr>
<tr>
<td>Stainless steel version</td>
</tr>
<tr>
<td>Hastelloy version</td>
</tr>
<tr>
<td><strong>Pipe wall thickness</strong></td>
</tr>
<tr>
<td>Stainless steel version</td>
</tr>
<tr>
<td>Hastelloy version</td>
</tr>
<tr>
<td><strong>Liquid pressure measuring pipe</strong></td>
</tr>
<tr>
<td>Stainless steel</td>
</tr>
<tr>
<td>Hastelloy C22</td>
</tr>
<tr>
<td><strong>Materials</strong></td>
</tr>
<tr>
<td>Measuring pipe and connection</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
</tr>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Enclosure grade</td>
</tr>
<tr>
<td><strong>Connection thread</strong></td>
</tr>
<tr>
<td>ISO 228/1</td>
</tr>
<tr>
<td>ANSI/ASME B 1.20.1</td>
</tr>
<tr>
<td><strong>Ex approval</strong></td>
</tr>
<tr>
<td>EEx ia IIC T3-T6</td>
</tr>
<tr>
<td>05ATEX138072X</td>
</tr>
<tr>
<td>UL/CSA</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
</tr>
</tbody>
</table>

1) According to DIN 2413, DIN 17457
2) Housing is not rated for pressure containment.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS F C Flow sensors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITRANS FC300 DN 4 (1/6&quot;) sensor, without heating jacket</td>
<td>7 ME 4 4 0 0 -</td>
<td>A</td>
</tr>
</tbody>
</table>

### Pipe material and temperature

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel W 1.4435/316L</td>
<td>1 G</td>
<td></td>
</tr>
<tr>
<td>115 °C (239 °F)</td>
<td>1 H</td>
<td></td>
</tr>
<tr>
<td>180 °C (356 °F)</td>
<td>2 G</td>
<td></td>
</tr>
<tr>
<td>W 2.4602/Hastelloy C22</td>
<td>2 H</td>
<td></td>
</tr>
<tr>
<td>115 °C (239 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180 °C (356 °F)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pressure

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 100</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>PN 130 (316L)</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>PN 410 (C22)</td>
<td>Q</td>
<td></td>
</tr>
</tbody>
</table>

### Process connection

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe thread</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>G ¼&quot; male</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>¼&quot; NPT male</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

### Configuration

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Brix/Plato</td>
<td>3</td>
<td>N</td>
</tr>
<tr>
<td>Fraction (specification required)</td>
<td>9</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Cable

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cable</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>5 m (16 ft) cable</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>10 m (32 ft) cable</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>25 m (82 ft) cable</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>50 m (164 ft) cable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>75 m (246 ft) cable</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>150 m (492 ft) cable</td>
<td>G</td>
<td></td>
</tr>
</tbody>
</table>

### Calibration

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard calibration 3 flow x 2 points</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Standard calibration matched pair 3 flow x 2 points</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Accredited calibration matched pair 5 flow x 2 points (DANAK)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

### Additional information

Please add "Z" to Order 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 (5x2) | Y60 |
- Customer-specified calibration (5x2) | Y61 |
- Customer-specified, matched pair (10x1) | Y62 |
- Customer-specified calibration (10x1) | Y63 |
- Cleaned for oil and grease | Y80 |
- Special version | Y99 |

### Spare parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple plug for cable mounting</td>
<td>FDK-083H5056</td>
</tr>
<tr>
<td>Cable with multiple plug</td>
<td>FDK-083H3015</td>
</tr>
<tr>
<td>Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs.</td>
<td>FDK-083H3016</td>
</tr>
<tr>
<td>Temperature range -20 °C ... +110 °C (-4 °F... +230 °F)</td>
<td>FDK-083H3017</td>
</tr>
<tr>
<td>50 m (164 ft)</td>
<td>FDK-083H3018</td>
</tr>
<tr>
<td>75 m (246 ft)</td>
<td>FDK-083H3054</td>
</tr>
<tr>
<td>150 m (492 ft)</td>
<td>FDK-083H3055</td>
</tr>
<tr>
<td>2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified by ordering)</td>
<td>FDK-083H4410</td>
</tr>
<tr>
<td>Bracket</td>
<td>ASE02590427</td>
</tr>
</tbody>
</table>

This device is shipped with a Quick Start manual and the SITRANS F literature CD containing operating instructions, quick starts and certificates.

1) Not possible to order DN 4 sensor with heating jacket
**Characteristic curves**

**Pressure drop**

### Stainless steel 316L

![Graph showing pressure drop vs. viscosity for stainless steel 316L](image)

### Hastelloy C22

![Graph showing pressure drop vs. viscosity for Hastelloy C22](image)
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 range 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 range better than 500:1
• Densitometer performance available through a density accuracy better than 0.0005 g/cm³ with a repeatability better than 0.0001 g/cm³
• Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food & beverage and pharmaceutical applications
• Markets’ biggest wall thickness, ensuring 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 & SENSORPROM enables true “plug & play”. Installation and commissioning in less than 10 min.
• 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 AISI 316L or Hastelloy C22 with a wide variety of process connections.
• The enclosure is made in stainless steel AISI 316L W 1.4404 with a grade of encapsulation of IP66/NEMA 4.
• The sensor is as standard EEx ia approved, intrinsically safe.
• The sensor can be installed in horizontal or vertical position. In horizontal position the sensor is self draining.

Heating Jacket: 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.

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 turn-down range which is a paramount in many applications.

The main applications of the coriolis flowmeter can be found in all industries, such as:

| Chemical & pharma | Detergents, bulk chemicals, pharmaceuticals, acids, alkalis |
| Food & beverage | Dairy products, beer, wine, soft-drinks, Plato/brix, fruit juices and pulps, bottling, CO₂ dosing, CIP-liquids |
| Automotive | Fuel injection nozzle & pump testing, filling of AC units, engine consumption, paint robots |
| Oil & gas | Filling of gas bottles, furnace control, CNG-dispensers, test separators, LPG |
| Water & 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.

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 or Hastelloy C22 with a wide variety of process connections.

The enclosure is made in stainless steel AISI 316L W 1.4404 with a grade of encapsulation of IP66/NEMA 4.

The sensor is as standard EEx ia approved, intrinsically safe.

The sensor can be installed in horizontal or vertical position. In horizontal position the sensor is self draining.
**Function**

The measuring principle is based on coriolis law of movement, see “System information SITRANS F C coriolis mass flowmeters”.

**Integration**

The sensor can be connected to all MASS 6000 transmitters for compact as well as remote installation.

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” ... 1½”)*

**Installation of sensor**

If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

<table>
<thead>
<tr>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horizontal</strong></td>
<td></td>
</tr>
<tr>
<td>![Horizontal Liquid Diagram]</td>
<td>![Horizontal Gas Diagram]</td>
</tr>
<tr>
<td><strong>Vertical</strong></td>
<td></td>
</tr>
<tr>
<td>![Vertical Liquid Diagram]</td>
<td>![Vertical Gas Diagram]</td>
</tr>
</tbody>
</table>

**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 facilitate 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 accuracy.
## Technical specifications

<table>
<thead>
<tr>
<th>Versions (mm (inch))</th>
<th>DI 3 (1/8)</th>
<th>DI 6 (%)</th>
<th>DI 15 (5/8)</th>
<th>DI 25 (1)</th>
<th>DI 40 (1½)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inside pipe diameter</strong> (sensor consists of one continuous pipe)</td>
<td>mm (inch)</td>
<td>3.0 (0.12)</td>
<td>6.0 (0.24)</td>
<td>14.0 (0.55)</td>
<td>29.7 (1.17)</td>
</tr>
<tr>
<td><strong>Pipe wall thickness</strong></td>
<td>mm (inch)</td>
<td>0.5 (0.02)</td>
<td>1.0 (0.04)</td>
<td>1.0 (0.04)</td>
<td>2.0 (0.08)</td>
</tr>
<tr>
<td><strong>Mass flow measuring range</strong></td>
<td>kg/h (lb/h)</td>
<td>0 ... 250 (0 ... 550)</td>
<td>0 ... 1000 (0 ... 2200)</td>
<td>0 ... 5600 (0 ... 12345)</td>
<td>0 ... 25000 (0 ... 55100)</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>g/cm³ (lb/inch³)</td>
<td>0 ... 2.9 (0 ... 0.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fraction e.g.</strong></td>
<td>°Brix</td>
<td>0 ... 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>°C (°F)</td>
<td>-50 ... +180 °C (-58 ... +356 °F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Liquid pressure measuring pipe</strong></td>
<td>Stainless steel</td>
<td>bar (psi)</td>
<td>230 (3336)</td>
<td>265 (3844)</td>
<td>130 (1885)</td>
</tr>
<tr>
<td></td>
<td>Hastelloy C22</td>
<td>bar (psi)</td>
<td>350 (5076)</td>
<td>410 (5946)</td>
<td>200 (2900)</td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td>Measuring pipe, flange and thread connection</td>
<td>W 1.4435 (AISI 316L) (Stainless steel)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>not available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enclosure and enclosure material</strong></td>
<td>IP65 (NEMA 4) and W 1.4404 (AISI 316L) (Stainless steel), housing is not rated for pressure containment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process connections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flange</strong></td>
<td>EN 1092-1, PN 40</td>
<td>DN 10</td>
<td>DN 15</td>
<td>DN 25</td>
<td>DN 40</td>
</tr>
<tr>
<td></td>
<td>ANSI B16.5, Class 150</td>
<td>½”</td>
<td>½”</td>
<td>1”</td>
<td>1½”</td>
</tr>
<tr>
<td></td>
<td>ANSI B16.5, Class 600 (Class 300)</td>
<td>½”</td>
<td>½”</td>
<td>1”</td>
<td>1½”</td>
</tr>
<tr>
<td></td>
<td><strong>Dairy screwed connection</strong> (PN 16/25/40)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 11851</td>
<td>DN 10</td>
<td>DN 15</td>
<td>DN 32</td>
<td>DN 40</td>
</tr>
<tr>
<td></td>
<td>ISO 2853/B.S. 4825 part 4 (SS3351)</td>
<td>25 mm</td>
<td>25 mm</td>
<td>38 mm</td>
<td>51 mm</td>
</tr>
<tr>
<td></td>
<td><strong>Dairy clamp connection</strong> (PN 16)³</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISO 2852/B.S. 4825 part 3 (SMS3016)</td>
<td>25 mm</td>
<td>25 mm</td>
<td>38 mm</td>
<td>51 mm</td>
</tr>
<tr>
<td><strong>Thread</strong></td>
<td>ISO 228/1, PN 100</td>
<td>G ¾” female</td>
<td>G ¼” male</td>
<td>G ⅝” male</td>
<td>G 1” male</td>
</tr>
<tr>
<td></td>
<td>ANSI/ASME B1.20.1, PN 100</td>
<td>¾” NPT female</td>
<td>⅝” NPT male</td>
<td>⅞” NPT male</td>
<td>1” NPT male</td>
</tr>
<tr>
<td><strong>Cable connection</strong></td>
<td>Multiple plug connection to sensor 5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ex-version</strong></td>
<td>EEEx ia IIC T3-T6, DEMKO 03 ATEX 135252X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight approx.</strong></td>
<td>kg (lb)</td>
<td>4 (8.8)</td>
<td>8 (17.6)</td>
<td>12 (26.5)</td>
<td>48 (105.8)</td>
</tr>
</tbody>
</table>

1) Max. at 20 °C (68 °F), DIN 2413, DIN 17457
2) Other connections to order, see “Selection and Ordering data”
3) Material, W 1.4401 or corresponding

For accuracy specification see “System information SITRANS F C”.

© Siemens AG 2010
Pressure drop

MASS 2100 DI 3 (1/8”), pressure drop for density = 1000 kg/m³

MASS 2100 DI 15 (1/2”), pressure drop for density = 1000 kg/m³

MASS 2100 DI 6 (1/4”), pressure drop for density = 1000 kg/m³

MASS 2100 DI 25 (1”), pressure drop for density = 1000 kg/m³
MASS 2100 DI 40 (1½”), pressure drop for density = 1000 kg/m³
### Flow sensor MASS 2100 DI 3 to DI 40

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F C sensors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MASS 2100 without heating jacket</td>
<td>7 ME 4 1 0 0 -</td>
<td></td>
</tr>
<tr>
<td>MASS 2100 heated, DN 15 connection</td>
<td>7 ME 4 2 0 0 -</td>
<td></td>
</tr>
<tr>
<td>MASS 2100 heated, ½ inch, ANSI B16.5 connection</td>
<td>7 ME 4 2 1 0 -</td>
<td></td>
</tr>
</tbody>
</table>

### Diameter
- Stainless steel W 1.4435/316L
  - DI 3 (PN 100/PN 230) 1 C
  - DI 6 1 D
  - DI 15 1 E
  - DI 25 1 F
  - DI 40 1 G
  - W 2.4602/Hastelloy C22
  - DI 3 (PN 100/PN 350) 2 C
  - DI 6 2 D
  - DI 15 2 E
  - DI 25 2 F

### Pressure
- PN 16 (DI 6, DI 15, DI 25 and DI 40)  A
- PN 25 (DI 6, DI 15, DI 25 and DI 40)  B
- PN 40 (DI 6, DI 15, DI 25 and DI 40)  C
- PN 100 (DI 3, DI 6, DI 15, DI 25 and DI 40)  D
- PN 105 (DI 40, 2", 316L)  E
- PN 110 (DI 25, 1", 316L)  F
- PN 130 (DI 15, ¼", 316L)  G
- PN 185 (DI 25, 1", Hastelloy C22)  H
- PN 200 (DI 15, ¼", Hastelloy C22)  J
- PN 230 (DI 3, ¼", 316L)  K
- PN 265 (DI 6, ¼", 316L)  L
- PN 350 (DI 3, ¼", Hastelloy C22)  M
- PN 410 (DI 6, ¼", Hastelloy C22)  N
- Class 150 (DI 6, DI 15, DI 25 and DI 40)  O
- Class 600 (DI 6, DI 15, DI 25 and DI 40)  P

### Process connection/flange
- Pipe thread
  - G ¼" 10
  - ¼" NPT 11
  - G ½" 12
  - ½" NPT 13
  - G 1 14
  - 1" NPT 15
  - G 2" 16
  - 2" NPT 17
- Flange EN1092-1 Form B
  - DN 10 (PN 40/PN 100) 20
  - DN 15 (PN 40/PN 100) 21
  - DN 25 (PN 40/PN 100) 22
  - DN 40 (PN 40/PN 100) 23
  - DN 50 (PN 40/PN 100) 24
- Flange ASME/ANSI B 16.5
  - ½" (class 150/class 600) 30
  - ¼" (class 150/class 600) 31
  - 1" (class 150/class 600) 32
  - 1 ½" (class 150/class 600) 33
  - 2" (class 150/class 600) 34

### Configuration/calibration type
- Standard 1
- Density 2
- Brix/Plato 3
- Fraction (specification required) Y 9

### 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 EEx-de [ia/ib] T3 -T6 Ex-approval.  B
- MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC  C
- MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC  D
- 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  E
- MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC  F
- 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  G

### Cable
- No cable  A
- 5 m (16 ft) cable  B
- 10 m (32 ft) cable  C
- 25 m (82 ft) cable  D
- 50 m (164 ft) cable  E
- 75 m (246 ft) cable  F
- 150 m (492 ft) cable  G

### Calibration/verification
- Standard calibration 3 flow x 2 points 1
- Stand. calibration matched pair 3 flow x 2 points 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

---

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.
**SITRANS F flowmeters**

**SITRANS F C**

**Flow sensor MASS 2100 DI 3 to DI 40**

### Dairy MLFB example

**MASS 2100**
- Sensor size DI 15, W 1.4435/316L
- PN 40
- DN 15 connector
- Standard configuration/calibration
- MASS 6000 IP67 compact mounted
- No cable
- Standard calibration, 3 flow x 2 points

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure testing certificate PED: 97/23/EC</td>
<td>C11</td>
</tr>
<tr>
<td>Material certificate EN 10204-3.1</td>
<td>C12</td>
</tr>
<tr>
<td>Welding certificate NDT X-ray: EN 25817/B DI 3 sensor only: NDT-Penetrant: ISO 3452</td>
<td>C13</td>
</tr>
<tr>
<td>Factory certificate according to EN 10204 2.2</td>
<td>C14</td>
</tr>
<tr>
<td>Factory certificate according to EN 10204 2.1</td>
<td>C15</td>
</tr>
<tr>
<td>Tag name plate, stainless steel</td>
<td>Y17</td>
</tr>
<tr>
<td>Tag name plate, plastic</td>
<td>Y18</td>
</tr>
<tr>
<td>Customer-specific transmitter setup</td>
<td>Y20</td>
</tr>
<tr>
<td>Customer-specified, matched pair (5x2)</td>
<td>Y60</td>
</tr>
<tr>
<td>Customer-specified calibration (5x2)</td>
<td>Y61</td>
</tr>
<tr>
<td>Customer-specified, matched pair (10x1)</td>
<td>Y62</td>
</tr>
<tr>
<td>Customer-specified calibration (10x1)</td>
<td>Y63</td>
</tr>
<tr>
<td>Cleaned for oil and grease</td>
<td>Y80</td>
</tr>
<tr>
<td>Special version</td>
<td>Y99</td>
</tr>
</tbody>
</table>

Please add “-Z” to Order No. and specify Order code(s) and plain text.

**Additional information**

This device is shipped with a Quick Start manual and the SITRANS F literature CD containing operating instructions, quick starts and certificates.

### Gaskets for MASS 2100

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimension</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 10</td>
<td>FDK-085U1006</td>
</tr>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 15</td>
<td>FDK-085U1007</td>
</tr>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 25</td>
<td>FDK-085U1019</td>
</tr>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 32</td>
<td>FDK-085U1020</td>
</tr>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 40</td>
<td>FDK-085U1021</td>
</tr>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 50</td>
<td>FDK-085U1022</td>
</tr>
<tr>
<td>2 EPDM gaskets with collar for mounting set DIN 11851</td>
<td>DN 65</td>
<td>FDK-085U1023</td>
</tr>
</tbody>
</table>

### Cables

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable with multiple plug</td>
<td>5 m (16.4 ft)</td>
<td>FDK-083H3015</td>
</tr>
<tr>
<td>Cable with multiple plug</td>
<td>10 m (32.8 ft)</td>
<td>FDK-083H3016</td>
</tr>
<tr>
<td>Cable with multiple plug</td>
<td>25 m (82 ft)</td>
<td>FDK-083H3017</td>
</tr>
<tr>
<td>Cable with multiple plug</td>
<td>50 m (164 ft)</td>
<td>FDK-083H3018</td>
</tr>
<tr>
<td>Cable with multiple plug</td>
<td>75 m (246 ft)</td>
<td>FDK-083H3054</td>
</tr>
<tr>
<td>Cable with multiple plug</td>
<td>150 m (492 ft)</td>
<td>FDK-083H3055</td>
</tr>
</tbody>
</table>

### Adapter for MASS 2100

- FDK-083L8889

### Multiple plug for cable mounting

- FDK-083H5056

### 2 kB SENSORPROM unit

- FDK-083H4410

© Siemens AG 2010
### Dimensional drawings

**MASS 2100 sensor**

![Dimensional drawing of MASS 2100 sensor](image)

<table>
<thead>
<tr>
<th>Sensor size</th>
<th>Connections</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>H1</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DI 3</strong> (1/8”)</td>
<td>Pipe thread ISO 228/1 - G¼</td>
<td>PN 100</td>
<td>¾”</td>
<td>400</td>
<td>280</td>
<td>75.0</td>
<td>60</td>
<td>0</td>
<td>21.3</td>
<td>104</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Pipe thread ANSI/ASME B 1.20.1 - ¼” NPT</td>
<td>PN 100</td>
<td>¾”</td>
<td>400</td>
<td>280</td>
<td>75.0</td>
<td>60</td>
<td>0</td>
<td>21.3</td>
<td>104</td>
<td>-</td>
</tr>
<tr>
<td><strong>DI 6</strong> (¼”)</td>
<td>Flange EN 1092-1</td>
<td>PN 100</td>
<td>DN 10</td>
<td>580</td>
<td>390</td>
<td>62.0</td>
<td>40</td>
<td>12</td>
<td>17.0</td>
<td>104</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Flange EN 1092-1</td>
<td>PN 40</td>
<td>DN 10</td>
<td>560</td>
<td>390</td>
<td>62.0</td>
<td>40</td>
<td>12</td>
<td>17.0</td>
<td>104</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 150</td>
<td>¾”</td>
<td>624</td>
<td>390</td>
<td>62.0</td>
<td>40</td>
<td>12</td>
<td>17.0</td>
<td>104</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 600</td>
<td>¾”</td>
<td>608</td>
<td>390</td>
<td>62.0</td>
<td>40</td>
<td>12</td>
<td>17.0</td>
<td>104</td>
<td>95.3</td>
</tr>
<tr>
<td></td>
<td>Screwed connection DIN 11851</td>
<td>PN 40</td>
<td>DN 10</td>
<td>532</td>
<td>390</td>
<td>62.0</td>
<td>40</td>
<td>12</td>
<td>17.0</td>
<td>104</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clamp ISO 2852</td>
<td>PN 16</td>
<td>25 mm</td>
<td>570</td>
<td>390</td>
<td>62.0</td>
<td>40</td>
<td>12</td>
<td>17.0</td>
<td>104</td>
<td>-</td>
</tr>
<tr>
<td><strong>DI 15</strong> (½”)</td>
<td>Flange EN 1092-1</td>
<td>PN 100</td>
<td>DN 15</td>
<td>634</td>
<td>444</td>
<td>75.0</td>
<td>44</td>
<td>20</td>
<td>21.3</td>
<td>129</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>Flange EN 1092-1</td>
<td>PN 40</td>
<td>DN 15</td>
<td>620</td>
<td>444</td>
<td>75.0</td>
<td>44</td>
<td>20</td>
<td>21.3</td>
<td>129</td>
<td>95.0</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 150</td>
<td>¾”</td>
<td>639</td>
<td>444</td>
<td>75.0</td>
<td>44</td>
<td>20</td>
<td>21.3</td>
<td>129</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 600</td>
<td>¾”</td>
<td>660</td>
<td>444</td>
<td>75.0</td>
<td>44</td>
<td>20</td>
<td>21.3</td>
<td>129</td>
<td>95.3</td>
</tr>
<tr>
<td></td>
<td>Screwed connection DIN 11851</td>
<td>PN 40</td>
<td>DN 15</td>
<td>586</td>
<td>444</td>
<td>75.0</td>
<td>44</td>
<td>20</td>
<td>21.3</td>
<td>129</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clamp ISO 2852</td>
<td>PN 16</td>
<td>25 mm</td>
<td>624</td>
<td>444</td>
<td>75.0</td>
<td>44</td>
<td>20</td>
<td>21.3</td>
<td>129</td>
<td>-</td>
</tr>
<tr>
<td><strong>DI 25</strong> (1”)</td>
<td>Flange EN 1092-1</td>
<td>PN 100</td>
<td>DN 25</td>
<td>970</td>
<td>700</td>
<td>74.5</td>
<td>126</td>
<td>25</td>
<td>33.7</td>
<td>219</td>
<td>140.0</td>
</tr>
<tr>
<td></td>
<td>Flange EN 1092-1</td>
<td>PN 40</td>
<td>DN 25</td>
<td>934</td>
<td>700</td>
<td>74.5</td>
<td>126</td>
<td>25</td>
<td>33.7</td>
<td>219</td>
<td>115.0</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 150</td>
<td>1”</td>
<td>967</td>
<td>700</td>
<td>74.5</td>
<td>126</td>
<td>25</td>
<td>33.7</td>
<td>219</td>
<td>124.0</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 600</td>
<td>1”</td>
<td>992</td>
<td>700</td>
<td>74.5</td>
<td>126</td>
<td>25</td>
<td>33.7</td>
<td>219</td>
<td>124.0</td>
</tr>
<tr>
<td></td>
<td>Screwed connection DIN 11851</td>
<td>PN 40</td>
<td>DN 32</td>
<td>922</td>
<td>700</td>
<td>74.5</td>
<td>126</td>
<td>25</td>
<td>33.7</td>
<td>219</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clamp ISO 2852</td>
<td>PN 16</td>
<td>38 mm</td>
<td>940</td>
<td>700</td>
<td>74.5</td>
<td>126</td>
<td>25</td>
<td>33.7</td>
<td>219</td>
<td>-</td>
</tr>
<tr>
<td><strong>DI 40</strong> (1½”)</td>
<td>Flange EN 1092-1</td>
<td>PN 100</td>
<td>DN 40</td>
<td>1100</td>
<td>850</td>
<td>71.5</td>
<td>180</td>
<td>0</td>
<td>48.3</td>
<td>273</td>
<td>170.0</td>
</tr>
<tr>
<td></td>
<td>Flange EN 1092-1</td>
<td>PN 40</td>
<td>DN 40</td>
<td>1064</td>
<td>850</td>
<td>71.5</td>
<td>180</td>
<td>0</td>
<td>48.3</td>
<td>273</td>
<td>150.0</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 150</td>
<td>1”½”</td>
<td>1100</td>
<td>850</td>
<td>71.5</td>
<td>180</td>
<td>0</td>
<td>48.3</td>
<td>273</td>
<td>127.0</td>
</tr>
<tr>
<td></td>
<td>Flange ANSI B16.5</td>
<td>Class 600</td>
<td>1”½”</td>
<td>1128</td>
<td>850</td>
<td>71.5</td>
<td>180</td>
<td>0</td>
<td>48.3</td>
<td>273</td>
<td>155.4</td>
</tr>
<tr>
<td></td>
<td>Screwed connection DIN 11851</td>
<td>PN 25</td>
<td>DN 50</td>
<td>1090</td>
<td>850</td>
<td>71.5</td>
<td>180</td>
<td>0</td>
<td>48.3</td>
<td>273</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clamp ISO 2852</td>
<td>PN 25</td>
<td>51 mm</td>
<td>1062</td>
<td>850</td>
<td>71.5</td>
<td>180</td>
<td>0</td>
<td>48.3</td>
<td>273</td>
<td>-</td>
</tr>
<tr>
<td>Sensor size</td>
<td>Connections</td>
<td>L1  inch</td>
<td>L2  inch</td>
<td>L3  inch</td>
<td>H1  inch</td>
<td>B1  inch</td>
<td>D1  inch</td>
<td>D2  inch</td>
<td>D3  inch</td>
<td>D4  inch</td>
<td>D5  inch</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| DI 3  
1/8”   | Pipe thread ISO 228/1 - G1/4 | 15.75 | 11.02   | 2.95    | 2.36    | 0       | 0.84    | 4.09    | -       | -       | -       |
|          | Pipe thread ANSI/ASME B 1.20.1 - ¼” NPT | 15.75 | 11.02   | 2.95    | 2.36    | 0       | 0.84    | 4.09    | -       | -       | -       |
| DI 6  
¼”   | 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    |
|          | 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 ¼” | 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 ¼” | 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  
½”   | Flange EN 1092-1-PN 100 DN 15 | 24.96 | 17.48   | 2.95    | 1.73    | 0.79    | 0.84    | 5.08    | 2.95    | 4.13    | 0.55    |
|          | Flange EN 1092-1-PN 40 DN 15 | 24.41 | 17.48   | 2.95    | 1.73    | 0.79    | 0.84    | 5.08    | 3.74    | 2.56    | 0.55    |
|          | Flange ANSI B16.5-Class 150 ½” | 25.16 | 17.48   | 2.95    | 1.73    | 0.79    | 0.84    | 5.08    | 3.5    | 2.38    | 0.62    |
|          | Flange ANSI B16.5-Class 600 ½” | 25.98 | 17.48   | 2.95    | 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   | 2.95    | 1.73    | 0.79    | 0.84    | 5.08    | -       | -       | -       |
|          | Clamp ISO 2852-PN 16 25 mm | 24.57 | 17.48   | 2.95    | 1.73    | 0.79    | 0.84    | 5.08    | -       | -       | -       |
| DI 25  
1”   | Flange EN 1092-1-PN 100 DN 25 | 38.19 | 27.56   | 2.93    | 4.96    | 0.98    | 1.33    | 8.62    | 3.94    | 5.51    | 0.71    |
|          | Flange EN 1092-1-PN 40 DN 25 | 36.77 | 27.56   | 2.93    | 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   | 2.93    | 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   | 2.93    | 4.96    | 0.98    | 1.33    | 8.62    | 4.88    | 3.5    | 0.75    |
|          | Screwed connection DIN 11851-PN 40 DN 32 | 36.30 | 27.56   | 2.93    | 4.96    | 0.98    | 1.33    | 8.62    | -       | -       | -       |
|          | Clamp ISO 2852-PN 16 38 mm | 37.01 | 27.56   | 2.93    | 4.96    | 0.98    | 1.33    | 8.62    | -       | -       | -       |
| DI 40  
1½”  | Flange EN 1092-1-PN 100 DN 40 | 43.31 | 33.46   | 2.81    | 7.09    | 0       | 1.9    | 10.75   | 4.92    | 6.69    | 0.87    |
|          | Flange EN 1092-1-PN 40 DN 40 | 41.69 | 33.46   | 2.81    | 7.09    | 0       | 1.9    | 10.75   | 5.91    | 4.33    | 0.71    |
|          | Flange ANSI B16.5-Class 150 1½” | 43.31 | 33.46   | 2.81    | 7.09    | 0       | 1.9    | 10.75   | 5      | 3.88    | 0.62    |
|          | Flange ANSI B16.5-Class 600 1½” | 44.41 | 33.46   | 2.81    | 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   | 2.81    | 7.09    | 0       | 1.9    | 10.75   | -       | -       | -       |
|          | Clamp ISO 2852-PN 25 51 mm | 41.81 | 33.46   | 2.81    | 7.09    | 0       | 1.9    | 10.75   | -       | -       | -       |
MASS 2100 sensor with "heating jacket"

### Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>Sensor size [DI (inch)]</th>
<th>L3 [mm (inch)]</th>
<th>H5 [mm (inch)]</th>
<th>H6 [mm (inch)]</th>
<th>H5 + H6 [mm (inch)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1/8”)</td>
<td>75 (2.95)</td>
<td>82 (3.23)</td>
<td>247 (9.72)</td>
<td>329 (12.95)</td>
</tr>
<tr>
<td>6 (¼”)</td>
<td>62 (2.44)</td>
<td>72 (2.83)</td>
<td>257 (10.12)</td>
<td>329 (12.95)</td>
</tr>
<tr>
<td>15 (½”)</td>
<td>75 (2.95)</td>
<td>67 (2.64)</td>
<td>267 (10.51)</td>
<td>354 (13.94)</td>
</tr>
<tr>
<td>25 (1”)</td>
<td>75 (2.95)</td>
<td>173 (6.81)</td>
<td>271 (10.67)</td>
<td>444 (17.48)</td>
</tr>
<tr>
<td>40 (1½”)</td>
<td>75 (2.95)</td>
<td>227 (8.94)</td>
<td>271 (10.67)</td>
<td>498 (19.61)</td>
</tr>
</tbody>
</table>

### Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>Sensor size [DI (inch)]</th>
<th>L3 [mm (inch)]</th>
<th>H5 [mm (inch)]</th>
<th>H6 [mm (inch)]</th>
<th>H5 + H6 [mm (inch)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1/8”)</td>
<td>75 (2.95)</td>
<td>82 (3.23)</td>
<td>247 (9.72)</td>
<td>306 (12.04)</td>
</tr>
<tr>
<td>6 (¼”)</td>
<td>62 (2.44)</td>
<td>72 (2.83)</td>
<td>227 (8.94)</td>
<td>316 (12.44)</td>
</tr>
<tr>
<td>15 (½”)</td>
<td>75 (2.95)</td>
<td>87 (3.43)</td>
<td>271 (10.67)</td>
<td>352 (13.83)</td>
</tr>
<tr>
<td>25 (1”)</td>
<td>75 (2.95)</td>
<td>173 (6.81)</td>
<td>271 (10.67)</td>
<td>330 (13.00)</td>
</tr>
<tr>
<td>40 (1½”)</td>
<td>75 (2.95)</td>
<td>227 (8.94)</td>
<td>271 (10.67)</td>
<td>330 (13.00)</td>
</tr>
</tbody>
</table>

**Flow sensor MASS 2100 DI 3 to DI 40**

**MASS 2100 and MASS 6000 Ex d compact version**

**MASS 2100 and MASS 6000 IP67 compact version**
Overview

SITRANS F C MC2 is available as a standard version (DN 50 to DN 150 (2" to 6")) and a hygienic, EHEDG-certified version (DN 20 to DN 80 (¾" to 3")) MC2 and MC2 hygienic are 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 range 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 straightforward and easy.

Benefits

- High accuracy better than 0.15% of mass flow rate
- Large dynamic turn-down range
- Densitometer performance available through a density accuracy better than 0.001 g/cm³
- Space-saving split-flow sensor design facilitating low pressure loss
- Parallel S-tube design and optimal oriented inductive sensors enhances accuracy and turn-down range
- 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". Installation and commissioning in less than 10 min.
- Safe Ex-design EEx em [ib] IIC
- Sensor pipe available in high-quality AISI 316L stainless steel W 1.4571 or Hastelloy C4 W 2.4610 offering optimum corrosion resistance
- The sensor calibration factor is also valid for gas measurement.

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 turn-down range which is a paramount in many applications.

<table>
<thead>
<tr>
<th>The main applications of the coriolis flowmeter can be found in all industries, such as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical &amp; pharma</td>
</tr>
<tr>
<td>Food &amp; beverage</td>
</tr>
<tr>
<td>EDEHG-certified</td>
</tr>
<tr>
<td>Oil &amp; gas</td>
</tr>
<tr>
<td>Water &amp; waste water</td>
</tr>
</tbody>
</table>

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

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 or Hastelloy C4 with a wide variety of process connections.

The enclosure is made of stainless steel AISI W 304 1.4301 with a grade of encapsulation of IP67/NEMA 4.

The sensor is Ex-approved EEx em [ib] IIC.

The sensor can be installed in horizontal or vertical position, and is self-draining in both positions.

MC2 is based on increased safety and can therefore only be connected to: MASS 6000 19” or SIFLOW FC070 Ex standard versions which have to be remote mounted in the safe area.

For all non-hazardous applications the complete MASS 6000 transmitter program can be used, though only remote mounted.

<table>
<thead>
<tr>
<th>Hazardous area</th>
<th>Safe area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 + 2</td>
<td></td>
</tr>
</tbody>
</table>
## Function

The measuring principle is based on coriolis law of movement, see “System information coriolis mass flowmeters”.

## Integration

### Installation guidelines MC2 DN 50 ... DN 150

**Installation of sensor**

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)](image1)

**Horizontal orientation, self-draining**

![Horizontal orientation, self-draining](image2)

**Avoid vibrations**

![Avoid vibrations](image3)

### Avoid cross talk

![Avoid cross talk](image4)

**Installation in a drop line**

Mount with reduction or orifice to prevent partially draining (A), orifice (B), pipe constriction valve.

![Installation in a drop line](image5)
### Technical specifications

<table>
<thead>
<tr>
<th>Versions (mm [inch])</th>
<th>20 (%)</th>
<th>25 (1)</th>
<th>40 (1½)</th>
<th>50 (2)</th>
<th>65 (2½)</th>
<th>80 (3)</th>
<th>100 (4)</th>
<th>150 (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside pipe diameter</td>
<td>mm [inch]</td>
<td>8.0 (0.31)</td>
<td>10.0 (0.39)</td>
<td>16.0 (0.63)</td>
<td>22.0 (0.87)</td>
<td>29.0 (1.14)</td>
<td>34.0 (1.34)</td>
<td>43.1 (1.69)</td>
</tr>
<tr>
<td>Pipe wall thickness</td>
<td>mm [inch]</td>
<td>1.0 (0.04)</td>
<td>1.0 (0.04)</td>
<td>1.0 (0.04)</td>
<td>1.5 (0.06)</td>
<td>1.5 (0.06)</td>
<td>2.0 (0.08)</td>
<td>2.6 (0.10)</td>
</tr>
<tr>
<td>Mass flow measuring range at pressure drop of 2 bar (29 psi) at 1 g/cm³ (0.036 lb/inch³)</td>
<td>kg/h (lb/h)</td>
<td>4 600 (10 141)</td>
<td>7 360 (16 626)</td>
<td>21 850 (48 171)</td>
<td>55 200 (121 695)</td>
<td>113 400 (250 000)</td>
<td>147 600 (325 401)</td>
<td>249 600 (550 273)</td>
</tr>
<tr>
<td>Density</td>
<td>g/cm³ (lb/inch³)</td>
<td>0.5 ... 3.5 (0.18 ... 0.126)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraction e.g. Brix</td>
<td>°Brix</td>
<td>0 ... 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td>-50 ... +180 °C (-58 ... +356 °F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid pressure measuring pipe</td>
<td>bar (psi)</td>
<td>20</td>
<td>25</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel (DIN 2413, 20 °C (68 °F))</td>
<td></td>
<td>100 (1450)</td>
<td>100 (1450)</td>
<td>100 (1450)</td>
<td>100 (1450)</td>
<td>100 (1450)</td>
<td>100 (1450)</td>
<td>40 (580)</td>
</tr>
<tr>
<td>Materials</td>
<td></td>
<td>SS 1.4571 or Hastelloy C4, W 2.4610</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flange</td>
<td></td>
<td>SS 1.4571 or Hastelloy C4, W 2.4610</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td></td>
<td>IP67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure material/connection box</td>
<td></td>
<td>W 1.4301/aluminium, max. pressure 40 bar (580 psi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process connections</td>
<td></td>
<td>See dimensional drawings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connections</td>
<td></td>
<td>Screw terminals, M 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable</td>
<td></td>
<td>5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td></td>
<td>10, 25, 75 or 150 m (32, 80, 240 or 480 ft.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex-version</td>
<td></td>
<td>ATEX 1443X ≤ DN 40: II 1/2 EEEx e [ib] IIC T2-T6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight approx.</td>
<td>kg (lb)</td>
<td>13 (28)</td>
<td>14 (31)</td>
<td>18 (40)</td>
<td>34 (75)</td>
<td>47 (104)</td>
<td>58 (128)</td>
<td>91 (201)</td>
</tr>
</tbody>
</table>

For accuracy specifications see „System information Coriolis mass flowmeters“.

### Pressure drop

![Pressure drop graph](image)
Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS F C flow sensors MC2</th>
<th>Order No. 7 ME 4 3 0 0 -</th>
</tr>
</thead>
</table>

**Nominal diameter**

- W 1.4571/316Ti
- DN 50: 1 A
- DN 65: 1 B
- DN 80: 1 C
- DN 100: 1 D
- DN 150: 1 E

- Hastelloy C4, W2.4610
- DN 50: 2 A
- DN 65: 2 B
- DN 80: 2 C
- DN 100: 2 D
- DN 150: 2 E

**Nominal pressure**

- PN 40: 3 A
- PN 100: 3 B
- Class 150: 3 C
- Class 300: 3 D
- Class 600: 3 E

**Process connections**

- Flange EN 1092-1
- DN 50 (PN 40/PN 100): 4 A
- DN 65 (PN 40/PN 100): 4 B
- DN 80 (PN 40/PN 100): 4 C
- DN 100 (PN 40): 4 D
- DN 150 (PN 40): 4 E

- Flange ASME/ANSI
- 2” (class 150/300/600): 5 A
- 2 ½” (class 150/300/600): 5 B
- 3” (class 150/300/600): 5 C
- 4” (class 150/300): 5 D
- 6” (class 150/300): 5 E

**Clamps/screwed-connections**

- DIN 11851, DN 80, PN 25: 6 A

**Dairy screwed connection to DIN 11851**

- DN 50 (PN 25): 7 A
- DN 65 (PN 25): 7 B
- DN 80 (PN 25): 7 C
- DN 100 (PN 25): 7 D

**Dairy clamp connection DIN 32676 Tri-clamp**

- 50 mm clamp (PN 16): 8 A
- 66 mm clamp (PN 10): 8 B
- 81 mm clamp (PN 10): 8 C
- 100 mm clamp (PN 10): 8 D

**Aseptic nut flange DIN 11864-2 form A for pipes dimensioned by DIN 11866**

- DN 40 (1½”): 9 A
- DN 50 (2”): 9 B
- DN 65 (2½”): 9 C
- DN 80 (3”): 9 D
- DN 100 (4”): 9 E

**Configuration**

- Flow and density (5 kg/m²)
- Flow, Brix/Plato and density (1 kg/m³)
- Density (1 kg/m³)
- Fraction (specified by customer) and density (1 kg/m³)

**Ex-approval**

- Standard, without explosion protection
- With explosion protection: Ex, ATEX
- With explosion protection: Ex, FM Class I, Div 1
- With explosion protection: Ex, FM Class I, Div 2

**Cable**

- No cable (see accessories)

**Calibration**

- Standard
- Matched pair

---

**Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering**

**Dairy MLFB example**

**MC2 sensor**

- Sensor size DN 80.
- Material W 1.4571/316Ti
- Nominal pressure: Clamps DIN 11851, DN 80, PN 25

**Configuration/calibration type:** flow and density (5 kg/m³)

**Without Ex approval**

- No cable

**Dairy MLFB example**

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDK-083H3001</td>
<td>10 m (32.8 ft)</td>
</tr>
<tr>
<td>FDK-083H3002</td>
<td>25 m (82 ft)</td>
</tr>
<tr>
<td>FDK-083H3003</td>
<td>75 m (246 ft)</td>
</tr>
<tr>
<td>FDK-083H3004</td>
<td>150 m (492 ft)</td>
</tr>
</tbody>
</table>

**Accessories**

- Description
- Order No.

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 kB SENSORPROM unit</td>
<td>FDK-083H4410</td>
</tr>
</tbody>
</table>

---

© Siemens AG 2010

Siemens FI 01 · 2010 US Edition

4/171
Selection and Ordering data

Order code: 7ME 4 3 1 0 -

Order No.

SITRANS F C flow sensors
MC2 for Hygienic applications only

Nominal diameter
W 1.4435/316L
DN 20
DN 25
DN 40
DN 50
DN 65
DN 80

Nominal pressure 40 bar, PN 25
Clamps/screwed-connections
DN 20 (¾”), PN 25
DN 25 (1”), PN 25
DN 40 (1½”), PN 25
DN 50 (2”), PN 25
DN 65 (2½”), PN 25
DN 80 (3”), PN 25

Dairy clamp connectors for DIN 32676
Tri-clamp
20 mm clamp
26 mm clamp
38 mm clamp
50 mm clamp
66 mm clamp
81 mm clamp

Aseptic connectors DIN 11864-2 Form A for DIN tubes
DN 20
DN 25
DN 40
DN 50
DN 65
DN 80

Configuration
Flow and density (5 kg/m³)
Flow, Brix/Plato and density (1 kg/m³)¹
Density (1 kg/m³)¹
Flow, fraction (customer specified application from the net)

Ex-approval
Standard, without explosion protection
With explosion protection: Ex, ATEX
With explosion protection: Ex, FM Class I, Div 1
With explosion protection: Ex, FM Class I, Div 2

Cable
No cable (see accessories)

Calibration
Standard
Matched pair

Accessories

Cables from MC2 sensor to MASS 6000 transmitter
10 m (32 ft)
25 m (80 ft)
75 m (240 ft)
150 m (480 ft)

2 kB SENSORPROM unit
(Sensor Serial No. and Order No. must be specified by ordering)

Dairy MLFB example

MC2 sensor
Sensor size DN40 mat. 1.4435/316L
Nominal pressure: Clamp
DN 11851, DN 40, PN 25

Configuration/calibration type: flow and density (5 kg/m³)
Without Ex approval
No cable
Standard calibration

¹ Extended density and fraction not possible with DN 150.

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering.
### Dimensional drawings

Remote design, flanged construction, DIN/ANSI

#### Meter size

<table>
<thead>
<tr>
<th>Inch</th>
<th>DN</th>
<th>Diameter [mm (inch)]</th>
<th>Threaded stubs</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>50</td>
<td>918 (36.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4</td>
<td>65</td>
<td>1081 (42.56)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>1197 (47.13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>1463 (57.60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>65</td>
<td>918 (36.14)</td>
<td>Rd 78 x 1/6</td>
<td>918 (36.14)</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>1197 (47.13)</td>
<td>Rd 110 x 1/6</td>
<td>1197 (47.13)</td>
</tr>
<tr>
<td>3/4</td>
<td>65</td>
<td>1081 (42.56)</td>
<td>Rd 95 x 1/6</td>
<td>1081 (42.56)</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>1463 (57.60)</td>
<td>Rd 130 x 1/4</td>
<td>1463 (57.60)</td>
</tr>
</tbody>
</table>

1) For EEx add 54 mm

### Remote design, food industry fittings, DIN 11851

#### Meter size

<table>
<thead>
<tr>
<th>Inch</th>
<th>DN</th>
<th>Diameter [mm (inch)]</th>
<th>Threaded stubs</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>50</td>
<td>918 (36.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4</td>
<td>65</td>
<td>1081 (42.56)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>1197 (47.13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>1463 (57.60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>65</td>
<td>918 (36.14)</td>
<td>Rd 78 x 1/6</td>
<td>918 (36.14)</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>1197 (47.13)</td>
<td>Rd 110 x 1/6</td>
<td>1197 (47.13)</td>
</tr>
<tr>
<td>3/4</td>
<td>65</td>
<td>1081 (42.56)</td>
<td>Rd 95 x 1/6</td>
<td>1081 (42.56)</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>1463 (57.60)</td>
<td>Rd 130 x 1/4</td>
<td>1463 (57.60)</td>
</tr>
</tbody>
</table>

1) For EEx add 54 mm
Remote design, Tri-clamp DIN 32676 (ISO 2852)

Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>Meter size</th>
<th>Process connection size</th>
<th>L [mm (inch)] ± 3</th>
<th>Q [mm (inch)]</th>
<th>F [mm (inch)]</th>
<th>B [mm (inch)]</th>
<th>A [mm (inch)]</th>
<th>R [mm (inch)]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>DN Inch DN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2 50</td>
<td>913 (35.94)</td>
<td>403 (15.87)</td>
<td>148 (5.83)</td>
<td>80 (3.15)</td>
<td>110 (4.33)</td>
<td>110 (4.33)</td>
<td>225 (8.86)</td>
</tr>
<tr>
<td></td>
<td>2½ 65</td>
<td>1073 (42.24)</td>
<td>164 (6.46)</td>
<td>97 (3.82)</td>
<td>130 (5.12)</td>
<td>275 (10.83)</td>
<td>335 (13.19)</td>
<td>305 (12.01)</td>
</tr>
<tr>
<td>2½</td>
<td>2 50</td>
<td>1192 (46.93)</td>
<td>429 (16.89)</td>
<td>164 (6.46)</td>
<td>97 (3.82)</td>
<td>130 (5.12)</td>
<td>164 (6.46)</td>
<td>275 (10.83)</td>
</tr>
<tr>
<td></td>
<td>2½ 65</td>
<td>1073 (42.24)</td>
<td>164 (6.46)</td>
<td>97 (3.82)</td>
<td>130 (5.12)</td>
<td>275 (10.83)</td>
<td>335 (13.19)</td>
<td>305 (12.01)</td>
</tr>
<tr>
<td>3</td>
<td>2 80</td>
<td>1180 (46.46)</td>
<td>456 (17.95)</td>
<td>186 (7.32)</td>
<td>108 (4.25)</td>
<td>140 (5.51)</td>
<td>186 (7.32)</td>
<td>378 (14.88)</td>
</tr>
<tr>
<td></td>
<td>2½ 65</td>
<td>1302 (51.26)</td>
<td>456 (17.95)</td>
<td>186 (7.32)</td>
<td>108 (4.25)</td>
<td>140 (5.51)</td>
<td>296 (11.65)</td>
<td>306 (12.01)</td>
</tr>
<tr>
<td></td>
<td>3 80</td>
<td>1180 (46.46)</td>
<td>456 (17.95)</td>
<td>186 (7.32)</td>
<td>108 (4.25)</td>
<td>140 (5.51)</td>
<td>296 (11.65)</td>
<td>306 (12.01)</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>1448 (57.01)</td>
<td>500 (19.69)</td>
<td>215 (8.46)</td>
<td>131 (5.16)</td>
<td>170 (6.69)</td>
<td>215 (8.46)</td>
<td>440 (17.32)</td>
</tr>
<tr>
<td>4</td>
<td>3 80</td>
<td>1598 (62.91)</td>
<td>500 (19.69)</td>
<td>215 (8.46)</td>
<td>131 (5.16)</td>
<td>170 (6.69)</td>
<td>215 (8.46)</td>
<td>440 (17.32)</td>
</tr>
<tr>
<td></td>
<td>4 100</td>
<td>1448 (57.01)</td>
<td>500 (19.69)</td>
<td>215 (8.46)</td>
<td>131 (5.16)</td>
<td>170 (6.69)</td>
<td>215 (8.46)</td>
<td>365 (14.37)</td>
</tr>
</tbody>
</table>

1) For EEx add 54 mm
Process Connections
- Flanges DIN/ASME
- Tri-Clamp DIN 32676
  - DN 15 to DN 50: Series 3
  - DN 65 to 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, PN 100 (to DN 80 (3”))
  - Class 150, Class 300, Class 600 (to DN 80 (3”))

Housing as secondary containment
- Max. 40 bar

Pressure Equipment Directive 97/23/EG
- Conformity evaluation category III, fluid group 1, gas, diagramme 6

Corrosion resistance of measuring pipe material to measuring medium has to be considered.

Material strength for process connections

<table>
<thead>
<tr>
<th>Process connection</th>
<th>Size</th>
<th>PS_{max.} (bar/psi g)</th>
<th>TS_{max.} (°C/°F)</th>
<th>TS_{min.} (°C/°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread acc. DIN 11851</td>
<td>15 ... 40</td>
<td>½ ... 1½</td>
<td>40 (580)</td>
<td>140 (284)</td>
</tr>
<tr>
<td></td>
<td>50 ... 100</td>
<td>2 ... 4</td>
<td>25 (363)</td>
<td>140 (284)</td>
</tr>
<tr>
<td>Tri-Clamp acc. DIN 32676</td>
<td>15 ... 50</td>
<td>½ ... 2</td>
<td>16 (232)</td>
<td>120 (248)</td>
</tr>
<tr>
<td></td>
<td>65 ... 100</td>
<td>2½ ... 4</td>
<td>10 (145)</td>
<td>120 (248)</td>
</tr>
</tbody>
</table>

Material Loads Curves for Flanged Flowmeters

DIN-Flanges SS 1.4571/316Ti to DN 100 (4”)

ASME-Flanges SS 1.4571/316Ti to DN 100 (4”)

© Siemens AG 2010
Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>DN (Size)</th>
<th>Process connections</th>
<th>L₅</th>
<th>g</th>
<th>G</th>
<th>F</th>
<th>B</th>
<th>ΔA</th>
<th>R</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN inch</td>
<td>DN inch</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>kg</td>
</tr>
<tr>
<td>20 ¾”</td>
<td>15 ½” Rd34 x 1/8</td>
<td>672 (26.46)</td>
<td>4 (0.16)</td>
<td>358 (14.94)</td>
<td>127 (5.00)</td>
<td>66 (2.60)</td>
<td>89 (3.50)</td>
<td>152 (5.98)</td>
<td>13</td>
</tr>
<tr>
<td>20 ¾”</td>
<td>20 ¾” Rd44 x 1/6</td>
<td>583 (22.95)</td>
<td>6 (0.24)</td>
<td>358 (14.94)</td>
<td>127 (5.00)</td>
<td>66 (2.60)</td>
<td>89 (3.50)</td>
<td>152 (5.98)</td>
<td>13</td>
</tr>
<tr>
<td>25 1”</td>
<td>25 1” Rd52 x 1/6</td>
<td>683 (26.89)</td>
<td>7 (0.28)</td>
<td>358 (14.94)</td>
<td>127 (5.00)</td>
<td>66 (2.60)</td>
<td>89 (3.50)</td>
<td>162 (6.38)</td>
<td>14</td>
</tr>
<tr>
<td>40 1½”</td>
<td>40 1½” Rd65 x 1/6</td>
<td>786 (30.94)</td>
<td>7 (0.28)</td>
<td>358 (14.94)</td>
<td>127 (5.00)</td>
<td>66 (2.60)</td>
<td>89 (3.50)</td>
<td>185 (7.28)</td>
<td>14</td>
</tr>
</tbody>
</table>

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!
### Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>DN (Size)</th>
<th>Process connections</th>
<th>L₅</th>
<th>g</th>
<th>G</th>
<th>F</th>
<th>B</th>
<th>∅A</th>
<th>R</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1½”</td>
<td>25</td>
<td>1</td>
<td>Rd52 x 1/6</td>
<td>864 (34.02)</td>
<td>7 (0.28)</td>
<td>374 (14.72)</td>
<td>129 (5.08)</td>
<td>64 (2.52)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>1½</td>
<td>Rd65 x 1/6</td>
<td>761 (29.96)</td>
<td>7 (0.28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
<td>2”</td>
<td>Rd78 x 1/6</td>
<td>918 (36.14)</td>
<td>7 (0.28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>2”</td>
<td>40</td>
<td>1½</td>
<td>Rd65 x 1/6</td>
<td>1025 (40.35)</td>
<td>7 (0.28)</td>
<td>403 (15.87)</td>
<td>148 (5.83)</td>
<td>80 (3.15)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
<td>2”</td>
<td>Rd78 x 1/6</td>
<td>918 (36.14)</td>
<td>7 (0.28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>65</td>
<td>2½”</td>
<td>Rd95 x 1/6</td>
<td>1081 (42.56)</td>
<td>8 (0.31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>2½”</td>
<td>50</td>
<td>2”</td>
<td>Rd78 x 1/6</td>
<td>1197 (47.13)</td>
<td>7 (0.28)</td>
<td>429 (16.89)</td>
<td>164 (6.46)</td>
<td>97 (3.82)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65</td>
<td>2½”</td>
<td>Rd95 x 1/6</td>
<td>1081 (42.56)</td>
<td>8 (0.31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>80</td>
<td>3”</td>
<td>Rd110 x 1/4</td>
<td>1200 (47.24)</td>
<td>8 (0.31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>3”</td>
<td>65</td>
<td>2½”</td>
<td>Rd95 x 1/6</td>
<td>1310 (51.57)</td>
<td>8 (0.31)</td>
<td>456 (17.95)</td>
<td>186 (7.32)</td>
<td>108 (4.25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80</td>
<td>3”</td>
<td>Rd110 x 1/4</td>
<td>1200 (47.24)</td>
<td>8 (0.31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td>4”</td>
<td>Rd130 x 1/4</td>
<td>1463 (57.60)</td>
<td>10 (0.39)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!
SITRANS F flowmeters
SITRANS F C

SITRANS F C MC2

Remote Design, Tri-Clamp DIN 32676

Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>DN (Size)</th>
<th>Process connections</th>
<th>L₅</th>
<th>G</th>
<th>F</th>
<th>B</th>
<th>ØA</th>
<th>R</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>¼</td>
<td>15</td>
<td>½</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>656 (25.83)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>¾</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>561 (22.09)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>661 (26.02)</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>20</td>
<td>¼</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>721 (28.39)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>621 (24.45)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>1½</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>773 (30.43)</td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>358 (14.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>127 (5.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>66 (2.60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>89 (3.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>140 (5.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>92 (3.62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>142 (5.59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>152 (5.98)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>102 (4.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN 32676</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>180 (7.09)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!
Remote Design, Tri-Clamp DIN 32676

Dimensions in mm (inch)

<table>
<thead>
<tr>
<th>DN (Size)</th>
<th>Process connections</th>
<th>L₅</th>
<th>G</th>
<th>F</th>
<th>B</th>
<th>ØA</th>
<th>R</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN inch</td>
<td>DN inch</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>mm (inch)</td>
<td>kg</td>
</tr>
<tr>
<td>40 1½&quot;</td>
<td>25 1</td>
<td>842 (33.15)</td>
<td>129 (5.08)</td>
<td>64 (2.52)</td>
<td>90 (3.54)</td>
<td>242 (9.53)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 1½</td>
<td>748 (29.45)</td>
<td>374 (14.72)</td>
<td></td>
<td></td>
<td></td>
<td>195 (7.68)</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>50 2&quot;</td>
<td>913 (35.94)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>278 (10.94)</td>
<td>18</td>
</tr>
<tr>
<td>50 2&quot;</td>
<td>40 1½</td>
<td>1012 (39.84)</td>
<td>403 (15.87)</td>
<td>148 (5.83)</td>
<td>80 (3.15)</td>
<td>110 (4.33)</td>
<td>275 (10.83)</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>50 2&quot;</td>
<td>913 (35.94)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>225 (8.86)</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>65 2½</td>
<td>1073 (42.24)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>305 (12.02)</td>
<td>27</td>
</tr>
<tr>
<td>65 2½&quot;</td>
<td>50 2&quot;</td>
<td>1192 (46.93)</td>
<td>429 (16.89)</td>
<td>164 (6.46)</td>
<td>97 (3.82)</td>
<td>130 (5.12)</td>
<td>335 (13.19)</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>65 2½</td>
<td>1073 (42.24)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>275 (10.83)</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>80 3&quot;</td>
<td>1180 (46.46)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>328 (12.91)</td>
<td>38</td>
</tr>
<tr>
<td>80 3&quot;</td>
<td>80 3&quot;</td>
<td>1180 (46.46)</td>
<td>456 (17.95)</td>
<td>186 (7.32)</td>
<td>108 (4.25)</td>
<td>140 (5.51)</td>
<td>378 (14.88)</td>
<td>45</td>
</tr>
<tr>
<td>100 4&quot;</td>
<td></td>
<td>1448 (57.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>430 (16.93)</td>
<td>46</td>
</tr>
</tbody>
</table>

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!
Overview

Siemens offers two types of ultrasonic flowmeters, in-line 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 in-line versions.

Benefits

- Greater flexibility:
  - Sensor sizes from DN 50 to 1 200 mm (2" to 48"), optional down to DN 25 (1")
  - In-line retrofit as 1 and 2 track up to DN 4 000 (160")
  - Compact and remote transmitter installation
  - HART, PROFIBUS PA and MODBUS 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 logging
  - Exchange of the transducers without interrupting operation
  - Battery lifetime of up to 8 year
- Approvals/certificates:
  - Custody transfer approvals within district heating
  - ATEX
  - Standard with calibration certificate

Application

In-line 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
- MODBUS
Please see Product selector on the Internet, since some constraints might be related to some of the features:
www.pia-selector.automation.siemens.com

<table>
<thead>
<tr>
<th>Industry</th>
<th>SONO 3300/ FUS060</th>
<th>SONO 3100/ FUS060</th>
<th>SONOKIT/ FUS060 FUS080</th>
<th>FUE380</th>
<th>FUS380</th>
<th>FUS880</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water, treated waste water</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XXX</td>
<td>XXX</td>
<td></td>
</tr>
<tr>
<td>Utility, district heating water, cooling</td>
<td>XXX</td>
<td>XX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td></td>
</tr>
<tr>
<td>Utility, district heating, CT approvals required</td>
<td>XX</td>
<td>XXX</td>
<td>XX</td>
<td>XXX</td>
<td>XXX</td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryogenic fluids (only on request)</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On- and Offshore applications</td>
<td>XX</td>
<td>XXX</td>
<td>XX</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td>XXX</td>
<td>XXX</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Design                     |                   |                   |                        |        |        |        |
| Electronic compact mounted |                   |                   |                        |        |        |        |
| Electronic remote mounted  |                   |                   |                        |        |        |        |
| Transducers can be replaced under pressure |                   |                   |                        |        |        |        |
| Retrofit on existing steel pipes/non-weldable |                   |                   |                        |        |        |        |

| Transmitter enclosure     |                   |                   |                        |        |        |        |
| Polyamid, IP67            |                   |                   |                        |        |        |        |
| Die-cast aluminium (painted), IP65 |                   |                   |                        |        |        |        |

| Communication              |                   |                   |                        |        |        |        |
| HART                      |                   |                   |                        |        |        |        |
| PROFIBUS PA               |                   |                   |                        |        |        |        |
| MODBUS RTU / RS 232 and RS 485 |                   |                   |                        |        |        |        |

| Power supply              |                   |                   |                        |        |        |        |
| 3.6 V Battery            |                   |                   |                        |        |        |        |
| 115 ... 230 V AC         |                   |                   |                        |        |        |        |
| 115 ... 230 V AC and 3.6 V battery backup |                   |                   |                        |        |        |        |
| 24 V AC/DC              |                   |                   |                        |        |        |        |

| Accuracy                  |                   |                   |                        |        |        |        |
| 0.25% (with 4-track system on request) |                   |                   |                        |        |        |        |
| 0.50%                     |                   |                   |                        |        |        |        |

| Sensor design             |                   |                   |                        |        |        |        |
| 1 track ultrasonic measurement (special request) |                   |                   |                        |        |        |        |
| 2 track ultrasonic measurement |                   |                   |                        |        |        |        |
| 4 track ultrasonic measurement |                   |                   |                        |        |        |        |

| Dimension                 |                   |                   |                        |        |        |        |
| DN 25 ... 40               |                   |                   |                        |        |        |        |
| DN 60                      | 2"                |                   |                        |        |        |        |
| DN 80                      | 2"                |                   |                        |        |        |        |
| DN 65                      | 2½"               |                   |                        |        |        |        |
| DN 80                      | 3"                |                   |                        |        |        |        |
| DN 100                     | 4"                |                   |                        |        |        |        |
| DN 125                     | 5"                |                   |                        |        |        |        |
| DN 150                     | 6"                |                   |                        |        |        |        |
| DN 200                     | 8"                |                   |                        |        |        |        |
| DN 225                     | 9"                |                   |                        |        |        |        |
| DN 250                     | 10"               |                   |                        |        |        |        |
| DN 300                     | 12"               |                   |                        |        |        |        |
| DN 350                     | 14"               |                   |                        |        |        |        |
| DN 400                     | 16"               |                   |                        |        |        |        |
| DN 500                     | 20"               |                   |                        |        |        |        |
| DN 600                     | 24"               |                   |                        |        |        |        |
| DN 700                     | 28"               |                   |                        |        |        |        |

X = can be used, XX = often used, XXX = most often used, ● = available

1) Also available as 1-track solution on request (down to DN 25 (1"))
2) Only SONO 3100 1-track (special request)
3) SONOKIT 1-Track DN 100 to DN 2400 and 2-track DN 200 to DN 4000
## Dimension (continued)

<table>
<thead>
<tr>
<th>DN</th>
<th>32&quot;</th>
<th>36&quot;</th>
<th>40&quot;</th>
<th>48&quot;</th>
<th>54&quot;</th>
<th>60&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>●●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3600</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4800</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5400</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7200</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12000</td>
<td>●●●●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Process connection

- Flanges: ●
- Flangeless (for weld-in): ●

## Flanges Norm

- EN 1092-1: ●
- EN 1759-1: ●
- ANSI B16.5: ●

## Pressure rating

<table>
<thead>
<tr>
<th>PN</th>
<th>6</th>
<th>10</th>
<th>16</th>
<th>25</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
</tr>
<tr>
<td>●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
</tr>
<tr>
<td>●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
</tr>
<tr>
<td>●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
</tr>
<tr>
<td>●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
</tr>
</tbody>
</table>

## Pipe, flange and transducer material

- Carbon steel: ●
- Stainless steel: ●
- Die cast bronze: ●
- Other materials: on request

## Media temperature

<table>
<thead>
<tr>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-200</td>
<td>-328</td>
</tr>
<tr>
<td>-4</td>
<td>●</td>
</tr>
<tr>
<td>-10</td>
<td>+14</td>
</tr>
<tr>
<td>+2</td>
<td>+35.6</td>
</tr>
<tr>
<td>+60</td>
<td>+140</td>
</tr>
<tr>
<td>+120</td>
<td>+248</td>
</tr>
<tr>
<td>+150</td>
<td>+302</td>
</tr>
<tr>
<td>+160</td>
<td>+320</td>
</tr>
<tr>
<td>+190</td>
<td>+374</td>
</tr>
<tr>
<td>+200</td>
<td>+392</td>
</tr>
<tr>
<td>+250</td>
<td>+482</td>
</tr>
</tbody>
</table>

## Measuring principle

- Transit time principle: ●

---

1) Also available as 1-track solution on request (down to DN 25 (1"))
2) Only SONO 3100 1-track (special request)
3) SONOKIT 1-Track DN100 to DN 2400 and 2-track DN 200 to DN 4000
4) Only on special request
5) Compact
6) Pipe material bronze brass
7) SONOKIT with FUS080 up to DN 1200

---

Please see Product selector on the Internet, since some constrains might be related to some of the features:

[www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)
Please see Product selector on the internet, since some constrains might be related to some of the features: www.pia-selector.automation.siemens.com

<table>
<thead>
<tr>
<th>Approvals</th>
<th>SONO 3300/ FUS060</th>
<th>SONO 3100/ FUS060</th>
<th>SONOKIT/ FUS060 FUS080</th>
<th>FUE380</th>
<th>FUS380</th>
<th>FUS880</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custody transfer approval for energy metering</td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
<td><img src="image" alt="" /></td>
</tr>
<tr>
<td>MID class 2</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>EN 1434 class 2 (Heat meter approval)</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OIML R 75 class 2 (Heat meter approval)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PTB, Germany</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Other country specific type approval available for:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>- Russia (GOSS/GOST)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>- Rumania</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>- China</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ex approval</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ex d ATEX</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ex i ATEX</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

X = can be used, XX = often used, XXX = most often used, ● = available
**Function**

**Physical principle**

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:

$$v = K \cdot \frac{(t_{B,A} - t_{A,B})}{t_{A,B} \cdot t_{B,A}} = K \cdot \frac{\Delta t}{t^2}$$

- $v$ = 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-track solution**

Ultrasonic 2-track flowmeter with 4 transducers. In the upper track transducers 1A / 1B and in the lower track 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 tracks.

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-track 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 track 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-track ultrasonic flowmetering is $\pm 0.5\%$ with installations according to above demands.

**4-track ultrasonic flowmeters**

Some applications require accuracy under extreme short inlet conditions and swirl that cannot be obtained with 2-track solutions.

For these applications we can offer a 4-track solution – customer-specified – according to actual inlet conditions.

Please contact Siemens Flow Instruments for specific applications.
Technical specifications

Nominal size and flow

© Siemens AG 2010
Guidelines for selection of sensor

- Min. measuring range: 0 … 0.25 m/s
- Max. measuring range: 0 … 10 m/s

Normally nominal flow velocity is within the measuring range 1 … 3 m/s.

Flow velocity calculation formula:

\[ v = \frac{4 \times Q_{\text{max}}}{\pi \times D_i^2 \times 3600} \]

- \( v \) in m/s, \( Q_{\text{max}} \) in m³/h, \( D_i \) in m

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 inlet/outlet

<table>
<thead>
<tr>
<th>Inlet</th>
<th>Sono 3300, Sono 3100, Sonokit 2-track</th>
<th>FUS380/FUE380</th>
<th>Sonokit 1-track</th>
</tr>
</thead>
<tbody>
<tr>
<td>90° bend</td>
<td>10 x ( D_i )</td>
<td>10 x ( D_i )</td>
<td>20 x ( D_i )</td>
</tr>
<tr>
<td>Fully opened valve</td>
<td>10 x ( D_i )</td>
<td>10 x ( D_i )</td>
<td>20 x ( D_i )</td>
</tr>
<tr>
<td>Partially opened valve</td>
<td>40 x ( D_i )</td>
<td>40 x ( D_i )</td>
<td>40 x ( D_i )</td>
</tr>
<tr>
<td>2 x 90° bends in same plane</td>
<td>15 x ( D_i )</td>
<td>15 x ( D_i )</td>
<td>25 x ( D_i )</td>
</tr>
<tr>
<td>2 x 90° bends in two planes</td>
<td>20 x ( D_i )</td>
<td>20 x ( D_i )</td>
<td>40 x ( D_i )</td>
</tr>
<tr>
<td>Outlet</td>
<td>3 x ( D_i )</td>
<td>3 x ( D_i )</td>
<td>3 x ( D_i )</td>
</tr>
</tbody>
</table>

1) Inlet for FUE380 with MID approval should be for sizes ≥ DN 80: 1.5 m

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

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:

Reference conditions

To ensure maximum accuracy sensor and transmitter must be calibrated together. Flowmeter calibration data are stored in the internal EPROM of the transmitters FUS060 or FUS080. The system accuracy refers to the following systems:

SONO 3300/FUS060, SONO 3100/FUS0601).

Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For exact data please refer to the PED requirements.

Fluid
Fluid temperature
Ambient temperature
Supply voltage

Straight inlet length
Rangeability
Repeatability
Linearity

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

1) Only systems with transmitter FUS060. For systems with transmitter FUS080 see chapter on FUS380 and FUE380.
Overview

SITRANS FUS060 is a transit time based transmitter designed for ultrasonic flowmetering with any sensor in the FUS in-line series up to DN 4000. SITRANS FUS060 is engineered for high performance and is suitable for 1-, 2- and 4-tracks 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-tracks
- 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.

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.
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 amplitude
- Noise suppression using damping, error stages and hysteresis
- 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 the output 1:
  - Pulse output, frequency output, limit, flow direction or device status
- Functions of the 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 SITRANS F version with PROFIBUS PA, the analog output is replaced by the electronic PROFIBUS PA output. The device can then be parameterized via PROFIBUS communication and with SIMATIC PDM in addition to local operation.

### Technical specifications

<table>
<thead>
<tr>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal diameters and measuring ranges</td>
</tr>
<tr>
<td>Max. cable length</td>
</tr>
</tbody>
</table>

2-track DN 50 ... DN 4000 (optionally also for 1 and 4-track)
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.

<table>
<thead>
<tr>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog output</td>
</tr>
<tr>
<td>• Signal range</td>
</tr>
<tr>
<td>• Upper limit</td>
</tr>
<tr>
<td>• Signal on alarm</td>
</tr>
<tr>
<td>• Load</td>
</tr>
</tbody>
</table>

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 Ω; for non Ex version
≥ 230 Ω for HART communication
≤ 330 Ω for Ex-version

<table>
<thead>
<tr>
<th>Digital output 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Active or passive signal, can be configured with positive or negative logic</td>
</tr>
<tr>
<td>• For explosion protection (ATEX version)</td>
</tr>
</tbody>
</table>

Active: 24 V DC, ≤ 24 mA, \( R_i = 300 \ \Omega \)
Passive: open collector, 30 V DC, ≤ 200 mA

<table>
<thead>
<tr>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Only PROFIBUS PA version:</td>
</tr>
</tbody>
</table>

Only passive signals for digital output 1

<table>
<thead>
<tr>
<th>Digital output 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Relay, NC or NO contact</td>
</tr>
</tbody>
</table>

Switching capacity max. 5 W
Max. 50 V DC, max. 200 mA DC
Self-resetting fuse, \( R_i = 9 \ \Omega \)

<table>
<thead>
<tr>
<th>Communication via PROFIBUS PA interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Power supply</td>
</tr>
<tr>
<td>• Current consumption from bus</td>
</tr>
</tbody>
</table>

Separate supply, four-wire device
Permissible bus voltage 9 ... 32 V
See certificates and approvals
10 mA; ≤ 15 mA in event of error with electronic current limiting

<table>
<thead>
<tr>
<th>Electrical isolation</th>
</tr>
</thead>
</table>

Outputs electrically isolated from power supply and from one another

<table>
<thead>
<tr>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error in measurement (at reference conditions)</td>
</tr>
</tbody>
</table>

\[ \pm 0.5\% \text{ of measured value at } 0.5 \ldots 10 \text{ m/s or } \pm 0.25 \text{ [%/m/s] [% of measured value at flow } < 0.5 \text{ m/s} \]

<table>
<thead>
<tr>
<th>Pulse output</th>
</tr>
</thead>
</table>

\[ \pm 0.5\% \text{ of measured value at } 0.5 \ldots 10 \text{ m/s or } \pm 0.25 \text{ [%/m/s] [% of measured value at flow } < 0.5 \text{ m/s} \]

<table>
<thead>
<tr>
<th>Analog output</th>
</tr>
</thead>
</table>

As pulse output plus ± 0.1% of measured value, ± 20 μA

<table>
<thead>
<tr>
<th>Repeatability</th>
</tr>
</thead>
</table>

≤ ± 0.25% of measured value at 0.5 ... 10 m/s
## Transmitter FUS060

### Reference conditions
- **Process temperature**: 25 °C ± 5 °C (77 °F ± 9 °F)
- **Ambient temperature**: 25 °C ± 5 °C (77 °F ± 9 °F)
- **Warming-up time**: 30 min.
- **Installation conditions**: Upstream section > 10 x DN and downstream section > 5 x DN

### Rated operation conditions

#### Ambient conditions
- **Operation**: -20 ... +50 °C (-4 ... +122 °F)
- **In potentially explosive atmospheres**: Observe temperature classes
- **Storage**: -25 ... +80 °C (-13 ... +176 °F)
- **Enclosure rating**: IP65 (NEMA 4)

#### Medium conditions
- **Process temperature**: -200 ... +250 °C (-328 ... +482 °F)
- **Gases/solids**: Influence accuracy of measurement (approx. max. 3% gases or solids)

### Design
- **Separate version**: Transmitter is connected to the transducers via 3 ... 120 m (9.8 ... 395 ft) long specially shielded cables (coaxial cable)
- **Enclosure material**: Die-cast aluminum, painted
- **Wall mounting bracket**: Stainless steel (standard: always incl.)
- **Weight of transmitter**: 4.4 kg (9.7 lb)
- **Electrical connection**: Cable glands (always incl.)
  - Power supply and outputs: - 2 x M20 (HART) / M25 (PROFIBUS) or - 2 x ½”-NPT (HART)
  - Transducers/sensor: - 2/4 x M16 or - 2/4 x ½” NPT

### Displays and controls
- **Display**: LCD, two lines with 16 characters each
- **Multi-display**: Flow, volume, mass flow, mass, flow velocity, speed of sound, ultrasonic signal information, current, frequency, alarm information
- **Operation**: 4 infrared keys, hierarchical menu prompting with codes

### Power supply
- **Supply voltage**:
  - **Standard version**: 120 ... 230 V AC ± 15% (50/60 Hz) or 19 ... 30 V DC / 21 ... 26 V AC
  - **Ex version**: 19 ... 30 V DC / 21 ... 26 V AC
- **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)

#### Coaxial cable

<table>
<thead>
<tr>
<th>Standard Coaxial cable (75 Ω)</th>
<th>Coaxial cable with SMB straight plug on one end for the FUS060 connector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outside diameter</strong></td>
<td>Ø 5.8 mm</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft)</td>
</tr>
<tr>
<td><strong>Material (outside jacket)</strong></td>
<td>black PE</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-10 ... +70 °C (14 ... 158 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High temperature Coaxial cable (75 Ω)</th>
<th>Coaxial cable with SMB straight plug on one end for the FUS060 connector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outside diameter</strong></td>
<td>Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>(for remaining cable to the transmitter - with SMB plug at the end) and</td>
</tr>
<tr>
<td><strong>Material (outside jacket)</strong></td>
<td>between these is a black hot melt junction Ø 16 mm (length 70 mm)</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and</td>
</tr>
<tr>
<td></td>
<td>-10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)</td>
</tr>
</tbody>
</table>
Dimensional drawings

SITRANS FUS060 with standard mounting bracket, dimensions in mm (inch)

![Dimensional drawing of SITRANS FUS060 with standard bracket](image1)

SITRANS FUS060 with optional special mounting bracket, dimensions in mm (inch)

![Dimensional drawing of SITRANS FUS060 with optional special bracket](image2)

Schematics

Earth connection for signal cable screen

Digital output 2 (relays) (only for HART)

Digital output 1 (active/passive)

Analog output (active) 4 to 20 mA (or PROFIBUS)

Power supply: L/N for AC 120 to 230 V, L+/L- for AC/DC 24 V

Earth terminal for PE

Electrical connection SITRANS FUS060

Transmitter FUS060 accessories and spare parts

SITRANS FUS060 transmitter, available standard and Ex versions

The transmitter configuration is made in the flowmeter order codes (together with the sensors). Here only for spare part ordering.

<table>
<thead>
<tr>
<th>Description</th>
<th>Version</th>
<th>Enclosure</th>
<th>Supply</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUS060, 230 V, HART, Metric cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 115 to 230 V AC 50/60 Hz</td>
<td>7ME3050-2BA10-1BA1</td>
<td></td>
</tr>
<tr>
<td>FUS060, 230 V, HART, Imperial cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 115 to 230 V AC 50/60 Hz</td>
<td>7ME3050-2BA10-1BA2</td>
<td></td>
</tr>
<tr>
<td>FUS060, 230 V, PROFIBUS, Metric cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 115 to 230 V AC 50/60 Hz</td>
<td>7ME3050-2BA10-1DA1</td>
<td></td>
</tr>
<tr>
<td>FUS060, 230 V, PROFIBUS, Imperial cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 115 to 230 V AC 50/60 Hz</td>
<td>7ME3050-2BA10-1DA2</td>
<td></td>
</tr>
<tr>
<td>FUS060, 24 V, HART, Metric cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 19 ... 30 V DC / 21 ... 26 V AC</td>
<td>7ME3050-2BA20-1BA1</td>
<td></td>
</tr>
<tr>
<td>FUS060, 24 V, HART, Imperial cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 19 ... 30 V DC / 21 ... 26 V AC</td>
<td>7ME3050-2BA20-1BA2</td>
<td></td>
</tr>
<tr>
<td>FUS060, 24 V, PROFIBUS, Metric cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 19 ... 30 V DC / 21 ... 26 V AC</td>
<td>7ME3050-2BA20-1DA1</td>
<td></td>
</tr>
<tr>
<td>FUS060, 24 V, PROFIBUS, Imperial cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) 19 ... 30 V DC / 21 ... 26 V AC</td>
<td>7ME3050-2BA20-1DA2</td>
<td></td>
</tr>
<tr>
<td>FUS060, ATEX, 24 V, HART, Metric cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) ATEX approval 19 ... 30 V DC / 21 ... 26 V AC</td>
<td>7ME3050-2BA21-1CA1</td>
<td></td>
</tr>
<tr>
<td>FUS060, ATEX, 24 V, PROFIBUS, Metric cable glands</td>
<td>Transmitter for remote connection</td>
<td>IP65 (NEMA 4) ATEX approval 19 ... 30 V DC / 21 ... 26 V AC</td>
<td>7ME3050-2BA21-1EA1</td>
<td></td>
</tr>
</tbody>
</table>

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.
## SITRANS FUS060 spare parts

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating/Display module for FUS060</td>
<td>7ME5933-0AC00</td>
</tr>
<tr>
<td>Electronics cover with glass plate (non Ex)</td>
<td>7ME5933-0AC01</td>
</tr>
<tr>
<td>Cover for sensor cable and gasket</td>
<td>7ME5933-0AC02</td>
</tr>
<tr>
<td>Cover for mains supply/communication</td>
<td>7ME5933-0AC03</td>
</tr>
<tr>
<td>Standard wall mounting bracket for SITRANS FUS060</td>
<td>7ME5933-0AC04</td>
</tr>
<tr>
<td>Special wall-/pipe mounting bracket kit for SITRANS FUS060 transmitter</td>
<td>7ME5933-0AC05</td>
</tr>
<tr>
<td>Safety clamp for electronic cover with glass plate (7ME5933-0AC01)</td>
<td>7ME5933-0AC06</td>
</tr>
</tbody>
</table>

### Cables for FUS060

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Length m (ft)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial cable for FUS060, (75 Ω max. 70 °C (158 °F), black PVC) (2 pcs.)</td>
<td>3 (9.84)</td>
<td>A5E00875101</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861432</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01278662</td>
</tr>
<tr>
<td></td>
<td>60 (196.85)</td>
<td>A5E01278682</td>
</tr>
<tr>
<td></td>
<td>90 (295.28)</td>
<td>A5E01278687</td>
</tr>
<tr>
<td></td>
<td>120 (393.70)</td>
<td>A5E01278698</td>
</tr>
</tbody>
</table>

| High temp. coaxial cable for FUS060; with 0.3 m brown 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.) | 3 (9.84) | A5E00875105 |
|                                                      | 15 (49.21) | A5E00861435 |
|                                                      | 30 (98.43) | A5E01196952 |

F) Subject to export regulations AL: 9I999, ECCN: N.
**Overview**

SITRANS FUS080 transmitter on the wall mounting kit

SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flowmetering with any sensor in the FUS in-line 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 4/212. The standard flowmeter series SITRANS FUS380 is described from page 4/223. The type approved flowmeter series for flowmetering in heatmeter custody transfer systems are named SITRANS FUE380 - see page 4/229.

**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 20 Hz/0.5 Hz (230 V AC/Battery)
- Easy one button straight forward display
- IrDA optical interface for local communication
- 2-track 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 $Q_{\text{min}}$, $Q_{\text{max}}$ up to 1:400
- MODBUS RTU/RS 232, RS 485 communication modules

**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.

---

**SITRANS F flowmeters**

**SITRANS F US**

The transmitter is available in an IP67/NEMA 4X/6 enclosure and is designed for use in the flowmeters series:

- SONOKIT (1- or 2-track)
- FUS380 (2-track)
- FUE380 (2-track)

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 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, and optional MODBUS RTU communication modules.

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**

<table>
<thead>
<tr>
<th>Input</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow by measuring the transit time difference of ultrasonic signals through transducers in DN 50 ... 1200 2-track sensor pipes (optional also as SONOKIT 1-track)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery mode</td>
</tr>
<tr>
<td>0.5 Hz</td>
</tr>
<tr>
<td>Mains supply</td>
</tr>
<tr>
<td>up to 20 Hz</td>
</tr>
<tr>
<td>Back-up mode</td>
</tr>
<tr>
<td>0.5 Hz (at mains supply drop)</td>
</tr>
<tr>
<td>Flow rate</td>
</tr>
<tr>
<td>0.02 ... 9 m/s (0.065 ... 29.5 ft/s), bidirectional flow metering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. ±35 V AC/DC, max. 50 mA</td>
</tr>
<tr>
<td>Max. pulse frequency</td>
</tr>
<tr>
<td>100 Hz at $Q_{\text{max}}$</td>
</tr>
<tr>
<td>Selectable with the ordering of the flowmeter</td>
</tr>
<tr>
<td>Pulse: forward, reverse, forward net, reverse net (preset: forward)</td>
</tr>
<tr>
<td>Pulse: forward, reverse, forward net, reverse net (preset: forward) or alarm indication or call-up indication (preset: alarm)</td>
</tr>
<tr>
<td>Pulse value A and B</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td>Pulse length (depending on $Q_{\text{max}}$ by DN selection)</td>
</tr>
<tr>
<td>5, 10, 20, 50, 100, 200, 500 ms</td>
</tr>
<tr>
<td>Track 1 (F1), track 2 (F2) internal, failure (F3, F4), powers supply warning or low battery indication (F5), $Q_{\text{max}}$ overflow (F6), pulse overflow (F7, F8), internal data logger warning (F9)</td>
</tr>
</tbody>
</table>
## SITRANS F flowmeters
### SITRANS F US

<table>
<thead>
<tr>
<th><strong>Transmitter FUS080</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated operation conditions</strong></td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
</tr>
<tr>
<td>• Operation: -5 ... +60 °C (23 ... 140 °F)</td>
</tr>
<tr>
<td>• Storage: -40 ... +85 °C (-40 ... 185 °F) (battery included)</td>
</tr>
<tr>
<td><strong>Enclosure rating</strong></td>
</tr>
<tr>
<td>IP67/NEMA 4X/6 to EN 60529 and DIN 40050</td>
</tr>
<tr>
<td><strong>Electromagnetic compatibility</strong></td>
</tr>
<tr>
<td>• Emitted interference: To EN 61000-6-4</td>
</tr>
<tr>
<td>• Immunity: To EN 61000-6-2</td>
</tr>
<tr>
<td>• MID approved (FUE380 series): Environment class E2 and M1</td>
</tr>
<tr>
<td><strong>Mechanical vibration</strong></td>
</tr>
<tr>
<td>2 g, 1 ... 800 Hz sinusoidal in all directions according to IEC 68-2-6</td>
</tr>
<tr>
<td><strong>Weight of transmitter</strong></td>
</tr>
<tr>
<td>Approx. 1.5 kg (3.3 lb)</td>
</tr>
</tbody>
</table>

| **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, fibre-glass reinforced polyamide with stainless steel bracket, cable glands entries: 2 x 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 Ω 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 |
| **Display setting** |
| Flow unit: Preset: m³/h |
| Volume unit: Preset: m³ |
| **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 8 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 |

### Add-on modules
- RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable
- RS 485 serial interface with Modbus RTU (+/-/GND), multi-drop with up to 32 devices with max. 1 000 m cable
- Modbus RTU protocol is an open protocol (further information available on request)
- Serial speed 1 200, 2 400, 4 800, 9 600, 19 200, 38 400 Baud

#### SONOKIT, FUS380, FUE380
Flow value setting predefined settings 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 FUS380 series, SONOKIT series will differ in the accuracy)
- **Pulse output**
  - ≤ ±0.5 % of measured value at 0.5 ... 10 m/s or
  - ≤ ±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 ± 5 °C (77 °F ± 9 °F)
  - Warming-up time 30 min.
  - Installation conditions: Upstream section > 10 x DN and downstream section > 5 DN

---

![Calibration limits FUS380](calibration_chart.png)

![Calibration limits FUS380](calibration_chart.png)

![Calibration limits FUS380](calibration_chart.png)
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.
SITRANS F flowmeters

Transmitter FUS080

Accessories and spare parts for flowmeters based on FUS080

SITRANS FUS080 Spare parts

Spare part transmitter for FUS380 systems

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series</td>
<td>A5E02734600</td>
</tr>
<tr>
<td>FUS080 transmitter 230V mains as spare part transmitter for FUS380 flowmeter series</td>
<td>A5E02734539</td>
</tr>
<tr>
<td>FUS080 transmitter 230V mains with backup-battery as spare part transmitter for FUS380/FUE380/SONOKIT flowmeter series</td>
<td>A5E02729610</td>
</tr>
</tbody>
</table>

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3410-xxxxx-xxxxx-Z, XX.... and xxxxxxNxxx)

Spare part transmitter for FUE380 approved systems

(only with approval marks, no verification – it can be only done as complete flowmeter, means “sensor together with the transmitter”)

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flowmeter series</td>
<td>A5E02734600</td>
</tr>
<tr>
<td>FUS080 transmitter 230V mains as spare part transmitter for FUE380 flowmeter series</td>
<td>A5E02734539</td>
</tr>
<tr>
<td>FUS080 transmitter 230V mains with backup-battery as spare part transmitter for FUE380 flowmeter series</td>
<td>A5E02729610</td>
</tr>
</tbody>
</table>

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3410-xxxxx-xxxxx-Z, XX.... and xxxxxxNxxx)

Spare part transmitter for SONOKIT systems

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters</td>
<td>On request</td>
</tr>
<tr>
<td>FUS080 transmitter 230V mains as spare part transmitter for SONOKIT flowmeters</td>
<td>On request</td>
</tr>
<tr>
<td>FUS080 transmitter 230V mains with backup-battery as spare part transmitter for SONOKIT flowmeters</td>
<td>On request</td>
</tr>
</tbody>
</table>

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3410-xxxxx-xxxxx-Z, XX.... and xxxxxxNxxx)

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.

Accessories and spare parts for transmitter FUS080

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual battery pack (6 year lifetime) 33 Ah</td>
<td>A5E02679676</td>
</tr>
<tr>
<td>Single battery back-up to main supply 13.5 Ah</td>
<td>A5E02679923</td>
</tr>
<tr>
<td>Battery cover for transmitter FUS080</td>
<td>A5E00694468</td>
</tr>
<tr>
<td>PG 13.5 set (2 pcs.) for main cable/pulse cable</td>
<td>FDK:083G0228</td>
</tr>
<tr>
<td>PG 13.5 set (2 pcs.) for dual coax cable (6 mm)</td>
<td>A5E00694500</td>
</tr>
<tr>
<td>SITRANS FUS/FUE380 wall mounting kit for remote transmitter mounting, including connection plate (DN 50 ... DN 1200/2&quot; ... 48&quot;)</td>
<td>A5E00694509</td>
</tr>
<tr>
<td>SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (bronze sensors only, DN 50 ... DN 80/2&quot; ... 3&quot;)</td>
<td>A5E01208138</td>
</tr>
<tr>
<td>SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 ... DN 1200/4&quot; ... 48&quot;)</td>
<td>A5E00694660</td>
</tr>
<tr>
<td>Brace (holder) for optical IrDA eye</td>
<td>A5E00695277</td>
</tr>
<tr>
<td>IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable</td>
<td>FDK:087L4163</td>
</tr>
<tr>
<td>RS 232 add-on module, point to point communication interface with MODBUS RTU protocol</td>
<td>FDK:087L4212</td>
</tr>
<tr>
<td>RS 485 add-on module, multi-drop communication interface with MODBUS RTU protocol</td>
<td>FDK:087L4213</td>
</tr>
</tbody>
</table>

F) Subject to export regulations AL: 9I999, ECCN: N.
## 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

### Sensor cables for FUS380/FUE380 flowmeters

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 to 80 flowmeters</td>
<td></td>
</tr>
<tr>
<td>5 m (16.4 ft) cable set (4 pcs.)</td>
<td>A5E01208092</td>
</tr>
<tr>
<td>for DN 50 ... DN 80 (2&quot; ... 3&quot;)</td>
<td></td>
</tr>
<tr>
<td>remote mounting</td>
<td></td>
</tr>
<tr>
<td>10 m (32.8 ft) cable set (4 pcs.)</td>
<td>A5E01208114</td>
</tr>
<tr>
<td>for DN 50 ... DN 80 (2&quot; ... 3&quot;)</td>
<td></td>
</tr>
<tr>
<td>remote mounting</td>
<td></td>
</tr>
<tr>
<td>20 m (65.6 ft) cable set (4 pcs.)</td>
<td>A5E01208117</td>
</tr>
<tr>
<td>for DN 50 ... DN 80 (2&quot; ... 3&quot;)</td>
<td></td>
</tr>
<tr>
<td>remote mounting</td>
<td></td>
</tr>
<tr>
<td>30 m (98.4 ft) cable set (4 pcs.)</td>
<td>A5E01208121</td>
</tr>
<tr>
<td>for DN 50 ... DN 80 (2&quot; ... 3&quot;)</td>
<td></td>
</tr>
<tr>
<td>remote mounting</td>
<td></td>
</tr>
<tr>
<td>1 m (3.28 ft) cable set (4 pcs.)</td>
<td>A5E01208126</td>
</tr>
<tr>
<td>for DN 50 ... DN 80 (2&quot; ... 3&quot;)</td>
<td></td>
</tr>
<tr>
<td>compact version of FUS380/FUE380</td>
<td></td>
</tr>
</tbody>
</table>

| DN 100 to 1200 flowmeters         |           |
| 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 (4 pcs.)  | A5E00695479 |
| for DN 100 ... DN 1200 (4" ... 48") |           |
| remote mounting                    |           |
| 20 m (65.6 ft) cable set (4 pcs.)  | A5E00695480 |
| for DN 100 ... DN 1200 (4" ... 48") |           |
| remote mounting                    |           |
| 30 m (98.4 ft) cable set (4 pcs.)  | A5E00695483 |
| for DN 100 ... DN 1200 (4" ... 48") |           |
| remote mounting                    |           |
| 1 m (3.28 ft) cable set (4 pcs.)   | A5E00695486 |
| for DN 100 ... DN 1200 (4" ... 48") |           |
| compact version of FUS380/FUE380   |           |

### Sensor cables for SONOKIT flowmeter with FUS080

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 m (49.2 ft) cable set (4 pcs.)</td>
<td>A5E02478541</td>
</tr>
<tr>
<td>remote mounting with SONOKIT flowmeters</td>
<td></td>
</tr>
<tr>
<td>30 m (65.6 ft) cable set (4 pcs.)</td>
<td>A5E02478551</td>
</tr>
<tr>
<td>remote mounting with SONOKIT flowmeters</td>
<td></td>
</tr>
</tbody>
</table>

F) Subject to export regulations AL: 91999, ECON: N.

### Dimensional drawings

**FUS080 transmitter IP67/NEMA 4X/6, wall mounting**

Dimensions in mm (inch)
Schematics

The scheme shows the transducer cable connections between transmitter terminals and respective transducer and the electrical connection of the energy calculator SITRANS FUE950.
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 flowmeter is measurement of volume.

SONO 3300/FUS060 can be used for water and treated waste water, oil and liquefied gases, hot water / cooling systems.

Design

The SONO 3300/FUS060 consists of a casted sensor (DN 50 to 150 (2" to 6")), welded pipes (DN 200 to 300 (8" 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 4/189.

2-track sensor with flanges and integrated transducers

<table>
<thead>
<tr>
<th>Error in measurement</th>
<th>v &gt; 0.5...10 m/s, &lt;± 0.5% of rate (v=flow speed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. flow velocity</td>
<td>10 m/s (32 ft/s)</td>
</tr>
<tr>
<td>Nominal size</td>
<td>DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 250, DN 300 (2&quot; ... 12&quot;)</td>
</tr>
<tr>
<td>Media/surface temperature</td>
<td>Separate version: -10 ... +160 °C (14 ... 320 °F)</td>
</tr>
<tr>
<td>Ambient temperature (sensor)</td>
<td>Separate version: -20 ... +60 °C (-4 ... +140 °F)</td>
</tr>
<tr>
<td>Storage: -40 ... +85 °C (-40 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>Standard version: IP67 (NEMA 4X/NEMA 6) ATEX version: As standard, but with ATEX approval (see below)</td>
</tr>
</tbody>
</table>

Process connections

<table>
<thead>
<tr>
<th>PN designated EN 1092-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 ... 300 (2&quot; ... 12&quot;), PN 40</td>
</tr>
<tr>
<td>DN 100 ... 300 (4&quot; ... 12&quot;), PN 16</td>
</tr>
<tr>
<td>DN 200 ... 300 (8&quot; ... 12&quot;), PN 10</td>
</tr>
</tbody>
</table>

Class designated EN 1759-1

| DN 50 ... 300 (2" ... 12"), class 150 |
| DN 50 ... 300 (2" ... 12"), class 300 |

Transducer

Integrated version welded into pipe

Materials

<table>
<thead>
<tr>
<th>Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 ... 150 (2&quot; ... 6&quot;): Steel EN 1.113145-16Mn5</td>
</tr>
<tr>
<td>DN 200 ... 300 (8&quot; ... 12&quot;): Steel EN 1.0345-P235GH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 ... 300 (2&quot; ... 12&quot;): EN 1.0025-S323JRG2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class Transducer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM A105 Stainless steel AISI 316 or similar</td>
</tr>
</tbody>
</table>
### Certificates and approvals

<table>
<thead>
<tr>
<th>Conformity certificate</th>
<th>The devices are supplied as standard with a Siemens Certificate of Conformity on CD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material certificate</td>
<td>Material certificate according to EN 10204-3.1 is optionally available</td>
</tr>
<tr>
<td>NDT examination report</td>
<td>Extended material certificate is optionally available</td>
</tr>
<tr>
<td>Calibration report</td>
<td>A standard calibration report is shipped with each flowmeter.</td>
</tr>
<tr>
<td>Extended accredited ISO/IEC 17025 calibration certificates</td>
<td>Optionally available</td>
</tr>
<tr>
<td>Approvals</td>
<td>No custody transfer approvals</td>
</tr>
<tr>
<td>Ex approval</td>
<td>System ATEX approval for SONO 3300 with remote transmitter 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 for electrical immunity.</td>
</tr>
<tr>
<td>Approvals</td>
<td>System ATEX approval for SONO 3300 with remote transmitter 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 for electrical immunity.</td>
</tr>
<tr>
<td>Ex approval</td>
<td>System ATEX approval for SONO 3300 with remote transmitter 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 for electrical immunity.</td>
</tr>
</tbody>
</table>

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 Ω)

- **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 Ω)

- **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 transducer - 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)
Selection and Ordering data

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Qn setting [m³/h]</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 (2&quot;&quot;)</td>
<td>10</td>
<td>7</td>
<td>ME</td>
</tr>
<tr>
<td>DN 50 (2&quot;&quot;)</td>
<td>20</td>
<td>E</td>
<td>300</td>
</tr>
<tr>
<td>DN 50 (2&quot;&quot;)</td>
<td>60</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DN 65 (2½&quot;&quot;)</td>
<td>15</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>DN 65 (2½&quot;&quot;)</td>
<td>42</td>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>DN 65 (2½&quot;&quot;)</td>
<td>100</td>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>DN 80 (3&quot;&quot;)</td>
<td>20</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 80 (3&quot;&quot;)</td>
<td>60</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>DN 80 (3&quot;&quot;)</td>
<td>150</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 100 (4&quot;&quot;)</td>
<td>36</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 100 (4&quot;&quot;)</td>
<td>100</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 100 (4&quot;&quot;)</td>
<td>230</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 125 (5&quot;&quot;)</td>
<td>50</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 125 (5&quot;&quot;)</td>
<td>150</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 125 (5&quot;&quot;)</td>
<td>360</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 150 (6&quot;&quot;)</td>
<td>80</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 150 (6&quot;&quot;)</td>
<td>220</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 150 (6&quot;&quot;)</td>
<td>500</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 200 (8&quot;&quot;)</td>
<td>120</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 200 (8&quot;&quot;)</td>
<td>380</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 200 (8&quot;&quot;)</td>
<td>900</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 250 (10&quot;&quot;)</td>
<td>200</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 250 (10&quot;&quot;)</td>
<td>600</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 250 (10&quot;&quot;)</td>
<td>1400</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 300 (12&quot;&quot;)</td>
<td>300</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 300 (12&quot;&quot;)</td>
<td>850</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DN 300 (12&quot;&quot;)</td>
<td>2200</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Flange norm and pressure rating</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1092-1</td>
<td>B</td>
</tr>
<tr>
<td>PN 10 (DN 200 ... 300 (8&quot; ... 12&quot;))</td>
<td>C</td>
</tr>
<tr>
<td>PN 16 (DN 80 ... 300 (3&quot; ... 12&quot;))</td>
<td>E</td>
</tr>
<tr>
<td>PN 40 (DN 50 ... 300 (2&quot; ... 12&quot;))</td>
<td>F</td>
</tr>
<tr>
<td>ANSI B16.5</td>
<td>H</td>
</tr>
<tr>
<td>class 150 (DN 50 ... 300 (2&quot; ... 12&quot;))</td>
<td>J</td>
</tr>
<tr>
<td>class 300 (DN 50 ... 300 (2&quot; ... 12&quot;))</td>
<td>K</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Sensor type (approval) and transmitter mounting</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP67 standard, remote transmitter</td>
<td>1</td>
</tr>
<tr>
<td>IP67 Ex-version (ATEX), remote transmitter (Ex-version)</td>
<td>3</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Cable gland entries in FUS060 and SONO 3300</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable glands M20 in sensor and in transmitter M25/20/16 x 1.5</td>
<td>1</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Transmitter SITRANS FUS060</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP65 (NEMA 4), 120/230 V AC</td>
<td>N</td>
</tr>
<tr>
<td>IP65 (NEMA 4), 24 V AC/DC</td>
<td>P</td>
</tr>
<tr>
<td>IP65 (NEMA 4), 24 V AC/DC, Ex-version (ATEX)</td>
<td>Q</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add -.Z* to Order No. and specify Order code(s) and plain text.</td>
<td></td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Calibration</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor prepared for older SONO 3000 transmitters</td>
<td>A30</td>
</tr>
<tr>
<td>Production calibration DN 50 ... DN 300 (with certificate)</td>
<td>D20</td>
</tr>
<tr>
<td>Accredited Siemens ISO/IEC 17025 calibration for DN50 to DN150 with Qn as selected in Diameter. Verification certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 325 m³/h).</td>
<td>D21</td>
</tr>
<tr>
<td>Accredited Siemens ISO/IEC 17025 calibration for DN125 to DN300 with Qn as selected in Diameter. Verification certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 1300 m³/h).</td>
<td></td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Material certificate</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10204-3.1</td>
<td>F10</td>
</tr>
<tr>
<td>EN 10204-3.1 with 100% NDT on weldings</td>
<td>F11</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Pressure certificate</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10204-2.3</td>
<td>F21</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Tag name plate</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add plain text)</td>
<td>Y17</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>FUS060 output module</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART, 4 ... 20 mA, 1 pulse output, 1 relay</td>
<td>B</td>
</tr>
<tr>
<td>HART, Ex version, 4 ... 20 mA, 1 pulse output, 1 relay</td>
<td>C</td>
</tr>
<tr>
<td>PROFIBUS PA, 1 pulse/frequency</td>
<td>D</td>
</tr>
<tr>
<td>PROFIBUS PA, Ex version, 1 pulse/frequency</td>
<td>E</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Transducer coax cable</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 3 m, max. 70 °C (158 °F), the only option for Ex-i</td>
<td>0</td>
</tr>
<tr>
<td>2 x 15 m, max. 70 °C (158 °F)</td>
<td>1</td>
</tr>
<tr>
<td>2 x 30 m, high temp. max. 200 °C (392 °F)</td>
<td>2</td>
</tr>
<tr>
<td>2 x 30 m, max. 70 °C (158 °F)</td>
<td>3</td>
</tr>
<tr>
<td>2 x 60 m, max. 70 °C (158 °F)</td>
<td>4</td>
</tr>
<tr>
<td>2 x 90 m, max. 70 °C (158 °F)</td>
<td>5</td>
</tr>
<tr>
<td>2 x 120 m, max. 70 °C (158 °F)</td>
<td>6</td>
</tr>
<tr>
<td>2 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex-i</td>
<td>7</td>
</tr>
<tr>
<td>2 x 15 m, high temp. max. 200 °C (392 °F)</td>
<td>8</td>
</tr>
</tbody>
</table>
Sensor SONO 3300 accessories and spare parts

**Potting kit**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potting kit, IP68, 10 m (32.81 ft) w.g. rating</td>
<td>FDK-085L2403</td>
</tr>
</tbody>
</table>

**Cables for SONO 3300 with FUS060**

(only as spare parts)

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Length m (ft)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)</td>
<td>3 (9.84)</td>
<td>A5E00875101</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861432</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01278662</td>
</tr>
<tr>
<td></td>
<td>60 (196.85)</td>
<td>A5E01278682</td>
</tr>
<tr>
<td></td>
<td>90 (295.28)</td>
<td>A5E01278687</td>
</tr>
<tr>
<td></td>
<td>120 (393.70)</td>
<td>A5E01278698</td>
</tr>
</tbody>
</table>

High temp. coaxial cable for FUS060, with 0.3 m brown PTFE high temp. transducer part (max. 200 °C (392 °F)) and black PVC transmitter part with SMB plug (max. 70 °C (158 °F)); impedance 75 Ω (2 pcs.)

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Length m (ft)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part (max. 200 °C (392 °F)) and black PVC transmitter part with SMB plug (max. 70 °C (158 °F)); impedance 75 Ω (2 pcs.)</td>
<td>3 (9.84)</td>
<td>A5E00875105F)</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861435</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01196952F)</td>
</tr>
</tbody>
</table>

**Cable connection boxes**

(For the connection of individually transducer cables with the FUS060 transducer cables)

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction box for coax cable</td>
<td>FDK-085B1361</td>
</tr>
<tr>
<td>• IP68 metal box for 4 coax cables</td>
<td></td>
</tr>
</tbody>
</table>

**Cable glands (for the SONO 3300 terminal box)**

(only as spare parts)

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Temperature range °C (°F)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M20</td>
<td>Nickel-plated brass, 2x cables Ø 5 ... 6 mm (2 pcs.)</td>
<td>-25 ... +200 (-13 ... +392)</td>
<td>A5E02246329</td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONO 3300 terminal box lid, in metal (1 pc.)</td>
<td>A5E02593569</td>
</tr>
<tr>
<td>Gasket for SONO 3300 terminal lid (1 pc.)</td>
<td>A5E02593567</td>
</tr>
<tr>
<td>SONO 3300 SS terminal box (1 pc.), incl. 2 x M20 cable glands, incl. lid and gasket</td>
<td>A5E02593566</td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coax cable connecting plate (1 pc.) for the SONO 3300 terminal box and use with transmitter type FUS060</td>
<td>A5E02593568</td>
</tr>
</tbody>
</table>
Dimensional drawings of sensor SONO 3300

Sensor SONO 3300

<table>
<thead>
<tr>
<th>DN</th>
<th>EN 1092-1</th>
<th>PN 16</th>
<th>PN 40</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L (1)</td>
<td>D</td>
<td>D1</td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>50</td>
<td>475</td>
<td>18.70</td>
<td>165</td>
</tr>
<tr>
<td>80</td>
<td>475</td>
<td>18.70</td>
<td>185</td>
</tr>
<tr>
<td>100</td>
<td>380</td>
<td>14.96</td>
<td>220</td>
</tr>
<tr>
<td>125</td>
<td>355</td>
<td>13.98</td>
<td>250</td>
</tr>
<tr>
<td>150</td>
<td>360</td>
<td>14.17</td>
<td>285</td>
</tr>
<tr>
<td>200</td>
<td>400</td>
<td>15.75</td>
<td>340</td>
</tr>
<tr>
<td>250</td>
<td>400</td>
<td>15.75</td>
<td>395</td>
</tr>
<tr>
<td>300</td>
<td>400</td>
<td>17.52</td>
<td>445</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN</th>
<th>ANSI</th>
<th>150 lb</th>
<th>300 lb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L (1)</td>
<td>D</td>
<td>D1</td>
</tr>
<tr>
<td>50 mm / 2”</td>
<td>510</td>
<td>20.08</td>
<td>152</td>
</tr>
<tr>
<td>65 mm / 2½”</td>
<td>510</td>
<td>20.08</td>
<td>178</td>
</tr>
<tr>
<td>80 mm / 3”</td>
<td>420</td>
<td>16.54</td>
<td>191</td>
</tr>
<tr>
<td>100 mm / 4”</td>
<td>420</td>
<td>16.54</td>
<td>229</td>
</tr>
<tr>
<td>125 mm / 5”</td>
<td>440</td>
<td>17.32</td>
<td>254</td>
</tr>
<tr>
<td>150 mm / 6”</td>
<td>430</td>
<td>16.93</td>
<td>279</td>
</tr>
<tr>
<td>200 mm / 8”</td>
<td>480</td>
<td>18.90</td>
<td>343</td>
</tr>
<tr>
<td>250 mm / 10”</td>
<td>490</td>
<td>19.29</td>
<td>365</td>
</tr>
<tr>
<td>300 mm / 12”</td>
<td>550</td>
<td>21.65</td>
<td>483</td>
</tr>
</tbody>
</table>

(1) Length tolerance (mm): DN50 ... DN100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 300 +4/-5

(2) Approximate weights without transmitter FUS060 - weight of FUS060 is 4.4 kg (9.7 lb)
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 easily be changed without interrupting operation. SONO 3100 can optionally be delivered as a 4-track 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: - Special sensor material, e.g. Duplex - High/low temperature sensor version: +250 °C (+482 °F) / -200 °C (-328 °F) sensors - Pressure rating 430 bar (6235 psi)
- 4-track sensor technology

Application

The main application for SONO 3100 in combination with FUS060 ultrasonic flowmeter 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, transducers with O-rings or flanges depending on selection - and a FUS060 transmitter. SONO 3100 is basically supplied in a 2-track solution with and without flanges in sizes from DN 100 to DN 1200. 4-track version is available on request.

SONO 3100 is as standard available in carbon/stainless steel from DN 100 to DN 1200. FUS060 is designed for wall mounting only.

Technical specifications

The transmitter related to this system is the SITRANS FUS060. Technical specifications to the FUS060 see page 4/193.

2-track sensor fitted with four SONO 3200 transducers

<table>
<thead>
<tr>
<th>Error in measurement</th>
<th>v &gt; 0.5 ... 10 m/s, &lt; ±0.5% of rate (v=flow velocity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max flow velocity</td>
<td>10 m/s (32 ft)</td>
</tr>
<tr>
<td>Nominal size</td>
<td>DN 100 ... 1200 (4&quot; ... 48&quot;)</td>
</tr>
<tr>
<td>Media/surface temperature</td>
<td>• Standard: -10 °C ... +200 °C (14 ... 392 °F)</td>
</tr>
<tr>
<td></td>
<td>• ATEX Ex-d version: -20 ... +180 °C (-4 ... +356 °F)</td>
</tr>
<tr>
<td></td>
<td>• ATEX Ex-i version: -10 ... +190 °C (+14 ... +374 °F)</td>
</tr>
<tr>
<td></td>
<td>• Specials: -200 °C (-328 °F) or up to 250 °C (482 °F)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP68 (NEMA 6)/IP68 (NEMA 6X) and ATEX (see below)</td>
</tr>
</tbody>
</table>

Process connections

PN designated, EN 1092-1

- Pipe material carbon steel
  - DN 200 ... 1200 (8" ... 48"), PN 10
  - DN 100 ... 1200 (4" ... 48"), PN 16
  - DN 200 ... 1000 (8" ... 40"), PN 25
  - DN 100 ... 500 (4" ... 20"), PN 40

- Pipe material stainless steel
  - DN 200 ... 300 (8" ... 12"), PN 10 and PN 25
  - DN 100 ... 300 (4" ... 12"), PN 16 and PN 40

Class designated, EN 1759-1

- Pipe material carbon steel
  - Class designated, EN 1759-1
    - DN 100 ... 600 (4" ... 24") Class 150
    - DN 100 ... 300 (4" ... 12") Class 300

- Pipe material stainless steel
  - Class designated, EN 1759-1
    - DN 100 ... 300 (4" ... 12") Class 150 and Class 300

Without flanges, (weld-in version) only in carbon steel

- Transducer SONO 3200
  - O-ring or flange versions

Materials

- Pipe:
  - Steel EN 1.0345-P235GH or stainless steel EN 1.4404 - AISI 316L
  - EN 10025-S235JRG2, 1E1 or stainless steel EN 10222-5-1.4404, 13ED ASTM A105,1,1 or stainless steel ASTM F316L,2,3
- Flange
  - Stainless steel AISI 316 or similar
- Class
  - Stainless steel AISI 316 or plastic PA 6.6
- Transducer body
- Transducer terminal house
Certificates and approvals

System ATEX approval for SONO 3100 together with transmitter FUS060-Ex

ATEX II 2G Ex diem [ia/ib] IIC T6/T4/T3 or ATEX II 2G EEx d IIC T3-T6 with SONO 3200 Ex 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.

Conformity certificate

The devices are supplied as standard with a Siemens Certificate of Conformity on CD

Material certificate

Material certificate according to EN 10204-3.1 is optionally available

NDT examination report

Extended material certificate is optionally available

Pressure certificate

Pressure test according EN 1024-2.3 optionally available

Calibration report

A standard calibration report is shipped with each flowmeter. Optionally available Extended accredited ISO/IEC 17025 calibration certificates

Approvals

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).

Selection and Ordering data

Order No. Order code

SITRANS F US SONO 3100 sensor 2-track

Diameter Qn setting [m³/h]

DN 100 (4”) 28 1N
DN 100 (4”) 100 1P
DN 100 (4”) 220 1R
DN 125 (5”) 44 1S
DN 125 (5”) 150 1T
DN 125 (5”) 350 1V
DN 150 (6”) 64 2A
DN 150 (6”) 220 2B
DN 150 (6”) 500 2D
DN 200 (8”) 110 2E
DN 200 (8”) 380 2F
DN 200 (8”) 900 2H
DN 250 (10”) 180 2J
DN 250 (10”) 600 2K
DN 250 (10”) 1300 (1) 2M
DN 300 (12”) 250 2N
DN 300 (12”) 850 2P
DN 300 (12”) 2000 (1) 2R
DN 350 (14”) 350 2S
DN 350 (14”) 1000 2T
DN 350 (14”) 2800 (1) 2V
DN 400 (16”) 450 3A
DN 400 (16”) 1300 (1) 3B
DN 400 (16”) 3600 (1) 3D
DN 500 (20”) 1300 (1) 3J
DN 500 (20”) 2200 (1) 3K
DN 500 (20”) 4200 (1) 3M
DN 600 (24”) 1300 3S
DN 600 (24”) 3200 3T
DN 600 (24”) 4200 (1) 3V
DN 700 (28”) 2000 4E
DN 700 (28”) 4200 4F
DN 800 (32”) 4200 4N
DN 800 (32”) 5500 (1) 4P
DN 900 (36”) 4200 5A
DN 900 (36”) 7500 (1) 5B
DN 1000 (40”) 4200 5J
DN 1000 (40”) 9000 (1) 5K
DN 1200 (48”) 4200 5S
DN 1200 (48”) 13200 (1) 5T

Flange norm and pressure rating

(All sizes are not available in all pressure ratings)

EN 1092-1

PN 10 (DN 200 ... DN 1200) B
PN 16 (DN 100 ... DN 1200) C
PN 25 (DN 200 ... DN 1000) D
PN 40 (DN 100 ... DN 500) E

ANSI B16.5

class 150 (DN 100 ... DN 600) H
class 300 (DN 100 ... DN 300) J
Pipe without flanges (weld-in version)

PN 10 (DN 200 ... DN 1200) P
PN 16 (DN 100 ... DN 1200) Q
PN 25 (DN 200 ... DN 1200) R
PN 40 (DN 100 ... DN 500) S
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order code</th>
<th>Selection and Ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ME 3 1 0 0 -</td>
<td>SITRANS F US SONO 3100 sensor 2-track</td>
</tr>
</tbody>
</table>

**Pipe and flange material**

- Carbon steel (DN 100 ... 1200) 1
- Stainless steel (DN 100 ... 300) 2

**Transducer type and approval**

| 1 | IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F) (DN 100 ... 1200; SS and CS sensors) |
| 2 | IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F) (DN 100 ... 1200; SS and CS sensors) |
| 3 | IP68 SS housing, PN 40, O-ring, 50 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) |
| 4 | IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F) (DN 100 ... 300; SS sensors) |
| 5 | IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F) |
| 6 | IP68 SS housing, PN 40, flange, 88 mm, 180 °C (356 °F), Ex d ATEX approval (only with FUS060) |
| 7 | IP67 SS housing, PN 40, O-ring, 50 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) |
| 8 | IP67 SS housing, PN 40, flange, 88 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) |

**Transmitter SITRANS FUS060**

| N | IP65 (NEMA 4), 120/230 V AC |
| Q | IP65 (NEMA 4), 24 V AC/DC |
| Q | IP65 (NEMA 4), 24 V AC/DC ATEX Ex version |

**Module**

- HART, 1 pulse output, 1 relay B
- HART Ex, 1 pulse output, 1 relay C
- PROFIBUS PA, 1 pulse/frequency D
- PROFIBUS PA, Ex, 1 pulse/frequency E

**Transducer coax cable**

- 4 x 3 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) 2
- 4 x 30 m, max. 70 °C (158 °F) 3
- 4 x 60 m, max. 70 °C (158 °F) 4
- 4 x 90 m, max. 70 °C (158 °F) 5
- 4 x 120 m, max. 70 °C (158 °F) 6
- 4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex-i 7
- 4 x 15 m, high temp. max. 200 °C (392 °F) 8

---

*Please add "Z" to Order No. and specify Order code(s) and plain text.*

**Additional information**

**Calibration**

- Production calibration DN 100 ... DN 1200 (with certificate)
- Accredited Siemens ISO/IEC 17025 calibration for DN100 to DN500/600 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 1235/1300 m³/h). Included
- Accredited Siemens ISO/IEC 17025 calibration for DN300 to DN700 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 4200 m³/h). D21
- Accredited Siemens ISO/IEC 17025 calibration for DN800 to DN1200 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 4200 m³/h). D22
- Accredited - Third Party ISO/IEC 17025 calibration for DN100 to DN600 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 1300 m³/h). D23
- Accredited - Third Party ISO/IEC 17025 calibration for DN300 to DN700 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 4200 m³/h). D31
- Accredited - Third Party ISO/IEC 17025 calibration for DN800 to DN1200 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 7000 m³/h). D32
- Accredited - Third Party ISO/IEC 17025 calibration for DN900 to DN1200 with Qn as selected in diameter. Verifi- 
  cation certificate: 2 x 3 points in 10%, 25% and 100% Qn (max. flow 7000 m³/h). D33

**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, DN 200 ... DN 700 F12
- EN 10204-3.1 and 100% NDT on weldings, DN 800 ... DN 1200 F13

**Pressure certificate**

- EN 10204-2.3 F21

**Tag name plate**

- Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add plain text) Y17

*Please also see www.siemens.com/SITRANSFordering for practical examples of ordering*
# Sensor SONO 3100 accessories and spare parts

## SONO 3200 spare parts, complete units

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Gasket</th>
<th>Press. rating</th>
<th>Terminal housing</th>
<th>Temp. range [°C (°F)]</th>
<th>Length mm (inch)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>Plastic, PA 6.6 M20</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>50 (1.97)</td>
<td>FDK:085B5453</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS M20</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>50 (1.97)</td>
<td>FDK:085B5450</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS M20</td>
<td>Ex-d1)</td>
<td>-10 ... +90 (+14 ... +374)</td>
<td>50 (1.97)</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>Plastic, PA 6.6 ½&quot; NPT</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>50 (1.97)</td>
<td>A5E00839448</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS M20</td>
<td>Ex-i2)</td>
<td>-10 ... +90 (+14 ... +374)</td>
<td>50 (1.97)</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN 40</td>
<td>Plastic, PA 6.6 M20</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>88 (3.47)</td>
<td>FDK:085B5461</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN 40</td>
<td>316 SS M20</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>88 (3.47)</td>
<td>FDK:085B5462</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN 40</td>
<td>316 SS M20</td>
<td>Ex-d1)</td>
<td>-10 ... +180 (+4 ... +356)</td>
<td>88 (3.47)</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN 40</td>
<td>Plastic, PA 6.6 ½&quot; NPT</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>88 (3.47)</td>
<td>A5E00839479</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN 40</td>
<td>316 SS M20</td>
<td>Ex-i2)</td>
<td>-10 ... +180 (+4 ... +356)</td>
<td>88 (3.47)</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS Graphite</td>
<td>Copper ring</td>
<td>PN 40</td>
<td>316 SS PG13.5 (c cryogenic version)</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>88 (3.47)</td>
<td>FDK:085B5416</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS Copper ring</td>
<td>PN 40</td>
<td>316 SS M20 (c cryogenic version)</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>88 (3.47)</td>
<td>FDK:085B5471</td>
<td></td>
</tr>
<tr>
<td>Flat flange</td>
<td>316 SS Flat gasket</td>
<td>PN 40</td>
<td>316 SS M20 (c cryogenic version)</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>88 (3.47)</td>
<td>A5E02593524</td>
<td></td>
</tr>
</tbody>
</table>

## Terminal housing

<table>
<thead>
<tr>
<th>Type</th>
<th>Pressure rating</th>
<th>Material</th>
<th>Temp. range [°C (°F)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal housing (M20 cable gland)</td>
<td>N/A</td>
<td>PA 6.6</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>FDK:085B5501</td>
</tr>
<tr>
<td>Terminal housing (M20 cable gland)</td>
<td>N/A</td>
<td>ASTM 316</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B5504</td>
</tr>
<tr>
<td>Terminal housing (½&quot; NPT cable gland)</td>
<td>N/A</td>
<td>PA 6.6</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>A5E00839460</td>
</tr>
<tr>
<td>Terminal housing (½&quot; NPT cable gland)</td>
<td>N/A</td>
<td>ASTM 316</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>A5E00839427</td>
</tr>
<tr>
<td>Ex-d1) terminal housing (M20 cable gland)</td>
<td>N/A</td>
<td>ASTM 316</td>
<td>-20 ... +180 (-4 ... +356)</td>
<td>FDK:085B5505</td>
</tr>
<tr>
<td>Ex-i2) terminal housing (M20 cable gland)</td>
<td>N/A</td>
<td>ASTM 316</td>
<td>-10 ... +190 (+14 ... +374)</td>
<td>A5E00835255 F)</td>
</tr>
<tr>
<td>Gaskets for O-ring transducer</td>
<td>PN 40</td>
<td>70 FFKM</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B1098</td>
</tr>
<tr>
<td>Gasket and 12 mm bolts and nuts for flange transducer</td>
<td>PN 40</td>
<td>Graphite 316 SS</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B1083</td>
</tr>
</tbody>
</table>

## SONO 3200 spare parts, transducer body without terminal housing, including insert

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Gasket</th>
<th>Pressure rating</th>
<th>Temp. range [°C (°F)]</th>
<th>Length mm (inch)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>50 (1.97)</td>
<td>FDK:085B1405</td>
</tr>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN 40</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>88 (3.47)</td>
<td>FDK:085B1464</td>
</tr>
</tbody>
</table>

F) Subject to export regulations AL: 9I999, ECCN: N.
### SITRANS F flowmeters

#### SITRANS F US

**Flowmeter SONO 3100/FUS060**

**SONO 3200 spare parts, transducer insert**

<table>
<thead>
<tr>
<th>Type</th>
<th>Temp. range [°C (°F)]</th>
<th>Length mm (inch)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert</td>
<td>-20 … +200 (-4 … +392)</td>
<td>50 (1.97)</td>
<td>FDK:085B1411</td>
</tr>
<tr>
<td>Insert</td>
<td>-20 … +200 (-4 … +392)</td>
<td>88 (3.47)</td>
<td>FDK:085B1459</td>
</tr>
</tbody>
</table>

1) ATEX (Ex) IIC 2G EEx d IIC T3 ... T6

2) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

**Transducer SONO 3200 gaskets**

<table>
<thead>
<tr>
<th>Type</th>
<th>Pressure rating</th>
<th>Material</th>
<th>Temperature range [°C (°F)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket O-ring (3 pcs. for o-ring transducers)</td>
<td>PN 40</td>
<td>FFKM1/FKM</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B1089</td>
</tr>
<tr>
<td>Gasket flange</td>
<td>PN 40/160</td>
<td>Graphite</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B1080</td>
</tr>
<tr>
<td>Gasket and 12 mm (0.47&quot;) bolts and nuts for flange transducers</td>
<td>PN 40</td>
<td>Flat ring type</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B1083</td>
</tr>
<tr>
<td>Gasket and 16 mm (0.63&quot;) bolts and nuts for flange transducers</td>
<td>PN 160</td>
<td>Graphite, 316 SS</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>FDK:085B1084</td>
</tr>
<tr>
<td>Gasket for cryogenics transducer with flat flange (2 pcs.)</td>
<td>PN 40</td>
<td>Graphite/metal</td>
<td>-200 ... +100 (-328 ... +212)</td>
<td>A5E02593522</td>
</tr>
<tr>
<td>Gasket cryogenics (2 pcs.)</td>
<td>PN 40</td>
<td>Copper, O-ring</td>
<td>-200 ... +100 (-328 ... +212)</td>
<td>A5E02593512</td>
</tr>
</tbody>
</table>

1) Chemical resistant O-ring

**SONO 3200 cable glands**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Temperature range [°C (°F)]</th>
<th>Appr.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black PA plastic, cable Ø 5 ... 13 mm</td>
<td>-20 ... 100 (-4 ... +212)</td>
<td>A5E02246304</td>
<td></td>
</tr>
<tr>
<td>½&quot; NPT gray PA plastic, cable Ø 5 ... 9 mm</td>
<td>-20 ... 100 (-4 ... +212)</td>
<td>A5E02246309</td>
<td></td>
</tr>
<tr>
<td>½&quot; NPT chrome-plated brass, cable Ø 5 ... 9 mm</td>
<td>-40 ... 100 (-40 ... +212)</td>
<td>A5E02246258</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Temperature range [°C (°F)]</th>
<th>Appr.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M20 Stainless steel, cable Ø 5 ... 8 mm</td>
<td>-60 ... 180 (-76 ... +356)</td>
<td>Ex-d</td>
<td>A5E02246311</td>
</tr>
</tbody>
</table>

**Accessories and spare parts**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersible kit for transducers SONO 3200, IP68 10 m (32.81 ft) w.g. rating</td>
<td>FDK:085L2403</td>
</tr>
</tbody>
</table>

**Tools for transducer SONO 3200**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Transducer length</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction tool for replacement of SONO 3200 O-ring transducers under pressure (hot-tap)</td>
<td>50 mm (1.97&quot;) transducers</td>
<td>FDK:085B5331</td>
</tr>
</tbody>
</table>
### Cables for SONO 3100 with FUS060

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Length m (ft)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)</td>
<td>3 (9.84)</td>
<td>A5E00875101</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861432</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01278662</td>
</tr>
<tr>
<td></td>
<td>60 (196.85)</td>
<td>A5E01278682</td>
</tr>
<tr>
<td></td>
<td>90 (295.28)</td>
<td>A5E01278687</td>
</tr>
<tr>
<td></td>
<td>120 (393.7)</td>
<td>A5E01278698</td>
</tr>
<tr>
<td>High temp. coaxial cable for FUS060; with 0.3 m brown 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.)</td>
<td>3 (9.84)</td>
<td>A5E00875105</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861435</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01196952</td>
</tr>
</tbody>
</table>

F) Subject to export regulations AL: 9I999, ECCN: N.

### Cable connection boxes

(For the connection of individually transducer cables with the FUS060 transducer cables)

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction box for coax cable</td>
<td>FDK:085B1361</td>
</tr>
<tr>
<td>• IP68 metal box for 4 coax cables</td>
<td>FDK:085B1363</td>
</tr>
<tr>
<td>• IP68 EEx e plastic box for 4 coax cables, no ATEX approval</td>
<td></td>
</tr>
</tbody>
</table>
Dimensional drawings of sensor SONO 3100

Sensor SONO 3100 with EN norm

<table>
<thead>
<tr>
<th>DN</th>
<th>D1</th>
<th>L1</th>
<th>B</th>
<th>H</th>
<th>W10</th>
<th>W16</th>
<th>W25</th>
<th>W40</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>114.3</td>
<td>860</td>
<td>305</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>125</td>
<td>139.7</td>
<td>862</td>
<td>325</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>150</td>
<td>168.3</td>
<td>862</td>
<td>350</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>200</td>
<td>219.1</td>
<td>868</td>
<td>430</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>250</td>
<td>273.0</td>
<td>860</td>
<td>525</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>300</td>
<td>332.9</td>
<td>807</td>
<td>525</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>350</td>
<td>385.6</td>
<td>839</td>
<td>550</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>400</td>
<td>406.4</td>
<td>800</td>
<td>550</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>500</td>
<td>508.0</td>
<td>797</td>
<td>690</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>600</td>
<td>610.0</td>
<td>712</td>
<td>705</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>700</td>
<td>711.0</td>
<td>837</td>
<td>895</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>800</td>
<td>813.0</td>
<td>867</td>
<td>985</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>900</td>
<td>914.0</td>
<td>907</td>
<td>1070</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>1000</td>
<td>1016.0</td>
<td>1060</td>
<td>1160</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
<tr>
<td>1200</td>
<td>1220.0</td>
<td>1130</td>
<td>1350</td>
<td>84.5</td>
<td>340</td>
<td>900</td>
<td>970</td>
<td>970</td>
</tr>
</tbody>
</table>

1) Length tolerance (mm): DN100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 400 +4/-5, DN 500 ... 1200 +5/-6
2) Wall thickness for pressure rates PN 10 ... 40
3) For all sensors with flange transducers track angle are 60°
4) L is the length of sensor versions without flanges (weld-in version)

Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lbs). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lbs).
## Sensor SONO 3100 with ANSI norm

<table>
<thead>
<tr>
<th>Size (DN)</th>
<th>D_U</th>
<th>L</th>
<th>B</th>
<th>H</th>
<th>W_150</th>
<th>D_150</th>
<th>L_150</th>
<th>W_300</th>
<th>D_300</th>
<th>L_300</th>
</tr>
</thead>
<tbody>
<tr>
<td>inch (mm)</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
<td>[inch]</td>
</tr>
<tr>
<td>4” (100)</td>
<td>4.50</td>
<td>33.86</td>
<td>12.01</td>
<td>45</td>
<td>1.69</td>
<td>0.14</td>
<td>9.00</td>
<td>39.86</td>
<td>0.25</td>
<td>10.00</td>
</tr>
<tr>
<td>5” (125)</td>
<td>5.50</td>
<td>39.94</td>
<td>12.80</td>
<td>45</td>
<td>2.54</td>
<td>0.15</td>
<td>10.00</td>
<td>40.94</td>
<td>0.27</td>
<td>11.00</td>
</tr>
<tr>
<td>6” (150)</td>
<td>6.63</td>
<td>39.94</td>
<td>13.78</td>
<td>45</td>
<td>3.07</td>
<td>0.16</td>
<td>11.00</td>
<td>40.94</td>
<td>0.30</td>
<td>12.50</td>
</tr>
<tr>
<td>8” (200)</td>
<td>8.63</td>
<td>26.30</td>
<td>16.93</td>
<td>45</td>
<td>4.02</td>
<td>0.16</td>
<td>13.50</td>
<td>34.30</td>
<td>0.29</td>
<td>15.00</td>
</tr>
<tr>
<td>10” (250)</td>
<td>10.75</td>
<td>28.11</td>
<td>18.90</td>
<td>45</td>
<td>5.02</td>
<td>0.18</td>
<td>16.00</td>
<td>36.11</td>
<td>0.34</td>
<td>17.50</td>
</tr>
<tr>
<td>12” (300)</td>
<td>12.75</td>
<td>23.90</td>
<td>20.67</td>
<td>45</td>
<td>5.98</td>
<td>0.20</td>
<td>19.00</td>
<td>32.90</td>
<td>0.39</td>
<td>20.50</td>
</tr>
<tr>
<td>14” (350)</td>
<td>14.00</td>
<td>25.16</td>
<td>21.65</td>
<td>45</td>
<td>6.55</td>
<td>0.21</td>
<td>21.00</td>
<td>35.16</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16” (400)</td>
<td>16.00</td>
<td>27.68</td>
<td>23.62</td>
<td>45</td>
<td>7.53</td>
<td>0.22</td>
<td>23.50</td>
<td>33.74</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20” (500)</td>
<td>20.00</td>
<td>31.38</td>
<td>27.17</td>
<td>45</td>
<td>9.49</td>
<td>0.26</td>
<td>27.50</td>
<td>42.76</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>24” (600)</td>
<td>24.00</td>
<td>35.91</td>
<td>27.76</td>
<td>60</td>
<td>11.61</td>
<td>0.30</td>
<td>32.00</td>
<td>47.91</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1) Length tolerance (mm): 4” +0.08”/-0.12”(+2/-3mm), 5” to 8” +0.12”/-0.16”(+3/-4mm), 10” to 16” +0.16”/-0.20”(+4/-5mm), 20” to 24” +0.20”/-0.24”(+5/-6mm) 2) Minimum wall thickness for pressure rates CL150 or CL300 3) For all sensors with flange transducers track angle are 60º 4) L is the length of sensor versions without flanges (weld-in version)

### Nominal diameter weights for SONO 3100 sensor with ANSI B16.5 flanges

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4”</td>
<td>100</td>
<td>32</td>
<td>70.5</td>
<td>35</td>
<td>77.2</td>
</tr>
<tr>
<td>5”</td>
<td>125</td>
<td>38</td>
<td>83.8</td>
<td>44</td>
<td>97.0</td>
</tr>
<tr>
<td>6”</td>
<td>150</td>
<td>45</td>
<td>99.2</td>
<td>52</td>
<td>114.6</td>
</tr>
<tr>
<td>8”</td>
<td>200</td>
<td>58</td>
<td>127.9</td>
<td>79</td>
<td>174.2</td>
</tr>
<tr>
<td>10”</td>
<td>250</td>
<td>75</td>
<td>165.3</td>
<td>117</td>
<td>257.9</td>
</tr>
<tr>
<td>12”</td>
<td>300</td>
<td>92</td>
<td>202.8</td>
<td>151</td>
<td>332.9</td>
</tr>
<tr>
<td>14”</td>
<td>350</td>
<td>113</td>
<td>249.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16”</td>
<td>400</td>
<td>141</td>
<td>310.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20”</td>
<td>500</td>
<td>207</td>
<td>456.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>24”</td>
<td>600</td>
<td>276</td>
<td>608.5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1) Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lbs). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lbs).
SONOKIT is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines. The kit includes all necessary parts and special tools to make the installation as 1- or 2-track 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 in-line 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-track DN 100 to DN 2400 (4” to 96”) – without process shut-down or flow interruption.
- 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
- In-line 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

**Technical specifications**

The transmitter related to this system is the SITRANS FUS080 or FUS060.

Technical specifications to the FUS060 see page 4/188 and to FUS080 see page 4/193.

**Accuracy**
Typical, depending on accuracy of measurements of installation
- 2-Track: ≤ ± (0.5 ... 1.5 %)
- 1-Track: ≤ ± (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 FUS060 transmitter.

**Requirements for pipes**

<table>
<thead>
<tr>
<th>Size</th>
<th>FUS060: DN 100 ... DN 4000 (4” ... 160”)</th>
<th>FUS080: DN 100 ... DN 1200 (4” ... 48”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line pressure</td>
<td>max. 40 bar (580 psi)</td>
<td></td>
</tr>
<tr>
<td>Media/surface temperature</td>
<td>• Standard version: -20 ... +200 °C (-4 ... +392 °F)</td>
<td>• ATEX Ex-d version (FUS060): -20 ... +180 °C (-4 ... +356 °F)</td>
</tr>
<tr>
<td></td>
<td>• ATEX Ex-i version (FUS060): -10 ... +190 °C (14 ... 374 °F)</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature sensor</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td></td>
</tr>
</tbody>
</table>

**Transducer enclosure/ approvals/certificates**
- Standard version
- Ex approval
- IP67 (NEMA 6) / IP68 (NEMA 6X)
- System ATEX approval for SONO 3200 Ex I transducers together with transmitter FUS060-Ex:
  - ATEX II 2G Ex dem [ia]fb IIC T6/T4/T3 or
  - ATEX II 2G Ex d IIC T3-T6 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)
### Materials of existing pipeline

<table>
<thead>
<tr>
<th>Material</th>
<th>Transducer holder:</th>
<th>Mounting plates:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>EN 10273 or EN 10216 (P235GH)</td>
<td>EN 10273 or EN 10216 (P235GH)</td>
</tr>
<tr>
<td>Concrete</td>
<td>Stainless steel AISI 316 or similar</td>
<td>(not included)</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>Stainless steel AISI 316 or similar</td>
<td>Stainless steel AISI 316 or similar</td>
</tr>
</tbody>
</table>

### Pipe wall thickness

<table>
<thead>
<tr>
<th>Material</th>
<th>Transducer and holder available in length L = 160, allowing a pipe wall thickness up to 20 mm (0.79&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel pipe (AISI 316 and St. 37.2 or corresponding material)</td>
<td></td>
</tr>
<tr>
<td>Concrete pipe</td>
<td>Transducer and holder available in length L = 230, allowing a pipe wall thickness up to 200 mm (7.9&quot;) and pipe sizes ≥ DN 600</td>
</tr>
</tbody>
</table>

### 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-track with FUS060) | approx. 53 kg (116.8 lb) |

### Certificates and approvals

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity certificate</td>
<td>The devices are supplied as standard with a Siemens Certificate of Conformity on a CD</td>
</tr>
<tr>
<td>Material certificate</td>
<td>Material certificate for the transducer parts according to EN 10204-3.1 is optionally available</td>
</tr>
<tr>
<td>Approvals</td>
<td>No custody transfer approvals</td>
</tr>
</tbody>
</table>
**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**

- Min. 500
- Min. (1 x DN) + 1000

**Hot-tap installation**

- Min. 100
- Min. 1400
- Min. (1 x DN) + 1500
### Selection and Ordering data

#### SITRANS F US SONOKIT

<table>
<thead>
<tr>
<th>1-track sensor</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F US SONOKIT</td>
<td>7 ME 3 2 1 0 -</td>
<td></td>
</tr>
</tbody>
</table>

#### Transducer type and approval

- **IP67 (NEMA 4X/6) PA** housing, PN 40, O-ring, 100 °C (212 °F), no approval
- **IP66 SS** housing, PN 40, O-ring, 180 °C (356 °F), Ex d, ATEX approval (only with standard FUS060)
- **IP68 PA** housing, Sylgard potting kit, PN 40, O-ring, 100 °C (212 °F), no approval
- **IP68 SS** housing, Sylgard potting kit, PN 40, O-ring, 200 °C (392 °F), no approval
- **IP67 SS** housing, PN 40, SS, O-ring, 190 °C (374 °F), Ex i type, ATEX approval (only with FUS060 Ex)

#### Cable gland entries

- **2 x 3 m, max. 70 °C (158 °F)**, the only option for Ex-i
- **2 x 15 m, max. 70 °C (158 °F)**
- **2 x 30 m, high temp. max. 200 °C (392 °F)**
- **2 x 30 m, max. 70 °C (158 °F)**
- **2 x 120 m, max. 70 °C (158 °F)**
- **2 x 3 m, high temp. max. 200 °C (392 °F)**, the only option for Ex-i
- **2 x 15 m, high temp. max. 200 °C (392 °F)**

#### Transmitter SITRANS FUS060

- **IP65 (NEMA 4), 120/230 V AC**
- **IP66 (NEMA 4), 24 V AC/DC**
- **IP65 (NEMA 4), 24 V AC/DC Ex version**

#### Transmitter SITRANS FUS080

- **IP67/NEMA 4X/6 115 ... 230 V AC**
- **IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack**
- **IP67/NEMA 4X/6 115 V AC, incl. 3.6 V single battery backup**
- **IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)**

#### Module

- **No module (FUS080 only)**
- **HART, 1 pulse output, 1 relay**
- **HART Ex version, 1 pulse output, 1 relay**
- **PROFIBUS PA, 1 pulse/frequency**
- **PROFIBUS PA, Ex version, 1 pulse/frequency**

### Transducer coax cables

**with FUS080 only, 15 and 30 m, 70°C (158 °F) cable types**

- **2 x 3 m, max. 70 °C (158 °F)**, the only option for Ex-i
- **2 x 15 m, max. 70 °C (158 °F)**
- **2 x 30 m, high temp. max. 200 °C (392 °F)**
- **2 x 30 m, max. 70 °C (158 °F)**
- **2 x 60 m, max. 70 °C (158 °F)**
- **2 x 90 m, max. 70 °C (158 °F)**
- **2 x 120 m, max. 70 °C (158 °F)**
- **2 x 3 m, high temp. max. 200 °C (392 °F)**, the only option for Ex-i
- **2 x 15 m, high temp. max. 200 °C (392 °F)**

**Special version (add order code):**

- No transducer cable, cable length 2 x 3 m, the only option for Ex-i
- No transducer cable, cable length 2 x 15 m
- No transducer cable, cable length 2 x 30 m
- No transducer cable, cable length 2 x 60 m
- No transducer cable, cable length 2 x 90 m
- No transducer cable, cable length 2 x 120 m

---

1) Tapping band via special request
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.”
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code(s) and plain text.</td>
<td></td>
</tr>
<tr>
<td><strong>Material certificate</strong></td>
<td></td>
</tr>
<tr>
<td>EN 10204-3.1, transducer body material</td>
<td>F30</td>
</tr>
<tr>
<td>EN 10204-3.1, transducer holder material</td>
<td>F31</td>
</tr>
<tr>
<td>EN 10204-3.1, mounting plate material</td>
<td>F32</td>
</tr>
<tr>
<td><strong>Tag name plate</strong></td>
<td></td>
</tr>
<tr>
<td>Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add plain text)</td>
<td>Y17</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
</tr>
<tr>
<td>Alignment rods-set for DN 100 ... 650 (4&quot; ... 26&quot;) Ø = 25 mm, L = 500 mm, 3 pcs.</td>
<td>S10</td>
</tr>
<tr>
<td>Alignment rods-set for DN 700 ... 1900 (28&quot; ... 76&quot;) Ø = 25 mm, L = 500 mm, 6 pcs.</td>
<td>S11</td>
</tr>
<tr>
<td>Alignment rods-set for DN 2000 ... 2400 (80&quot; ... 96&quot;) Ø = 25 mm, L = 500 mm, 8 pcs.</td>
<td>S12</td>
</tr>
<tr>
<td>Spanner key for transducer mounting type SONO 3200 O-ring type</td>
<td>T11</td>
</tr>
<tr>
<td>Tool set with various mounting/spare parts SONOKIT installation</td>
<td>T12</td>
</tr>
</tbody>
</table>

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.

Please use online Product selector to get latest updates. Product selector link: [www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)
### Selection and Ordering data

#### SITRANS F US SONOKIT
2-track sensor

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Qn setting [m³/h]</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 200 (8&quot;)</td>
<td>380</td>
<td>7</td>
<td>M</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>600</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>850</td>
<td>3</td>
<td>P</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>1000</td>
<td>2</td>
<td>T</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>1300</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>1700</td>
<td>3</td>
<td>F</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>2200</td>
<td>3</td>
<td>K</td>
</tr>
<tr>
<td>DN 550 (22&quot;)</td>
<td>2600</td>
<td>3</td>
<td>P</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>3200</td>
<td>3</td>
<td>T</td>
</tr>
<tr>
<td>DN 650 (26&quot;)</td>
<td>3600</td>
<td>3</td>
<td>L</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>4200</td>
<td>3</td>
<td>E</td>
</tr>
<tr>
<td>DN 750 (30&quot;)</td>
<td>4800</td>
<td>3</td>
<td>G</td>
</tr>
<tr>
<td>DN 800 (32&quot;)</td>
<td>5500</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>7500</td>
<td>4</td>
<td>B</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>9000</td>
<td>4</td>
<td>K</td>
</tr>
<tr>
<td>DN 1100 (44&quot;)</td>
<td>10 000</td>
<td>4</td>
<td>P</td>
</tr>
<tr>
<td>DN 1200 (48&quot;)</td>
<td>13 200</td>
<td>4</td>
<td>T</td>
</tr>
</tbody>
</table>

Only for FUS060

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Qn setting [m³/h]</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 1300 (52&quot;)</td>
<td>14 000</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>DN 1400 (56&quot;)</td>
<td>16 800</td>
<td>5</td>
<td>C</td>
</tr>
<tr>
<td>DN 1500 (60&quot;)</td>
<td>19 000</td>
<td>5</td>
<td>E</td>
</tr>
<tr>
<td>DN 1600 (64&quot;)</td>
<td>22 800</td>
<td>5</td>
<td>G</td>
</tr>
<tr>
<td>DN 1700 (68&quot;)</td>
<td>25 000</td>
<td>5</td>
<td>J</td>
</tr>
<tr>
<td>DN 1800 (72&quot;)</td>
<td>27 800</td>
<td>5</td>
<td>L</td>
</tr>
<tr>
<td>DN 1900 (76&quot;)</td>
<td>31 000</td>
<td>5</td>
<td>N</td>
</tr>
<tr>
<td>DN 2000 (80&quot;)</td>
<td>36 000</td>
<td>5</td>
<td>Q</td>
</tr>
<tr>
<td>DN 2100 (84&quot;)</td>
<td>37 000</td>
<td>5</td>
<td>S</td>
</tr>
<tr>
<td>DN 2200 (88&quot;)</td>
<td>42 000</td>
<td>5</td>
<td>U</td>
</tr>
<tr>
<td>DN 2300 (92&quot;)</td>
<td>45 000</td>
<td>5</td>
<td>W</td>
</tr>
<tr>
<td>DN 2400 (96&quot;)</td>
<td>51 000</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>DN 2500 (100&quot;)</td>
<td>53 000</td>
<td>5</td>
<td>C</td>
</tr>
<tr>
<td>DN 2600 (104&quot;)</td>
<td>60 000</td>
<td>5</td>
<td>E</td>
</tr>
<tr>
<td>DN 2700 (108&quot;)</td>
<td>62 000</td>
<td>5</td>
<td>G</td>
</tr>
<tr>
<td>DN 2800 (112&quot;)</td>
<td>72 000</td>
<td>5</td>
<td>J</td>
</tr>
<tr>
<td>DN 2900 (116&quot;)</td>
<td>71 000</td>
<td>5</td>
<td>L</td>
</tr>
<tr>
<td>DN 3000 (120&quot;)</td>
<td>78 000</td>
<td>5</td>
<td>N</td>
</tr>
<tr>
<td>DN 3100 (124&quot;)</td>
<td>82 000</td>
<td>5</td>
<td>Q</td>
</tr>
<tr>
<td>DN 3200 (128&quot;)</td>
<td>85 000</td>
<td>5</td>
<td>W</td>
</tr>
<tr>
<td>DN 3300 (132&quot;)</td>
<td>92 000</td>
<td>5</td>
<td>U</td>
</tr>
<tr>
<td>DN 3400 (136&quot;)</td>
<td>100 000</td>
<td>5</td>
<td>X</td>
</tr>
<tr>
<td>DN 3500 (140&quot;)</td>
<td>100 000</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>DN 3600 (144&quot;)</td>
<td>110 000</td>
<td>5</td>
<td>C</td>
</tr>
<tr>
<td>DN 3700 (148&quot;)</td>
<td>120 000</td>
<td>5</td>
<td>E</td>
</tr>
<tr>
<td>DN 3800 (152&quot;)</td>
<td>130 000</td>
<td>5</td>
<td>G</td>
</tr>
<tr>
<td>DN 3900 (156&quot;)</td>
<td>130 000</td>
<td>5</td>
<td>J</td>
</tr>
<tr>
<td>DN 4000 (160&quot;)</td>
<td>144 000</td>
<td>5</td>
<td>L</td>
</tr>
</tbody>
</table>

#### Installation method

- Empty pipe
- Hot tap, mounting under pressure
- SONOKIT for tapping band
  (DN 200 ... DN 1800) (tapping band to be ordered separately)

---

1) Tapping band via special request

---

### Transducer holder

None (for tapping band)

Carbon steel, length = 160 mm, mounting plates in carbon steel

Stainless steel, length = 160 mm, mounting plates in stainless steel

Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... DN 4000)

---

### Transducer type and approval

- IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 100 °C (212 °F), no approval
- IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), Ex-d, ATEX approval (only with standard FUS060)
- IP68 PA housing, Syigard potting kit, PN 40, SS, O-ring, 100 °C (212 °F), no approval
- IP68 SS housing, Syigard potting kit, PN 40, SS, O-ring, 200 °C (392 °F), no approval
- IP67 SS housing, PN 40, O-ring, 190 °C (374 °F), EEi, ATEX approval (only with FUS060 Ex)

### Cable gland entries

- Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5 (FUS080 only M20)
- Cable glands ½" NPT in transducers and in transmitter (only with FUS060)

### Transmitter SITRANS FUS060

Only DN 200 ... 4000 (8" ... 160")

- IP65 (NEMA 4), 120/230 V AC
- IP65 (NEMA 4), 24 V AC/DC
- IP65 (NEMA 4), 24 V AC/DC Ex version

### Transmitter SITRANS FUS080

Only DN 200 ... 1200 (8" ... 48")

- PDM software tool and IrDA-adapter, which are needed for settings update, to be ordered separately, see FUS080 accessories
- IP67/NEMA 4X/6 115 ... 230 V AC
- IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack
- IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup
- IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)

### Module

No module (FUS080 only)

- HART, 1 pulse output, 1 relay
- HART Ex version, 1 pulse output, 1 relay
- PROFINET PA1 pulse/frequency
- PROFINET PA, Ex version, 1 pulse/frequency
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ME 3 2 2 0</td>
<td></td>
</tr>
</tbody>
</table>

#### Transducer coax 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: 0
  - 4 x 15 m, max. 70 °C (158 °F): 1
  - 4 x 30 m, high temp. max. 200 °C (392 °F): 2
  - 4 x 60 m, max. 70 °C (158 °F): 3
  - 4 x 90 m, max. 70 °C (158 °F): 4
  - 4 x 120 m, max. 70 °C (158 °F): 5
  - 4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex-i: 7
  - 4 x 15 m, high temp. max. 200 °C (392 °F): 8

**Special version (add order code):**
- No transducer cable, cable length 4 x 3 m, the only option for Ex-i: 9 R 0 A
- No transducer cable, cable length 4 x 15 m: 9 R 0 B
- No transducer cable, cable length 4 x 30 m: 9 R 0 C
- No transducer cable, cable length 4 x 60 m: 9 R 0 D
- No transducer cable, cable length 4 x 90 m: 9 R 0 E
- No transducer cable, cable length 4 x 120 m: 9 R 0 F

### Additional information

#### Material certificate
- EN 10204-3.1, transducer body material: F30
- EN 10204-3.1, transducer holder material: F31
- EN 10204-3.1, mounting plate material: F32

#### Tag name plate
- Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add 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 transducer mounting type SONO 3200
  - O-ring type: T11
- Tool set with various mounting/spare parts SONOKIT installation: T12

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.

---

Please use online Product selector to get latest updates. Product selector link: [www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)
SONOKIT accessories and spare parts

**SONO 3200 spare parts, complete transducer with ½"-NPT cable glands**

<table>
<thead>
<tr>
<th>Transducer type</th>
<th>Material</th>
<th>Gasket</th>
<th>Pressure rating</th>
<th>Terminal housing</th>
<th>Approval</th>
<th>Temperature range [°C (°F)]</th>
<th>Length [mm (inch)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>Plastic PA 6.6</td>
<td></td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>160 (6.3)</td>
<td>ASE00839476</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS</td>
<td></td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>160 (6.3)</td>
<td>ASE00839435</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>Plastic PA 6.6</td>
<td></td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>230 (9.14)</td>
<td>ASE00839477</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS</td>
<td></td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>230 (9.14)</td>
<td>ASE00839437</td>
</tr>
</tbody>
</table>

1) Chemical resistant O-ring

**SONO 3200 spare parts, complete transducer with M20 cable glands**

<table>
<thead>
<tr>
<th>Transducer type</th>
<th>Material</th>
<th>Gasket</th>
<th>Pressure rating</th>
<th>Terminal housing</th>
<th>Approval</th>
<th>Temperature range [°C (°F)]</th>
<th>Length [mm (inch)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>Plastic PA 6.6</td>
<td></td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>160 (6.3)</td>
<td>FDK:085B5454</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS</td>
<td></td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>160 (6.3)</td>
<td>FDK:085B5455</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>Plastic PA 6.6</td>
<td></td>
<td>-20 ... +100 (-4 ... +212)</td>
<td>230 (9.14)</td>
<td>FDK:085B5458</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS</td>
<td>Ex-d1)</td>
<td>-20 ... +180 (-4 ... +356)</td>
<td>160 (6.3)</td>
<td>FDK:085B5452</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS</td>
<td>Ex-i2)</td>
<td>-10 ... +190 (14 ... 374)</td>
<td>160 (6.3)</td>
<td>ASE00836462</td>
</tr>
<tr>
<td>O-ring</td>
<td>316 SS</td>
<td>O-ring</td>
<td>PN 40</td>
<td>316 SS</td>
<td></td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>230 (9.14)</td>
<td>FDK:085B5459</td>
</tr>
</tbody>
</table>

1) Chemical resistant O-ring

**SONO 3200 spare parts, transducer terminal housing with M20 cable glands**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Temperature range</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PA 6.6</td>
<td>-20 ... +100 °C (-4 ... +212 °F)</td>
<td>FDK:085B5501</td>
</tr>
<tr>
<td></td>
<td>AISI 316</td>
<td>-20 ... +200 °C (-4 ... +392 °F)</td>
<td>FDK:085B5504</td>
</tr>
<tr>
<td></td>
<td>AISI 316</td>
<td>-20 ... +180 °C (-4 ... +356 °F)</td>
<td>FDK:085B5505</td>
</tr>
<tr>
<td></td>
<td>AISI 316</td>
<td>-10 ... +190 °C (14 ... 374 °F)</td>
<td>A5E00835255</td>
</tr>
</tbody>
</table>

1) ATEX (Ex) IIC 2G Ex d IIC T3 ... T6
2) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

**SONO 3200 spare parts, transducer terminal housing with ½"-NPT cable glands**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Temperature range</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PA 6.6</td>
<td>-20 ... +100 °C (-4 ... +212 °F)</td>
<td>ASE00839460</td>
</tr>
<tr>
<td></td>
<td>AISI 316</td>
<td>-20 ... +200 °C (-4 ... +392 °F)</td>
<td>ASE00839427</td>
</tr>
</tbody>
</table>

**SONO 3200 spare parts transducer body with insert**

<table>
<thead>
<tr>
<th>Temperature range [°C (°F)]</th>
<th>Gasket</th>
<th>Length [mm (inch)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20 ... +200 (-4 ... +392)</td>
<td>O-ring1)</td>
<td>160 (6.3)</td>
<td>FDK:085B1406</td>
</tr>
<tr>
<td>-20 ... +200 (-4 ... +392)</td>
<td>O-ring1)</td>
<td>160 (6.3)</td>
<td>FDK:085B5510</td>
</tr>
<tr>
<td>-20 ... +200 (-4 ... +392)</td>
<td>O-ring1)</td>
<td>230 (9.14)</td>
<td>FDK:085B5511</td>
</tr>
</tbody>
</table>

1) Chemical resistant O-ring

F) Subject to export regulations AL: 9I999, ECCN: N.
**SONO 3200 spare parts, transducer insert**

<table>
<thead>
<tr>
<th>Temperature range [°C (°F)]</th>
<th>Length [mm (inch)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20 … +200 (-4 … +392)</td>
<td>160 (6.3)</td>
<td>FDK:085B1419</td>
</tr>
<tr>
<td>-20 … +200 (-4 … +392)</td>
<td>230 (9.1)</td>
<td>FDK:085B1420</td>
</tr>
</tbody>
</table>

**Transducer SONO 3200 gasket**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Pressure rating</th>
<th>Material</th>
<th>Temperature range [°C (°F)]</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket O-ring (3 pcs. for O-ring transducers) PN 40</td>
<td>FFKM1)FKM</td>
<td>-20 … +200 (-4 … +392)</td>
<td>FDK:085B1089</td>
<td></td>
</tr>
</tbody>
</table>

1) Chemical resistant O-ring

**Potting kit for SONO 3200 terminal housing**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersible kit for transducers SONO 3200, IP68 10 m (32.81 ft) w.g. rating</td>
<td>FDK:085L2403</td>
</tr>
</tbody>
</table>

**Tools for SONO 3200 transducers and SONOKIT**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction tool for replacement of SONO 3200 O-ring transducers under pressure (hot-tap)</td>
<td>FDK:085B5333</td>
</tr>
<tr>
<td>Transducer length:</td>
<td></td>
</tr>
<tr>
<td>• 160 mm (6.3”)</td>
<td>FDK:085B5333</td>
</tr>
<tr>
<td>• 230 mm (9.1”)</td>
<td>FDK:085B5335</td>
</tr>
<tr>
<td>Angle measurement tool for SONOKIT</td>
<td>FDK:085B5330</td>
</tr>
<tr>
<td>Hot-tap drilling tool for SONOKIT</td>
<td>FDK:085B5392</td>
</tr>
<tr>
<td>Alignment tool for SONOKIT</td>
<td>FDK:085B5393</td>
</tr>
</tbody>
</table>

*For use on pipe sizes in the range DN 300 to DN 1200.*
## Alignment tools and other accessories

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment rods-set for DN 100 ... 650 (4&quot; ... 26&quot;), Ø = 25 mm, L = 500 mm, 3 pcs.</td>
<td>A5E02609214</td>
</tr>
<tr>
<td>Alignment rods-set for DN 700 ... 1900 (28&quot; ... 76&quot;), Ø = 25 mm, L = 500 mm, 6 pcs.</td>
<td>A5E02609215</td>
</tr>
<tr>
<td>Alignment rods-set for DN 2000 ... 4000 (80&quot; ... 160&quot;), Ø = 25 mm, L = 500 mm, 10 pcs.</td>
<td>A5E02609216</td>
</tr>
<tr>
<td>Spanner key for transducer mounting type SONO 3200 O-ring type</td>
<td>A5E02609218</td>
</tr>
<tr>
<td>Tool set with various mounting/spare parts SONOKIT installation</td>
<td>A5E02609219</td>
</tr>
</tbody>
</table>

## Cables for SONOKIT SONO 3200 transducers with FUS060

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Length m (ft)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)</td>
<td>3 (9.84)</td>
<td>A5E00875101</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861432</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01278662</td>
</tr>
<tr>
<td></td>
<td>60 (196.85)</td>
<td>A5E01278682</td>
</tr>
<tr>
<td></td>
<td>90 (295.28)</td>
<td>A5E01278687</td>
</tr>
<tr>
<td></td>
<td>120 (393.70)</td>
<td>A5E01278698</td>
</tr>
<tr>
<td>High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)</td>
<td>3 (9.84)</td>
<td>A5E00875105</td>
</tr>
<tr>
<td></td>
<td>15 (49.21)</td>
<td>A5E00861435</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E01196952</td>
</tr>
</tbody>
</table>

## Cables for SONOKIT SONO 3200 transducers with FUS080

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Length m (ft)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial cable for FUS080, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)</td>
<td>15 (49.21)</td>
<td>A5E02478541</td>
</tr>
<tr>
<td></td>
<td>30 (98.43)</td>
<td>A5E02478551</td>
</tr>
</tbody>
</table>

F) Subject to export regulations AL: 9I999, ECCN: N.
Flowmeter SONOKIT (with FUS060 or FUS080)

**Transducer holder for SONOKIT SONO 3200 transducers**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-track (each incl. 1 pc.)</td>
<td></td>
</tr>
<tr>
<td>160 mm (6.3&quot;) stainless steel 45°, DN 100 ... DN 150 (4&quot; ... 6&quot;)</td>
<td>FDK:085L1103</td>
</tr>
<tr>
<td>160 mm (6.3&quot;) carbon steel 45°, DN 100 ... DN 150 (4&quot; ... 6&quot;)</td>
<td>FDK:085L1102</td>
</tr>
<tr>
<td>230 mm (9.1&quot;) for concrete pipe 60°, DN 600 ... DN 2400 (24&quot; ... 96&quot;)</td>
<td>FDK:085L1107</td>
</tr>
<tr>
<td>160 mm (6.3&quot;) stainless steel 60°, DN 200 ... DN 2400 (8&quot; ... 96&quot;)</td>
<td>FDK:085L1105</td>
</tr>
<tr>
<td>160 mm (6.3&quot;) carbon steel 60°, DN 200 ... DN 2400 (8&quot; ... 96&quot;)</td>
<td>FDK:085L1104</td>
</tr>
</tbody>
</table>

| 2-track (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 (material no. 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 (material no. 1.4404 or similar).

**Mounting plate for SONOKIT SONO 3200 transducers**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-track (each incl. 1 pc.)</td>
<td></td>
</tr>
<tr>
<td>Stainless steel plate, 45°, DN 100 ... DN 150 (4&quot; ... 6&quot;)</td>
<td>FDK:085L1113</td>
</tr>
<tr>
<td>Carbon steel plate, 45°, DN 100 ... DN 150 (4&quot; ... 6&quot;)</td>
<td>FDK:085L1112</td>
</tr>
<tr>
<td>Stainless steel plate, 60°, DN 200 ... DN 2400 (8&quot; ... 96&quot;)</td>
<td>FDK:085L1115</td>
</tr>
<tr>
<td>Carbon steel plate, 60°, DN 200 ... DN 2400 (8&quot; ... 96&quot;)</td>
<td>FDK:085L1114</td>
</tr>
</tbody>
</table>

| 2-track (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 completely in stainless steel (mat. no. 1.4404 or similar) or carbon steel (St.37 or similar).

**Cable connection boxes**

(For the connection of individual transducer cables with the FUS060 transducer cables)

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction box for coax cable</td>
<td></td>
</tr>
<tr>
<td>IP68 metal box for 2 coaxial cables</td>
<td>FDK:085B1360</td>
</tr>
<tr>
<td>IP68 metal box for 4 coaxial cables</td>
<td>FDK:085B1361</td>
</tr>
<tr>
<td>IP68 EEx e plastic box for 2 coaxial cables, no ATEX approval</td>
<td>FDK:085B1362</td>
</tr>
<tr>
<td>IP68 EEx e plastic box for 4 coaxial cables, no ATEX approval</td>
<td>FDK:085B1363</td>
</tr>
</tbody>
</table>

**SONO 3200 cable glands**

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Temperature range [°C (°F)]</th>
<th>Appr. Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>black PA plastic, cable Ø 5 ... 13 mm</td>
<td>-20 ... 100 (-4 ... +212)</td>
<td>A5E02246304</td>
</tr>
<tr>
<td>grey PA plastic, cable Ø 5 ... 9 mm</td>
<td>-20 ... 100 (-4 ... +212)</td>
<td>A5E02246309</td>
</tr>
<tr>
<td>½&quot; NPT crome-plated brass, cable Ø 5 ... 9 mm</td>
<td>-40 ... 100 (-40 ... +212)</td>
<td>A5E02246258</td>
</tr>
<tr>
<td>M20 stainless steel, cable Ø 4 ... 6 mm</td>
<td>-25 ... 200 (-13 ... +392)</td>
<td>A5E02246194</td>
</tr>
<tr>
<td>M20 stainless steel, cable Ø 5 ... 8 mm</td>
<td>-60 ... 180 (-76 ... +356)</td>
<td>A5E02246311</td>
</tr>
</tbody>
</table>
Overview

The 2-track 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 4/229. 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 20 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-track 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 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range $Q_{\text{min}}:Q_{\text{max}}$ up to 1:400
- MODBUS RTU/RS 232, RS 485

Application

The main application for SITRANS FUS380 is measurement of water flow or water flow in heat meter systems in district heating networks or chilled water.

Design

The 2-track 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, and optional MODBUS RTU communication modules.

Pulse output rate is defined when ordering.

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.
## Configuration SITRANS FUS380

### Selection guide SITRANS FUS380, standard version

<table>
<thead>
<tr>
<th>DN</th>
<th>Qs (m³/h)</th>
<th>Qmax (m³/h) (105% of Qs)</th>
<th>Qp (m³/h) (1:100 of Qp)</th>
<th>Qi (m³/h) (50% of Qp)</th>
<th>Qc (m³/h) (50% of Qs)</th>
<th>Qc (% of Qmax)</th>
<th>Typical pulse value¹ (l/pulse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>15</td>
<td>15.75</td>
<td>15</td>
<td>0.15</td>
<td>0.075</td>
<td>0.48</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>45</td>
<td>47.25</td>
<td>15</td>
<td>0.15</td>
<td>0.075</td>
<td>0.16</td>
<td>1</td>
</tr>
<tr>
<td>65</td>
<td>25</td>
<td>26.25</td>
<td>25</td>
<td>0.25</td>
<td>0.125</td>
<td>0.48</td>
<td>1</td>
</tr>
<tr>
<td>65</td>
<td>72</td>
<td>75.6</td>
<td>25</td>
<td>0.25</td>
<td>0.125</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>42</td>
<td>40</td>
<td>0.4</td>
<td>0.200</td>
<td>0.48</td>
<td>2.5</td>
</tr>
<tr>
<td>80</td>
<td>120</td>
<td>126</td>
<td>40</td>
<td>0.4</td>
<td>0.200</td>
<td>0.16</td>
<td>2.5</td>
</tr>
<tr>
<td>100</td>
<td>60</td>
<td>63</td>
<td>60</td>
<td>0.6</td>
<td>0.300</td>
<td>0.48</td>
<td>2.5</td>
</tr>
<tr>
<td>100</td>
<td>180</td>
<td>189</td>
<td>60</td>
<td>0.6</td>
<td>0.300</td>
<td>0.16</td>
<td>2.5</td>
</tr>
<tr>
<td>125</td>
<td>10</td>
<td>10.5</td>
<td>100</td>
<td>1</td>
<td>0.500</td>
<td>4.76</td>
<td>2.5</td>
</tr>
<tr>
<td>125</td>
<td>280</td>
<td>294</td>
<td>100</td>
<td>1</td>
<td>0.500</td>
<td>0.17</td>
<td>2.5</td>
</tr>
<tr>
<td>125</td>
<td>400</td>
<td>420</td>
<td>200</td>
<td>2</td>
<td>1.000</td>
<td>0.24</td>
<td>2.5</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
<td>157.5</td>
<td>150</td>
<td>1.5</td>
<td>0.750</td>
<td>0.48</td>
<td>10</td>
</tr>
<tr>
<td>150</td>
<td>420</td>
<td>441</td>
<td>150</td>
<td>1.5</td>
<td>0.750</td>
<td>0.17</td>
<td>10</td>
</tr>
<tr>
<td>150</td>
<td>560</td>
<td>588</td>
<td>300</td>
<td>3</td>
<td>1.500</td>
<td>0.26</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>250</td>
<td>262.5</td>
<td>250</td>
<td>2.5</td>
<td>1.250</td>
<td>0.48</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>700</td>
<td>735</td>
<td>250</td>
<td>2.5</td>
<td>1.250</td>
<td>0.17</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>900</td>
<td>945</td>
<td>500</td>
<td>5</td>
<td>2.500</td>
<td>0.26</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>400</td>
<td>420</td>
<td>400</td>
<td>4</td>
<td>2.000</td>
<td>0.48</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>1120</td>
<td>1176</td>
<td>400</td>
<td>4</td>
<td>2.000</td>
<td>0.17</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>1400</td>
<td>1470</td>
<td>800</td>
<td>8</td>
<td>4.000</td>
<td>0.27</td>
<td>10</td>
</tr>
<tr>
<td>300</td>
<td>560</td>
<td>588</td>
<td>560</td>
<td>5.6</td>
<td>2.800</td>
<td>0.48</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>1560</td>
<td>1638</td>
<td>560</td>
<td>5.6</td>
<td>2.800</td>
<td>0.17</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>2100</td>
<td>2205</td>
<td>1120</td>
<td>11.2</td>
<td>5.600</td>
<td>0.25</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>750</td>
<td>787.5</td>
<td>750</td>
<td>7.5</td>
<td>3.750</td>
<td>0.48</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>2100</td>
<td>2205</td>
<td>750</td>
<td>7.5</td>
<td>3.750</td>
<td>0.17</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>2800</td>
<td>2940</td>
<td>1500</td>
<td>15</td>
<td>7.500</td>
<td>0.26</td>
<td>50</td>
</tr>
<tr>
<td>400</td>
<td>950</td>
<td>997.5</td>
<td>950</td>
<td>9.5</td>
<td>4.750</td>
<td>0.48</td>
<td>50</td>
</tr>
<tr>
<td>400</td>
<td>2660</td>
<td>2793</td>
<td>950</td>
<td>9.5</td>
<td>4.750</td>
<td>0.17</td>
<td>50</td>
</tr>
<tr>
<td>400</td>
<td>3600</td>
<td>3780</td>
<td>1900</td>
<td>19</td>
<td>9.500</td>
<td>0.25</td>
<td>50</td>
</tr>
<tr>
<td>500</td>
<td>1475</td>
<td>1548.75</td>
<td>1475</td>
<td>14.75</td>
<td>7.375</td>
<td>0.48</td>
<td>100</td>
</tr>
<tr>
<td>500</td>
<td>4130</td>
<td>4336.5</td>
<td>1475</td>
<td>14.75</td>
<td>7.375</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>500</td>
<td>5500</td>
<td>5775</td>
<td>2950</td>
<td>29.5</td>
<td>14.750</td>
<td>0.26</td>
<td>100</td>
</tr>
<tr>
<td>600</td>
<td>2150</td>
<td>2257.5</td>
<td>2150</td>
<td>21.5</td>
<td>10.750</td>
<td>0.48</td>
<td>100</td>
</tr>
<tr>
<td>600</td>
<td>6020</td>
<td>6321</td>
<td>2150</td>
<td>21.5</td>
<td>10.750</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>600</td>
<td>8000</td>
<td>8400</td>
<td>4300</td>
<td>43</td>
<td>21.500</td>
<td>0.26</td>
<td>100</td>
</tr>
<tr>
<td>700</td>
<td>2900</td>
<td>3045</td>
<td>2900</td>
<td>29</td>
<td>14.500</td>
<td>0.48</td>
<td>100</td>
</tr>
<tr>
<td>700</td>
<td>8120</td>
<td>8526</td>
<td>2900</td>
<td>29</td>
<td>14.500</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>700</td>
<td>10 800</td>
<td>11 340</td>
<td>5800</td>
<td>58</td>
<td>29.000</td>
<td>0.26</td>
<td>100</td>
</tr>
<tr>
<td>800</td>
<td>3800</td>
<td>3990</td>
<td>3800</td>
<td>38</td>
<td>19.000</td>
<td>0.48</td>
<td>100</td>
</tr>
<tr>
<td>800</td>
<td>10 640</td>
<td>11 172</td>
<td>3800</td>
<td>38</td>
<td>19.000</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>800</td>
<td>14 200</td>
<td>14 910</td>
<td>7600</td>
<td>76</td>
<td>38.000</td>
<td>0.25</td>
<td>100</td>
</tr>
<tr>
<td>900</td>
<td>5000</td>
<td>5250</td>
<td>3800</td>
<td>38</td>
<td>19.000</td>
<td>0.36</td>
<td>100</td>
</tr>
<tr>
<td>900</td>
<td>14 000</td>
<td>14 700</td>
<td>5000</td>
<td>50</td>
<td>25.000</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>900</td>
<td>20 000</td>
<td>21 000</td>
<td>5000</td>
<td>50</td>
<td>25.000</td>
<td>0.12</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>6000</td>
<td>6300</td>
<td>3800</td>
<td>38</td>
<td>19.000</td>
<td>0.30</td>
<td>100</td>
</tr>
</tbody>
</table>
The values $Q_1$, $Q_p$ and $Q_s$ are shown on the system label of the FUS380. $Q_1$ ($Q_{\text{min}}$) means the minimal and $Q_p$ ($Q_{\text{nom}}$) the nominal flow rate. $Q_s$ is the highest operatable flow rate. The maximum flow rate ($Q_{\text{max}}$) is 105% of $Q_s$. The low flow cut-off is 50% of $Q_1$.

In order to obtain best pulse output resolution in the range $Q_{\text{min}}$ 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 $Q_1$ ($Q_{\text{min}}$) and $Q_s$ and indicates the normal or typical flow.

1) Typical pulse values for SITRANS FUS380. Other pulse values are possible - see Selection and Ordering data table.

### Technical specifications

#### Pipe design
- 2-track sensor with flanges and integrated transducers wet-calibrated from factory

#### Nominal size welded version
- 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

#### Pipe material
- **DN 100 ... DN 1200:** Carbon Steel EN 1.0345 / p235 GH, painted in light-gray.
- **DN 50 ... 80:** Die-cast bronze G-CuSn10/W2.1050.01 (EN1982)

#### Transducer design
- **DN 100 ... DN 1200:** Integrated version and welded onto the pipe
- **DN 50 ... DN 80:** Screwed into the pipe

#### Transducer material
- Stainless steel (AISI 316/1.4404)/brass (CuZn36Pb2as)

#### Sensor operating conditions
- **Storage:** -40 ... +85 °C (-40 ... +185 °F)
- **Media/surface temperature:**
  - DN 100 ... DN 1200:
    - Remote: 2 ... 200 °C (35.6 ... 392 °F)
  - DN 50 ... DN 80:
    - Remote: 2 ... 150 °C (35.6 ... 302 °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 61000-6-4
  - Noise immunity: To EN 61000-6-2

### Transmitter

The transmitter related to this system is the SITRANS FUS080. Technical specifications to the FUS080 see page 4/193 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 standard with a Siemens Certificate of Conformity on CD
- **Material certificate:** Material certificate according EN 10204-3.1 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

---

<table>
<thead>
<tr>
<th>DN</th>
<th>$Q_s$ (m³/h)</th>
<th>$Q_{\text{max}}$ (105% of $Q_s$)</th>
<th>$Q_p$ (m³/h)</th>
<th>$Q_{\text{nom}}$ (50% of $Q_s$)</th>
<th>Cut-off (m³/h)</th>
<th>Cut-off (% of $Q_{\text{max}}$)</th>
<th>Typical pulse value (l/pulse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>16 800</td>
<td>17 640</td>
<td>600</td>
<td>120</td>
<td>30 000</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>24 000</td>
<td>25 200</td>
<td>12 000</td>
<td>120</td>
<td>60 000</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>1200</td>
<td>9 000</td>
<td>9 450</td>
<td>3800</td>
<td>38</td>
<td>19 000</td>
<td>0.20</td>
<td>100</td>
</tr>
<tr>
<td>1200</td>
<td>25 200</td>
<td>26 460</td>
<td>9000</td>
<td>90</td>
<td>45 000</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>1200</td>
<td>36 000</td>
<td>37 800</td>
<td>18 000</td>
<td>180</td>
<td>90 000</td>
<td>0.24</td>
<td>100</td>
</tr>
</tbody>
</table>
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 or UKAS.

The accreditation bodies DANAK and UKAS have 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 standard calibration certificate with Qₙ as selected flow is shipped with each SITRANS FUS380. This production calibration protocol consists of 2 x 3 points at Q₁, 10% Qₚ and Qₚ (max. 4 200 m³/h).

**Accuracy SITRANS FUS380:**

Standard calibration: Better than 0.5% of rate, 0.5 m/s < v < 8 m/s
v < 0.5 m/s, 0.5 + 0.25/v [%]
## Selection and Ordering data

### Flowmeter SITRANS FUS380 (standard)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Flow setting [m³/h]</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 50 (2&quot;)³</td>
<td>Qp (Qn) 100 l/p (typical for DN 50 ... DN 65) with 5 ms</td>
<td>7 ME 3 4 0 0 -</td>
<td>0 - A</td>
</tr>
<tr>
<td>DN 50 (2&quot;)³</td>
<td>Qp (Qn) 250 l/p (typical for DN 80 ... DN 125) with 5 ms</td>
<td>7 ME 3 4 0 0 -</td>
<td>0 - A</td>
</tr>
<tr>
<td>DN 50 (2&quot;)³</td>
<td>Qp (Qn) 500 l/p (option for DN 50 ... DN 65) with 5 ms</td>
<td>7 ME 3 4 0 0 -</td>
<td>0 - A</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)²</td>
<td>Qs 150 l/p (option for DN 60 ... DN 120) with 5 ms</td>
<td>7 ME 3 4 0 0 -</td>
<td>0 - A</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)²</td>
<td>Qs 500 l/p (option for DN 150 ... DN 200) with 5 ms</td>
<td>7 ME 3 4 0 0 -</td>
<td>0 - A</td>
</tr>
</tbody>
</table>

### Flange norm and pressure rating

System without sensor - only a transmitter FUS380 as spare part - settings as defined with this order no.

- **EN 1092-1 Flanges**: PN 16 (DN 100 ... DN 1200)
- **PN 25**: (DN 200 ... DN 1000)
- **PN 40**: (DN 50 ... DN 250)

### Compact / remote connection

- **Compact version**: max. 120 °C (248 °F) up to DN 800
- **Remote version**: max. 150/200 °C (302/392 °F)

### Pulse output value setup

- 3.1 l/p (option for DN 50 ... DN 65) with 5 ms
- 2.5 l/p (typical for DN 50 ... DN 65) with 5 ms
- 1 l/p (option for DN 50 ... DN 65) with 5 ms
- 10 l/p (option for DN 50 ... DN 65) with 5 ms
- 2.5 l/p (typical for DN 80 ... DN 125) with 5 ms
- 20 l/p (option for DN 80 ... DN 125) with 5 ms
- 25 l/p (option for DN 80 ... DN 125) with 5 ms
- 100 l/p (option for DN 80 ... DN 125) with 5 ms
- 500 l/p (option for DN 80 ... DN 125) with 5 ms
- 1000 l/p (option for DN 80 ... DN 125) with 5 ms

### Pulse width setup

- 5 ms (standard)
- 10 ms
- 20 ms
- 50 ms
- 100 ms
- 200 ms
- 500 ms

---

1) Qp (Qn) is the normal or typical flow. Qp and Qn is shown on the system label.
2) Suitable for IP66/NEMA 4X/6 115 ... 230 V AC.
3) 25 l/p (typical for DN 65 ... DN 100) with 5 ms.
4) Lithium batteries are subject to special battery backup (no battery pack included)³.

---

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

<table>
<thead>
<tr>
<th>Order code</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Calibration / certificate FUS380</strong></td>
</tr>
<tr>
<td></td>
<td>Production calibration for DN 50 ... DN 1200 with $Q_p$ as selected in diameter. Calibration protocol: 2 x 3 points, $Q_i$, 10% $Q_p$ and $Q_p$ (max. 4200 m³/h). Included</td>
</tr>
<tr>
<td></td>
<td>Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... DN 200 with $Q_p$ as selected in diameter. Certificate: 2 x 3 points, $Q_i$, 10% $Q_p$ and $Q_p$ (max. 250 m³/h). D20</td>
</tr>
<tr>
<td></td>
<td>Accredited Siemens ISO/IEC 17025 calibration for DN 100 ... DN 500 with $Q_p$ as selected in diameter. Certificate: 2 x 3 points, $Q_i$, 10% $Q_p$ and $Q_p$ (max. 1300 m³/h). D21</td>
</tr>
<tr>
<td></td>
<td>Accredited Siemens ISO/IEC 17025 calibration, DN 300 ... DN 1200 with $Q_p$ as selected in diameter. Certificate: 2 x 3 points, $Q_i$, 10% $Q_p$ and $Q_p$ (max. 4200 m³/h). D22</td>
</tr>
<tr>
<td></td>
<td>Output B as reverse flow pulses. No calibration/verification. E21</td>
</tr>
<tr>
<td></td>
<td><strong>Material certificate</strong></td>
</tr>
<tr>
<td></td>
<td>EN 10204-3.1 F10</td>
</tr>
<tr>
<td></td>
<td><strong>Tag name plate</strong></td>
</tr>
<tr>
<td></td>
<td>Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add plain text) Y17</td>
</tr>
</tbody>
</table>

For accessories and spare parts see end of following chapter on FUE380.

### MLFB Ordering example

Customer requires a flowmeter:
- DN 250, PN 25, compact version (media temperature max. 120 °C (248 °F)), mains power version.
- Material certificate and metal tag name plate.
- Pulse output for for 10 l/pulse and min. 5 ms pulse width.

**Ordering:**

FUS380: **7ME3400-2LD00-4BA2-Z, F10, Y17**

Please use online Product selector to get latest updates. Product selector link: [www.pia-selector.automation.siemens.com](http://www.pia-selector.automation.siemens.com)
Overview

The 2-track 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 heat 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 20 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straightforward display
- 2-track 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 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i:Q_p up to 1:50/100 or max. range Q_i:Q_s up to 1:400
- MODBUS RTU/RS 232, RS 485

Application

The main application for SITRANS FUE380 is measurement of water flow or water flow in heat 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-track design of SITRANS FUE380 ensures maximum accuracy under short inlet conditions. The flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and an approved 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.

FUE380 MI-004 approval

The SITRANS FUE380 program is type-approved according to international heat meter standard EN1434. On 1 November 2006 the MI-004 heat meter directive became effective providing that all heat 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: Type approval according to EN1434: 2006
Module D: Quality insurance 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 MID label

---

Siemens Flow Instruments A/S
Made in Denmark

FUE380 sensor MID label

---

Siemens Flow Instruments A/S
Made in Denmark
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, and optional MODBUS RTU communication modules.

Pulse output rate is defined when ordering.

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.

---

**Configuration SITRANS FUE380 type-approved**

**Selection guide SITRANS FUE380, type-approved flowmeter**

<table>
<thead>
<tr>
<th>DN</th>
<th>( Q_s ) (m³/h)</th>
<th>( Q_{max} ) (m³/h)</th>
<th>( Q_p ) (m³/h)</th>
<th>( Q_{105} ) (m³/h)</th>
<th>( Q_{100} ) (m³/h)</th>
<th>Cut-off (m³/h)</th>
<th>Cut-off (% of ( Q_{max} ))</th>
<th>Typical pulse value (l/pulse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>30</td>
<td>31.5</td>
<td>15³</td>
<td>0.3</td>
<td>0.15</td>
<td>0.075</td>
<td>0.24</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>45</td>
<td>47.25</td>
<td>15³</td>
<td>0.3</td>
<td>0.15</td>
<td>0.075</td>
<td>0.16</td>
<td>1</td>
</tr>
<tr>
<td>65</td>
<td>50</td>
<td>52.5</td>
<td>25²</td>
<td>0.5</td>
<td>0.25</td>
<td>0.125</td>
<td>0.24</td>
<td>1</td>
</tr>
<tr>
<td>65</td>
<td>72</td>
<td>75.6</td>
<td>25²</td>
<td>0.5</td>
<td>0.25</td>
<td>0.125</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>84</td>
<td>40³</td>
<td>0.8</td>
<td>0.40</td>
<td>0.200</td>
<td>0.24</td>
<td>2.5</td>
</tr>
<tr>
<td>80</td>
<td>120</td>
<td>126</td>
<td>40³</td>
<td>0.8</td>
<td>0.40</td>
<td>0.200</td>
<td>0.16</td>
<td>2.5</td>
</tr>
<tr>
<td>100</td>
<td>120</td>
<td>126</td>
<td>60²</td>
<td>1.2</td>
<td>0.60</td>
<td>0.300</td>
<td>0.24</td>
<td>2.5</td>
</tr>
<tr>
<td>100</td>
<td>180</td>
<td>189</td>
<td>60²</td>
<td>1.2</td>
<td>0.60</td>
<td>0.300</td>
<td>0.16</td>
<td>2.5</td>
</tr>
<tr>
<td>100</td>
<td>180</td>
<td>189</td>
<td>120³</td>
<td>-</td>
<td>1.20</td>
<td>0.600</td>
<td>0.32</td>
<td>2.5</td>
</tr>
<tr>
<td>125</td>
<td>200</td>
<td>210</td>
<td>100³</td>
<td>2.0</td>
<td>1.00</td>
<td>0.500</td>
<td>0.24</td>
<td>2.5</td>
</tr>
<tr>
<td>125</td>
<td>280</td>
<td>294</td>
<td>100³</td>
<td>2.0</td>
<td>1.00</td>
<td>0.500</td>
<td>0.17</td>
<td>2.5</td>
</tr>
<tr>
<td>150</td>
<td>300</td>
<td>315</td>
<td>150³</td>
<td>3.0</td>
<td>1.50</td>
<td>0.750</td>
<td>0.24</td>
<td>10</td>
</tr>
<tr>
<td>150</td>
<td>420</td>
<td>441</td>
<td>150³</td>
<td>3.0</td>
<td>1.50</td>
<td>0.750</td>
<td>0.17</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>500</td>
<td>525</td>
<td>250³</td>
<td>5.0</td>
<td>2.50</td>
<td>1.250</td>
<td>0.24</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>700</td>
<td>735</td>
<td>250³</td>
<td>5.0</td>
<td>2.50</td>
<td>1.250</td>
<td>0.17</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>700</td>
<td>735</td>
<td>500³</td>
<td>-</td>
<td>5.00</td>
<td>2.500</td>
<td>0.34</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>800</td>
<td>840</td>
<td>400³</td>
<td>8.0</td>
<td>4.00</td>
<td>2.000</td>
<td>0.24</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>1120</td>
<td>1176</td>
<td>400³</td>
<td>8.0</td>
<td>4.00</td>
<td>2.000</td>
<td>0.17</td>
<td>10</td>
</tr>
<tr>
<td>250</td>
<td>1120</td>
<td>1176</td>
<td>800³</td>
<td>-</td>
<td>8.00</td>
<td>4.000</td>
<td>0.34</td>
<td>10</td>
</tr>
<tr>
<td>300</td>
<td>1120</td>
<td>1176</td>
<td>560³</td>
<td>11.2</td>
<td>5.60</td>
<td>2.800</td>
<td>0.24</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>1560</td>
<td>1638</td>
<td>560³</td>
<td>11.2</td>
<td>5.60</td>
<td>2.800</td>
<td>0.17</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>1560</td>
<td>1638</td>
<td>1120³</td>
<td>-</td>
<td>11.20</td>
<td>5.600</td>
<td>0.34</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>1500</td>
<td>1575</td>
<td>750³</td>
<td>15.0</td>
<td>7.50</td>
<td>3.750</td>
<td>0.24</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>2100</td>
<td>2205</td>
<td>750³</td>
<td>15.0</td>
<td>7.50</td>
<td>3.750</td>
<td>0.17</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>2100</td>
<td>2205</td>
<td>1500³</td>
<td>-</td>
<td>15.00</td>
<td>7.500</td>
<td>0.34</td>
<td>50</td>
</tr>
<tr>
<td>400</td>
<td>1900</td>
<td>1995</td>
<td>950³</td>
<td>19.0</td>
<td>9.50</td>
<td>4.750</td>
<td>0.24</td>
<td>50</td>
</tr>
<tr>
<td>400</td>
<td>2660</td>
<td>2793</td>
<td>950³</td>
<td>19.0</td>
<td>9.50</td>
<td>4.750</td>
<td>0.17</td>
<td>50</td>
</tr>
<tr>
<td>400</td>
<td>2660</td>
<td>2793</td>
<td>1900³</td>
<td>-</td>
<td>19.00</td>
<td>9.500</td>
<td>0.34</td>
<td>50</td>
</tr>
<tr>
<td>500</td>
<td>2950</td>
<td>3097.5</td>
<td>1475³</td>
<td>29.5</td>
<td>14.75</td>
<td>7.375</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>500</td>
<td>4130</td>
<td>4336.5</td>
<td>1475³</td>
<td>29.5</td>
<td>14.75</td>
<td>7.375</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>500</td>
<td>4130</td>
<td>4336.5</td>
<td>2950³</td>
<td>-</td>
<td>29.50</td>
<td>14.750</td>
<td>0.34</td>
<td>100</td>
</tr>
</tbody>
</table>
### Flowmeter FUE380 with approval

<table>
<thead>
<tr>
<th>DN</th>
<th>$Q_s$ (m$^3$/h)</th>
<th>$Q_{max}$ (m$^3$/h)</th>
<th>$Q_p$ (m$^3$/h)</th>
<th>$Q_i$ (m$^3$/h) (1:50 of $Q_p$)</th>
<th>Cut-off (m$^3$/h) (50% of $Q_i$)</th>
<th>Cut-off (% of $Q_{max}$)</th>
<th>Typical pulse value ($l/pulse$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>4300</td>
<td>4515</td>
<td>2150</td>
<td>43.0</td>
<td>21.50</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>600</td>
<td>6020</td>
<td>6321</td>
<td>2900</td>
<td>58.0</td>
<td>29.00</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>700</td>
<td>8120</td>
<td>8526</td>
<td>5800</td>
<td>58.0</td>
<td>29.00</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>800</td>
<td>7600</td>
<td>7980</td>
<td>3800</td>
<td>76.0</td>
<td>38.00</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>800</td>
<td>10 640</td>
<td>11 172</td>
<td>3800</td>
<td>76.0</td>
<td>38.00</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>900</td>
<td>14 000</td>
<td>14 700</td>
<td>5000</td>
<td>100.0</td>
<td>50.00</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>900</td>
<td>14 000</td>
<td>14 700</td>
<td>10 000</td>
<td>100.0</td>
<td>50.00</td>
<td>0.34</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>12 000</td>
<td>12 600</td>
<td>6000</td>
<td>120.0</td>
<td>60.00</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>16 800</td>
<td>17 640</td>
<td>6000</td>
<td>120.0</td>
<td>60.00</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>16 800</td>
<td>17 640</td>
<td>12 000</td>
<td>120.0</td>
<td>60.00</td>
<td>0.34</td>
<td>100</td>
</tr>
<tr>
<td>1200</td>
<td>18 000</td>
<td>18 900</td>
<td>9000</td>
<td>180.0</td>
<td>90.00</td>
<td>0.24</td>
<td>100</td>
</tr>
<tr>
<td>1200</td>
<td>25 200</td>
<td>26 460</td>
<td>18 000</td>
<td>180.0</td>
<td>90.00</td>
<td>0.17</td>
<td>100</td>
</tr>
<tr>
<td>1200</td>
<td>25 200</td>
<td>26 460</td>
<td>-</td>
<td>-</td>
<td>90.00</td>
<td>0.34</td>
<td>100</td>
</tr>
</tbody>
</table>

Dynamic range $Q_i$/$Q_p$: better than 1:100 or 1:50 according to EN 1434, OIML R 75 class 2 and MID class 2.

$Q_i$ ($Q_{min}$) 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 label 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 $Q_p$ ($Q_{nom}$). This flow rate is between $Q_i$ ($Q_{min}$) and $Q_s$ and indicates the normal or typical flow according to the approval requirements.

1) In connection with SITRANS FUE950 - other pulse values - see Selection and Ordering data table.
2) EN 1434 and MID flow values
3) OIML R 75 and MID flow values
4) The minimum flow ($Q_i$) should be checked in the PIA-selector or product master data base (PMD)
Technical specifications

Pipe design
- 2-track sensor with flanges and integrated transducers wet-calibrated from factory

Nominal size welded version
- 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

Pipe material
- • DN 100 ... DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray
- • DN 50 ... DN 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN1982)

Transducer design
- • DN 100 ... DN 1200: Integrated version and welded onto the pipe
- • DN 50 ... DN 80: Screwed into the pipe

Transducer material
- Stainless steel (AISI 316/1.4404)/brass (CuZn36Pb2As)

Sensor operating conditions

Storage
- DN 100 ... DN 1200: Remote: -40 ... 85 °C (-40 ... 185 °F)
- DN 50 ... DN 80: Remote: -40 ... 200 °C (35.6 ... 392 °F)
- DN 50 ... DN 1200: Remote: -40 ... 275 °C (35.6 ... 527 °F)

Media/surface temperature
- DN 100 ... DN 1200: Remote: 2 ... 200 °C (35.6 ... 392 °F)
- DN 50 ... DN 80: Remote: 2 ... 120 °C (35.6 ... 248 °F)
- DN 50 ... DN 1200: Compact: 2 ... 120 °C (35.6 ... 248 °F)

Degree of protection
- Sensor connection IP67/NEMA 4X/6

Electromagnetic compatibility
- • Emitted interference: To EN 61000-6-4
- • Noise immunity: To EN 61000-6-2
- • MID: Environment class E2 and M1

Max. flow velocity at Qs
- DN 50 ... DN 1200: 9 m/s (29.5 ft/s)

Transmitter

The transmitter related to this system is the SITRANS FUS080.

Technical specifications to the FUS080 see page 4/193 ff.

Certificates and approvals

Conformity certificate
- The devices are supplied as standard with a Siemens Certificate of Conformity on CD

Material certificate
- Material certificate according EN 10204-3.1 is optionally available

Calibration report
- A standard calibration report is shipped with every flowmeter.
- Extended accredited ISO/IEC 17025 calibration certificates optionally available

Approvals
- • EN 1434 and OIML R 75 Class 2
- • PTB approval based on EN1434
- • MID class 2 approval and certification

Type-dependent settings

Flow value
- Predefined according to EN 1434 / OIML R 75 / MID

Approval
- Country specific

Flow rate v1
- 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

Pulse width
- Preset: 5 ms

Flow unit setup
- Preset: m³/h

Volume unit setup
- Preset: m³

SITRANS FUE380 uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at SIEMENS facilities accredited according to ISO/IEC 17025 by DANAK or UKAS.

The accreditation bodies DANAK and UKAS have 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 standard calibration certificate with Qn as selected flow is shipped with each SITRANS FUS380. This production calibration protocol consists of 2 x 3 points at Qi, 10% Qp and Qp (max. 4 200 m³/h).

Typical accuracy SITRANS FUE380:

±(0.5 + 0.02 Qp/Q) [%]
Qp according to EN 1434/OIML requirements.

Example: DN 100, Qp = 60 m³/h at Q = 1.2 m³/h:
Accuracy at 1.2 m³/h = typical 1.5 %

SITRANS FUE380 fulfills the requirements

\[ E_f = \pm (2 + 0.02 Q_p/Q) \text{ max. } \pm 5\% , \text{ according to EN 1434 and OIML R 75, class 2 or MID class 2 requirements.} \]
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Flowmeter SITRANS FUE380 (type-approved)</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>Flow setting [m³/h]</td>
<td>Qp[m³/h]</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>15³</td>
<td>30³</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>15³</td>
<td>45³</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>30³</td>
<td>45³</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>25³</td>
<td>50³</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>25³</td>
<td>72³</td>
</tr>
<tr>
<td>DN 65 (2½&quot;)</td>
<td>50³</td>
<td>72³</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>40³</td>
<td>80³</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>40³</td>
<td>120³</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>80³</td>
<td>120³</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>60³</td>
<td>120³</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>60³</td>
<td>180³</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>120³</td>
<td>180³</td>
</tr>
<tr>
<td>DN 125 (5&quot;)</td>
<td>100³</td>
<td>200³</td>
</tr>
<tr>
<td>DN 125 (5&quot;)</td>
<td>100³</td>
<td>280³</td>
</tr>
<tr>
<td>DN 125 (5&quot;)</td>
<td>200³</td>
<td>280³</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>150³</td>
<td>300³</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>150³</td>
<td>420³</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>300³</td>
<td>420³</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>250³</td>
<td>500³</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>250³</td>
<td>700³</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>500³</td>
<td>700³</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>400³</td>
<td>800³</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>400³</td>
<td>1120³</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>800³</td>
<td>1120³</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>560³</td>
<td>1120³</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>560³</td>
<td>1560³</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>1120³</td>
<td>1560³</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>750³</td>
<td>1500³</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>750³</td>
<td>2100³</td>
</tr>
<tr>
<td>DN 350 (14&quot;)</td>
<td>1500³</td>
<td>2100³</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>950³</td>
<td>1900³</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>950³</td>
<td>2660³</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>1900³</td>
<td>2660³</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>1475³</td>
<td>2950³</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>1475³</td>
<td>4130³</td>
</tr>
<tr>
<td>DN 500 (20&quot;)</td>
<td>2950³</td>
<td>4130³</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>2150³</td>
<td>4300³</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>2150³</td>
<td>6020³</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>4300³</td>
<td>6020³</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>2900³</td>
<td>5800³</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>2900³</td>
<td>8120³</td>
</tr>
<tr>
<td>DN 700 (28&quot;)</td>
<td>5800³</td>
<td>8120³</td>
</tr>
<tr>
<td>DN 800 (32&quot;)</td>
<td>3800³</td>
<td>7600³</td>
</tr>
<tr>
<td>DN 800 (32&quot;)</td>
<td>3800³</td>
<td>10 640³</td>
</tr>
<tr>
<td>DN 800 (32&quot;)</td>
<td>7600³</td>
<td>10 640³</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>5000³</td>
<td>10 000³</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>5000³</td>
<td>14 000³</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>10 000³</td>
<td>14 000³</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>6000³</td>
<td>12 000³</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>6000³</td>
<td>16 800³</td>
</tr>
<tr>
<td>DN 1000 (40&quot;)</td>
<td>12 000³</td>
<td>16 800³</td>
</tr>
<tr>
<td>DN 1200 (48&quot;)</td>
<td>9000³</td>
<td>18 000³</td>
</tr>
<tr>
<td>DN 1200 (48&quot;)</td>
<td>9000³</td>
<td>25 200³</td>
</tr>
<tr>
<td>DN 1200 (48&quot;)</td>
<td>18 000³</td>
<td>25 200³</td>
</tr>
</tbody>
</table>

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
Customer requires a flowmeter for custody transfer:
- DN 250, PN 25, compact version (media temperature max. 120 °C), battery version.
- Type-approved according to MID (EN 1434), verified and sealed, type label in German.
- Raw material certificate and metal tag name plate.
- Pulse output for energymeter SITRANS FUE950.

Ordering:
FUE380: 7ME3410-2LD05-4DS2-Z, F10, Y17
Example of appropriate energy meter (see the following chapter): Energy meter type: 7ME3470-3AA36-0DD2-Z, E02

Please also see [www.siemens.com/SITRANSFordering](http://www.siemens.com/SITRANSFordering) for practical examples of ordering.
## Accessories and spare parts for flowmeter FUS380 and FUE380

### SITRANS FUS380/FUE380 - Spare parts

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual battery pack (6 year lifetime) 33 Ah</td>
<td>A5E02679676</td>
</tr>
<tr>
<td>Single battery back-up to main supply 13.5 Ah. Attention on note 1)</td>
<td>A5E02679923</td>
</tr>
<tr>
<td>Battery cover for transmitter FUS080</td>
<td>A5E00694468</td>
</tr>
<tr>
<td>PG 13.5 set (2 pcs.) for main cable/pulse cable</td>
<td>FDK:083G0228</td>
</tr>
<tr>
<td>PG 13.5 set (2 pcs.) for dual coax cable (6 mm)</td>
<td>A5E00694500</td>
</tr>
<tr>
<td>SITRANS FUS/FUE380 wall mounting kit for remote transmitter mounting, including connection plate (DN 50 ... DN 1200/2&quot; ... 48&quot;)</td>
<td>A5E00694509</td>
</tr>
<tr>
<td>SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (bronze sensors only, DN 50 ... DN 80/2&quot; ... 3&quot;)</td>
<td>A5E01208138</td>
</tr>
<tr>
<td>SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 ... DN 1200/4&quot; ... 48&quot;)</td>
<td>A5E00694660</td>
</tr>
<tr>
<td>Brace (holder) for optical IrDA eye</td>
<td>A5E00695277</td>
</tr>
<tr>
<td>IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable</td>
<td>FDK:087L4163</td>
</tr>
<tr>
<td>RS 232 add-on module, point to point communication interface with MODBUS RTU protocol</td>
<td>FDK:087L4212</td>
</tr>
<tr>
<td>RS 485 add-on module, multi-drop communication interface with MODBUS RTU protocol</td>
<td>FDK:087L4213</td>
</tr>
<tr>
<td>5 m (16.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2&quot; ... 3&quot;) remote mounting</td>
<td>A5E01208092</td>
</tr>
<tr>
<td>10 m (32.8 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2&quot; ... 3&quot;) remote mounting</td>
<td>A5E01208114</td>
</tr>
<tr>
<td>20 m (65.6 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2&quot; ... 3&quot;) remote mounting</td>
<td>A5E01208117</td>
</tr>
<tr>
<td>30 m (98.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2&quot; ... 3&quot;) remote mounting</td>
<td>A5E01208121</td>
</tr>
<tr>
<td>1 m (3.28 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4&quot; ... 48&quot;) remote mounting</td>
<td>A5E01208126</td>
</tr>
<tr>
<td>5 m (16.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4&quot; ... 48&quot;) remote mounting</td>
<td>A5E00695476</td>
</tr>
<tr>
<td>10 m (32.8 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4&quot; ... 48&quot;) remote mounting</td>
<td>A5E00695479</td>
</tr>
<tr>
<td>20 m (65.6 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4&quot; ... 48&quot;) remote mounting</td>
<td>A5E00695480</td>
</tr>
<tr>
<td>30 m (98.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4&quot; ... 48&quot;) remote mounting</td>
<td>A5E00695483</td>
</tr>
<tr>
<td>1 m (3.28 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4&quot; ... 48&quot;) for compact version</td>
<td>A5E00695486</td>
</tr>
</tbody>
</table>

### Process Device Manager SIMATIC PDM

**SIMATIC PDM Single Point V6.0**  
For operation and parameterization of one field device, communication using PROFIBUS DP/PA or HART modem, incl. 1 TAG  
*Cannot* be expanded by further functions or TAG option/power-pack 5 languages (German, English, French, Spanish, Italian) executes with Windows 2000 Professional or Windows XP Professional  
Type/description | Order No.  
--- | ---  
SIMATIC PDM Single Point V6.0 | 6ES7658-3HX06-0YA5  

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) Subject to export regulations AL: 9I999, ECCN: N.  

Downloads for DEVICE description FUE380  
Flowmeter FUS380 and FUE380

Dimensional drawings

Transmitter IP67/NEMA 4X/6, wall mounting

Pipe Dimensions for FUS380 and FUE380

<table>
<thead>
<tr>
<th>Size</th>
<th>PN 16</th>
<th></th>
<th>PN 25</th>
<th></th>
<th>PN 40</th>
<th></th>
<th>A1</th>
<th></th>
<th>Lift hug</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>L</td>
<td>Weight</td>
<td>L</td>
<td>Weight</td>
<td>L</td>
<td>Weight</td>
<td>L</td>
<td>Weight</td>
<td>A1</td>
</tr>
<tr>
<td>mm</td>
<td>kg</td>
<td>mm</td>
<td>kg</td>
<td>mm</td>
<td>kg</td>
<td>mm</td>
<td>kg</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>350 +0/-2</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>350 +0/-2</td>
<td>18</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>350 +0/-2</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>350 +0/-3</td>
<td>24</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>500 +0/-3</td>
<td>28</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>500 +0/-3</td>
<td>34</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>500 +0/-3</td>
<td>38</td>
<td>500 +0/-3</td>
<td>47</td>
<td>-</td>
<td>500 +0/-3</td>
<td>55</td>
<td>414</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>600 +0/-3</td>
<td>60</td>
<td>600 +0/-3</td>
<td>76</td>
<td>600 +0/-3</td>
<td>91</td>
<td>440</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>500 +0/-3</td>
<td>66</td>
<td>500 +0/-3</td>
<td>81</td>
<td>-</td>
<td>-</td>
<td>466</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>350</td>
<td>550 +0/-3</td>
<td>94</td>
<td>550 +0/-3</td>
<td>121</td>
<td>-</td>
<td>-</td>
<td>495</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>400</td>
<td>600 +0/-3</td>
<td>124</td>
<td>600 +0/-3</td>
<td>153</td>
<td>-</td>
<td>-</td>
<td>507</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>500</td>
<td>625 +0/-3</td>
<td>176</td>
<td>625 +0/-3</td>
<td>235</td>
<td>-</td>
<td>-</td>
<td>558</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>600</td>
<td>750 +0/-3</td>
<td>244</td>
<td>750 +0/-3</td>
<td>292</td>
<td>-</td>
<td>-</td>
<td>609</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>700</td>
<td>875 +0/-3</td>
<td>298</td>
<td>875 +0/-3</td>
<td>416</td>
<td>-</td>
<td>-</td>
<td>660</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>800</td>
<td>1000 +0/-3</td>
<td>338</td>
<td>1000 +0/-3</td>
<td>562</td>
<td>-</td>
<td>-</td>
<td>710</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>900</td>
<td>1230 +6/-6</td>
<td>475</td>
<td>1300 +6/-6</td>
<td>835</td>
<td>-</td>
<td>-</td>
<td>810</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>1000</td>
<td>1300 +6/-6</td>
<td>594</td>
<td>1370 +6/-6</td>
<td>1078</td>
<td>-</td>
<td>-</td>
<td>910</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>1200</td>
<td>1360 +6/-6</td>
<td>860</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1110</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

Notes:
- Weight for transmitter/electronics 1.5 kg (3.3 lb)
- Means not available
- All weights are approximately
- For flange values - see norm EN 1092-1
### Size	PN 16 Weight	L	inch	lb	PN 25 Weight	L	inch	lb	PN 40 Weight	L	inch	A1	Lift hug

<table>
<thead>
<tr>
<th>Size</th>
<th>PN 16</th>
<th>Weight</th>
<th>L</th>
<th>inch</th>
<th>lb</th>
<th>PN 25</th>
<th>Weight</th>
<th>L</th>
<th>inch</th>
<th>lb</th>
<th>PN 40</th>
<th>Weight</th>
<th>L</th>
<th>inch</th>
<th>A1</th>
<th>Lift hug</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12 +0/-0.08</td>
<td>22</td>
<td>14</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2½</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12 +0/-0.08</td>
<td>33</td>
<td>14.4</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>14 +0/-0.08</td>
<td>40</td>
<td>14.8</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>13.77 +0/-0.08</td>
<td>33</td>
<td>-</td>
<td>-</td>
<td>13.77 +0/-0.12</td>
<td>40</td>
<td>15</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>13.77 +0/-0.08</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>13.77 +0/-0.12</td>
<td>53</td>
<td>15.2</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>19.68 +0/-0.12</td>
<td>62</td>
<td>-</td>
<td>-</td>
<td>19.68 +0/-0.12</td>
<td>75</td>
<td>15.6</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>19.68 +0/-0.12</td>
<td>84</td>
<td>19.68 +0/-0.12</td>
<td>104</td>
<td>19.68 +0/-0.12</td>
<td>121</td>
<td>16.30</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>23.62 +0/-0.12</td>
<td>132</td>
<td>23.62 +0/-0.12</td>
<td>168</td>
<td>23.62 +0/-0.12</td>
<td>201</td>
<td>17.32</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>19.68 +0/-0.12</td>
<td>146</td>
<td>19.68 +0/-0.12</td>
<td>179</td>
<td>-</td>
<td>-</td>
<td>18.35</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>21.65 +0/-0.12</td>
<td>207</td>
<td>21.65 +0/-0.12</td>
<td>267</td>
<td>-</td>
<td>-</td>
<td>19.8</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>23.62 +0/-0.12</td>
<td>273</td>
<td>23.62 +0/-0.12</td>
<td>337</td>
<td>-</td>
<td>-</td>
<td>19.96</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>24.61 +0/-0.12</td>
<td>419</td>
<td>24.61 +0/-0.12</td>
<td>538</td>
<td>-</td>
<td>-</td>
<td>21.97</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>29.53 +0/-0.12</td>
<td>668</td>
<td>29.53 +0/-0.12</td>
<td>805</td>
<td>-</td>
<td>-</td>
<td>23.98</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>34.45 +0/-0.12</td>
<td>796</td>
<td>34.45 +0/-0.12</td>
<td>1217</td>
<td>-</td>
<td>-</td>
<td>25.98</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>39.37 +0/-0.12</td>
<td>1089</td>
<td>39.37 +0/-0.12</td>
<td>1698</td>
<td>-</td>
<td>-</td>
<td>27.95</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>39.2 +0/-0.24</td>
<td>1047</td>
<td>52.00 +0/-0.24</td>
<td>1841</td>
<td>-</td>
<td>-</td>
<td>32.4</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>52 +0/-0.24</td>
<td>1310</td>
<td>54.80 +0/-0.24</td>
<td>2376</td>
<td>-</td>
<td>-</td>
<td>36.4</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>54.4 +0/-0.24</td>
<td>1892</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>44.4</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Weight for transmitter/electronics 1.5 kg (3.3 lb)
- Means not available
- All weights are approximate
- For flange values - see norm EN 1092-1
Schematics

Electrical connection FUS380 and FUE380

The scheme shows the transducer cable connections between transmitter terminals and respective transducer and the electrical connection of the energy calculator SITRANS FUE950.
Overview

SITRANS FUE950 is a universal thermal energy calculator, which meets the requirements EN 1434 and has the MID approval for heat metering.

SITRANS FUE950 has been developed for the SITRANS FUS380/FUE380 and alternatively MAG 5000/6000. SITRANS FUE950 is modular in construction and can by order be fitted with optional modules depending on the application. SITRANS FUE950 can be used for flow rates up to 9 999.9 m³/h.

Benefits

Basic functions
- Prepared for heating, cooling measurement
- Approval for MID for heat metering
- High-accuracy thermal energy metering, meets EN1434 class 2 requirements
- Measured temperature range -10 … +190 °C (+14 … +374 °F)
- Instantaneous values for energy/volume flow
- Battery or mains powered
- Lithium battery with lifetime typical 12 years (depending on selected functionality up to 16 years)
- Optical data interface
- Real date and time
- Storage of volume and energy data

Additional functions
- Individual tariff functions
- Leak detection function
- Advanced functions for cooling/heating applications or the combination
- 24 months memory
- Data logger function
- Expandable add-on plug and play output modules
- Communication over M-Bus or RS 232
- Power save mode

Add-on modules

Expandable functionality with 2 separate plug and play add-on modules
- Plug-in module with 2 extra pulse inputs
- Plug-in module with pulse outputs for accumulated energy and volume or alarm signal
- Plug-in module with combination of input and output pulses
- Plug-in module for M-Bus communication
- Plug-in module for RS 232 communication

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 F flowmeters
SITRANS F US
SITRANS FUE950 energy calculator
SITRANS F flowmeters
SITRANS F US

Design

SITRANS FUE950 has an easy-read 7-digit LCD display with associated pictograms for the various functions. As the display has been made for several applications, there will be figures/symbols which are not used for normal district heating applications. SITRANS FUE950 has a SIMPLE OPERATION push button and provides user-friendly control of various the display menu loops. The display will always be configured for the application chosen, and for the selected display settings. In normal operation menu loop, the display will show cumulative current energy values. The integrator has an IP54 plastic housing 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 programmed as default setting.

In the standard setting the menu loop no. 5 (tariff menu loop) is not activated.

Displays and output pulses

Units: MWh, kWh, GJ, Gcal, MBtu, m³, m³/h, ºC, all decimal points are statically.

The places after the decimal point of displayed values are indicated by the selected pulse input value and flow rate. 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:

\[ \text{Energy} = \text{Volume} \times (T_{\text{Hot}} - T_{\text{Cold}}) \times K_{\text{factor}} (T_i) \]

Volume: Volume [m³] of a given amount of volume pulses

\( T_{\text{Hot}} \): Measured temperature in the hot line

\( T_{\text{Cold}} \): Measured temperature in the cold line

\( K_{\text{factor}} (T_i) \): Thermal coefficient of media enthalpy and heat content

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 sec. If the connected flowmeter has not sent enough pulses the energy calculation and flow indication is also based on the 2 sec. value.

Monthly memory

The FUE950 has a history memory of 24 months. The following values are stored monthly in the EEPROM on the programmed day of 1…31 (via software tool).

- Date/Time
- Energy
- Tariff energy 1
- Tariff energy 2
- Tariff definition 1
- Tariff definition 2
- Pulse counter input 1
- Operation hours
- Volume
- Error day counter
- Maximum monthly flow rate
- Maximum monthly power
- Date of maximum monthly flow rate
- Date of maximum monthly power
- Pulse counter input 2

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 with a software tool and can be used for evaluations.

Extract of possible LOG settings

<table>
<thead>
<tr>
<th>Storage interval</th>
<th>Values</th>
<th>Number of data records</th>
<th>Recording period</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>• Error status</td>
<td>440</td>
<td>36.6 hours</td>
</tr>
<tr>
<td>15 minutes</td>
<td>• Overload time temperature</td>
<td>440</td>
<td>110 hours</td>
</tr>
<tr>
<td>1 hour</td>
<td>• Overload time flow rate</td>
<td>440</td>
<td>18.3 days</td>
</tr>
<tr>
<td>24 hours (default setting)</td>
<td>• Forward temperature</td>
<td>440</td>
<td>440 days</td>
</tr>
<tr>
<td></td>
<td>• Return temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Date and time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tariff energy 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tariff energy 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tariff definition 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tariff definition 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Error day counter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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" (type "Z") the switch-on and the switch-off time are adjustable independent from each other for each day of the week in steps of 15 minutes.

The following limit types are possible:
(This example applies to the display at 3 fractional digits after comma)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Limit</th>
<th>Limit resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>dT</td>
<td>Temperature difference</td>
<td>1...190 °C</td>
<td>1 °C</td>
</tr>
<tr>
<td>-dT</td>
<td>Negative temperature difference</td>
<td>1...190 °C</td>
<td>1 °C</td>
</tr>
<tr>
<td>TR</td>
<td>Return temperature (low)</td>
<td>1...190 °C</td>
<td>1 °C</td>
</tr>
<tr>
<td>TV</td>
<td>Forward temperature (high)</td>
<td>1...190 °C</td>
<td>1 °C</td>
</tr>
<tr>
<td>P</td>
<td>Power</td>
<td>0,1...1 MWh</td>
<td>0,1 MWh</td>
</tr>
<tr>
<td>Q</td>
<td>Flow</td>
<td>0,1 ... 30 m³/h</td>
<td>100 l/h</td>
</tr>
<tr>
<td>FE</td>
<td>&quot;Theoretically forward energy&quot; with return temperature of 0 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>&quot;Time triggered&quot; counting energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>&quot;External&quot; counting energy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Error handling and memory

Events such as changes and faults are stored in a non-volatile memory with a capacity of up to 31 entries. The following events are recorded:
- Checksum error
- Temperature measurement error
- 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 measurement error
- Swapped hot and cold temperature sensors
- Battery empty warning
- Power supply failure
- Communication warning
- Leak detection 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, EN1434/EN 60870-3 (M-Bus protocol).

A reader 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 Slots for optionally plug-in modules
The calculator features 2 slots for the plug-in modules.

One slot is for the function modules and the other for the communication modules. The following communication modules are available as options: RS 232 module, M-Bus module. The RS 232 communication module is a serial interface and permits 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 Repeater/Centre). According 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 a pulse output 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 (standard setting)
- Volume (standard 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 l, 1.0 l, 10 l, 100 l) at 3 digits after volume comma for the display unit m³
- Energy with specific resolution (0.1 kWh) at 3 digit after volume comma for the display unit MWh
- Leakage detection (2 flow meter channel)

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

Communication modules:
- M-Bus
- RS 232
SITRANS F flowmeters
SITRANS F US

SITRANS FUE950 energy calculator

Integration
SITRANS FUE950 is a multi-purpose energy calculator which meets the requirements of EN 1434. Further, the energy calculator has been specially developed to receive volume pulses from SITRANS FUS380/FUE380 or alternatively MAG 5000/6000 transmitter.

Technical specifications

<table>
<thead>
<tr>
<th>Approval</th>
<th>MID approved in accordance with heat meter EN 1434</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved temperature range</td>
<td>0 ... +180 °C (32 ... 356 °F)</td>
</tr>
<tr>
<td>Absolute temperature range</td>
<td>-9.9 ... +189.9 °C (14 ... 338 °F)</td>
</tr>
<tr>
<td>Differential temperature</td>
<td>3 ... 177 K (starting at 0.1 K)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>max. ±(0.5 + 3K/ΔΘ) [%]</td>
</tr>
<tr>
<td>Flow range</td>
<td>Qn (Qp) ≤ 9 999.9 m³/h</td>
</tr>
<tr>
<td>Power range value</td>
<td>0 ... 999 999.9 kW</td>
</tr>
<tr>
<td>Environment class</td>
<td>EN 1434 class C/A</td>
</tr>
</tbody>
</table>

Accuracy of FUE950

Temperature input

- Temperature range
  Absolute measuring range
  Temperature difference
  Sensor types

<table>
<thead>
<tr>
<th>Sensor connection</th>
<th>4-wire (prepared as 2-wire)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement resolution</td>
<td>0.1 °C (0.18 °F)</td>
</tr>
</tbody>
</table>

Flow input (In 0)

<table>
<thead>
<tr>
<th>Volume input from an external flowmeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse value</td>
</tr>
<tr>
<td>Pulse frequency</td>
</tr>
<tr>
<td>Flow range</td>
</tr>
<tr>
<td>Pulse ON-time</td>
</tr>
<tr>
<td>Pulse OFF-time</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>External voltage supply (active pulse input)</td>
</tr>
<tr>
<td>Flowmeter installation place</td>
</tr>
</tbody>
</table>

Slots for option modules

Type
Function modules
- Pulse input module, 2 inputs (In1, In2)
- Pulse output module, 2 outputs (Out1, Out2)
- Combination module of 2 inputs (In1, In2) and 1 output (Out1)

Communication modules

M-Bus or RS 232

Pulse output

Type
Pulse value
Pulse frequency
Pulse length
External voltage supply
Current

| Passive “open collector” pulse output, outputs potential isolated to each other |
| Last display digit until/pulse, selection by order code and setting can be read via display menu, freely programmable by a software tool |
| ≤ 4 Hz                                                                      |
| typical 125 ms (100 ... 150 ms)                                            |
| 3 ... 30 V DC                                                             |
| ≤ 20 mA                                                                   |

User interface

Display
7-digit LCD display with associated pictograms/symbols
Units
MWh, kWh, GJ, Gcal, MBtu, m³, m³/h, °C, kW
Totalizer value range
999 999.9, 99 999.99, 9 999.999
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 EN1434, connection via separate IrDA-adapter

Rated operation conditions

Enclosure
IP54 in accordance with IEC 529
Material
- Top PC Lexan 141R Transparent 111
- Pipe/wall fitting PA 6,6 GF25
- Other plastic parts ABS Cycolac GPM500
- Gaskets Neoprene
- Rubber cable bushings EPDM 50
Temperature
- Ambient +0 ... +55 °C (+32 ... +131 °F)
- Storage -25 ... +70 °C (-13 ... +158 °F)
Environment class
EN 1434 class C/A
SITRANS F flowmeters

SITRANS F US

Possible pulse output selection
(max. output frequency: 4 Hz)

- Energy (standard setting for 'Out1')
- Volume (standard setting for 'Out2')
- Tariff energy 1
- Tariff energy 2
- ariff condition 1 (limit switch)
- Tariff condition 2 (limit switch)
- Energy error
- Volume error
- Volume in m³ with specific display resolution (or with factor 0.1, 10 or 100 thereof)
- Energy with specific display resolution (or factor 0.1 thereof)
- Leakage detection (2 channel)

Pulse input

Type
Passive "open collector" pulse inputs, outputs not potential isolated to each other, data are separate cumulated in different registers and are also stored on the two accounting day's.

Pulse value
Pulse value and the unit are configurable for energy, water, gas or electrical meter by a software tool

Pulse frequency
≤ 8 Hz

Pulse length
≥ 10 ms

External voltage supply
3 ... 30 V DC

Current
based on R_i = 2.2 MΩ

Cable length
< 10 m connection limit

M-Bus output

Type
The optional M-Bus plug-in module is a serial interface for communication with external devices (M-Bus Repeater)

Protocol
M-Bus according EN1434

Connection
Open collector, 2400/300 baud, 3.6 V

RS 232 output

Type
The optional plug-in RS232 communication module is a serial interface and permits data exchange with the calculator. For this purpose a special data cable is necessary

Protocol
M-Bus according EN1434

Connection
Open collector, 2400/300 baud, 3.6 V

Power supply

Supply data
Internal voltage 3.0 V or 3.6 V by the battery or plug-in power supply module

Battery, 3.6 V type
3.6 V lithium D-cell, battery lifetime typically years, 16 years with independently powered flowmeter

Battery, 3.0 V type (standard):
3.0 V lithium C-cell, battery lifetime typically years, 12 years with independently powered flowmeter

230 V AC module
Plug-in module for 230 V AC +15/-30% 50/60 Hz (incl. battery backup)

24 V AC module
Plug-in module for 24 V AC (incl. battery backup)

Battery backup
Only with mains supply modules by internal 3.0 V lithium battery (type BR 2732)

Accessories/Software
The parameterization software based on the M-Bus is a convenient tool for handling the calculator. It runs on Windows® 2000/XP and is used for: Configuration of the calculator functionality, reading out different memories, printing out calculator logs. For more details to it please contact Siemens.

A reader head with a permanent magnet in (IrDA adapter) 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.

Dimensional drawings

SITRANS FUE950, dimensions in mm (inch)

Wall mounting

Panel mounting, dimensions in mm (inch)
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 net.

To ensure an accurate measurement of the temperature difference according to MID (EN 1434) the sensors are delivered as matched pairs.

By selection with the order code the sensor pair sets can be delivered without any approvals for multiple-purpose applications.

Technical specifications

<table>
<thead>
<tr>
<th>Pt500 temperature sensor pair (EN 1434)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring insert</td>
<td>Pt500 temperature sensor, EN 60751, tolerance class B, 2-wire</td>
</tr>
<tr>
<td>Pairing</td>
<td>Paired to EN1434 (10 ... 130 °C/14 ... 266 °F)</td>
</tr>
<tr>
<td>Media temperature</td>
<td>0...150 °C (32 ... 302 °F)</td>
</tr>
<tr>
<td>Response time T₀.₅</td>
<td>See specification sensor pocket</td>
</tr>
<tr>
<td>Medium</td>
<td>Typically heating water</td>
</tr>
<tr>
<td>Pressure rating</td>
<td>See specification sensor pocket</td>
</tr>
<tr>
<td>Protection</td>
<td>IP65</td>
</tr>
<tr>
<td>Pipe material</td>
<td>Mat. No. 1.4303 (AISI 304 Ti)</td>
</tr>
<tr>
<td>Dimension</td>
<td>Ø 6 mm</td>
</tr>
<tr>
<td>Sensor length</td>
<td>50 m</td>
</tr>
<tr>
<td>Cable length</td>
<td>2, 3, 5 or 10 m (‘C’ at the dimensional drawing)</td>
</tr>
</tbody>
</table>

| Stainless steel sensor pocket |
|---|---|
| Media temperature | 0 ... 180 °C (32 ... 356 °F) |
| Medium | Typically heating water |
| Response time T₀.₅ | Typically 13 s at 0.4 m/s with pasta |
| Typically 5 s at 0.4 m/s without pasta |
| Pressure rating | PN 16 |
| Cable length | L1 (mm) 92 127 168 223 |
| L (mm) | 82 117 155 210 |
| Material | Stainless steel: Mat. No. 1.4571 |

| Dimensional drawings |
|---|---|
| Pt500 temperature sensor pair (EN 1434) | Cable length 2, 3, 5 or 10 m (‘C’ at the dimensional drawing) |

| Stainless steel sensor pocket |
|---|---|
| Media temperature | 0 ... 180 °C (32 ... 356 °F) |
| Medium | Typically heating water |
| Response time T₀.₅ | Typically 9 s at 0.4 m/s with pasta |
| Typically 5 s at 0.4 m/s without pasta |
| Pressure rating | PN 16 |
| Cable length | L1 (mm) 92 127 168 223 |
| L (mm) | 82 117 155 210 |
| Material | Stainless steel: Mat. No. 1.4571 |

| Stainless steel sensor pocket |
|---|---|
| Media temperature | 0 ... 180 °C (32 ... 356 °F) |
| Medium | Typically heating water |
| Response time T₀.₅ | Typically 9 s at 0.4 m/s with pasta |
| Typically 5 s at 0.4 m/s without pasta |
| Pressure rating | PN 16 |
| Cable length | L1 (mm) 47 92 127 |
| L (mm) | 40 82 117 |
| Material | Brass: CuZn 40 Pb2 (Ms 58) |

| Stainless steel sensor pocket |
|---|---|
| Media temperature | 0 ... 180 °C (32 ... 356 °F) |
| Medium | Typically heating water |
| Response time T₀.₅ | Typically 9 s at 0.4 m/s with pasta |
| Typically 5 s at 0.4 m/s without pasta |
| Pressure rating | PN 16 |
| Cable length | L1 (mm) 47 92 127 |
| L (mm) | 40 82 117 |
| Material | Stainless steel: Mat. No. 1.4571 |

| Stainless steel sensor pocket |
|---|---|
| Media temperature | 0 ... 180 °C (32 ... 356 °F) |
| Medium | Typically heating water |
| Response time T₀.₅ | Typically 9 s at 0.4 m/s with pasta |
| Typically 5 s at 0.4 m/s without pasta |
| Pressure rating | PN 16 |
| Cable length | L1 (mm) 47 92 127 |
| L (mm) | 40 82 117 |
| Material | Stainless steel: Mat. No. 1.4571 |

| Stainless steel sensor pocket |
|---|---|
| Media temperature | 0 ... 180 °C (32 ... 356 °F) |
| Medium | Typically heating water |
| Response time T₀.₅ | Typically 9 s at 0.4 m/s with pasta |
| Typically 5 s at 0.4 m/s without pasta |
| Pressure rating | PN 16 |
| Cable length | L1 (mm) 47 92 127 |
| L (mm) | 40 82 117 |
| Material | Stainless steel: Mat. No. 1.4571 |

Sensor pocket, stainless steel, dimensions in mm (inch)
### Selection and Ordering data

#### Energy calculator SITRANS FUE950, Custody transfer approved

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3470</td>
<td></td>
</tr>
</tbody>
</table>

#### Flow input setting:
(The pulse input value selection must be the same as the pulse output setting of the selected flowmeter)

<table>
<thead>
<tr>
<th>Pulse input value (L/pulse)</th>
<th>Flow limit $Q_s (Q_{\text{max}})$ in m³/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>36</td>
</tr>
<tr>
<td>0.25</td>
<td>90</td>
</tr>
<tr>
<td>0.5</td>
<td>180</td>
</tr>
<tr>
<td>1</td>
<td>360 (typical selection for FUS380/FUE380: DN 50 ... 65)</td>
</tr>
<tr>
<td>2.5</td>
<td>900 (typical selection for FUS380/FUE380: DN 80 ... 125)</td>
</tr>
<tr>
<td>5</td>
<td>1 800</td>
</tr>
<tr>
<td>10</td>
<td>3 600 (typical selection for FUS380/FUE380: DN 150 ... 250)</td>
</tr>
<tr>
<td>25</td>
<td>9 000</td>
</tr>
<tr>
<td>50</td>
<td>9 999.9 (typical selection for FUS380/FUE380: DN 300 ... 400)</td>
</tr>
<tr>
<td>100</td>
<td>9 999.9 (typical selection for FUS380/FUE380: DN 500 ... 900/1200*)</td>
</tr>
<tr>
<td>250</td>
<td>9 999.9</td>
</tr>
</tbody>
</table>

*) Max. flow rate up to 9 999 m³/h

#### Calculator application

- For heating, flowmeter in return pipe (cold pipe) (typical standard) A
- For heating, flowmeter in forward pipe (hot pipe) B
- For cooling, flowmeter in forward pipe (cold pipe) C
- For cooling, flowmeter in return pipe (hot pipe) D
- For combined cooling/heating, flowmeter in forward pipe (hot pipe as heating) E
- For combined cooling/heating, flowmeter in return pipe (cold pipe as heating) F

#### Temperature input and sensor pair

- Pt 500 setting, no sensor pair included (standard) 0
- Pt 500 pair, 2-wire, 6 mm sensor diameter, 2 m cable 1
- Pt 500 pair, 2-wire, 6 mm sensor diameter, 3 m cable 2
- Pt 500 pair, 2-wire, 6 mm sensor diameter, 5 m cable 3
- Pt 500 pair, 2-wire, 6 mm sensor diameter, 10 m cable 4
- Pt 100 setting, no sensor pair included 5
- Pt 100 pair, 2-wire, 5.2 mm sensor diameter, 2 m cable 6

#### Temperature sensor pocket sets: (for 6 mm sensor diameter)

- No pockets (standard) 0
- 40 mm brass pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 1
- 85 mm brass pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 2
- 120 mm brass pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 3
- 85 mm steel pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 4
- 120 mm steel pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 5
- 155 mm steel pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 6
- 210 mm steel pocket for 6 mm sensor diameter (2 pcs. for the selected sensor pair above) 7

#### Voltage supply

- Battery 3.0 V DC (C-cell) (standard) 0
- Battery 3.6 V DC (D-cell) 1
- Mains power module for 230 V AC supply 2
- Mains power module for 24 V DC supply 3
- No power supply module (power supply ordering separate) 4

*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

<table>
<thead>
<tr>
<th>Option modules at place 1 and 2</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>No module at place 1 and 2 (standard)</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Module on place 1 (communication)</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>M-Bus module and no module on place 2</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>RS 232 module and no module on place 2</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Module on place 2 (pulse in-/outputs)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Pulse output, 2x output (Out1 &quot;Energy&quot; and Out2 &quot;Volume&quot;) and no module on place 1</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Pulse input, 2x input (In1 and In2) and no module on place 1</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>Pulse out/input combination, 2x input and 1x output and no module on place 1</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Combination of modules on place 1 and 2</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>M-Bus module (place 1) and Pulse output, 2x output (Out1 &quot;Energy&quot; and Out2 &quot;Volume&quot;) (place 2)</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>M-Bus module (place 1) and Pulse input, 2x input (In1 and In2) (place 2)</td>
<td>K</td>
<td></td>
</tr>
<tr>
<td>M-Bus module (place 1) and Pulse out/input combination, 2x input and 1x output (place 2)</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>RS 232 module (place 1) and Pulse output, 2x output (Out1 &quot;Energy&quot; and Out2 &quot;Volume&quot;) (place 2)</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>RS 232 module (place 1) and Pulse input, 2x input (In1 and In2) (place 2)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>RS 232 module (place 1) and Pulse out/input combination, 2x input and 1x output (place 2)</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

### Display units and shown fractional digits

- MWh & kW, \(m^3\), \(m^3/h\) - 2 fractional digits
- MWh & kW, \(m^3\), \(m^3/h\) - 1 fractional digit
- GJ & kW, \(m^3\), \(m^3/h\) - 2 fractional digits
- GJ & kW, \(m^3\), \(m^3/h\) - 1 fractional digit
- Gcal & kW, \(m^3\), \(m^3/h\) - 2 fractional digits
- Gcal & kW, \(m^3\), \(m^3/h\) - 1 fractional digit
- Mbtu & kW, \(m^3\), \(m^3/h\) - 2 fractional digits
- Mbtu & kW, \(m^3\), \(m^3/h\) - 1 fractional digit

*) See also at the flow input selection

### Verification/Approval

- Without type approval mark, neutral label (in English (standard))
- With MID type approval mark (only for heating, selection "A"/"B")
- With MID approval mark and first verification (only for heating, selection "A"/"B")

### Further designs

- Please add "+A" to Order No. and specify Order code

### Special settings/programming

- Settings for tariff function (specify in clear text)
- Pulse output settings (specify in clear text)
- Pulse input settings (specify in clear text)
- M-Bus address (specify in clear text)

### Cooling

- Water/glycol setting for media type "Tyfocor LS (R)" (only with neutral label, no verification and approval)

### Country/Label/Type plates/Documentation language

- English setup (standard) (no Code necessary)
- German setup
Ordering example

Example:
Calculator for a DN 500 FUE380 flowmeter (Qs = 4 130 m³/h).
• Flowmeter with Qs = 4 130 m³/h and 100 l/pulse output setting (7ME3410-3MC35-6ER2)
• District heating, flowmeters in return pipe (cold line)
• Pt 500 sensor pair with 10 m cables (2-wire)
• 210 mm stainless steel pockets
• 230 V AC supply
• RS 232 data output and also 2 pulse outputs
• MWh as unit in the display and 1 fractional digit
• With MID approval mark and first verification

Order No. 7ME3470-4AA47-2KD2

SITRANS FUE950 accessories and spare parts

Calculator SITRANS FUE950

<table>
<thead>
<tr>
<th>Type/description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option modules</td>
<td></td>
</tr>
<tr>
<td>Pulse input module (2 inputs)</td>
<td>A5E02611742</td>
</tr>
<tr>
<td>Pulse output module (2 outputs)</td>
<td>A5E02611749</td>
</tr>
<tr>
<td>Combination pulse in-/output module (2 inputs and 1 output)</td>
<td>A5E02611751</td>
</tr>
<tr>
<td>Data RS 232 module</td>
<td>A5E02611753</td>
</tr>
<tr>
<td>Data RS 232 module, incl. serial data cable (1.5 m, incl. serial PC-plug)</td>
<td>A5E02611754</td>
</tr>
<tr>
<td>M-Bus slave module</td>
<td>A5E02611758</td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>3.0 V C-cell battery for SITRANS FUE950</td>
<td>A5E02611759</td>
</tr>
<tr>
<td>3.6 V D-cell battery for SITRANS FUE950 (16 years, by internal regulator)</td>
<td>A5E02611761</td>
</tr>
<tr>
<td>230 V AC supply module for SITRANS FUE950 (incl. internal fuse T50mA L 250 V)</td>
<td>A5E02611762</td>
</tr>
<tr>
<td>24 V AC supply module for SITRANS FUE950</td>
<td>A5E02611764</td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>Infrared optical adapter for data communication via PC</td>
<td>A5E02611767</td>
</tr>
<tr>
<td>Bracket for SITRANS FUE950 wall mounting (12 pcs)</td>
<td>A5E02611769</td>
</tr>
<tr>
<td>Cable for data communication PC/D-sub 9F/3-wire</td>
<td>A5E02611774</td>
</tr>
</tbody>
</table>
SITRANS F flowmeters

SITRANS F US

SITRANS FUE950 energy calculator

Schematics

Electrical connection for SITRANS FM electromagnetic flowmeters MAG 5000/6000 and SITRANS FUE950 in combination

2 resistors are required to obtain a correct transmission of pulses, when MAG 5000/6000 is connected together with a SITRANS FUE950 as a heat meter.

The 2 resistors are to be mounted between terminals 57 and 58 in the MAG terminal socket. Moreover, the resistors used are respectively 10 kΩ and 1.5 kΩ.

Resistors are not part of our accessories list.

The diagram shows the correct connection between SITRANS FUE950 and MAG 5000/6000.
The SITRANS FUS880 is a battery-powered irrigation flowmeter, designed for pipes measuring from DN 200 up to DN 1200 (8” up to 48”) in diameter. The SITRANS FUS880 gives you the ability to install the flowmeter underground retrofitting onto existing pipelines. This ultrasonic transient time irrigation flowmeter is used for full pipe flow measurements. Pipe material may be PVC or concrete and pipe construction may be single wall or double wall, smooth or corrugated.

The flowmeter produces a signal proportional to the velocity of the flow (flow rate) as the liquid flows past the ultrasonic sensors. SITRANS FUS880 has transducers in the flow (in-line) which assures superior aides in accuracy and superior performance when compared to doppler or many other types of flow measurement systems.

**Benefits**

- Cost-effective solution - contains all the necessary components for retrofitting onto existing pipe
- Battery-operated - Maintenance-free up to 6 years
- SITRANS FUS880 is easy to install in pipeline sizes from DN 200 up to DN 1200 (8” up to 48”) in diameter
- The transmitter display shows both accumulated volume and instantaneous flow rate
- The flowmeter provides a digital signal that can be sent directly to a PLC/RTU/DCS
- Solid construction with no moving parts for a 100% maintenance and obstruction-free flowmeter
- The SITRANS FUS880 transmitter comes within an IP67 enclosure
- Sensor can easily be buried and withstand constant flooding
- Automatic calculation of the calibration factor when pipe geometry data are entered in the signal transmitter
- Pipe material may be polyvinylchloride (PVC) or concrete
- Pipe construction may be single wall or double wall, smooth or corrugated

**Application**

- Irrigation systems
- Irrigation distribution systems
- Pumping stations
- Canal laterals
- On-farm outlets
- Water well production
- Drip and sprinkler irrigation
- Center pivot systems
- Potable water

**Design**

The SITRANS FUS880 set contains all necessary parts to build up an ultrasonic flowmeter on existing pipes depending on choices at ordering:

- Templates to wrap around pipes for alignment of sensors
- Transducer threading tool
- Thread adapters
- Transducer alignment tools
- Mounting plugs or saddles as well as FUS880 transmitter dependant upon the specifics at time of ordering and required mounting hardware
- Cables
SITRANS F flowmeters

SITRANS F US

Technical specifications

Accuracy
Typical $\pm 2.0\%$, dependant upon the accuracy of measurements of tube diameter and during installation

Note:
Flow system measurement performance depends on the accuracy of the measurements taken at time of installation. This means that inaccurate measurements of angles, distance between transducers, wall thickness and pipe diameter will have a direct effect on the accuracy as these values measured are entered into the memory of the FUS880 transmitter and used in part of the calculation of flow rate.

Requirements for pipes

<table>
<thead>
<tr>
<th>Size</th>
<th>Typical</th>
<th>± 2.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 200 ... DN 1200</td>
<td>8&quot; ... 48&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Transmitter Enclosure

- **Rating**: IP67 rated enclosure
- **Material**: Fibre glass reinforced polyamide
- **Terminal box**: PA 6.6, 100 °C (212 °F)
- **Transducer element**: AISI 316 Stainless Steel 200 °C (392 °F)
- **2000 Corrugated PVC**
  - **Line pressure max.**: Pressure rating per spec. ASTM D-1784 (5.5 bar (80 psi))
  - **Liquid temperature max.**: Temperature rating per spec. ASTM D-1784 (60 °C (140 °F))
- **Pro21 Corrugated PVC**
  - **Line pressure max.**: Pressure rating per spec. ASTM D-1784 (5.5 bar (80 psi))
  - **Liquid temperature max.**: Temperature rating per spec. ASTM D-1784 (60 °C (140 °F))
- **PVC Solid PIP 80**
  - **Line pressure max.**: Pressure rating per spec. ASTM D-1784 (5.5 bar (80 psi))
  - **Liquid temperature max.**: Temperature rating per spec. ASTM D-1784 (60 °C (140 °F))
- **Concrete**
  - **Line pressure max.**: Pressure rating per spec. ASTM D-1784 (5.5 bar (80 psi))
  - **Liquid temperature max.**: Temperature rating per spec. ASTM D-1784 (60 °C (140 °F))

Pipe wall thickness

<table>
<thead>
<tr>
<th>Pipe wall thickness</th>
<th>Pipe wall thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2000 Corrugated PVC</td>
<td>25 ... 50 mm (1&quot; ... 2&quot;)</td>
</tr>
<tr>
<td>Pro21 Corrugated PVC</td>
<td>25 ... 50 mm (1&quot; ... 2&quot;)</td>
</tr>
<tr>
<td>PVC Solid PIP 80</td>
<td>Less than 25 mm (1&quot;)</td>
</tr>
<tr>
<td>Concrete</td>
<td>51 ... 57 mm (2&quot; ... 2.25&quot;)</td>
</tr>
<tr>
<td></td>
<td>57 ... 64 mm (2.25&quot; ... 2.5&quot;)</td>
</tr>
<tr>
<td></td>
<td>70 ... 76 mm (2.75&quot; ... 3&quot;)</td>
</tr>
<tr>
<td></td>
<td>76 ... 83 mm (3&quot; ... 3.25&quot;)</td>
</tr>
<tr>
<td></td>
<td>89 ... 95 mm (3.5&quot; ... 3.75&quot;)</td>
</tr>
<tr>
<td></td>
<td>95 ... 100 mm (3.75&quot; ... 4&quot;)</td>
</tr>
<tr>
<td></td>
<td>108 ... 114 mm (4.25&quot; ... 4.50&quot;)</td>
</tr>
</tbody>
</table>

More information

Installation requirement

The space requirements around the pipe for retrofitting an ultrasonic flowmeter type SITRANS FUS880 are given below:

- The space requirements around the pipe for retrofitting an ultrasonic flowmeter type SITRANS FUS880 are given below:
- It is important to prepare excavation site for a safe and efficient installation. An underground pipe needs to be exposed so that there is a minimum of 1.52 m (5 ft) or more of working space on either side of the pipe. The length of the trench should exceed the template length by 1.83 m (6 ft) or more.

Pipe support:

Ensure that an unearthed pipe has sufficient support beneath it to prevent deformation or breakage.

Cave-in:

Always brace trench walls. Follow all applicable (e.g. municipal, company, customer, site, union) construction guidelines.

Epoxy:

Follow all safety recommendations listed by the epoxy manufacturer. Use proper protection equipment, such as gloves, safety glasses, clothing, etc. Read the labels on the epoxy cans before mixing. Note all safety related statements and temperature recommendations in particular. For additional information, see the epoxy manufacturer’s internet site.

Pipe template:

Templates are printed on a durable material, such as Mylar, and are resistant to normal contaminants. Do not expose the template to excessive moisture or excessive periods of sunlight, heat and cold temperatures. Always roll and store the template in its’ shipping tube. Do not stretch or fold as this could permanently damage the template.

Installation overview:

Installation steps

Installation of the SITRANS FUS880 is accomplished with the following steps.

1. Expose and clean the pipe.
2. Mark a centerline on the pipe.
3. Place the template on the pipe and tape it securely to the pipe.
4. Mark the locations of the sensor mounting holes on the pipe.
5. Drill the sensor mounting holes in the pipe.
6. Clean and de-burr the sensor mounting area.
7. Measure up the pipe circumference $C$, the wall thickness $W_T$ and calculate $OD$ and $ID$.
8. Epoxy and screw the saddle sensor holder to the pipe.
9. Assemble and install the sensors-holders.
10. Measure up the actual sensor-location to see if re-calibration is needed.
11. Assemble and install the sensors.
12. Install sensor wiring and conduit.
13. Install the transmitter and connect the sensor wiring.
14. Check the transmitter configuration.
15. Test the installation thoroughly and run a flow test.
16. Fill in the "Site Acceptance Form".
17. Cover the pipe.

For detailed instruction in installation please refer to User Manual Order no.: FDK-521HAP0553.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS F US</th>
<th>Ultrasonic flowmeters</th>
<th>SITRANS FUS880 PVC (Solid) (PIP80) SONOKIT Battery-powered</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ME 3 4 4 0 -</td>
<td>SITRANS F US</td>
<td>Ultrasonic flowmeters</td>
<td>SITRANS FUS880 PVC (Solid) (PIP80) SONOKIT Battery-powered</td>
</tr>
</tbody>
</table>

#### Pipe diameter

- DN 200 (8")
- DN 250 (10")
- DN 300 (12")
- DN 380 (15")
- DN 450 (18")
- DN 530 (21")
- DN 600 (24")
- DN 680 (27")

#### Wall thickness

- Less than 25 mm (1")

#### Pipe material

- PVC (Solid) (PIP80)

#### Track configuration

- 1-track
- 2-track X-configuration

#### Region version

- EU, US

#### Transmitters

- SITRANS FUS080, IP67, Battery-powered

#### Template

- Standard

#### Cable length

- 20 m (65.6 ft) with gland

### Further designs

Please add „-Z“ to Order No. and specify Order code(s).

#### Add on units of measure

- Flow unit GPM: L01
- Flow unit CFS: L02
- Flow unit m³/h: L03
- Flow unit MGD: L05
- Volume unit US Gal: L42
- Volume unit m³/h: L44
- Volume unit US Gal x 100: L46
- Volume unit US Gal x 1000: L49
- Volume unit US Mgal: L48
- Volume unit AcF (Acre Feet): L43
- Volume unit AcI (Acre Inch): L51

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order code</th>
<th>SITRANS F US</th>
<th>Ultrasonic flowmeters</th>
<th>SITRANS FUS880 A2000 Corrugated PVC SONOKIT 1-track Battery-powered</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ME 3 4 4 0 -</td>
<td>SITRANS F US</td>
<td>Ultrasonic flowmeters</td>
<td>SITRANS FUS880 A2000 Corrugated PVC SONOKIT 1-track Battery-powered</td>
</tr>
</tbody>
</table>

#### Pipe diameter

- DN 380 (15")
- DN 450 (18")
- DN 530 (21")
- DN 600 (24")
- DN 750 (30")
- DN 900 (36")

#### Wall thickness

- 25 ... 50 mm (1" ... 2")

#### Pipe material

- PVC Corrugated A2000

#### Track configuration

- 1-track

#### Region version

- EU, US

#### Transmitter

- SITRANS FUS80, IP67, Battery-powered

#### Template

- Standard

#### Cable length

- 20 m (65.6 ft) with gland
### SITRANS FUS880 (retrofit kit)

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F US Ultrasonic flowmeters</td>
<td>7 ME 3 4 4 0 -</td>
</tr>
<tr>
<td>SITRANS FUS880 Pro21 Corrugated PVC</td>
<td>7 ME 3 4 4 0 -</td>
</tr>
<tr>
<td>SONOKIT 1-track</td>
<td></td>
</tr>
<tr>
<td>Battery-powered</td>
<td></td>
</tr>
</tbody>
</table>

**Pipe diameter**
- DN 750 (30’’)
- DN 840 (33’’)
- DN 900 (36’’)
- DN 1050 (42’’)
- DN 1200 (48’’)

**Wall thickness**
- 25 ... 50 mm (1” ... 2”)

**Pipe material**
- PVC Pro21 Corrugated

**Track configuration**
- 1-track

**Region version**
- EU, US

**Transmitter**
- SITRANS FUS080, IP67, battery-powered

**Template**
- Standard

**Cable length**
- 20 m (65.6 ft) with gland

#### Further designs

Please add “-Z” to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Add on units of measure</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow unit GPM</td>
<td>L01</td>
</tr>
<tr>
<td>Flow unit CFS</td>
<td>L02</td>
</tr>
<tr>
<td>Flow unit m³/h</td>
<td>L03</td>
</tr>
<tr>
<td>Flow unit MGD</td>
<td>L05</td>
</tr>
<tr>
<td>Volume unit US Gal</td>
<td>L42</td>
</tr>
<tr>
<td>Volume unit m³/h</td>
<td>L44</td>
</tr>
<tr>
<td>Volume unit US Gal x 100</td>
<td>L46</td>
</tr>
<tr>
<td>Volume unit US Gal x 1000</td>
<td>L49</td>
</tr>
<tr>
<td>Volume unit US Mgal</td>
<td>L48</td>
</tr>
<tr>
<td>Volume unit AcF (Acre Feet)</td>
<td>L43</td>
</tr>
<tr>
<td>Volume unit AcI (Acre Inch)</td>
<td>L51</td>
</tr>
</tbody>
</table>

### SITRANS FUS880 Concrete

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS F US Ultrasonic flowmeters</td>
<td>7 ME 3 4 4 0 -</td>
</tr>
<tr>
<td>SITRANS FUS880 Concrete</td>
<td>7 ME 3 4 4 0 -</td>
</tr>
<tr>
<td>SONOKIT 1-track</td>
<td></td>
</tr>
<tr>
<td>Battery-powered</td>
<td></td>
</tr>
</tbody>
</table>

**Pipe diameter**
- DN 300 (12’’)
- DN 380 (15’’)
- DN 450 (18’’)
- DN 530 (21’’)
- DN 600 (24’’)
- DN 680 (27’’)
- DN 750 (30’’)
- DN 900 (36’’)
- DN 1050 (42’’)

**Wall thickness**
- 51 ... 57 mm (2” ... 2.25”)
- 57 ... 64 mm (2.25” ... 2.5”)
- 70 ... 76 mm (2.75” ... 3”)
- 76 ... 83 mm (3” ... 3.25”)
- 89 ... 95 mm (3.5” ... 3.75”)
- 95 ... 100 mm (3.75” ... 4”)
- 108 ... 114 mm (4.25” ... 4.5”)

**Pipe material**
- Concrete

**Track configuration**
- 1-track

**Region version**
- EU, US

**Transmitter**
- SITRANS FUS080, IP67, battery-powered

**Template**
- Standard

**Cable length**
- 20 m (65.6 ft) with gland

#### Further designs

Please add “-Z” to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Add on units of measure</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow unit GPM</td>
<td>L01</td>
</tr>
<tr>
<td>Flow unit CFS</td>
<td>L02</td>
</tr>
<tr>
<td>Flow unit m³/h</td>
<td>L03</td>
</tr>
<tr>
<td>Flow unit MGD</td>
<td>L05</td>
</tr>
<tr>
<td>Volume unit US Gal</td>
<td>L42</td>
</tr>
<tr>
<td>Volume unit m³/h</td>
<td>L44</td>
</tr>
<tr>
<td>Volume unit US Gal x 100</td>
<td>L46</td>
</tr>
<tr>
<td>Volume unit US Gal x 1000</td>
<td>L49</td>
</tr>
<tr>
<td>Volume unit US Mgal</td>
<td>L48</td>
</tr>
<tr>
<td>Volume unit AcF (Acre Feet)</td>
<td>L43</td>
</tr>
<tr>
<td>Volume unit AcI (Acre Inch)</td>
<td>L51</td>
</tr>
</tbody>
</table>
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Accessories and Spare parts</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS F US Ultrasonic flowmeters</strong></td>
<td></td>
</tr>
<tr>
<td>FUS880 transmitter</td>
<td>7ME3440-0AA01-2DA4</td>
</tr>
<tr>
<td>includes 2 transducers and 20 m (65.6 ft) of cable</td>
<td></td>
</tr>
<tr>
<td><strong>FUS880 Installation pipe template</strong></td>
<td></td>
</tr>
<tr>
<td>Template, PVC PIP 80</td>
<td></td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>TGGX:16347-80</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>TGGX:16347-81</td>
</tr>
<tr>
<td>DN 380 (15&quot;)</td>
<td>TGGX:16347-82</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>TGGX:16347-83</td>
</tr>
<tr>
<td>DN 530 (21&quot;)</td>
<td>TGGX:16347-84</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>TGGX:16347-85</td>
</tr>
<tr>
<td>DN 680 (27&quot;)</td>
<td>TGGX:16347-86</td>
</tr>
<tr>
<td>Template, Concrete</td>
<td></td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>TGGX:16347-90</td>
</tr>
<tr>
<td>DN 380 (15&quot;)</td>
<td>TGGX:16347-91</td>
</tr>
<tr>
<td>DN 400 (16&quot;)</td>
<td>TGGX:16347-89</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>TGGX:16347-92</td>
</tr>
<tr>
<td>DN 530 (21&quot;)</td>
<td>TGGX:16347-93</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>TGGX:16347-94</td>
</tr>
<tr>
<td>DN 680 (27&quot;)</td>
<td>TGGX:16347-95</td>
</tr>
<tr>
<td>DN 750 (30&quot;)</td>
<td>TGGX:16347-96</td>
</tr>
<tr>
<td>DN 900 (36&quot;)</td>
<td>TGGX:16347-97</td>
</tr>
<tr>
<td>DN 1050 (42&quot;)</td>
<td>TGGX:16347-98</td>
</tr>
<tr>
<td>Template, pipe DN 900 (36&quot;) PVC, A2000 corrugated</td>
<td>TGGX:16347-100</td>
</tr>
<tr>
<td>Template, pipe DN 1050 (42&quot;) Pro21 corrugated</td>
<td>TGGX:16347-101</td>
</tr>
<tr>
<td><strong>FUS880 Installation spare kit</strong></td>
<td></td>
</tr>
<tr>
<td>Concrete kit, Sensor mounting</td>
<td></td>
</tr>
<tr>
<td>51 ... 57 mm (2&quot; ... 2.25&quot;)</td>
<td>TGGX:16347-213K</td>
</tr>
<tr>
<td>57 ... 64 mm (2.25&quot; ... 2.5&quot;)</td>
<td>TGGX:16347-214K</td>
</tr>
<tr>
<td>70 ... 76 mm (2.75&quot; ... 3&quot;)</td>
<td>TGGX:16347-215K</td>
</tr>
<tr>
<td>76 ... 83 mm (3&quot; ... 3.25&quot;)</td>
<td>TGGX:16347-216K</td>
</tr>
<tr>
<td>89 ... 95 mm (3.5&quot; ... 3.75&quot;)</td>
<td>TGGX:16347-217K</td>
</tr>
<tr>
<td>95 ... 100 mm (3.75&quot; ... 4&quot;)</td>
<td>TGGX:16347-218K</td>
</tr>
<tr>
<td>108 ... 114 mm (4.25&quot; ... 4.5&quot;)</td>
<td>TGGX:16347-212K</td>
</tr>
<tr>
<td>PVC kit, Sensor Mounting</td>
<td></td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>TGGX:16347-219K</td>
</tr>
<tr>
<td>DN 380 (15&quot;)</td>
<td>TGGX:16347-220K</td>
</tr>
<tr>
<td>DN 450 (18&quot;)</td>
<td>TGGX:16347-221K</td>
</tr>
<tr>
<td>DN 530 (21&quot;)</td>
<td>TGGX:16347-222K</td>
</tr>
<tr>
<td>DN 600 (24&quot;)</td>
<td>TGGX:16347-223K</td>
</tr>
<tr>
<td>DN 680 (27&quot;)</td>
<td>TGGX:16347-224K</td>
</tr>
<tr>
<td>Corrugated PVC kit, DN 900 (36&quot;) A2000</td>
<td>TGGX:16347-225K</td>
</tr>
<tr>
<td>Corrugated PVC kit, DN 1050 (42&quot;) Pro21</td>
<td>TGGX:16347-226K</td>
</tr>
<tr>
<td><strong>FUS880 spares</strong></td>
<td></td>
</tr>
<tr>
<td>Holder - Saddle</td>
<td></td>
</tr>
<tr>
<td>DN 250 (10&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-165</td>
</tr>
<tr>
<td>DN 300 (12&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-166</td>
</tr>
<tr>
<td>DN 380 (15&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-168</td>
</tr>
<tr>
<td>DN 450 (18&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-170</td>
</tr>
<tr>
<td>DN 530 (21&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-174</td>
</tr>
<tr>
<td>DN 600 (24&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-175</td>
</tr>
<tr>
<td>DN 680 (27&quot;) PIP 80 PVC Saddle</td>
<td>TGGX:16347-177</td>
</tr>
</tbody>
</table>

**Note:**
Installation spares kit include:

- **Concrete kit:**
  - 2 transducer mounting plugs, 2 straps, mounting hardware, epoxy, conduit adapter, installation guide

- **PVC kit:**
  - 2 transducer mounting saddles, mounting hardware, epoxy, conduit adapter, installation guide
SITRANS F flowmeters

SITRANS F US

Accessories and spare parts for older flowmeter systems type F US SONOFLO

Accessories for transmitter SITRANS F US SONOFLO

**Accessories for transmitter SONO 3000**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall mounting kit for 7ME3150-1AA10-1AA0 and 7ME3150-1AA20-1AA0, using 4 x coaxial sensor cables, wall brackets, PG 13.5 cable glands.</td>
<td>FDK:085F5027</td>
</tr>
</tbody>
</table>

**SENSORPROM memory unit for sensors with SONO 3000 transmitters**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENSORPROM memory unit for SITRANS F US systems with transmitter type SONO 3000 When ordering: Inform on sensor Order No. and Serial No.</td>
<td>FDK:085B5329</td>
</tr>
</tbody>
</table>

**Terminal housing with PG 13.5 cable glands**

<table>
<thead>
<tr>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material: PA 6.6, Temperature range: -20 ... +100 °C (-4 ... +212 °F)</td>
<td>FDK:085B1403</td>
</tr>
<tr>
<td>Material: AISI 316, Temperature range: -20 ... +200 °C (-4 ... +392 °F)</td>
<td>FDK:085B1402</td>
</tr>
</tbody>
</table>

**SONO 3200 spare parts, complete units**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Gasket</th>
<th>Pressure rating</th>
<th>Terminal housing / cable gland</th>
<th>Approv. Temp. range [°C (°F)]</th>
<th>Length mm (inch)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flange</td>
<td>316 SS</td>
<td>Graphite</td>
<td>PN40</td>
<td>316 SS/M20</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>158 (6.22)</td>
<td>On request</td>
</tr>
</tbody>
</table>

**Spare parts for transmitter SONO 3000**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONO 3000 19&quot; back print for IP65 (NEMA 4) wall mounting 230 V version</td>
<td>FDK:085F5327</td>
</tr>
<tr>
<td>SONO 3000 assembly plate for coaxial connection in the SONO 3300 sensor and wall mounting connection box</td>
<td>FDK:085L1023</td>
</tr>
<tr>
<td>SONO 3000 assembly base plate</td>
<td>FDK:085L1015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONO 3000 EEx d, front glass incl. frame</td>
<td>FDK:085U2109</td>
</tr>
<tr>
<td>SONO 3000 EEx d, gaskets for transmitter housing</td>
<td>FDK:085U2002</td>
</tr>
<tr>
<td>SONO 3300 / FUS060 connection kit</td>
<td>On request</td>
</tr>
</tbody>
</table>
### Spare parts/accessories SONOCAL 3000 and SONO 3000/3300 CT spare parts, transducer cables

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial cable with transducer connection for sensor type SONO 3300-CT (1 pc.)</td>
<td></td>
</tr>
<tr>
<td>1 x 10 m (32.8 ft)</td>
<td>FDK:085L2400</td>
</tr>
<tr>
<td>1 x 20 m (65.6 ft)</td>
<td>FDK:085L2401</td>
</tr>
<tr>
<td>1 x 30 m (98.4 ft)</td>
<td>FDK:085L2402</td>
</tr>
</tbody>
</table>

### SONO 3200 / SONO 3000 PG 13.5 cable glands (each 1 pc.)

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Temperature range [°C (°F)]</th>
<th>Approval</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG 13.5</td>
<td>Nickel-plated brass, cable</td>
<td>-20 ... +100 (-4 ... +212)</td>
<td></td>
<td>A5E02247692</td>
</tr>
<tr>
<td></td>
<td>Ø 6 ... 8 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PG 13.5</td>
<td>Stainless steel, cable</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td></td>
<td>A5E02247682</td>
</tr>
<tr>
<td></td>
<td>Ø 5 ... 6 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PG 13.5</td>
<td>Stainless steel, cable</td>
<td>-20 ... +200 (-4 ... +392)</td>
<td>Ex-d1)</td>
<td>A5E02247711</td>
</tr>
<tr>
<td></td>
<td>Ø 6 ... 8 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) No ATEX

### Cables

<table>
<thead>
<tr>
<th>Type/Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard 75 Ω coax cable</td>
<td></td>
</tr>
<tr>
<td>$T_{\text{max}} = 75$ °C (167 °F)</td>
<td>FDK:085B1373</td>
</tr>
<tr>
<td>• 15 m (49.2 ft)</td>
<td>FDK:085B1374</td>
</tr>
<tr>
<td>• 30 m (98.4 ft)</td>
<td>FDK:085B1375</td>
</tr>
<tr>
<td>• 60 m (196.8 ft)</td>
<td>FDK:085B1376</td>
</tr>
<tr>
<td>• 100 m (328 ft)</td>
<td></td>
</tr>
</tbody>
</table>

| Teflon 75 Ω coax cable |                  |
| $T_{\text{max}} = 200$ °C (392 °F) |                 |
| • 15 m (49.2 ft)     | FDK:085B1378     |
| • 30 m (98.4 ft)     | FDK:085B1379     |
SITRANS F flowmeters
SITRANS F US

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 transducers 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 six product families, each targeting specific applications:

FUS1010 and FUP1010 General purpose 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

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

FUH1010 Oil flowmeters are ideal for applications carrying crude oil, refined petroleum or liquefied gas. There are three application areas: Interface detectors, volumetric flowmeters and mass or standard volume flowmeters
- Interface detectors/density meters
  - Precise identification of interfaces on multi-liquid pipelines
  - Rapid and precise scraper "pig" indication
  - Product identification
  - Density indication
- Viscosity compensated volumetric flowmeters
  - Applications with multiple liquids having a wide viscosity range
  - Automatic gross volume compensation due to viscosity changes

Standard volume (net) mass flowmeters
- 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

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

FUS1020 General purpose 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
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 clamp-on 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 including but not limited to:

- Water and wastewater
- Energy measurement
- Oil and gas industries

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 shot 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

<table>
<thead>
<tr>
<th>Display type</th>
<th>4-digit LCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display resolution</td>
<td>0.01 mm (0.001&quot;)</td>
</tr>
<tr>
<td>Measurement units</td>
<td>Metric and imperial</td>
</tr>
<tr>
<td>Sound velocity range</td>
<td>1 000 to 9 999 m/s</td>
</tr>
<tr>
<td>(3 280 to 32 805 ft/s)</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10 ... +50 °C (14 ... 122 °F)</td>
</tr>
<tr>
<td>Update range</td>
<td>4 Hz</td>
</tr>
<tr>
<td>Frequency</td>
<td>5 MHz</td>
</tr>
<tr>
<td>Power source</td>
<td>2 x 1.5 V AAA dry cells</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Working current is less than 3 mA</td>
</tr>
<tr>
<td>Battery life</td>
<td>Approx. 250 h on a set of batteries</td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>61 x 108 x 28 mm (2.4 x 4.3 x 1.1&quot;)</td>
</tr>
<tr>
<td>Weight</td>
<td>150 g (5.3 oz)</td>
</tr>
</tbody>
</table>

Selection and Ordering data

Order No. Thickness gauge D) 7ME3951-0TG20

D) Subject to export regulations AL: N; ECCN: EAR99H.

© Siemens AG 2010
# System information and selection guide

## SITRANS F US Clamp-on meters

<table>
<thead>
<tr>
<th>Industry/Applications</th>
<th>FUS1010 (Standard)</th>
<th>FUS1020 (Basic)</th>
<th>FUP1010 (Portable)</th>
<th>FUE1010 (Energy)</th>
<th>FUH1010 (Oil)</th>
<th>FUG1010 (Gas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and aqueous solutions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility district heating, cooling</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocarbons/Petrochemical, multiple products or varying viscosity, liquefied gases, net and gross volume</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocarbons (Single product with limited viscosity range) gross volume</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very low flow (&lt;10 lpm) in small pipes</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Process gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Slurries or liquids with high percentage of undissolved gases</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High temperature liquids &gt; 120 °C (248 °F)</td>
<td>X(^1)</td>
<td>X(^1)</td>
<td>X(^1)</td>
<td>X(^1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerospace or hydraulic test</td>
<td>X(^2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration liquids</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food products</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Design

| Field clamp-on (non-intrusive)                                                        | X                  | X              | X                 | X              | X            | X            |
| Doppler (Reflexor) hybrid capability                                                  | X\(^4\)            |                |                   |                |              |              |
| Standard volume or mass flow; per API 2540                                            |                    |                |                   |                | X            |              |
| Interface detection                                                                  |                    |                |                   |                |              |              |
| Density output                                                                       |                    |                |                   |                | X            |              |
| Standard volume or mass flow; per AGA 8                                              |                    |                |                   |                | X            |              |
| Differential temperature with energy calculation                                      |                    |                |                   |                | X            |              |
| Temperature measurement                                                               | X                  | X              | X                 | X              | X            | X            |
| Analog input                                                                         | X                  | X              | X                 | X              | X            | X            |
| Large graphics display (optional)                                                     | X                  |                | X                 | X              |              | X            |
| Diagnostic PC software (DataView)                                                     | X                  |                | X                 | X              |              | X            |

## Number of acoustic paths and channels

| 1-channel                                                                             | X                  | X              | X                 | X              | X            | X            |
| 2-path                                                                                | X                  | X              | X                 | X              | X            | X            |
| 2-channel w/ arithmetic function                                                      | X                  | X              | X                 | X              |              | X            |
| 4-path / (special order)                                                              | X                  |                |                   |                | X            | X            |
| 4-channel w/ sum of active channels                                                  | X                  |                |                   |                |              |              |

## Transmitter enclosure

| IP65 (NEMA 4)                                                                         |                    |                |                   | X              |              |              |
| IP65 (NEMA 4X)                                                                        |                    |                |                   | X              | X            | X            |
| IP67                                                                                  |                    |                |                   | X\(^3\)        |              |              |
| IP40 (NEMA 1)                                                                         |                    |                |                   | X\(^3\)        |              |              |
| IP65 (NEMA 7) Compact                                                                 |                    |                |                   | X              | X            | X            |
| IP66 (NEMA 7) Wall mount                                                               | X                  |                |                   | X              | X            | X            |

---
1) Special order high temperature clamp-on transducer
2) Special order Aerospace clip-on transducer recommended
3) Available with portable energy systems
4) Not for NEMA 7 Compact
# SITRANS F US Clamp-on meters

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>FUS1010 (Standard)</th>
<th>FUS1020 (Basic)</th>
<th>FUP1010 (Portable)</th>
<th>FUE1010 (Energy)</th>
<th>FUH1010 (Oil)</th>
<th>FUG1010 (Gas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal battery operation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Battery charger (100 ... 240 V AC 50 ... 60 Hz) with country specific line cord</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>90 ... 240 V AC, 50 ... 60 Hz</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9 ... 36 V DC</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Size (larger sizes up to 9150 mm (360") are available as special order)

<table>
<thead>
<tr>
<th>Size (larger sizes up to 9150 mm (360&quot;)</th>
<th>FUS1010 (Standard)</th>
<th>FUS1020 (Basic)</th>
<th>FUP1010 (Portable)</th>
<th>FUE1010 (Energy)</th>
<th>FUH1010 (Oil)</th>
<th>FUG1010 (Gas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5 ... 1220 mm (0.25&quot; ... 48&quot;)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>38 ... 1220 mm (1.5&quot; ... 48&quot;)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Approvals**

<table>
<thead>
<tr>
<th>Approvals</th>
<th>FUS1010 (Standard)</th>
<th>FUS1020 (Basic)</th>
<th>FUP1010 (Portable)</th>
<th>FUE1010 (Energy)</th>
<th>FUH1010 (Oil)</th>
<th>FUG1010 (Gas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM / CSA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ATEX</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>UL / ULc / CE</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

1) Available with portable energy systems
2) NEMA 4X associated equipment in DIV 2 connected to DIV 1 transducers, NEMA 7 explosionproof equipment in DIV 1 connected to DIV 1 transducers.
3) Ordinary, unclassified locations only

---

**Transducer type selection guide**

<table>
<thead>
<tr>
<th>Application condition. Note all that apply before making selection</th>
<th>Standard transducers supported in MLFB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard clamp-on</strong></td>
<td>Standard clamp-on</td>
</tr>
<tr>
<td><strong>High precision</strong></td>
<td>Standard precision</td>
</tr>
<tr>
<td><strong>Universal</strong></td>
<td>Standard Doppler</td>
</tr>
<tr>
<td><strong>Reflexor</strong></td>
<td>Notes</td>
</tr>
</tbody>
</table>

### Media

- General survey (clean liquids) on steel and non-steel pipes
  - X = preferred choice
  - O = not suitable
- General survey (clean liquids) on a limited range of steel pipes
  - X = preferred choice
  - O = not suitable
- Moderately aerated liquid or slurry
  - X = preferred choice
- Highly aerated liquid or slurry
  - O = not suitable
  - X = preferred choice
- High temperature Doppler transducers also available as special order

### Pipe material

- Steel
  - X = preferred choice
  - O = not suitable
- Steel pipe with diameter/wall thickness ratio < 10
  - O = not suitable
  - X = preferred choice
- Non-steel pipe material (copper, ductile iron, cast iron, etc.)
  - O = not suitable
  - X = preferred choice
- Wall thickness > 25.4 mm (1"
  - O = not suitable
  - X = preferred choice

O = not suitable  X = preferred choice
**Function**

**Operating Principle**

The SITRANS FUS1010 system is a transit-time ultrasonic meter that provides exceptional performance using a non-invasive clamp-on approach. Ultrasonic transducers transmit and receive acoustic signals directly through the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.

Clamp-on transducer mounted in a reflect configuration

The beam refraction angle is calculated as follows:

\[
\sin \theta = \frac{c}{V_p} 
\]

\(c\) = Velocity of sound in fluid

\(V_p\) = 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 transducers A and B. By subtracting the computed fixed times (within the transducers and pipe wall) from the measured average transit-time, the meter can then infer the required transit-time in the fluid (\(T_{\text{Fluid}}\)).

The Sound waves traveling in the same direction as flow (\(T_{AB}\)) arrive earlier than sound waves traveling against the direction of flow (\(T_{BA}\)). This time difference (\(\Delta t\)) is used to compute the line integrated flow velocity (\(v\)) as shown in the equation below:

\[
v = \frac{V_p}{2} \cdot \frac{\Delta t}{T_{\text{Fluid}}} 
\]

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 (\(\text{visc}\)) as shown in the equations below, where \(Q\) represents the final flow profile compensated volumetric flow rate.

\[
\text{Re} = \frac{D_i \cdot v}{\text{visc} \cdot Q} = K(\text{Re}) \cdot \left( \frac{\pi}{4} \cdot D_i^2 \right) \cdot v 
\]

\(v\) = Flow velocity

\(\text{visc} = \frac{\mu}{\rho} = (\text{dynamic viscosity} / \text{density})\)

\(K(\text{Re}) = \text{Reynolds flow profile compensation}\)

In all 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 meters 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 Transducer Types**

Two basic types of Clamp-On transducers can be selected for use with the SITRANS FUS1010 flowmeter. The lower cost “universal” transducer is the most common type in the industry and is suitable for most single liquid application where the sound velocity does not vary much. This transducer type can be used on any sonically conductive pipe material (including steel) making it well suited for portable survey applications. Universal transducers are selected based on the pipe diameter range alone, so wall thickness is not important to the selection process.

The second transducer type is the patented WideBeam transducer (called high precision), which utilizes the pipe wall as a kind of loudspeaker to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of transducer less sensitive to any change in the fluid medium.

The WideBeam transducer is designed for steel pipes, but can also be used with aluminum, titanium and plastic pipe. It is preferred transducer for HPI and gas applications. Note that unlike the universal type, this transducer selection is dependent only on the pipe’s wall thickness.

**Automatic Zero Drift Correction (ZeroMatic Path™)**

When WideBeam transducers are installed in the “Reflect” mode configuration shown below, the acoustic signal travels in two different paths between transducers 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 transducer “mis-match”. By continually analyzing this pipe wall signal the 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 1 or 2 measurement channel, with 4 channel meters supplied as special order.

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.
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 transducer.

**SITRANS meter family description**

SITRANS FUS1010 flowmeters

The 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 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 FUS1020 flowmeters

The FUS1020 system has the same basic function of the FUS1010 system, but does not include the same I/O capability or safety approval rating of the FUS1010. This basic meter is intended for single liquid applications that do not require these additional features. Note that the FUS1020 is not available with hazardous area approvals.

SITRANS FUP1010 Portable meters

The FUP1010 meter has all the capabilities of the 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 area approvals.

SITRANS FUE1010 Energy meters

By combining clamp-on transit-time flow measurement with accurate temperature differential measurement, the 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 k$\phi$ 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 FUE1010 system is available in both dedicated (IP65 (NEMA 4X)) and portable configurations (IP40).

**SITRANS FUG1010 Gas meters**

**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: The FUG1010 gas meter is not designed with the same capabilities of a volume compensating flow computer but it can provide a standard volume or mass flow output for fixed gas compositions. All 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 ($Z_{acq}$) in response to changes in gas pressure and temperature, as indicate below:

$$\text{Std. Rate} = \frac{Q_{acq}}{P_{act}/P_{base}} \cdot \frac{T_{base}/T_{act}}{Z_{base}/Z_{act}}$$

**SITRANS FUH1010 Hydrocarbon meters**

There are two models of flowmeters included in the FUH1010 family, a viscosity compensated model, used for applications that will flow a wide range of viscosity, and a standard volume (Mass) model. Both 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 liquidident output will remain constant over a wide range of pressure or temperature.

PV (Viscosity Compensation) Option:

This is the lower cost FUH meter option that uses the liquidident 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 DV meter option described below. The PV meter is suitable for any petroleum application where actual volume required as the input to an external RTU or flow computer.
DV (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 ($\alpha_b$):

$$\alpha_b = \frac{K_0}{\rho_b^2} + \frac{K_1}{\rho_b}$$

where: $K_0$ and $K_1$ are constants dependent on type of liquid and $\rho_b$ is the liquid density at base conditions

Compute temperature correction factor ($K_T$):

$$K_T = \rho_b \times \exp(-\alpha_b \Delta T (1 + 0.8 \alpha_b \Delta T))$$

where: $\Delta T = (T - \text{base temperature})$

Correction for Pressure:

Compute Compressibility Factor ($F$):

$$F = \exp(A + B T + (C + D T) / \rho_b^2)$$

where: $A$, $B$, $C$ and $D$ are constants, and “$T$” is liquid temperature

Compute pressure correction factor ($K_p$):

$$K_p = \frac{1}{1 - F (P_{\text{act}} - P_{\text{base}}) \times 10^{-4}}$$

Final Volume Correction: $Q_{\text{std}} = Q_{\text{act}} \times K_T \times K_p$

Available outputs from this meter include: API, Density, Mass Flowrate, Standard Volume Flowrate and Liquid Identification.

B (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, interface detector or pig detector. Be aware that this meter does NOT measure flow rate.

General Installation Guidelines for transit-time Clamp-On Transducers:

- 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 transducers). Final flow range determination requires application review

Pipe must be completely full within the transducer 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

Transducers 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

Submersible and direct burial installations can be accommodated. Consult sales representative for details

Ultrasonic coupling compound is provided with all transducer orders. Insure that a permanent coupling compound is used for long term installations

Refer to the “Transducer type selection guide” to insure proper application of the equipment
### Dimensional drawings

#### FUS1010, FUE1010, FUH1010 and FUG1010 IP65 (NEMA 4X) Enclosure

- **Transducer cables**
- **Data/Control I/O**
- **Power In**
- **Mounting hole pattern (7.8 (0.31)) diam. holes in mounting flanges**

#### FUS1010, FUH1010 and FUG1010 IP65 (NEMA 7) Compact explosionproof enclosure

- **Flow display computer** (shown with cover open)
- **Graphic display cable** (optional)
- **System computer module**
- **Analog input module**

**Dimensions in mm (inch)**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power In</td>
<td>273 (10.75)</td>
</tr>
<tr>
<td>Latch (Ref.)</td>
<td>54 (2.13)</td>
</tr>
<tr>
<td>Mounting flange (Ref.)</td>
<td>137 (5.38)</td>
</tr>
<tr>
<td>22 (.875) Diam. hole 5-PLCS.</td>
<td>76 (3.00)</td>
</tr>
<tr>
<td>Hinged side</td>
<td>19 (0.75)</td>
</tr>
</tbody>
</table>

**Note:**
Net weight: 4.1 kg (9.0 lbs) max.

---

### FUS1010, FUH1010 and FUG1010 IP65 (NEMA 7) Compact explosionproof enclosure

- **Optional alpha numeric display**
- **Viewing lens cover (zone B1)**
- **1/2”-14 male NPT fitting for customer’s conduit fitting or cable gland**
- **F’ Connector protective cap**
- **Standard upright installation**

**Dimensions in mm (inch)**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect to earth ground</td>
<td>165.1 (6.50)</td>
</tr>
<tr>
<td>76.2 (3.00)</td>
<td></td>
</tr>
<tr>
<td>1/2”-14 male NPT fitting for customer’s conduit fitting or cable gland</td>
<td>127 (5.0) min. cable clearance</td>
</tr>
<tr>
<td>266.7 (10.5)</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
Net weight: 4.4 kg (9.8 lbs.) max.
FUS1010 and FUH1010 IP66 (NEMA 7) Wall mount explosionproof enclosure

Dimensions in mm (inch)

Note: Net weight: 29 kg (64.0 lbs) max.
FUG1010 IP66 (NEMA 7) wall mount explosionproof enclosure

Dimensions in mm (inch)
FUP1010 IP67 Weatherproof impact resistant enclosure

Dimensions in mm (inch)

Note:
Net weight: 3.64 kg (8.0 lbs)
FUE1010 IP40 (NEMA 1) Portable impact resistant enclosure

- Transducer, data/control and power cable connectors (see zone B2)
- Flow display computer test connector
- RS-232 connector
- Battery status indicator
- Auxiliary power/battery charger input
- Temperature sensor cable connectors (Optional)

Dimensions in mm (inch)

Note:
Net weight: 3.5 kg (7.7 lbs)
**SITRANS F flowmeters**

**SITRANS F US**

**System information and selection guide**

**FUS1020 IP65 (NEMA 4) Wall mount enclosure**

Dimensions in mm (inch)

- **FUS1020 IP65 (NEMA 4)** Wall mount enclosure

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>197 (7.77)</td>
<td></td>
</tr>
<tr>
<td>184 (7.25)</td>
<td></td>
</tr>
<tr>
<td>157 (6.19)</td>
<td></td>
</tr>
<tr>
<td>103 (4.06)</td>
<td></td>
</tr>
<tr>
<td>76 (3.0)</td>
<td>1. Net weight 1.4 kg (3.0 lbs)</td>
</tr>
<tr>
<td></td>
<td>2. Use conduit fittings or cable glands at all cable entries. Install weather tight seals at all unused holes.</td>
</tr>
</tbody>
</table>

Transducer cable connectors ("F" Type)

4-hole mtg. pattern for optional 1" NPT conduit/gland adapter

Data/Control cables

Power cable entry ports for customer’s conduit or cable gland

Notes:

- 1. Net weight 1.4 kg (3.0 lbs)
- 2. Use conduit fittings or cable glands at all cable entries. Install weather tight seals at all unused holes.
SITRANS F flowmeters

SITRANS FUS1010 Standard clamp-on

Overview

SITRANS FUS1010 is the most versatile clamp-on ultrasonic flow display computer 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) or IP65 (NEMA 7) and IP66 (NEMA 7) explosionproof 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 transducers 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 transducers 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

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

FUS1010 is available in three configurations:

• IP65 (NEMA 4X) 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 explosionproof enclosure constructed of cast aluminum, stainless steel hardware, optional glass window
  - Single channel
  - Dual channel / dual path
  - Four channel (optional)

Function

• IP65 (NEMA 4X) and IP66 (NEMA 7) flow display computers 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 computer has a 2 x 16 Alphanumeric LCD display
• Current, voltage, status alarm, frequency and RS232 outputs (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 options
### Technical specifications

**SITRANS FUS1010, IP65 (NEMA 4X) Flow display computer**

#### Enclosure IP65 (NEMA 4X)**

**Input**

- **Flow range**: ± 12 m/s (± 40 ft/s), bidirectional
- **Pipe size**: 6.4 mm ... 9.14 m (0.25" ... 360")
- **Optional inputs**
  - Single channel
    - Current: 2 x 4 ... 20 mA DC
    - Voltage: 2 x 0 ... 10 V DC
    - Temperature: 2 x 4 wire 1 kΩ RTD

**Output**

- **Standard outputs**
  - Current: 2 x 4 ... 20 mA DC (1 kΩ at 30 V DC)
  - Voltage: 2 x 0 ... 10 V DC (5 kΩ min.)
  - Status Alarm: 4 x SPDT relays
  - Mercury wetted relays
  - Frequency: 2 x 0 ... 5 kHz
  - RS232
- **Optional outputs**
  - Mercury wetted relays
  - Expanded I/Os (4 additional 4 ... 20 mA outputs) with form c relays
  - Expanded I/Os with Mercury wetted relays
  - uniMass capability with 1 RTD input and 4 x 4 ... 20 mA analog input

### Rated operation conditions

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid temperature</td>
<td>±40 ... +120 °C (-40 ... +250 °F)</td>
</tr>
<tr>
<td>Optional</td>
<td>±40 ... +230 °C (-40 ... +450 °F)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>±18 ... +60 °C (0 ... 140 °F)</td>
</tr>
</tbody>
</table>

### 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 backlight

**Keypad**

33 keypad buttons with tactile feedback

**Language options**

English, spanish, german, italian, french

### Certificates and approvals

**FM and CSA ratings**

- I.S. Class I, II, Div 1
- N-I Class I, Div 2
- S Class II, Div 2

**ATEX ratings**

- Flow display computer:
  - Ex II (1) G [Ex ia] IIC
  - Ex II 3 (1) G EEx nC [ia] IIC T5
- Transducers:
  - Ex II 1 G Ex ia IIC T5
  - Ex II 2 G Ex m II T5 (for use with flowmeter in safe area)
### SITRANS FUS1010, IP65 (NEMA 7) Compact explosionproof

**Enclosure IP65 (NEMA 7)**

<table>
<thead>
<tr>
<th><strong>Input</strong></th>
<th><strong>Output</strong></th>
<th><strong>Accuracy</strong></th>
<th><strong>Rated operation conditions</strong></th>
<th><strong>Design</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flow range</strong></td>
<td>± 12 m/s (± 40 ft/s), bidirectional</td>
<td>± 0.5% ... 1.0% of flow, for velocities greater than 0.3 m/s (1 ft/s)</td>
<td><strong>Degree of protection</strong></td>
<td><strong>Dimensions</strong> see SITRANS F US Clamp-on “System info and selection guide”</td>
</tr>
<tr>
<td><strong>Pipe size</strong></td>
<td>6.4 mm ... 9.14 m (0.25” ... 360”)</td>
<td>± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)</td>
<td><strong>Liquid temperature</strong> *<em>-40 ... +120 °C (-40 ... +250 °F)*</em></td>
<td><strong>Weight</strong> see diagrams</td>
</tr>
<tr>
<td><strong>Optional inputs</strong></td>
<td>Current: 1 x 4 … 20 mA DC</td>
<td>Batch repeatability</td>
<td><strong>Ambient temperature</strong></td>
<td><strong>Power supply</strong> 90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W</td>
</tr>
<tr>
<td><strong>single channel</strong></td>
<td>Temperature: 2 x 4 wire 1 kΩ RTD</td>
<td>± 0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s)</td>
<td><strong>-40 ... +230 °C (-40 ... +450 °F)</strong></td>
<td><strong>90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W</strong></td>
</tr>
</tbody>
</table>

**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**
  - XP Class I, Div 1
  - D-I Class II, Div 1
  - I.S. Class I, Div 1
  - N-I Class I, Div 2
  - S Class II, Div 2
- **ATEX ratings**
  - Flow display computer: Ex II 2 (1) G EEx d [ia] IIB + H2 T5
  - Transducers: Ex II 1 G EEx ia IIC T5
- **INMETRO ratings (Brazil)**
  - Flow display computer: BR Ex d [ia] IIC T5
  - Transducers: BR-Ex ia IIC T5

**Data refresh rate**

- 5 Hz

**Rated operation conditions**

- **Degree of protection** IP65 (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

© Siemens AG 2010
SITRANS F US

SITRANS FUS1010 Standard clamp-on

SITRANS FUS1010, IP66 (NEMA 7) Wall mount explosionproof enclosure

Enclosure IP66 (NEMA 7)

Input

Flow range
± 12 m/s (± 40 ft/s), bidirectional
Pipe size
6.4 mm ... 9.14 m (0.25" ... 360")
Optional Inputs
single channel
• Current: 2 x 4 … 20 mA DC
• Voltage: 2 x 0 … 10 V DC
• Temperature: 2 x 4 wire 1 kΩ RTD

Output

Outputs
single channel
• Current: 2 x 4 … 20 mA DC (1 kΩ at 30 V DC)
• Voltage: 2 x 0 … 10 V DC (5 kΩ min.)
• Status Alarm: 4 x SPDT Relays
• Frequency: 2 x 0 … 5 kHz
• RS232

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
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 backlight
Keypad
33 keypad buttons with tactile feedback
Language options
English, spanish, german, italian, french

Certificates and approvals

FM and CSA ratings
XP Class I, Div 1
D-I Class II, Div 1
I.S. Class I, Div 1
N-I Class I, Div 2
S Class II, Div 2

ATEX ratings
• Flow display computer
Ex II (1) G [Ex ia] IIC
Ex II 3 (1) G EEx nC [ia] IIC T5
Ex II 2 (1) G EEx d [ia IIC] IIb + H2 T5

• Transducers
Ex II 1 G EEx ia IIC T5

INMETRO ratings (Brazil)
• Flow display computer
[BR-Ex ia] IIC
BR-Ex d [ia IIC] IIb + H2 T5

• Transducers
BR-Ex ia IIC T5
-50 °C ≤ Ta ≤ +60 °C
SITRANS F flowmeters

SITRANS F US

SITRANS FUS1010 Standard clamp-on

Standard MLFB for quick delivery on SITRANS FUS1010 (Dedicated standard)

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS1010 Standard clamp-on</td>
<td>K) 7ME353-000000K02 + K02 + R02</td>
<td></td>
</tr>
</tbody>
</table>

Design (Includes cable glands)

IP65 (NEMA 4X)

Number of channels/ultrasonic paths

<table>
<thead>
<tr>
<th>Single channel</th>
<th>Dual channel/Dual path</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Flowmeter functions and I/O configurations

- Includes graphic display and Reflexor capability
- Standard outputs
  - 2 x 0 ... 10 V
  - 2 x pulse output
  - 4 x relay C type

Meter power options

- 90 ... 240 V AC

Communication options

- RS 232 (standard)

Transducer for channel 1

(includes pipe mounting kit and spacer bar for indicated max. OD listed)

See „Transducer selection charts“ for specifications.

- no transducer
- A2 universal: Trackmount and straps provided up to 75 mm (3”)
- B3 universal: Trackmount and straps provided up to 125 mm (5”)
- C3 universal: Mounting frame and straps provided up to 300 mm (13”)
- D3 universal: Mounting frame and straps provided up to 600 mm (24”)
- E2 universal: Mounting frame and straps provided up to 1200 mm (48”)¹
- C1H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²
- C2H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²
- D1H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²
- D2H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²

Transducer for channel 2

(includes pipe mounting kit for indicated max. OD listed)

See „Transducer selection charts“ for specifications.

- no transducer
- A2 universal: Trackmount and straps provided up to 75 mm (3”)
- B3 universal: Trackmount and straps provided up to 125 mm (5”)
- C3 universal: Mounting frame and straps provided up to 300 mm (13”)
- D3 universal: Mounting frame and straps provided up to 600 mm (24”)
- E2 universal: Mounting frame and straps provided up to 1200 mm (48”)¹
- C1H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²
- C2H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²
- D1H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²
- D2H (high precision): Mounting frame and straps provided up to 1200 mm (48”)²

Approvals

- FM/CSA (default)
- ATEX Exia

¹ Supplied spacer bar supports pipes up to 1050 mm (42 inches). For pipes larger than 1050 mm (42 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4)
² Supplied spacer bar supports pipes up to 750 mm (30 inches). For pipes larger than 750 mm (30 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

Standard MLFB product offering represents 4 to 6 weeks delivery time

K) Subject to export regulations AL: N, ECCN: 5A991X.
Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS1010 Standard clamp-on</td>
<td>7ME3530-0MS40</td>
<td>(1012BN-4)</td>
</tr>
<tr>
<td>- IP56 (NEMA 4X)</td>
<td>K)</td>
<td></td>
</tr>
<tr>
<td>- IP65 (NEMA 4X)</td>
<td>K)</td>
<td></td>
</tr>
<tr>
<td>- IP65 (NEMA 7) compact</td>
<td>K)</td>
<td></td>
</tr>
<tr>
<td>- IP66 (NEMA 7) wall mounted</td>
<td>K)</td>
<td></td>
</tr>
<tr>
<td>- IP66 (NEMA 7) with display window</td>
<td>K)</td>
<td></td>
</tr>
<tr>
<td>Number of channels/ultrasonic paths</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dual channel / Dual path</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Special: Four channel / Four path (NEMA 4X and NEMA 7 wall mount only)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Flowmeter functions and I/O configurations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>includes graphic or digital display and Reflexor capability for all except IP65 (NEMA 7) compact units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP65 (NEMA 4X) and IP66 (NEMA 7 wall mounted) units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Standard outputs</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>- 2 x 0 ... 10 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2 x 4 ... 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2 x pulse output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 4 x relay C type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Standard outputs with optional input adder</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>- UniMass capability with 2 x RTD input and 1 x analog input per channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other version (Extended I/O and/or Mercury wetted relays)</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Add order code and plain text.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard outputs with Mercury wetted relays and optional input adder</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Extended outputs adder with optional input adder (4 additional 4 ... 20 mA outputs) and form C relay</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Extended outputs adder with optional input adder (4 additional 4 ... 20 mA outputs) and Mercury wetted relays</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Standard outputs with Mercury wetted relays</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Meter power options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 ... 240 V AC</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>9 ... 36 V DC (except compact NEMA 7)</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>9 ... 36 V DC negative GND (compact only)</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>9 ... 36 V DC positive GND (compact only)</td>
<td>K</td>
<td></td>
</tr>
<tr>
<td>Communication options</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>RS232 (standard)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MODBUS (dedicated only, excludes NEMA 7 compact)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RTD temperature sensor (Includes mounting hardware for pipes between 1.5” and 24” outer diameter)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No RTDs</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1 x standard clamp-on RTD</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 x standard clamp-on RTD</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1 x submersible clamp-on RTD</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2 x submersible clamp-on RTD</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Special (for insert style RTDs), describe RTD length, thermowell and lagging</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>1 x insertion style RTD with thermowell and lagging</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Transducer for channel 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Including pipe mounting tracks for sizes A &amp; B transducers indented for pipe with a OD less than 125 mm (5”) and mounting frame/spacer bars for sizes C, D &amp; E transducers. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to “Transducer Selection Charts” for the transducer suitability of pipe size and wall thickness.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no transducer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2 universal</td>
<td>Trackmount and straps provided up to 75 mm (3”)</td>
<td></td>
</tr>
<tr>
<td>B3 universal</td>
<td>Trackmount and straps provided up to 125 mm (5”)</td>
<td></td>
</tr>
<tr>
<td>C3 universal</td>
<td>Mounting frame and straps provided up to 300 mm (12”)</td>
<td></td>
</tr>
<tr>
<td>D3 universal</td>
<td>Mounting frame and straps provided up to 600 mm (24”)</td>
<td></td>
</tr>
<tr>
<td>E2 universal</td>
<td>Mounting frame and straps provided up to 1200 mm (48”)</td>
<td></td>
</tr>
<tr>
<td>For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1H (high precision)</td>
<td>Trackmount and straps provided up to 75 mm (3”)</td>
<td></td>
</tr>
<tr>
<td>A2H (high precision)</td>
<td>Trackmount and straps provided up to 75 mm (3”)</td>
<td></td>
</tr>
<tr>
<td>A3H (high precision)</td>
<td>Trackmount and straps provided up to 125 mm (5”)</td>
<td></td>
</tr>
<tr>
<td>B1H (high precision)</td>
<td>Trackmount and straps provided up to 75 mm (3”)</td>
<td></td>
</tr>
<tr>
<td>B2H (high precision)</td>
<td>Trackmount and straps provided up to 125 mm (5”)</td>
<td></td>
</tr>
<tr>
<td>C1H (high precision)</td>
<td>Mounting frame and straps provided up to 1200 mm (48”)</td>
<td></td>
</tr>
<tr>
<td>C2H (high precision)</td>
<td>Mounting frame and straps provided up to 1200 mm (48”)</td>
<td></td>
</tr>
<tr>
<td>D1H (high precision)</td>
<td>Mounting frame and straps provided up to 1200 mm (48”)</td>
<td></td>
</tr>
<tr>
<td>D2H (high precision)</td>
<td>Mounting frame and straps provided up to 1200 mm (48”)</td>
<td></td>
</tr>
<tr>
<td>D4H (high precision)</td>
<td>Mounting frame and straps provided up to 1200 mm (48”)</td>
<td></td>
</tr>
<tr>
<td>Doppler to 12” with strap kit</td>
<td>(not for IP65 (NEMA 7))</td>
<td></td>
</tr>
</tbody>
</table>

1) Supplied spacer bar supports pipes up to 1050 mm (42 inches). For pipes larger than 1050 mm (42 inches) purchase also, spare part 7ME3960-OMS40 (1012BN-4)
2) Supplied spacer bar supports pipes up to 750 mm (30 inches). For pipes larger than 750 mm (30 inches) purchase also, spare part 7ME3960-OMS40 (1012BN-4)

K) Subject to export regulations AL: N, ECCN: 5A991X
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Transducer for channel 1 (continued)</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other versions (different size, mount, type or pipe larger than DN 1200 (48”), or corrosion resistant), add Order code and plain text.</td>
<td>Z</td>
<td>P 1 Y</td>
</tr>
<tr>
<td>High temperature transducer size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.).)</td>
<td>Z</td>
<td>P 1 A</td>
</tr>
<tr>
<td>High temperature transducer size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.).)</td>
<td>Z</td>
<td>P 1 B</td>
</tr>
<tr>
<td>High temperature transducer size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.).)</td>
<td>Z</td>
<td>P 1 C</td>
</tr>
<tr>
<td>For the following B1H to D4H transducers, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):</td>
<td>Z</td>
<td>P 1 K</td>
</tr>
<tr>
<td>B1H (high temperature range HP)</td>
<td>Z</td>
<td>P 1 L</td>
</tr>
<tr>
<td>C1H (high temperature range HP)</td>
<td>Z</td>
<td>P 1 M</td>
</tr>
<tr>
<td>C2H (high temperature range HP)</td>
<td>Z</td>
<td>P 1 N</td>
</tr>
<tr>
<td>D1H (high temperature range HP)</td>
<td>Z</td>
<td>P 1 P</td>
</tr>
<tr>
<td>D2H (high temperature range HP)</td>
<td>Z</td>
<td>P 1 Q</td>
</tr>
<tr>
<td>D4H (high temperature range HP)</td>
<td>Z</td>
<td>P 1 R</td>
</tr>
</tbody>
</table>

### Transducer for channel 2 (continued)

<table>
<thead>
<tr>
<th>Transducer for channel 2 (includes pipe mounting kit for indicated max. OD listed)</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>no transducer</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>A2 universal Trackmount and straps provided up to 75 mm (3”)</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>B3 universal Trackmount and straps provided up to 125 mm (5”)</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>C3 universal Mounting frame and straps provided up to 300 mm (13”)</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>D3 universal Mounting frame and straps provided up to 600 mm (24”)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>E2 universal Mounting frame and straps provided up to 1200 mm (48”)</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>A1H (high precision) Trackmount and straps provided up to 75 mm (3”)</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>A2H (high precision) Trackmount and straps provided up to 75 mm (3”)</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>A3H (high precision) Trackmount and straps provided up to 75 mm (3”)</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>B1H (high precision) Trackmount and straps provided up to 125 mm (5”)</td>
<td>K</td>
<td></td>
</tr>
<tr>
<td>B2H (high precision) Trackmount and straps provided up to 125 mm (5”)</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>C1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)</td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Transducer for channel 2 (continued)</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>D1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>D2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>D4H (high precision) Mounting frame and straps provided up to 1200 mm (48”)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Doppler to 12” with strap kit (not for IP65 (NEMA 7))</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Other versions (different size, mount, type or pipe larger than DN 1200 (48”), or corrosion resistant), add Order code and plain text.</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>High temperature transducer size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.).)</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>High temperature transducer size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.).)</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>High temperature transducer size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.).)</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Doppler to 12” with strap kit (not for IP65 (NEMA 7))</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

### Approvals

- FM/CeSA
- ATEX
- INMETRO (Brazil)
- Special ATEX EEx m

SITRANS F flowmeters

SITRANS FUS1010 Standard clamp-on

1) Supplied spacer bar supports pipes up to 1050 mm (42 inches). For pipes larger than 1050 mm (42 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

2) Supplied spacer bar supports pipes up to 750 mm (30 inches). For pipes larger than 750 mm (30 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

K) Subject to export regulations AL: N, ECCN: 5A991X.
SITRANS F flowmeters

SITRANS FUS1010 Standard clamp-on

Selection and Ordering data

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add &quot;Z&quot; to Order No. and specify Order code(s).</td>
<td></td>
</tr>
<tr>
<td>Cable assembly for transducers (add for No. of channels)</td>
<td>K..</td>
</tr>
<tr>
<td>See „Transducer cable selection chart“</td>
<td></td>
</tr>
<tr>
<td>Cable assembly for RTDs (add for No. of RTDs)</td>
<td>R..</td>
</tr>
<tr>
<td>See „RTD cable selection chart“</td>
<td></td>
</tr>
<tr>
<td>Cable termination kit (for one cable pair)</td>
<td></td>
</tr>
<tr>
<td>• Termination for standard, plenum and armored transducer cable</td>
<td>T01</td>
</tr>
<tr>
<td>• Termination for submersible transducer cable</td>
<td>T11</td>
</tr>
<tr>
<td>• RTD cable termination kit for standard RTD</td>
<td>T21</td>
</tr>
<tr>
<td>• RTD cable termination kit for submersible RTD</td>
<td>T31</td>
</tr>
<tr>
<td>• Insert RTD cable termination kit</td>
<td>T41</td>
</tr>
</tbody>
</table>

Languages (Meter and Documentation), English (default)

- German: B10
- French: B12
- Spanish: B13
- Italian: B14

Wet flow transfer calibration (priced on request)

- 6 point up to 4 inch (DN 100): D10
- 6 point up to 5 to 8 inch (DN 125 to DN 200): D11
- 6 point up to 10 to 12 inch (DN 250 to DN 300): D12
- 6 point up to 14 to 16 inch (DN 350 to DN 400): D13
- 6 point up to 18 to 20 inch (DN 450 to DN 500): D14
- 6 point up to 22 to 24 inch (DN 550 to DN 600): D15
- 6 point up to 26 to 30 inch (DN 650 to DN 750): D16
- 6 point up to 32 to 36 inch (DN 800 to DN 900): D17

Tag name plate

- Stainless steel tag with 3.2 mm (0.13 inch) character size (26 characters max.): Y17
- Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.): Y19

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 Order No.: 7ME3530-2AB00-0QQ1-Z

K03 + K03

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3530</td>
<td>2AB00</td>
</tr>
<tr>
<td>0QQ1</td>
<td>Z</td>
</tr>
<tr>
<td>K03</td>
<td>K03</td>
</tr>
</tbody>
</table>

FUS1010 meter family

IP65 (NEMA 4X) enclosure
Dual Path
Standard I/O option
9 ... 36 V DC power option
RS232 Standard
No RTD required
Transducer code for path 1
Transducer code for path 2
FM approval required
30 m (100 ft) transducer cable for path 1
30 m (100 ft) transducer cable for path 2

© Siemens AG 2010
### Transducer selection charts

**Universal transducers for any pipe material**

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Order Code</th>
<th>Outer diameter range (mm)</th>
<th>Outer diameter range (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>min.</td>
<td>max.</td>
</tr>
<tr>
<td>A2</td>
<td>B</td>
<td>12.7</td>
<td>50.8</td>
</tr>
<tr>
<td>B3</td>
<td>C</td>
<td>19</td>
<td>127</td>
</tr>
<tr>
<td>C3</td>
<td>D</td>
<td>51</td>
<td>305</td>
</tr>
<tr>
<td>D3</td>
<td>E</td>
<td>203</td>
<td>610</td>
</tr>
<tr>
<td>E2</td>
<td>F</td>
<td>254</td>
<td>6,096</td>
</tr>
</tbody>
</table>

**High precision transducers for steel pipe with outer diameter/wall thickness ratio >10**

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Order Code</th>
<th>Pipe wall (mm)</th>
<th>Pipe wall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>min.</td>
<td>max.</td>
</tr>
<tr>
<td>A1H</td>
<td>G</td>
<td>0.64</td>
<td>1.02</td>
</tr>
<tr>
<td>A2H</td>
<td>H</td>
<td>1.02</td>
<td>1.52</td>
</tr>
<tr>
<td>A3H</td>
<td>J</td>
<td>1.52</td>
<td>2.03</td>
</tr>
<tr>
<td>B1H</td>
<td>K</td>
<td>2.03</td>
<td>3.05</td>
</tr>
<tr>
<td>B2H</td>
<td>L</td>
<td>3.05</td>
<td>4.06</td>
</tr>
<tr>
<td>C1H</td>
<td>M</td>
<td>4.06</td>
<td>5.84</td>
</tr>
<tr>
<td>C2H</td>
<td>N</td>
<td>5.84</td>
<td>8.13</td>
</tr>
<tr>
<td>D1H</td>
<td>P</td>
<td>8.13</td>
<td>11.18</td>
</tr>
<tr>
<td>D2H</td>
<td>Q</td>
<td>11.18</td>
<td>15.75</td>
</tr>
<tr>
<td>D4H</td>
<td>R</td>
<td>15.75</td>
<td>31.75</td>
</tr>
</tbody>
</table>

**Transducer cable selection chart**

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (PVC jacket)</th>
<th>Submersible (polyethylene jacket)</th>
<th>Plenum Rated (teflon jacket)</th>
<th>Armored</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>K01</td>
<td>K11</td>
<td>K21</td>
<td>K31</td>
</tr>
<tr>
<td>15 (50)</td>
<td>K02</td>
<td>K12</td>
<td>K22</td>
<td>K32</td>
</tr>
<tr>
<td>30 (100)</td>
<td>K03</td>
<td>K13</td>
<td>K23</td>
<td>K33</td>
</tr>
<tr>
<td>46 (150)</td>
<td>K04</td>
<td>K14</td>
<td>K24</td>
<td>K34</td>
</tr>
<tr>
<td>61 (200)</td>
<td>K05</td>
<td>K15</td>
<td>K25</td>
<td>K35</td>
</tr>
<tr>
<td>91 (300)</td>
<td>K06</td>
<td>K16</td>
<td>K26</td>
<td>K36</td>
</tr>
</tbody>
</table>

**RTD cable selection chart**

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (teflon wrapped)</th>
<th>Submersible (extruded jacket)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>R01</td>
<td>R11</td>
</tr>
<tr>
<td>15 (50)</td>
<td>R02</td>
<td>R12</td>
</tr>
<tr>
<td>30 (100)</td>
<td>R03</td>
<td>R13</td>
</tr>
<tr>
<td>46 (150)</td>
<td>R04</td>
<td>R14</td>
</tr>
<tr>
<td>61 (200)</td>
<td>R05</td>
<td>R15</td>
</tr>
<tr>
<td>91 (300)</td>
<td>R06</td>
<td>R16</td>
</tr>
</tbody>
</table>
SITRANS F FUP1010 Portable clamp-on non-intrusive ultrasonic flow display computer offers maximum versatility plus battery power for portable field use. It can operate in either WideBeam Transit-Time or reflector (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 model can be used outdoors and left in place without concern for rain damage
- Weatherproof model’s 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 transducers 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 FUP1010 flow display computer is not available with hazardous area approvals

Application
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 RS232 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
### Technical specifications

#### Input

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow range</td>
<td>± 12 m/s (± 40 ft/s), bidirectional</td>
</tr>
<tr>
<td>Pipe size</td>
<td>6.4 mm … 9.14 m (0.25” … 360”)</td>
</tr>
</tbody>
</table>
| Inputs, single channel | • Current: 2 x 4 … 20 mA DC  
                         | • Voltage: 2 x 0 … 10 V DC      
                         | • Temperature: 2 x 4 wire 1 kΩ RTD |

#### Output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Outputs            | • Current: 2 x 4 … 20 mA DC  
                         | (1 kΩ at 30 V DC)       
                         | • Voltage: 2 x 0 … 10 V DC  
                         | (5 kΩ minimum)           
                         | • Status Alarm: 4 x SPDT Relays 
                         | • Frequency: 2 x 0 … 5000 Hz  
                         | • RS232                      |

#### Accuracy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± 0.5% … 2% of flow, for velocities greater than 0.3 m/s (1 ft/s)</td>
</tr>
<tr>
<td></td>
<td>±0.0015 … 0.006 m/s (± 0.005 … 0.02 ft/s), for velocities less than 0.3 m/s (1 ft/s)</td>
</tr>
<tr>
<td>Batch repeatability</td>
<td>± 0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s)</td>
</tr>
<tr>
<td></td>
<td>± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)</td>
</tr>
</tbody>
</table>

#### Rated operation conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection</td>
<td>• Weatherproof/impact resistant</td>
</tr>
<tr>
<td></td>
<td>• IP67</td>
</tr>
</tbody>
</table>
| 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>see SITRANS F US Clamp-on &quot;System info and selection guide&quot;</td>
</tr>
<tr>
<td>Weight</td>
<td>see diagrams</td>
</tr>
</tbody>
</table>

#### Power supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Internal rechargeable battery</td>
</tr>
<tr>
<td>Battery operation</td>
<td>4 hours</td>
</tr>
</tbody>
</table>

#### Indication and operation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data logger memory</td>
<td>1 MByte</td>
</tr>
<tr>
<td>Site storage memory</td>
<td>50 sites minimum</td>
</tr>
<tr>
<td>Display</td>
<td>128 x 240 pixel LCD with backlight</td>
</tr>
<tr>
<td>Keypad</td>
<td>33 keypad buttons with tactile feedback</td>
</tr>
<tr>
<td>Language options</td>
<td>English, spanish, german, italian, french</td>
</tr>
</tbody>
</table>

#### Certificates and approvals

<table>
<thead>
<tr>
<th>Certification</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclassified locations only</td>
<td>UL</td>
</tr>
<tr>
<td></td>
<td>ULc</td>
</tr>
<tr>
<td></td>
<td>CE</td>
</tr>
<tr>
<td></td>
<td>LVD IEC 61010-1; CB Test Certificate</td>
</tr>
<tr>
<td></td>
<td>EMC EN 61000-6-2, -4</td>
</tr>
</tbody>
</table>
# SITRANS F flowmeters

## SITRANS FUS

### SITRANS FUP1010 Portable clamp-on

**Standard MLFB for quick delivery on SITRANS FUP1010 Portables (excluding energy)**

#### Selection and Ordering data

| Order No. | SITRANS FUP1010 Portable clamp-on
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3510-</td>
<td><strong>•</strong> IP67 Weather proof battery powered</td>
</tr>
</tbody>
</table>

**Number of channels/ultrasonic paths**

- Dual channel

**Standard flowmeter types and I/O configurations**

- **•** Standard I/O
  - 2 x 4 ... 20 mA analog in
  - 2 x RTD input

**Transducer cables**

- (select proper quantity of active channels)
  - No transducer cable
  - 2 x PVC-jacket, length 6 m (20 ft) (for NEMA 6)

**RTD temperature sensor**

- (for type 3 meter only, mounting hardware and cable included)
  - No RTDs
  - 1 x standard clamp-on RTD (NEMA 6) with 6 m (20 ft) cable

**Battery charger options**

- Charger Type A for Europe (CEE7/7)
- Charger Type G for U.S. (NEMA 5-15P)

**Transducer for channel 1**

- (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed)
- See „Transducer selection charts“ for specifications.

<table>
<thead>
<tr>
<th>no transducer</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2 universal</td>
<td>B</td>
</tr>
<tr>
<td>B3 universal</td>
<td>C</td>
</tr>
<tr>
<td>C3 universal</td>
<td>D</td>
</tr>
<tr>
<td>D3 universal</td>
<td>E</td>
</tr>
<tr>
<td>E2 universal</td>
<td>F</td>
</tr>
<tr>
<td>C1H (high precision)</td>
<td>M</td>
</tr>
<tr>
<td>C2H (high precision)</td>
<td>N</td>
</tr>
<tr>
<td>D1H (high precision)</td>
<td>P</td>
</tr>
<tr>
<td>D2H (high precision)</td>
<td>Q</td>
</tr>
</tbody>
</table>

**Approvals:** No options (UL, ULc, CE by default)

Standard MLFB product offering represents 4 to 6 weeks delivery time

D) Subject to export regulations AL: N, ECCN: EAR99H.
Selection and Ordering data

**SITRANS FUP1010 Portable clamp-on**
- IP67 weather proof battery powered

**Order No.** 7ME3510

---

Number of channels/ultrasonic paths
- Single channel
- Dual channel/Dual path

Standard flowmeter types and I/O configurations
- Standard I/O
  - Relay logic capable
  - Graphic display
  - 2 x 0 ... 10 V
  - 2 x 4 ... 20 mA
  - 4 x status logic
  - 2 x 4 ... 20 mA analog in
  - 1 x RTD per channel

Transducer cables
(select proper quantity of active channels)
- No transducer cable
- 1 x PVC-jacket, length 6 m (20 ft)
- 2 x PVC-jacket, length 6 m (20 ft)
- 1 x PVC-jacket, length 15 m (50 ft)
- 2 x PVC-jacket, length 15 m (50 ft)

Other versions
- add Order code and plain text.

RTD temperature sensor
(for type 3 meter only, mounting hardware and cable included)
- No RTDs
- 1 x standard clamp-on RTD (NEMA 6) with 6 m (20 ft) cable
- 2 x standard clamp-on RTD (NEMA 6) with 6 m (20 ft) cable
- 1 x standard clamp-on RTD (NEMA 6) with 15 m (50 ft) cable
- 2 x standard clamp-on RTD (NEMA 6) with 15 m (50 ft) cable

Other versions
- add Order code and plain text.

Battery charger options
- no battery charger
- Charger Type A for Europe (CEE7/7)
- Charger Type C for Australia (AS3112)
- Charger Type D for U.K. (BS1363)
- Charger Type J for Japan (JIS8303)
- Charger Type L for Switzerland (SEV1011)

Special: External battery for extended service, add Order code and plain text.
- External 4 hours battery for IP67 Portable
- External 4 hours battery with European plug for IP67 Portable

---

Transducer for channel 1
Including pipe mounting tracks for sizes A & B transducers indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E transducers. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Transducer Selection Charts" for the transducer suitability of pipe size and wall thickness.

- no transducer
- A2 universal Trackmount and straps provided up to 75 mm (3")
- B3 universal Trackmount and straps provided up to 125 mm (5")
- C3 universal Mounting frame and straps provided up to 300 mm (12")
- D3 universal Mounting frame and straps provided up to 600 mm (24")
- E2 universal Mounting frame and straps provided up to 600 mm (24")

For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):

- A1H (high precision) Trackmount and straps provided up to 75 mm (3")
- A2H (high precision) Trackmount and straps provided up to 75 mm (3")
- A3H (high precision) Trackmount and straps provided up to 75 mm (3")
- B1H (high precision) Trackmount and straps provided up to 75 mm (3")
- B2H (high precision) Trackmount and straps provided up to 75 mm (3")
- C1H (high precision) Mounting frame and straps provided up to 600 mm (24")
- C2H (high precision) Mounting frame and straps provided up to 600 mm (24")
- D1H (high precision) Mounting frame and straps provided up to 600 mm (24")
- D2H (high precision) Mounting frame and straps provided up to 600 mm (24")
- D4H (high precision) Mounting frame and straps provided up to 600 mm (24")
- Doppler to 12" with chain kit

Other versions (different size, mount, type or SDP configuration)
- no transducer
- A universal Mounting frame and straps provided up to 75 mm (3")
- B universal Mounting frame and straps provided up to 125 mm (5")
- C universal Mounting frame and straps provided up to 300 mm (12")
- D universal Mounting frame and straps provided up to 600 mm (24")
- E universal Mounting frame and straps provided up to 600 mm (24")

For more information, refer to the "Transducer Selection Charts" provided in the manual.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Transducer for channel 1 (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the following B1H to D4H transducers, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):</td>
</tr>
<tr>
<td>B1H (high temperature range HP)</td>
</tr>
<tr>
<td>B2H (high temperature range HP)</td>
</tr>
<tr>
<td>C1H (high temperature range HP)</td>
</tr>
<tr>
<td>C2H (high temperature range HP)</td>
</tr>
<tr>
<td>D1H (high temperature range HP)</td>
</tr>
<tr>
<td>D2H (high temperature range HP)</td>
</tr>
<tr>
<td>D4H (high temperature range HP)</td>
</tr>
</tbody>
</table>

#### Transducer for channel 2 (continued)

For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):

A1H (high precision) Trackmount and straps provided up to 75 mm (3″)

A2H (high precision) Trackmount and straps provided up to 75 mm (3″)

A3H (high precision) Trackmount and straps provided up to 75 mm (3″)

B1H (high precision) Trackmount and straps provided up to 125 mm (5″)

B2H (high precision) Trackmount and straps provided up to 125 mm (5″)

C1H (high precision) Mounting frame and straps provided up to 600 mm (24″)

C2H (high precision) Mounting frame and straps provided up to 600 mm (24″)

D1H (high precision) Mounting frame and straps provided up to 600 mm (24″)

D2H (high precision) Mounting frame and straps provided up to 600 mm (24″)

D4H (high precision) Mounting frame and straps provided up to 600 mm (24″)

Doppler to 12″ with chain kit

#### Approvals:
No options (UL, ULc, CE by default)

1) -40 ... +200 °C (-40 ... +392 °F)
2) -40 ... +80 °C (-40 ... +176 °F)

D) Subject to export regulations AL: N, ECCN: EAR99H.
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 Order No.: 7ME3510-2AB01-0DE0-Z

B10

Selection and Ordering data

Order No.

Ord. code

FUP1010 meter family

IP67 weather proof

Dual channel

Portable Type 3 I/O with Doppler capable, temperature

2 Plenum rated transducer cables 20 ft

No RTDs required

Charger Type A for Europe (CEE7/7)

Transducer for DN 50 ... DN 300 (2" ... 12") pipes

Transducer for DN 200 ... DN 600 (8" ... 24") pipes

German language support

Transducer Selection Charts

Universal transducers for any pipe material

<table>
<thead>
<tr>
<th>Transducer Size Code</th>
<th>Order Code</th>
<th>Outer diameter range (mm)</th>
<th>Outer diameter range (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>B</td>
<td>12.7 - 50.8</td>
<td>0.5 - 2</td>
</tr>
<tr>
<td>B3</td>
<td>C</td>
<td>19 - 127</td>
<td>0.75 - 5</td>
</tr>
<tr>
<td>C3</td>
<td>D</td>
<td>51 - 305</td>
<td>2 - 12</td>
</tr>
<tr>
<td>D3</td>
<td>E</td>
<td>203 - 610</td>
<td>8 - 24</td>
</tr>
<tr>
<td>E2</td>
<td>F</td>
<td>254 - 6096</td>
<td>10 - 240</td>
</tr>
</tbody>
</table>

High precision transducers for steel pipe with outer diameter/wall thickness ratio > 10

<table>
<thead>
<tr>
<th>Transducer Size Code</th>
<th>Order Code</th>
<th>Pipe wall (mm)</th>
<th>Pipe wall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1H</td>
<td>G</td>
<td>0.64 - 1.02</td>
<td>0.025 - 0.04</td>
</tr>
<tr>
<td>A2H</td>
<td>H</td>
<td>1.02 - 1.52</td>
<td>0.04 - 0.06</td>
</tr>
<tr>
<td>A3H</td>
<td>J</td>
<td>1.52 - 2.03</td>
<td>0.06 - 0.08</td>
</tr>
<tr>
<td>B1H</td>
<td>K</td>
<td>2.03 - 3.05</td>
<td>0.08 - 0.12</td>
</tr>
<tr>
<td>B2H</td>
<td>L</td>
<td>3.05 - 4.06</td>
<td>0.12 - 0.16</td>
</tr>
<tr>
<td>C1H</td>
<td>M</td>
<td>4.06 - 5.84</td>
<td>0.16 - 0.23</td>
</tr>
<tr>
<td>C2H</td>
<td>N</td>
<td>5.84 - 8.13</td>
<td>0.23 - 0.32</td>
</tr>
<tr>
<td>D1H</td>
<td>P</td>
<td>8.13 - 11.17</td>
<td>0.32 - 0.44</td>
</tr>
<tr>
<td>D2H</td>
<td>Q</td>
<td>11.18 - 15.75</td>
<td>0.44 - 0.62</td>
</tr>
<tr>
<td>D4H</td>
<td>R</td>
<td>15.75 - 31.75</td>
<td>0.62 - 1.25</td>
</tr>
</tbody>
</table>
The SITRANS FUP1010 clamp-on check metering kit is an all inclusive water and wastewater 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: orifice, electromagnetic, ultrasonic, rotary piston, coriolis, etc. 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.

## Benefits
- Performance check or verification of any type or brand of flowmeter
- Field use is facilitated by meter portability and 1 hour quick charge for 4 hours of normal operation.
- Weatherproof model withstands even severe weather conditions.
- 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" to 360")
- Delivered as an all inclusive kit with all the equipment needed to conduct performance and verification tests (cables, multiple transducers, flow computer 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 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 performance 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

## Overview
![Image of SITRANS FUP1010 Portable clamp-on Check metering kit]

## 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).
- 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.

## Technical specifications
- **Pipe sizes**: 25.4 mm to 9.14 m (1" to 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**: IP67 (waterproof)

See page 4/279 for complete technical specifications.

## Certificates and approvals
- **Unclassified locations**: UL
- **Classified locations**: ULc
- **CE**:
  - LVD IEC 61010-1
  - EMC EN 61000-6-2, -4

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Portable clamp-on check metering kit</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CQO:FUPW-WKIT</td>
<td></td>
</tr>
</tbody>
</table>

**Content of delivery**

- 1 Single channel portable submersible flow computer
- 1 pair Universal transducer C3
- 1 pair Universal transducer E2
- 1 pair Doppler transducers
- 1 pair Mounting Ezclamp (2 mounting Ezclamp chains)
- 1 Ladder chain
- 1 Battery charger
- 1 pair 20 ft transducer cable
- 1 Cable - 1010WP/WDP to PC
- 1 PinStop spacer bar (universal)
- 1 Flow case
- 1 Flow computer manual
- 1 Laminated card set
- 1 Certificate of intrinsic calibration
Overview

SITRANS FUE1010 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.

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 transducers 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

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

FUE1010 is available in three configurations:
• IP65 (NEMA 4X) 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 display computer 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 Ω 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:
  - MODBUS / Metasys N2 (IP65 (NEMA 4X) only)
  - RS232 Serial digital port (standard)
• 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

### Input

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow range</td>
<td>0 … 12 m/s (0 … 40 ft/s), bi-directional</td>
</tr>
<tr>
<td>Flow sensitivity</td>
<td>0.0003 m/s (0.001 ft/s)</td>
</tr>
<tr>
<td>Pipe size</td>
<td>6.4 mm … 9.14 m (0.25” … 360”)</td>
</tr>
</tbody>
</table>
| Inputs per channel | • Current: 2 x 4 … 20 mA  
  • Voltage: 2 x 0 … 10 V DC  
  • Temperature: 2 x 4 wire 1 kΩ RTD  
  • Totalizer commands (clear/hold) |

### Output

<table>
<thead>
<tr>
<th>Channel Type</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Standard outputs   | • Current: 2 x 4 … 20 mA DC  
  (1 kΩ at 30 V DC)  
  • Voltage: 2 x 0 … 10 V DC  
  (5 kΩ minimum)  
  • Status Alarm: 4 x SPDT Relays  
  • Mercury wetted relays  
  • Frequency: 2 x 0 … 5000 Hz  
  • RS232 |
| Optional outputs   | • Expanded I/Os (4 additional 4 … 20 mA outputs) with form c relays  
  • Expanded I/Os with Mercury wetted relays |

### Accuracy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
</table>
| 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) |

### Rated operation conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Dedicated wall mount enclosure | IP65 (NEMA 4X)  
  Portable enclosures:  
  IP40 (NEMA 1) |
| Liquid temperature | • Standard: -40 … +120 °C (-40 … +250 °F)  
  • Optional: -40 … +230 °C (-40 … +450 °F) |
| Transducer temperature | • Standard: -40 … +120 °C (-40 … +250 °F)  
  • Optional: -62 … +232 °C (-80 … +450 °F) |
| Ambient temperature| -18 … +60 °C (0 … 140 °F)                                                       |

### Design

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>see SITRANS F US Clamp-on &quot;System info and selection guide&quot;</td>
</tr>
</tbody>
</table>

### Power supply

<table>
<thead>
<tr>
<th>Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated</td>
<td>90 … 240 V AC, 50 … 60 Hz, 30 VA or 14.0 … 18.5 V DC</td>
</tr>
<tr>
<td>Portable enclosure</td>
<td>Rechargeable battery</td>
</tr>
</tbody>
</table>

## Indication and operation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data logger memory</td>
<td>1 Mbyte of storage</td>
</tr>
<tr>
<td>Display</td>
<td>128 x 240 pixel LCD with backlight</td>
</tr>
<tr>
<td>Keypad</td>
<td>33 keypad buttons with tactile feedback</td>
</tr>
<tr>
<td>Language options</td>
<td>English, spanish, german, italian, french</td>
</tr>
</tbody>
</table>

## Certificates and approvals

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
</table>
| FM and CSA ratings | I.S. Class I, II, Div 1  
  NI Class I, Div 2  
  S Class II, Div 2 |
| ATEX ratings       | Ex II (1) G [Ex ia] IIC  
  Ex II 3 (1) G Ex nC [ia] IIC T5  
  Ex II 1 G Ex ia IIC T5  
  Ex II 2 G Ex m II T5 (for use with flowmeter in safe area) |
| Dedicated wall mount enclosure | CE  
  • EMC EN 61000-6-2, -4 |
| Portable enclosures | UL  
  ULc  
  CE  
  • LVD IEC 61010-1; CB Test Certificate  
  • EMC EN 61000-6-2, -4 |
Standard MLFB for quick delivery on SITRANS FUE1010 (Energy system)

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUE1010 Energy Clamp-on</td>
<td>K) 7 ME 3 5 0</td>
<td>K 0 2 + K 0 2 + R 0 2</td>
</tr>
<tr>
<td>Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedicated</td>
<td>0</td>
<td>K 0 1 + K 0 1 + R 0 1</td>
</tr>
<tr>
<td>IP65 (NEMA 4X)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portables</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>IP40 (NEMA 1) Battery powered</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Number of channels/ultrasonic paths**

<table>
<thead>
<tr>
<th>Dedicated meters</th>
<th>Dual channel/Dual path</th>
<th>Portable meters</th>
<th>Dual channel/Dual path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single channel</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Flowmeter functions and I/O configurations**

- Portable Standard I/O
  - Energy efficiency COP/EER output
  - 2x 4-20mA analog input

- Dedicated Standard I/O
  - Reflexor Capability
  - Energy efficiency COP/EER output
  - 2x 4-20mA analog input

**Meter power options**

- 90 ... 240 V AC (Dedicated only)
- Charger Type A for Europe (CEE7/7)
- Charger Type K for U.S. (NEMA 5-15P)

**Communication options**

- RS 232 (standard)
- RTD temperature sensor pair
  - (includes mounting hardware for pipes above 1.5" outer diameter)
  - No RTDs (Note: Temperature input is required for Energy systems)
  - 1x Pair Std clamp-on RTD (NEMA 4X only)3)
  - 2x Pair Std clamp-on RTD (For Dual Channel NEMA 4X only)3)
  - 1x Pair Std clamp-on RTD (For NEMA 12 portable)3)
  - 2x Pair Std clamp-on RTD (For Dual Channel NEMA 12 portable)3)

**Transducer for channel 1**

- (includes pipe mounting kit and spacer bar for indicated max. OD listed)
- See „Transducer selection charts” for specifications.
- no transducer
- A2 universal Trackmount and straps provided up to 75 mm (3”)
- B3 universal Trackmount and straps provided up to 125 mm (5”)
- C3 universal Mounting frame and straps provided up to 300 mm (13”)
- D3 universal Mounting frame and straps provided up to 600 mm (24”)
- E2 universal Mounting frame and straps provided up to 1200 mm (48”)4)
- C1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)
- C2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)
- D1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)
- D2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)

**Transducer for channel 2**

- (includes pipe mounting kit and spacer bar for indicated max. OD listed)
- See „Transducer selection charts” for specifications.
- no transducer
- A2 universal Trackmount and straps provided up to 75 mm (3”)
- B3 universal Trackmount and straps provided up to 125 mm (5”)
- C3 universal Mounting frame and straps provided up to 300 mm (13”)
- D3 universal Mounting frame and straps provided up to 600 mm (24”)
- E2 universal Mounting frame and straps provided up to 1200 mm (48”)4)
- C1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)
- C2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)
- D1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)
- D2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)4)

**Approvals**

- UL/Portable
- FM/Dedicated

1) Supplied spacer bar supports pipes up to 1050 mm (42 inches). For pipes larger than 1050 mm (42 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4)
2) Supplied spacer bar supports pipes up to 750 mm (30 inches). For pipes larger than 750 mm (30 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

Standard MLFB product offering represents 4 to 6 weeks delivery time

K) Subject to export regulations AL: N, ECCN: 5A991X.
# SITRANS F FUE1010 Energy clamp-on

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUE1010 Energy clamp-on</td>
<td>Dedicated</td>
<td>7ME3500-</td>
</tr>
<tr>
<td></td>
<td>Portables</td>
<td>7ME3502-</td>
</tr>
</tbody>
</table>

## Number of channels/ultrasonic paths

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated meter</td>
<td>1</td>
</tr>
<tr>
<td>Dual channel / Dual path</td>
<td>2</td>
</tr>
<tr>
<td>Portables</td>
<td>4</td>
</tr>
</tbody>
</table>

## Flowmeter functions and I/O configurations

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable Standard I/O</td>
<td>C</td>
</tr>
<tr>
<td>Dedicated Standard I/O</td>
<td>F</td>
</tr>
<tr>
<td>Specials (Extended I/O and or Mercury wetted relays for dedicated only)</td>
<td>Z</td>
</tr>
<tr>
<td>Standard I/O with Mercury wetted relays</td>
<td>Z</td>
</tr>
<tr>
<td>Extended output adder plus standard inputs (4 additional 4 ... 20 mA outputs) and form C relay</td>
<td>Z</td>
</tr>
<tr>
<td>Extended output adder plus standard inputs (4 additional 4 ... 20 mA outputs) and Mercury wetted relays</td>
<td>Z</td>
</tr>
</tbody>
</table>

## Meter power options

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 ... 240 V AC (Dedicated only)</td>
<td>A</td>
</tr>
<tr>
<td>9 ... 36 V DC (Dedicated only)</td>
<td>B</td>
</tr>
<tr>
<td>Charger Type A for Europe (CEE7/7)</td>
<td>C</td>
</tr>
<tr>
<td>Charger Type C for Australia (AS3112)</td>
<td>D</td>
</tr>
<tr>
<td>Charger Type D for U.K. (BS1363)</td>
<td>E</td>
</tr>
<tr>
<td>Charger Type J for Japan (JIS8303)</td>
<td>F</td>
</tr>
<tr>
<td>Charger Type K for U.S. (NEMA 5-15P)</td>
<td>G</td>
</tr>
<tr>
<td>Charger Type L for Switzerland (SEV1011)</td>
<td>H</td>
</tr>
<tr>
<td>No Charger</td>
<td>J</td>
</tr>
</tbody>
</table>

## Additional ordering information

1. Supplied spacer bar supports pipes up to 750 mm (30 inches) and mounting frame/spacer bars are available to accommodate larger pipes (refer to spare part list). Refer to "Transducer Selection Charts" for the transducer suitability of pipe size and wall thickness.
2. Special (for insert style RTDs), dedicated only
3. No RTDs (Note: temperature input is required for energy system)
4. Includes mounting hardware for pipes above 1.5" outer diameter
5. Includes mounting hardware for pipes above 1.5" outer diameter
6. Includes mounting hardware for pipes above 1.5" outer diameter

## Transducer for channel 1

- Including pipe mounting tracks for sizes A & B transducers indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E transducers. Straps provided for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Transducer Selection Charts" for the transducer suitability of pipe size and wall thickness.

## Communication options

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232 (standard)</td>
<td>0</td>
</tr>
<tr>
<td>MODBUS (dedicated only)</td>
<td>1</td>
</tr>
<tr>
<td>Selection and Ordering data</td>
<td>Order No.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>SITRANS FUE1010 Energy clamp-on</td>
<td>7ME3500-</td>
</tr>
<tr>
<td>• Dedicated IP65 (NEMA 4X)</td>
<td>7ME3502-</td>
</tr>
<tr>
<td>• Portables IP40 (NEMA 1) battery powered</td>
<td></td>
</tr>
</tbody>
</table>

### Transducer for channel 1 (continued)

- **B2H** (high precision) Trackmount and straps provided up to 125 mm (5")

- **C1H** (high precision) Mounting frame and straps provided up to 1200 mm (48")\(^2\)

- **C2H** (high precision) Mounting frame and straps provided up to 1200 mm (48")\(^3\)

- **D1H** (high precision) Mounting frame and straps provided up to 1200 mm (48")\(^3\)

- **D2H** (high precision) Trackmount and straps provided up to 1200 mm (48")\(^3\)

- **D4H** (high precision) Trackmount and straps provided up to 1200 mm (48")\(^3\)

- **Doppler** to 12" with strap kit

- **Other versions** (different size, mount, type or resistant), add Order code and plain text.

- **High temperature transducer size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))**

- **High temperature transducer size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))**

- **High temperature transducer size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))**

- **For the following B1H to D4H transducers, temperature range is -1 °C up to 104 °C (30 °F 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)\(^2\)
  - **D2H** (high temperature range HP)\(^2\)
  - **D4H** (high temperature range HP)\(^2\)

### Transducer for channel 2 (continued)

(includes pipe mounting kit for indicated max. outer diameter listed) See , Transducer selection charts for specifications.

- **no transducer**

- **A2 universal** Trackmount and straps provided up to 75 mm (3")

- **B3 universal** Trackmount and straps provided up to 125 mm (5")

- **C3 universal** Mounting frame and straps provided up to 300 mm (11.75")

- **D3 universal** Mounting frame and straps provided up to 600 mm (24")

- **E2 universal** Mounting frame and straps provided up to 1200 mm (48")\(^3\)

### Approvals

- **FM/CSA/CE Dedicated**
- **UL/JUL/cCE Portable**

1) Supplied spacer bar supports pipes up to 1050 mm (42 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

2) Supplied spacer bar supports pipes up to 750 mm (30 inches) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

3) 600 mm (24") for portable systems only

K) Subject to export regulations AL: N, ECCN: 5A991X.
## 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 Order No.: 7ME3500-2DA10-2NE0-Z  
K03 + K05 + R03 + R05 + R02 + R03

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ME 3 5</td>
<td>00 - 0 -</td>
</tr>
<tr>
<td>7 ME 3 6</td>
<td>00</td>
</tr>
<tr>
<td>7 ME 3 7</td>
<td>00</td>
</tr>
</tbody>
</table>

### Further designs

- Please add “-Z” to Order No. and specify Order code(s).
- Cable assembly for transducers (add for # of channels)  
  See „Transducer 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 transducer cable  
  T01  
  Termination for submersible transducer cable  
  T11  
  RTD cable termination kit for standard RTD  
  T21  
  RTD cable termination kit for submersible RTD  
  T31  
  Insert RTD cable termination kit  
  T41
- Wet flow transfer calibration (priced on request)  
  6 point up to 4 inch (DN 100)  
  D10  
  6 point up to 5 to 8 inch (DN 125 to DN 200)  
  D11  
  6 point up to 10 to 12 inch (DN 250 to DN 300)  
  D12  
  6 point up to 14 to 16 inch (DN 350 to DN 400)  
  D13  
  6 point up to 18 to 20 inch (DN 450 to DN 500)  
  D14  
  6 point up to 22 to 24 inch (DN 550 to DN 600)  
  D15  
  6 point up to 26 to 30 inch (DN 650 to DN 750)  
  D16  
  6 point up to 32 to 36 inch (DN 800 to DN 900)  
  D17
- Tag name plate  
  Stainless steel tag with 3.2 mm (0.13 inch) character size (26 characters max.)  
  Y17  
  Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)  
  Y19

### IP65 (NEMA 4X) enclosure

- Dual channel
- Dedicated Type 1 I/O option
- 90 … 230 V AC power option
- MODBUS option
- 2 pairs of clamp-on RTDs
- Transducer code for 6" pipe
- Transducer code for 12" pipe
- No approval required
- 30 m (100 ft) transducer cable for channel 1  
  61 m (200 ft) transducer cable for channel 1
- 30 m (100 ft) cable for RTD 1  
  61 m (200 ft) cable for RTD 2
- 15 m (50 ft) cable for RTD 3  
  30 m (100 ft) cable for RTD 4

### Transducer cable selection chart

- K..  
- K03 + K05 + R03 + R05 + R02 + R03

### RTD cable selection chart

- R..  
- R03

### Transducer and RTD cable termination kit

- T01  
- T11  
- T21  
- T31  
- T41

### Wet flow transfer calibration chart

- D10  
- D11  
- D12  
- D13  
- D14  
- D15  
- D16  
- D17
### Transducer selection charts

**Universal transducers for any pipe material**

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Order code</th>
<th>Outer diameter range (mm)</th>
<th>Outer diameter range (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size code</td>
<td></td>
<td>min</td>
<td>max</td>
</tr>
<tr>
<td>A2</td>
<td>B</td>
<td>12.7</td>
<td>50.8</td>
</tr>
<tr>
<td>B3</td>
<td>C</td>
<td>19</td>
<td>127</td>
</tr>
<tr>
<td>C3</td>
<td>D</td>
<td>51</td>
<td>305</td>
</tr>
<tr>
<td>D3</td>
<td>E</td>
<td>203</td>
<td>610</td>
</tr>
<tr>
<td>E2</td>
<td>F</td>
<td>254</td>
<td>6096</td>
</tr>
</tbody>
</table>

**High precision transducers for steel pipe with outer diameter/wall thickness ratio > 10**

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Order code</th>
<th>Pipe wall (mm)</th>
<th>Pipe wall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size code</td>
<td></td>
<td>min</td>
<td>max</td>
</tr>
<tr>
<td>A1H</td>
<td>G</td>
<td>0.64</td>
<td>1.02</td>
</tr>
<tr>
<td>A2H</td>
<td>H</td>
<td>1.02</td>
<td>1.52</td>
</tr>
<tr>
<td>A3H</td>
<td>J</td>
<td>1.52</td>
<td>2.03</td>
</tr>
<tr>
<td>B1H</td>
<td>K</td>
<td>2.03</td>
<td>3.05</td>
</tr>
<tr>
<td>B2H</td>
<td>L</td>
<td>3.05</td>
<td>4.06</td>
</tr>
<tr>
<td>C1H</td>
<td>M</td>
<td>4.06</td>
<td>5.84</td>
</tr>
<tr>
<td>C2H</td>
<td>N</td>
<td>5.84</td>
<td>8.13</td>
</tr>
<tr>
<td>D1H</td>
<td>P</td>
<td>8.13</td>
<td>11.18</td>
</tr>
<tr>
<td>D2H</td>
<td>Q</td>
<td>11.18</td>
<td>15.75</td>
</tr>
<tr>
<td>D4H</td>
<td>R</td>
<td>15.75</td>
<td>31.75</td>
</tr>
</tbody>
</table>

**Transducer cable codes for length and type options**

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (PVC jacket)</th>
<th>Submersible (polyethylene jacket)</th>
<th>Plenum Rated (teflon jacket)</th>
<th>Armored (teflon jacket)</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>K01</td>
<td>K11</td>
<td>K21</td>
<td>K31</td>
<td></td>
</tr>
<tr>
<td>15 (50)</td>
<td>K02</td>
<td>K12</td>
<td>K22</td>
<td>K32</td>
<td></td>
</tr>
<tr>
<td>30 (100)</td>
<td>K03</td>
<td>K13</td>
<td>K23</td>
<td>K33</td>
<td></td>
</tr>
<tr>
<td>46 (150)</td>
<td>K04</td>
<td>K14</td>
<td>K24</td>
<td>K34</td>
<td></td>
</tr>
<tr>
<td>61 (200)</td>
<td>K05</td>
<td>K15</td>
<td>K25</td>
<td>K35</td>
<td></td>
</tr>
<tr>
<td>91 (300)</td>
<td>K06</td>
<td>K16</td>
<td>K26</td>
<td>K36</td>
<td></td>
</tr>
</tbody>
</table>

1) Submersible and armored transducer cable is not available for portable versions.

**RTD cable selection chart**

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (teflon wrapped)</th>
<th>Insert</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>R01</td>
<td>R21</td>
<td></td>
</tr>
<tr>
<td>15 (50)</td>
<td>R02</td>
<td>R22</td>
<td></td>
</tr>
<tr>
<td>30 (100)</td>
<td>R03</td>
<td>R23</td>
<td></td>
</tr>
<tr>
<td>46 (150)</td>
<td>R04</td>
<td>R24</td>
<td></td>
</tr>
<tr>
<td>61 (200)</td>
<td>R05</td>
<td>R25</td>
<td></td>
</tr>
<tr>
<td>91 (300)</td>
<td>R06</td>
<td>R26</td>
<td></td>
</tr>
</tbody>
</table>

1) Submersible RTD cable is not available for portable versions.
**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 and 1 hour quick charge for 4 hours of normal operation
- 1 MByte datalogger capability downloadable to PC via included RS232 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 transducers, flow computer 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 meter 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

**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 Ω 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 RS232 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

**Technical specifications**

<table>
<thead>
<tr>
<th>Pipe sizes</th>
<th>25.4 mm to 9.14 m (1 ... 360”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>±0.5 % ... ±2.0 % of flow rate</td>
</tr>
<tr>
<td>Flow range</td>
<td>12 m/s (40 ft/s) bidirectional</td>
</tr>
<tr>
<td>Media temperature</td>
<td>-40 ... +104 °C (-40 ... 220 °F)</td>
</tr>
<tr>
<td>Enclosure ratings</td>
<td>IP40 (NEMA 1) impact resistant</td>
</tr>
</tbody>
</table>

See page 4/286 for complete technical specifications

**Certificates and approvals**

Unclassified locations: UL
Classified locations: ULc, CE:
- LVD IEC 61010-1
- EMC EN 61000-6-2, -4

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>HVAC chilled water and energy check metering kit</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content of delivery</strong></td>
<td>CQO:FUEHVACKIT</td>
</tr>
<tr>
<td>1 Dual channel portable submersible flow computer</td>
<td></td>
</tr>
<tr>
<td>1 pair Universal transducers C3</td>
<td></td>
</tr>
<tr>
<td>1 pair Doppler transducers</td>
<td></td>
</tr>
<tr>
<td>1 pair High precision transducers C2</td>
<td></td>
</tr>
<tr>
<td>1 pair High precision transducers D1</td>
<td></td>
</tr>
<tr>
<td>2 pair RTDs</td>
<td></td>
</tr>
<tr>
<td>2 pair Mounting Ezclamp (4 mounting Ezclamp chains)</td>
<td></td>
</tr>
<tr>
<td>1 Battery charger</td>
<td></td>
</tr>
<tr>
<td>2 pair 6.09 m (20 ft) transducer cables</td>
<td></td>
</tr>
<tr>
<td>1 RS 232 cable</td>
<td></td>
</tr>
<tr>
<td>4 RTD cable</td>
<td></td>
</tr>
<tr>
<td>4 Mountings for RTDs</td>
<td></td>
</tr>
<tr>
<td>1 PinStop spacer bar (universal)</td>
<td></td>
</tr>
<tr>
<td>2 F connector to BHC</td>
<td></td>
</tr>
<tr>
<td>1 Flow case</td>
<td></td>
</tr>
<tr>
<td>1 Flow computer manual</td>
<td></td>
</tr>
<tr>
<td>1 Laminated card set</td>
<td></td>
</tr>
<tr>
<td>1 Certificate of intrinsic calibration</td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010
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, volumetric flowmeters and mass or standard volume flowmeters.

Benefits

For all FUH1010 products
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external transducers 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
- Wide-Beam 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 detectors / Density meters ("interface detector")
- 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

Viscosity compensated volumetric flowmeters ("precision volume")
- Moderate cost
- Precise measurement is maintained with automatic Reynolds Number compensation for temperature and viscosity changes.

Application

Interface detectors / Density meters
- Precise identification of interfaces on multi-liquid pipelines
- Rapid and precise scraper "pig" indication
- Product identification
- Density indication

Viscosity compensated volumetric flowmeters
- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity changes

Standard volume (net) or mass flowmeters ("mass")
- 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

Design

FUH1010 is available in three enclosures:
- IP65 (NEMA 4X) Enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single path
  - Dual path
  - Optional four path
- IP65 (NEMA 7) Compact explosionproof enclosure constructed of cast aluminum with glass window, stainless steel hardware
  - Single path
  - Dual path (option)
- IP66 (NEMA 7) Wall mount explosionproof enclosure constructed of cast aluminum, stainless steel hardware, optional 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) flow meters 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 meters has a 2 x 16 alphanumeric LCD display
- Current, voltage, status alarm, frequency and RS232 outputs (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
## Technical specifications

### Specifications for interface detectors

**Accuracy**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± 0.05 of API No.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>± 0.01 of API No.</td>
</tr>
</tbody>
</table>

### Specifications for volumetric and mass flowmeters

**Input**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow range</td>
<td>± 12 m/s (± 40 ft/s), bidirectional</td>
</tr>
<tr>
<td>Flow sensitivity</td>
<td>0.0003 m/s (0.001 ft/s), flow rate independent</td>
</tr>
</tbody>
</table>

**Accuracy**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibratable accuracy</td>
<td>± 0.15% ... 0.3% of flow, depending on version</td>
</tr>
<tr>
<td>Batch repeatability</td>
<td>± 0.05% of flow, maximum</td>
</tr>
</tbody>
</table>

### Specifications for all FUH1010 products

**Input**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe size</td>
<td>6.4 mm ... 9.14 m (0.25&quot; ... 360&quot;)</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>• Current: 4 x 4 ... 20 mA (IP65 (NEMA 7) enclosure has (2))</td>
</tr>
</tbody>
</table>

**Output**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard outputs</td>
<td>• Current: 4 x 4 ... 20 mA (1 kΩ at 30 VDC)</td>
</tr>
<tr>
<td></td>
<td>• Voltage: 2 x 0 ... 10 V DC (5 kΩ minimum) (None for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 1 x 0 ... 5 kHz Pulse Rate, Digital Quad. (None for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• RS232 Serial Port</td>
</tr>
<tr>
<td>Extended outputs</td>
<td>• MODBUS (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• RS232 standard</td>
</tr>
<tr>
<td></td>
<td>• Up to 4 x additional 4 ... 20 mA (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 4 x Mercury wetted relays (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• Up to 4 x digital pulse (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td>Status/Alarm I/O</td>
<td>• 4 x Programmable relays (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 2 x Optically coupled output logic gates (for IP65 (NEMA 7) enclosure, only)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Totalizer clear switch input (not for IP65 (NEMA 4X) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Totalizer hold switch input (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Opto iso. totalizer clear switch input (for IP65 (NEMA 7) enclosure, only)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Opto iso. totalizer hold switch input (for IP65 (NEMA 7) enclosure, only)</td>
</tr>
</tbody>
</table>

### Accuracy

- Zero Drift: 0.0003 m/s (0.001 ft/s), with Zero-Matic Path active (not provided for interface detector)
- Data refresh rate: 5 Hz (80 Hz output for flow rate available on special order)

### Rated operation conditions

**Degree of protection**

- Wall mount enclosure: IP65 (NEMA 4X)
- Compact explosionproof: IP66 (NEMA 7)
- Wall mount explosionproof: 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

- IP65 (NEMA 4X) and IP66 (NEMA 7) Wall Mount:
  - 90 ... 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC, 12 W

- IP65 (NEMA 7) Compact:
  - 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:
  - 128 x 240 pixel LCD with backlight
- Keypad:
  - 33 keypad buttons with tactile feedback
- Language options:
  - English, Spanish, German, Italian, French

1) Totalizer switch inputs are not provided for the interface detector
### Certificates and approvals

#### IP65 (NEMA 4X) flow display computer ratings

- **FM and CSA**
  - I.S. Class I, II, Div 1
  - N-I Class I, Div 2
  - S Class II, Div 2

- **ATEX**
  - Flowmeter:  Ex II (1) G [EEx ia] IIC
  - Transducers: Ex II 1 G EEx ia IIC T5

- **INMETRO (Brazil)**
  - Flowmeter:  [BR-Ex ia] IIC
  - Transducers: BR-Ex ia IIC T5

#### IP65 (NEMA 7) compact explosion-proof enclosure ratings

- **FM and CSA**
  - XP Class I, Div 1
  - D-I Class II, Div 1
  - I.S. Class I, Div 1
  - N-I Class I, Div 2
  - S Class II, Div 2

- **ATEX**
  - Flowmeter:  Ex II 2 (1) G EEx d [ia] IIB + H2 T5
  - Transducers: Ex II 1 G EEx ia IIC T5

- **INMETRO (Brazil)**
  - Flowmeter:  BR-Ex d [ia] IIC T5
  - Transducers: BR-Ex ia IIC T5

#### IP66 (NEMA 7) wall mount explosion-proof enclosure ratings

- **FM and CSA**
  - XP Class I, Div 1
  - D-I Class II, Div 1
  - I.S. Class I, Div 1
  - N-I Class I, Div 2
  - S Class II, Div 2

- **ATEX**
  - Flowmeter:  Ex II (1) G [EEx ia] IIC
  - Transducers: Ex II 1 G EEx ia IIC T5

- **INMETRO (Brazil)**
  - Flowmeter:  [BR-Ex ia] IIC
  - Transducers: BR-Ex ia IIC T5

- Temperature range: 
  - $-50 °C \leq T_a \leq +60 °C$
### SITRANS FUH1010 Oil clamp-on

**Standard MLFB for quick delivery on SITRANS FUH1010 (Hydrocarbon liquid meter)**

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUH1010 Oil clamp-on</td>
<td>K) 7 M E 3 6 0 -</td>
<td>K 1 2 + K 1 2 + R 1 2</td>
</tr>
</tbody>
</table>

#### Design (Includes cable glands)
- IP65 (NEMA 4X)
- Dual path (DV-Standard Volume/Mass)

#### Flowmeter functions and I/O configurations
- Includes graphic or digital display, IP66 (8NB6665 (NEMA 4X)) and IP66 (NEMA 7 wall mounted) units:
  - **Standard**
    - Graphic display
    - 4x 4 ... 20 mA analog input
    - 2x 0 ... 10 V
    - 2x 4 ... 20 mA
    - 2x pulse outputs
    - 4x Mercury wetted relays
    - 2x RTD input

#### Meter power options
- 90 ... 240 V AC

#### Communication options
- RS 232 (standard)

#### RTD temperature sensor
- (includes mounting hardware for pipes above 1.5" outer diameter)
- No RTDs (Note: Temperature input is required for FUH1010 systems)
- 1 x submersible clamp-on RTD

#### Transducer for channel 1
- (includes pipe mounting kit and spacer bar for indicated max. outer diam. listed)
- no transducer
- C1H (high precision) Mounting frame and straps provided up to 1200 mm (48")
- C2H (high precision) Mounting frame and straps provided up to 1200 mm (48")
- D1H (high precision) Mounting frame and straps provided up to 1200 mm (48")
- D2H (high precision) Mounting frame and straps provided up to 1200 mm (48")

#### Transducer for channel 2
- (includes pipe mounting kit and spacer bar for indicated max. OD listed)
- See „Transducer selection charts“ for specifications.
- no transducer
- C1H (high precision) Mounting frame and straps provided up to 1200 mm (48")
- C2H (high precision) Mounting frame and straps provided up to 1200 mm (48")
- D1H (high precision) Mounting frame and straps provided up to 1200 mm (48")
- D2H (high precision) Mounting frame and straps provided up to 1200 mm (48")

#### Approvals
- FM/CSA (default)
- ATEX EExia

Standard MLFB product offering represents 4 to 6 weeks delivery time

K) Subject to export regulations AL: N, ECCN: 5A991X.
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3600-</td>
<td></td>
</tr>
<tr>
<td>7ME3601-</td>
<td></td>
</tr>
<tr>
<td>7ME3602-</td>
<td></td>
</tr>
<tr>
<td>7ME3603-</td>
<td></td>
</tr>
</tbody>
</table>

**SITRANS FUH1010 Oil clamp-on**

- **Order No:**
- **Ord. code:

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUH1010 Oil clamp-on</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Number of ultrasonic paths / meter type**

| Single path (precision volume) | 0 |
| Single path (interface detector) | 1 |
| Dual channel/Dual path (interface detector) | 2 |
| Dual path (precision volume) | 3 |
| Dual path (standard volume / mass) | 4 |
| Special: Four path (standard volume/mass) only | 9 |

**Flowmeter functions and I/O configurations**

- IP65 (NEMA 4X) and IP66 (NEMA 7 wall mounted) units
  - **Standard**
    - Graphic display
    - 4 x 4 ... 20 mA analog input
    - - 2 x 0 ... 10 V
    - 2 x 4 ... 20 mA analog output
    - 2 x pulse output
    - 4 x Mercury wetted relays (form C for interface detector)
    - 2 x RTD input
  - **Extended I/O option**
    - additional 2 x 4 ... 20 mA outputs
    - Form C relays
    - 4 x digital pulse outputs (2 x open collector and 2 x 0 ... 5 V TTL)
  - **IP65 (NEMA 7) compact units**
    - **Standard**
      - Digital display
      - 2 x 4 ... 20 mA (Loop)
      - 2 x 4 ... 20 mA analog input
      - 2 x status (open collector)
      - 1 x RTD input
    - **Digital pulse option**
      - 1 x digital pulse open collector output
      - 2 x 4 ... 20 mA (Loop)
      - 2 x 4 ... 20 mA analog input
      - 1 x status (open collector)
    - **Other version (Extended I/O for non-custody meters or dry contact relays for custody)**
      - Add order code and plain text.
    - **Other version (Mercury wetted or dry contact relays)**
      - Add order code and plain text.
      - Dry contact form C relays for standard meter
      - Mercury wetted relays for extended I/O meters

**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)

**Communication options**

- RS232 (standard)
- MODBUS (excludes NEMA 7 compact)

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3600-</td>
<td></td>
</tr>
<tr>
<td>7ME3601-</td>
<td></td>
</tr>
<tr>
<td>7ME3602-</td>
<td></td>
</tr>
<tr>
<td>7ME3603-</td>
<td></td>
</tr>
</tbody>
</table>

**SITRANS FUH1010 Oil clamp-on**

- **Order No:**
- **Ord. code:

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUH1010 Oil clamp-on</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RTD temperature sensor**

(includes mounting hardware for pipes above 1.5" OD)

No RTDs (Note: temperature input is required for FUH systems)

1 x standard clamp-on RTD 1
2 x standard clamp-on RTD(2)
1 x submersible clamp-on RTD 3
2 x submersible clamp-on RTD(2)
Special (for insert style RTDs)

**Transducer for channel/path 1**

(includes standard pipe mounting kit and spacer bar for indicated max. outer diameter listed)

See „Transducer selection charts“ for specifications

no transducer A
For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):

A1H (high precision) Trackmount and straps provided up to 75 mm (3") G
A2H (high precision) Trackmount and straps provided up to 75 mm (3") H
A3H (high precision) Trackmount and straps provided up to 125 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
B3H (high precision) Trackmount and straps provided up to 125 mm (5") T
C1H (high precision) Mounting frame and straps provided up to 1200 mm (48") M
C2H (high precision) Mounting frame and straps provided up to 1200 mm (48") N
D1H (high precision) Mounting frame and straps provided up to 1200 mm (48") P
D2H (high precision) Mounting frame and straps provided up to 1200 mm (48") Q
D3H (high precision) Mounting frame and straps provided up to 1200 mm (48") U
D4H (high precision) Mounting frame and straps provided up to 1200 mm (48") R

(1) Subject to export regulations AL: N, ECCN: 5A991X.
### Selection and Ordering data

**SITRANS FUH1010 Oil clamp-on**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3600-</td>
<td>K)</td>
<td>IP65 (NEMA 4X)</td>
</tr>
<tr>
<td>7ME3601-</td>
<td>K)</td>
<td>IP65 (NEMA 7) compact</td>
</tr>
<tr>
<td>7ME3602-</td>
<td>K)</td>
<td>IP66 (NEMA 7) wall mounted (no display window)</td>
</tr>
<tr>
<td>7ME3603-</td>
<td>K)</td>
<td>IP66 (NEMA 7) wall mounted (with display window)</td>
</tr>
</tbody>
</table>

**Transducer for channel/path 1 (continued)**

Other versions (different size, mount, type or pipe larger than DN 1200 (48") or corrosion resistant), add Order code and plain text:

- **B1H (high temperature range HP)1)**
- **B2H (high temperature range HP)1)**
- **B3H (high temperature range HP)1)**
- **B1H (high precision)1)**
- **D1H (high temperature range HP)1)**
- **D2H (high temperature range HP)1)**
- **D3H (high temperature range HP)1)**
- **D4H (high temperature range HP)1)**

**Transducer for channel/path 2**

(includes pipe mounting kit and spacer bar for indicated max. outer diameter listed)

See „Transducer selection charts“ for specifications.

- no transducer

For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):

- **A1H (high precision)1)**
- **A2H (high precision)1)**
- **A3H (high precision)1)**
- **B1H (high precision)1)**
- **B2H (high precision)1)**
- **B3H (high precision)1)**
- **C1H (high precision)1)**
- **C2H (high precision)1)**
- **D1H (high precision)1)**
- **D2H (high precision)1)**
- **D3H (high precision)1)**
- **D4H (high precision)1)**

**Selection and Ordering data**

**SITRANS FUH1010 Oil clamp-on**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3600-</td>
<td>K)</td>
<td>IP65 (NEMA 4X)</td>
</tr>
<tr>
<td>7ME3601-</td>
<td>K)</td>
<td>IP65 (NEMA 7) compact</td>
</tr>
<tr>
<td>7ME3602-</td>
<td>K)</td>
<td>IP66 (NEMA 7) wall mounted (no display window)</td>
</tr>
<tr>
<td>7ME3603-</td>
<td>K)</td>
<td>IP66 (NEMA 7) wall mounted (with display window)</td>
</tr>
</tbody>
</table>

**For the following B1H to D4H transducers, 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)1)**
- **B2H (high temperature range HP)1)**
- **B3H (high temperature range HP)1)**
- **B1H (high precision)1)**
- **D1H (high temperature range HP)1)**
- **D2H (high temperature range HP)1)**
- **D3H (high temperature range HP)1)**
- **D4H (high temperature range HP)1)**

**Approvals**

FM/CSA (default), also for non hazardous area:

- ATEX
- INMETRO (Brazil)

Special ATEX EEx m add Order code and plain text:

- Length of integral cable: ......

**Further designs**

Please add „-Z“ to Order No. and specify Order code(s):

- Transducer cable selection chart
- RTD cable selection chart
- Cable assembly for transducers (add for # of paths)
- Cable assembly for RTDs (add for # of RTDs)
- Cable termination kit for one cable pair
- Cable termination kit for standard, plenum and armored transducer cable
- Cable termination kit for submersible cable
- RTD cable termination kit for standard RTD
- RTD cable termination kit for submersible RTD
- Languages (Meter and Documentation), English (default)
- Tag name plate
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- German
- French
- Spanish
- Italian
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- (26 characters max.)
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- (68 characters max.)

**Selection and Ordering data**

**Further designs**

Please add „-Z“ to Order No. and specify Order code(s):

- Transducer cable selection chart
- RTD cable selection chart
- Cable assembly for transducers (add for # of paths)
- Cable assembly for RTDs (add for # of RTDs)
- Cable termination kit for one cable pair
- Cable termination kit for standard, plenum and armored transducer cable
- Cable termination kit for submersible cable
- RTD cable termination kit for standard RTD
- RTD cable termination kit for submersible RTD
- Languages (Meter and Documentation), English (default)
- Tag name plate
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- German
- French
- Spanish
- Italian
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- (26 characters max.)
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- (68 characters max.)

**Selection and Ordering data**

**Further designs**

Please add „-Z“ to Order No. and specify Order code(s):

- Transducer cable selection chart
- RTD cable selection chart
- Cable assembly for transducers (add for # of paths)
- Cable assembly for RTDs (add for # of RTDs)
- Cable termination kit for one cable pair
- Cable termination kit for standard, plenum and armored transducer cable
- Cable termination kit for submersible cable
- RTD cable termination kit for standard RTD
- RTD cable termination kit for submersible RTD
- Languages (Meter and Documentation), English (default)
- Tag name plate
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- German
- French
- Spanish
- Italian
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- (26 characters max.)
- Stainless steel tags with 3.2 mm (0.13 inch) characters
- (68 characters max.)
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 Order No.: 7ME3600-3CB00-3QQ1-Z

### Transducer Selection Chart

**High precision transducers for steel pipe with outer diameter/wall thickness ratio >10**

<table>
<thead>
<tr>
<th>Transducer code</th>
<th>Order Code</th>
<th>Pipe wall (mm)</th>
<th>Pipe wall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size code</td>
<td>min.</td>
<td>max.</td>
<td>min.</td>
</tr>
<tr>
<td>A1H</td>
<td>0.64</td>
<td>1.02</td>
<td>0.025</td>
</tr>
<tr>
<td>A2H</td>
<td>1.02</td>
<td>1.52</td>
<td>0.04</td>
</tr>
<tr>
<td>A3H</td>
<td>1.52</td>
<td>2.03</td>
<td>0.06</td>
</tr>
<tr>
<td>B1H</td>
<td>2.03</td>
<td>3.05</td>
<td>0.08</td>
</tr>
<tr>
<td>B2H</td>
<td>3.05</td>
<td>4.06</td>
<td>0.12</td>
</tr>
<tr>
<td>C1H</td>
<td>4.06</td>
<td>5.84</td>
<td>0.16</td>
</tr>
<tr>
<td>C2H</td>
<td>5.84</td>
<td>8.13</td>
<td>0.23</td>
</tr>
<tr>
<td>D1H</td>
<td>8.13</td>
<td>11.18</td>
<td>0.32</td>
</tr>
<tr>
<td>D2H</td>
<td>11.18</td>
<td>15.75</td>
<td>0.44</td>
</tr>
<tr>
<td>D4H</td>
<td>15.75</td>
<td>31.75</td>
<td>0.62</td>
</tr>
<tr>
<td>B3H</td>
<td>2.7</td>
<td>3.3</td>
<td>0.106</td>
</tr>
<tr>
<td>D3H</td>
<td>7.4</td>
<td>9.0</td>
<td>0.293</td>
</tr>
</tbody>
</table>

### Transducer Cable Selection Chart

**Transducer cable codes for length and type options**

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (PVC jacket)</th>
<th>Submersible (polyethylene jacket)</th>
<th>Plenum Rated (teflon jacket)</th>
<th>Armored</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-40...+80 °C</td>
<td>-40...+80 °C</td>
<td>-40...+200 °C</td>
<td>-40...+80 °C</td>
</tr>
<tr>
<td></td>
<td>(-40...+176 °F)</td>
<td>(-40...+176 °F)</td>
<td>(-40...+392 °F)</td>
<td>(-40...+176 °F)</td>
</tr>
<tr>
<td></td>
<td>6 (20)</td>
<td>K01</td>
<td>K11</td>
<td>K21</td>
</tr>
<tr>
<td></td>
<td>15 (50)</td>
<td>K02</td>
<td>K12</td>
<td>K22</td>
</tr>
<tr>
<td></td>
<td>30 (100)</td>
<td>K03</td>
<td>K13</td>
<td>K23</td>
</tr>
<tr>
<td></td>
<td>46 (150)</td>
<td>K04</td>
<td>K14</td>
<td>K24</td>
</tr>
<tr>
<td></td>
<td>61 (200)</td>
<td>K05</td>
<td>K15</td>
<td>K25</td>
</tr>
<tr>
<td></td>
<td>91 (300)</td>
<td>K06</td>
<td>K16</td>
<td>K26</td>
</tr>
</tbody>
</table>

### RTD Cable Selection Chart

**RTD cable codes for length and type**

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (teflon wrapped)</th>
<th>Submersible (extruded jacket)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-40... +200 °C (-40... +392 °F)</td>
<td>-40... +200 °C (-40... +392 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 (20)</td>
<td>R01</td>
</tr>
<tr>
<td></td>
<td>15 (50)</td>
<td>R02</td>
</tr>
<tr>
<td></td>
<td>30 (100)</td>
<td>R03</td>
</tr>
<tr>
<td></td>
<td>46 (150)</td>
<td>R04</td>
</tr>
<tr>
<td></td>
<td>61 (200)</td>
<td>R05</td>
</tr>
<tr>
<td></td>
<td>91 (300)</td>
<td>R06</td>
</tr>
</tbody>
</table>

K) Subject to export regulations AL: N, ECCN: 5A991X.
SITRANS F flowmeters
SITRANS F US
SITRANS FUG1010 Gas clamp-on

Overview

SITRANS FUG1010 clamp-on non-intrusive ultrasonic flow display computer 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) or IP65 (NEMA 7) and IP66 (NEMA 7) explosionproof enclosures.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external transducers 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 transducer enclosure permits permanent and direct burial installations
- Easy to use “DataView” 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

FUG1010 is available in three enclosures:

- IP65 (NEMA 4X) 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 explosionproof enclosure constructed of cast aluminum stainless steel hardware, optional glass window
  - Single path
  - Dual path
  - Four path (optional)

Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flow display computers 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 computer has a 2 x 16 alphanumeric LCD display
- Current, voltage, frequency and RS232 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

© Siemens AG 2010
## Technical specifications

### Input

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow range</td>
<td>± 30 m/s (± 100 ft/s), bidirectional</td>
</tr>
<tr>
<td>Flow sensitivity</td>
<td>0.0003 m/s (0.001 ft/s), flow rate independent</td>
</tr>
<tr>
<td>Minimum pressure</td>
<td>7 … 10 bar (100 … 145 psi), typical (gas composition and application dependent; plastic pipes support operation at atmospheric pressure)</td>
</tr>
<tr>
<td>Pipe size</td>
<td>25 mm … 1.52 m (1” … 60”) (for other sizes, consult factory)</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>Current: 4 x 4 … 20 mA, programmable (IP65 (NEMA 7) enclosure has 2 x 4 … 20 mA, programmable)</td>
</tr>
</tbody>
</table>

### Output

<table>
<thead>
<tr>
<th>Output Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard outputs</td>
<td>• Current: 4 x 4 … 20 mA, a programmable, standard</td>
</tr>
<tr>
<td></td>
<td>Additional 2 x optional, except IP65 (NEMA 7)</td>
</tr>
<tr>
<td></td>
<td>• Voltage: 4 x 0 … 10 V DC, menu programmable (None for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 4 x Open collector digital pulses (quadrature) (None for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 2 x 0 … 5 kHz, TTL pulse square wave + (None for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Optically isolated digital pulse &amp; source, IP65 (NEMA 7) enclosure</td>
</tr>
<tr>
<td></td>
<td>• RS232 Serial Port</td>
</tr>
<tr>
<td>Extended outputs</td>
<td>MODBUS (RS485/422/232) (not for IP65 (NEMA 7))</td>
</tr>
<tr>
<td>Status/Alarm I/O</td>
<td>• 4 x programmable form C relays (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 4 x programmable N.O. Mer. Wet. Relays optional (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 2 x Optically coupled output logic gates (for IP65 (NEMA 7) enclosure, only)</td>
</tr>
<tr>
<td></td>
<td>• 1 Totalizer clear switch input (not for IP65 (NEMA 7))</td>
</tr>
<tr>
<td></td>
<td>• 1 Totalizer hold switch input (not for IP65 (NEMA 7) enclosure)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Opto iso. totalizer clear switch input (for IP65 (NEMA 7) enclosure, only)</td>
</tr>
<tr>
<td></td>
<td>• 1 x Opto iso. totalizer hold switch input (for IP 65 (NEMA 7) enclosure, only)</td>
</tr>
</tbody>
</table>

### Accuracy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical accuracy</td>
<td>1 % … 2 % of actual volume reading (higher accuracy is pipe condition and flow profile dependent)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.05 % … 0.1 % of actual volume reading, for 1.5 … 30 m/s (5 … 100 ft/s) velocities (pipe condition dependent)</td>
</tr>
<tr>
<td>Zero drift</td>
<td>0.0009 m/s (0.001 ft/s), with ZeroMatic Path active</td>
</tr>
<tr>
<td>Data refresh rate</td>
<td>5 Hz (80 Hz optional)</td>
</tr>
</tbody>
</table>

### Rated operation conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection</td>
<td>• Wall mount enclosure IP65 (NEMA 4X)</td>
</tr>
<tr>
<td></td>
<td>• Compact explosionproof IP65 (NEMA 7)</td>
</tr>
<tr>
<td></td>
<td>• Wall mount explosionproof IP66 (NEMA 7)</td>
</tr>
<tr>
<td>Gas temperature</td>
<td>-40 … +60 °C (-40 … +140 °F) (for higher temperatures consult factory)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-18 … +60 °C (0 … 140 °F)</td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>see SITRANS F US Clamp-on „System info and selection guide“</td>
</tr>
<tr>
<td>Weight</td>
<td>see diagrams</td>
</tr>
</tbody>
</table>

### Power supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• For IP65 (NEMA 4X) and IP66 (NEMA 7):</td>
</tr>
<tr>
<td></td>
<td>• 90 … 240 V AC, 50 … 60 Hz (30 VA) or 9 … 36 V DC (12 W)</td>
</tr>
<tr>
<td></td>
<td>• For IP65 (NEMA 7):</td>
</tr>
<tr>
<td></td>
<td>90 … 240 V AC, 50 … 60 Hz (15 VA) or 9 … 36 V DC (10 W)</td>
</tr>
</tbody>
</table>

### Indication and operation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data logger memory</td>
<td>1 Mbyte, programmable for 17 data functions</td>
</tr>
<tr>
<td>Display</td>
<td>128 x 240 pixel LCD with backlight</td>
</tr>
<tr>
<td>Keypad</td>
<td>2 x 16 alphanumeric LCD display</td>
</tr>
<tr>
<td>Language options</td>
<td>33 keypad buttons with tactile feedback</td>
</tr>
<tr>
<td></td>
<td>5 magnetic hall effect switches</td>
</tr>
<tr>
<td></td>
<td>English, spanish, german, italian, french</td>
</tr>
</tbody>
</table>
### Certificates and approvals

**IP65 (NEMA 4X) flow display computer ratings**

| FM and CSA | I.S. Class I, II, Div 1  
|            | N-I Class I, Div 2  
|            | S Class II, Div 2  
| ATEX       | • Flowmeter:  
|            | Ex II 1 G [EEx ia] IIC  
|            | Ex II 3 1 G EEx nC [ia] IIC T5  
|            | • Transducers:  
|            | Ex II 1 G EEx ia IIC T5  
|            | Ex II 2 G EEx m II T5 (for use with flowmeter in safe area)  
| INMETRO (Brazil) | • Flowmeter:  
|            | [BR-Ex ia] IIC  
|            | BR-Ex nc [ia] IIC T5  
|            | • Transducers:  
|            | BR-Ex ia IIC T5 IP65  
|            | -50 °C ≤ Ta ≤ +60 °C  

**IP65 (NEMA 7) compact explosion-proof enclosure ratings**

| FM and CSA | XP Class I, Div 1  
|            | D-I Class II, Div 1  
|            | I.S. Class I, Div 1  
|            | N-I Class I, Div 2  
|            | S Class II, Div 2  
| ATEX       | • Flowmeter:  
|            | Ex II 1 G EEx d [ia] IIB + H2 T5  
|            | • Transducers:  
|            | Ex II 1 G EEx ia IIC T5  
| INMETRO (Brazil) | • Flowmeter:  
|            | BR-Ex d [ia] IIB + H2 T5  
|            | • Transducers:  
|            | BR-Ex ia IIC T5  
|            | -50 °C ≤ Ta ≤ +60 °C  

**IP66 (NEMA 7) wall mount explosion-proof enclosure ratings**

| FM and CSA | XP Class I, Div 1  
|            | D-I Class II, Div 1  
|            | I.S. Class I, Div 1  
|            | N-I Class I, Div 2  
|            | S Class II, Div 2  
| ATEX       | • Flowmeter:  
|            | Ex II 1 G [EEx ia] IIC  
|            | Ex II 3 1 G EEx nc [ia] IIC T5  
|            | Ex II 2 1 G EEx d [ia] IIC IIB+H2T5  
|            | • Transducers:  
|            | Ex II 1 G EEx ia IIC T5  
| INMETRO (Brazil) | • Flowmeter:  
|            | [BR-Ex ia] IIC  
|            | BR-Ex d [ia IIC] IIB + H2 T5  
|            | • Transducers:  
|            | BR-Ex ia IIC T5  
|            | -50 °C ≤ Ta ≤ +60 °C  

© Siemens AG 2010
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Design (Includes cable glands)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IP65 (NEMA 4X)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of ultrasonic paths</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual path</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flowmeter functions and I/O configurations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes graphic or digital display</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>- Extended I/O option</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Additional 2 x 4 ... 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mercury wetted relays</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 4 x digital pulse outputs (2 x open collector and 2 x 0 ... 5 V TTL)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meter power options</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>90 ... 240 V AC</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>9 ... 36 V, DC (except compact NEMA 7)</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication options</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RS 232 (standard)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Modbus (dedicated only, excludes NEMA 7 compact)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RTD temperature sensor</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes mounting hardware for pipes above 1.5” outer diameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No RTDs (Note: Temperature input is required for Energy systems)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x submersible clamp-on RTD</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transducer for channel 1</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Includes pipe mounting kit and spacer bar for indicated max. OD listed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See „Transducer selection charts“ for specifications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no transducer</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>C2H (high precision)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>D1H (high precision)</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>D2H (high precision)</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>D4H (high precision)</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transducer for channel 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Includes pipe mounting kit and spacer bar for indicated max. OD listed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See „Transducer selection charts“ for specifications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no transducer</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>C2H (high precision)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>D1H (high precision)</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>D2H (high precision)</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>D4H (high precision)</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM/CSA (default)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ATEX Exia</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Standard MLFB product offering represents 4 to 6 weeks delivery time.

K) Subject to export regulations AL: N, ECCN: 5A991X.
SITRANS F flowmeters
SITRANS F US

SITRANS FUG1010 Gas meter clamp-on

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3610-</td>
<td>K)</td>
</tr>
<tr>
<td>7ME3611-</td>
<td>K)</td>
</tr>
<tr>
<td>7ME3612-</td>
<td>K)</td>
</tr>
<tr>
<td>7ME3613-</td>
<td>K)</td>
</tr>
</tbody>
</table>

Number of channels/ultrasonic paths

<table>
<thead>
<tr>
<th>Single path</th>
<th>Dual path</th>
<th>Special: Four path (NEMA 4X and NEMA 7 wall mount only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

Flowmeter functions and I/O configurations (includes graphic or digital display)

<table>
<thead>
<tr>
<th>IP65 (NEMA 4X) and IP66 (NEMA 7 wall mounted) units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard (all but Compact NEMA 7)</td>
</tr>
<tr>
<td>- Graphic display</td>
</tr>
<tr>
<td>- 4 x 4 ... 20 mA analog input</td>
</tr>
<tr>
<td>- 2 x 0 ... 10 V</td>
</tr>
<tr>
<td>- 2 x 4 ... 20 mA analog output</td>
</tr>
<tr>
<td>- 2 x pulse output</td>
</tr>
<tr>
<td>- 4 x relay C type</td>
</tr>
<tr>
<td>- 2 x RTD input</td>
</tr>
<tr>
<td>Extended I/O option</td>
</tr>
<tr>
<td>- additional 2 x 4 ... 20 mA</td>
</tr>
<tr>
<td>- Mercury wetted relays</td>
</tr>
<tr>
<td>- 4 x digital pulse outputs (2 x open collector and 2 x 0 ... 5 V TTL)</td>
</tr>
</tbody>
</table>

IP65 (NEMA 7) compact units

<table>
<thead>
<tr>
<th>Standard (NEMA 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Digital display</td>
</tr>
<tr>
<td>- 2 x 4 ... 20 mA (loop)</td>
</tr>
<tr>
<td>- 2 x 4 ... 20 mA analog input</td>
</tr>
<tr>
<td>- 2 x status (open collector)</td>
</tr>
<tr>
<td>- 1 x RTD input</td>
</tr>
<tr>
<td>Digital pulse option</td>
</tr>
<tr>
<td>1 x digital pulse open collector output</td>
</tr>
<tr>
<td>Mercury wetted relays for standard meter</td>
</tr>
<tr>
<td>Dry contact form C relays for extended I/O meter</td>
</tr>
</tbody>
</table>

Meter power options

<table>
<thead>
<tr>
<th>90 ... 240 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 ... 36 V DC (except Compact NEMA 7)</td>
</tr>
<tr>
<td>9 ... 36 V DC negative GND (Compact only)</td>
</tr>
<tr>
<td>9 ... 36 V DC positive GND (Compact only)</td>
</tr>
</tbody>
</table>

Communication options

| RS232 (standard)                                    |
| MODBUS (excludes NEMA 7 Compact)                    |

RTD temperature sensor (includes mounting hardware for pipes above 1.5” outer diameter)

| No RTDs                                             |
| 1 x standard clamp-on RTD                           |
| 2 x standard clamp-on RTD                           |
| 1 x submersible clamp-on RTD                        |
| 2 x submersible clamp-on RTD                        |
| Special (for insert style RTDs)                     |

Transducer for channel 1
(includes pipe mounting kit and spacer bar for indicated max. outer diameter listed)

| See „Transducer selection chart“ for specifica-
| tions.
| no transducer                                       |

For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):

B1H (high precision) Trackmount and straps provided up to 125 mm (5’)
B2H (high precision) Trackmount and straps provided up to 125 mm (5’)
B3H (high precision) Trackmount and straps provided up to 125 mm (5’)
C1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)
C2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)
D1H (high precision) Mounting frame and straps provided up to 1200 mm (48”)
D2H (high precision) Mounting frame and straps provided up to 1200 mm (48”)
D3H (high precision) Mounting frame and straps provided up to 1200 mm (48”)
D4H (high precision) Mounting frame and straps provided up to 1200 mm (48”)

Other versions (different size, mount, type or pipe larger than DN 1200 (48”) or corrosion resistant), add Order code and plain text.

For the following B1H to D4H transducers, 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) Trackmount and straps provided up to 1200 mm (48”)
B2H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
B3H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
C1H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
C2H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
D1H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
D2H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
D3H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)
D4H (high temperature range HP) Trackmount and straps provided up to 1200 mm (48”)

1) Supplied spacer bar supports pipes up to 750 mm (30 inches). For pipes larger (than 750 mm (30 inches)) purchase also, spare part 7ME3960-0MS40 (1012BN-4).
K) Subject to export regulations AL: N, ECCN: 5A991X.
### 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 Order No.: 7ME3610-2BB00-0QQ1-Z**

**K03 + K03**

### Transducer for channel 2

| (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See „Transducer selection chart“ for specifications. | no transducer | A |
| For the following A1H to D4H transducers, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F): | 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 |
| | B3H (high precision) Trackmount and straps provided up to 125 mm (5") | T |
| | C1H (high precision) Mounting frame and straps provided up to 1300 mm (48") | M |
| | C2H (high precision) Mounting frame and straps provided up to 1200 mm (48") | N |
| | D1H (high precision) Mounting frame and straps provided up to 1200 mm (48") | P |
| | D2H (high precision) Mounting frame and straps provided up to 1200 mm (48") | Q |
| | D3H (high precision) Mounting frame and straps provided up to 1200 mm (48") | U |
| | D4H (high precision) Mounting frame and straps provided up to 1200 mm (48") | R |

| Other versions (different size, mount, type or pipe larger than DN 1200 (48") or corrosion resistant), add Order code and plain text. | Z | 01 |

### Selection and Ordering data

**Order No.** 7ME3610-2BB00-0QQ1-Z **K03 + K03**

### Further designs

| See „Transducer cable selection chart“ | 
| See „RTD cable selection chart“ | 

| For cable assembly for transducers (add for # of paths) | K.. |
| For cable assembly for RTDs (add for # of RTDs) | R.. |

### Approvals

| FM/CSA (default) | 1 |
| ATEX | 2 |
| INMETRO (Brazil) | 3 |

| Special ATEX EEx m Add Order code and plain text: Length of integral cable: | 

### Selection and Ordering data

**Order No.** 7ME3610-2BB00-0QQ1-Z **K03 + K03**
### Transducer Selection Chart

High precision transducers for steel pipe with outer diameter/wall thickness ratio >10

<table>
<thead>
<tr>
<th>Size code</th>
<th>Order Code</th>
<th>Pipe wall (mm)</th>
<th>Pipe wall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>min.</td>
<td>max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>min.</td>
<td>max.</td>
</tr>
<tr>
<td>B1H</td>
<td>K</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>B2H</td>
<td>L</td>
<td>3.0</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.12</td>
<td>0.16</td>
</tr>
<tr>
<td>B3H</td>
<td>T</td>
<td>2.7</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.106</td>
<td>0.128</td>
</tr>
<tr>
<td>C1H</td>
<td>M</td>
<td>4.1</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td>0.23</td>
</tr>
<tr>
<td>C2H</td>
<td>N</td>
<td>5.8</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.23</td>
<td>0.32</td>
</tr>
<tr>
<td>D1H</td>
<td>P</td>
<td>8.1</td>
<td>11.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.32</td>
<td>0.44</td>
</tr>
<tr>
<td>D2H</td>
<td>Q</td>
<td>11.2</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.44</td>
<td>0.62</td>
</tr>
<tr>
<td>D3H</td>
<td>U</td>
<td>7.4</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.293</td>
<td>0.354</td>
</tr>
<tr>
<td>D4H</td>
<td>R</td>
<td>15.7</td>
<td>31.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.62</td>
<td>1.25</td>
</tr>
</tbody>
</table>

### Transducer Cable Selection Chart

Transducer cable codes for length and type options

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (PVC jacket)</th>
<th>Submersible (polyethylene jacket)</th>
<th>Plenum Rated (teflon jacket)</th>
<th>Armored</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>K01</td>
<td>K11</td>
<td>K21</td>
<td>K31</td>
</tr>
<tr>
<td>15 (50)</td>
<td>K02</td>
<td>K12</td>
<td>K22</td>
<td>K32</td>
</tr>
<tr>
<td>30 (100)</td>
<td>K03</td>
<td>K13</td>
<td>K23</td>
<td>K33</td>
</tr>
<tr>
<td>46 (150)</td>
<td>K04</td>
<td>K14</td>
<td>K24</td>
<td>K34</td>
</tr>
<tr>
<td>61 (200)</td>
<td>K05</td>
<td>K15</td>
<td>K25</td>
<td>K35</td>
</tr>
<tr>
<td>91 (300)</td>
<td>K06</td>
<td>K16</td>
<td>K26</td>
<td>K36</td>
</tr>
</tbody>
</table>

### RTD Cable Selection Chart

RTD cable codes for length and type

<table>
<thead>
<tr>
<th>Cable length m (ft)</th>
<th>Standard (teflon wrapped)</th>
<th>Submersible (extruded jacket)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>R01</td>
<td>R11</td>
</tr>
<tr>
<td>15 (50)</td>
<td>R02</td>
<td>R12</td>
</tr>
<tr>
<td>30 (100)</td>
<td>R03</td>
<td>R13</td>
</tr>
<tr>
<td>46 (150)</td>
<td>R04</td>
<td>R14</td>
</tr>
<tr>
<td>61 (200)</td>
<td>R05</td>
<td>R15</td>
</tr>
<tr>
<td>91 (300)</td>
<td>R06</td>
<td>R16</td>
</tr>
</tbody>
</table>
SITRANS FUS1020 offers reliable flow measurement at a much lower cost than other clamp-on ultrasonic flowmeters, with flow rate accuracy of 1% or better for most applications.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external transducers do not require periodic cleaning
- No moving parts to wear or foul
- No pressure drop or energy loss
- Compact, integral design reduces installation cost
- Choice of single or dual channel operation
- Transducers are matched to the pipe material and have menu-driven location.
- Wide-Beam technology ensures high performance.
- Zeromatic Path automatically sets zero without stopping flow and eliminates zero drift.

Application

FUS1020 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 FUS1020 flowmeter is not available with hazardous areas approval.

Design

- IP65 (NEMA 4) wall mount constructed of powder coated steel enclosure with powder coated aluminum cover, stainless steel hardware, optional stainless steel housing
- Single and dual channel versions are available

Overview

SITRANS FUS1020 Basic clamp-on

Function

- 2x16 integral alphanumeric display and 5 key keypad for installation menu and data display
- Assignable 4 ... 20 mA isolated loop-powered output
- TTL flow pulse rate output
- RS232 digital communication port
- DB9 connector for PC communication
- Assignable open collector alarm output (40 V DC max)
- Batch totalizer start-stop control line
- Internal calibration security switch
- Remote PC installation menu
- Zeromatic Path automatically sets zero
- Bidirectional flow operation
- 1 MByte data logger with both site & data logger storage

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

Output

- Outputs:
  - Current: 4 ... 20 mA
    1 x for single channel
    2 x for dual channel
  - 1 x 0 ... 5 kHz pulse rate, digital isolated, single channel only
  - RS232 serial port

Optional output

- Current: 4 ... 20 mA, programmable, single channel only

Status/Alarm I/O

- Programmable form a relays (optional)
  1 x for single channel
  2 x for dual channel
- Optically coupled totalizer hold switch inputs
  1 x for single channel
  2 x for dual channel
- Optically isolated totalizer reset switch, single channel only

Accuracy

- Accuracy: ± 0.5 % ... 1.0 % of flow
- Batch repeatability: ± 0.15%
- Zero Drift: 0.1% of rate; 0.0003 m/s (0.001 ft/s), with zeromatic path active
- Data refresh rate: 5 Hz

Rated operation conditions

- Degree of protection: IP65 (NEMA 4)

Design

- Weight: 1.4 kg (3.0 lbs)
- Dimensions (W x H x D): 197 x 103 x 109 mm (7.77 x 4.06 x 4.3 inches)
- Power supply: 100 ... 240 V AC @ 15 VA or 9 ... 36 V DC @ 10 W

Certificates and approvals

- Unclassified locations only
  - UL Listing
  - ULc Listing
  - CE:
    - LVD IEC 61010-1; CB report
    - EMC EN 61000-6-4
### Standard MLFB for quick delivery on SITRANS FUS1020 (Dedicated basic standard)

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS1020 Basic Clamp-on</td>
<td>D) 7ME357-00000K02K02+</td>
<td></td>
</tr>
</tbody>
</table>

#### Design
- IP65 (NEMA 4)

#### Number of channels/ultrasonic paths
- Single channel
- Dual channel/Dual path

#### Flowmeter functions and I/O configurations
- With display

#### Meter power options
- 90 ... 240 V AC

#### Transducer for channel 1
- (includes pipe mounting kit for indicated max. OD listed)
  - no transducer
  - A2 universal: Trackmount and straps provided up to 75 mm (3"
  - B3 universal: Trackmount and straps provided up to 125 mm (5"
  - C3 universal: Mounting frame and straps provided up to 300 mm (13"
  - D3 universal: Mounting frame and straps provided up to 600 mm (24"
  - E2 universal: Mounting frame and straps provided up to 1200 mm (48"

#### Transducer for channel 2
- (includes pipe mounting kit for indicated max. OD listed)
  - no transducer
  - A2 universal: Trackmount and straps provided up to 75 mm (3"
  - B3 universal: Trackmount and straps provided up to 125 mm (5"
  - C3 universal: Mounting frame and straps provided up to 300 mm (13"
  - D3 universal: Mounting frame and straps provided up to 600 mm (24"
  - E2 universal: Mounting frame and straps provided up to 1200 mm (48"

#### Approvals
- No approval options

#### Languages (Meter, Labels and Documentation)
- German, English (default)

Standard MLFB offering represents 4 to 6 weeks delivery time

D) Subject to export regulations AL: N, ECCN: EAR99H.
## SITRANS FUS1020 Basic clamp-on

### Selection and Ordering Data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Ord. code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ME3570-00-0</td>
<td></td>
<td>SITRANS FUS1020 Basic clamp-on, IP65 (NEMA 4)</td>
</tr>
</tbody>
</table>

### Number of Channels/ULtrasonic Paths

- Single channel
- Dual channel / Dual path

### Flowmeter Functions and I/O Configurations

- Blind system
- 1 x 4 ... 20 mA per channel
- 1 x pulse out (for single channel only)
- With display
- With display and 1 x additional analog output (single channel only)
- With display and with SPST relay
- With display and 1 x additional analog output and SPST relay (single channel only)

### Transducer for Channel 1 (continued)

<table>
<thead>
<tr>
<th>Transducer for Channel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>D1H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 1200 mm (48”)</td>
<td>Z</td>
</tr>
<tr>
<td>A2H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A1H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>E2 universal Mounting frame and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>D3 universal Mounting frame and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>C3 universal Mounting frame and straps provided up to 300 mm (12”)</td>
<td>Z</td>
</tr>
<tr>
<td>B3 universal Trackmount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A2 universal Trackmount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>C2H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>B1H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A3H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A1H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A2H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>B1H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>C1H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>D2H (high precision) Trackless mount and straps provided up to 1200 mm (48”)</td>
<td>Z</td>
</tr>
<tr>
<td>C2H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 1200 mm (48”)</td>
<td>Z</td>
</tr>
<tr>
<td>D1H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>A2H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A1H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>E2 universal Mounting frame and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>D3 universal Mounting frame and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>C3 universal Mounting frame and straps provided up to 300 mm (12”)</td>
<td>Z</td>
</tr>
<tr>
<td>B3 universal Trackmount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A2 universal Trackmount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>C2H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>B1H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A3H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A1H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>A2H (high precision) Trackless mount and straps provided up to 75 mm (3”)</td>
<td>Z</td>
</tr>
<tr>
<td>B1H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 125 mm (5”)</td>
<td>Z</td>
</tr>
<tr>
<td>C1H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>D2H (high precision) Trackless mount and straps provided up to 1200 mm (48”)</td>
<td>Z</td>
</tr>
<tr>
<td>C2H (high precision) Trackless mount and straps provided up to 600 mm (24”)</td>
<td>Z</td>
</tr>
<tr>
<td>B2H (high precision) Trackless mount and straps provided up to 1200 mm (48”)</td>
<td>Z</td>
</tr>
</tbody>
</table>

### Approvals

- No approval options (UL, ULc, CE by default)

---

1) Additional mounting options available. Use option code M0*.

2) 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).

D) Subject to export regulations AL: N, EECN: EAR99H.
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 transducer cable is needed to reach pipe location.

MLFB Order No.: 7ME3570-1EA00-0NA0-Z

### Transducer selection charts

#### Universal transducers for any pipe material

<table>
<thead>
<tr>
<th>Transducer type (universal)</th>
<th>Order Code</th>
<th>Outer diameter range (mm)</th>
<th>Outer diameter range (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>B</td>
<td>12.7 50.8</td>
<td>0.5 2</td>
</tr>
<tr>
<td>B3</td>
<td>C</td>
<td>19 127</td>
<td>0.75 5</td>
</tr>
<tr>
<td>C3</td>
<td>D</td>
<td>51 305</td>
<td>2 12</td>
</tr>
<tr>
<td>D3</td>
<td>E</td>
<td>203 610</td>
<td>8 24</td>
</tr>
<tr>
<td>E2</td>
<td>F</td>
<td>254 6096</td>
<td>10 249</td>
</tr>
</tbody>
</table>

#### High precision transducers for steel pipe with outer diameter/wall thickness ratio > 10

<table>
<thead>
<tr>
<th>Transducer type (high precision)</th>
<th>Order Code</th>
<th>Pipe Wall [mm]</th>
<th>Pipe Wall [inches]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1H</td>
<td>G</td>
<td>0.64 1.02</td>
<td>0.025 0.04</td>
</tr>
<tr>
<td>A2H</td>
<td>H</td>
<td>1.02 1.52</td>
<td>0.04 0.06</td>
</tr>
<tr>
<td>A3H</td>
<td>J</td>
<td>1.52 2.03</td>
<td>0.06 0.08</td>
</tr>
<tr>
<td>B1H</td>
<td>K</td>
<td>2.03 3.05</td>
<td>0.08 0.12</td>
</tr>
<tr>
<td>B2H</td>
<td>L</td>
<td>3.05 4.06</td>
<td>0.12 0.16</td>
</tr>
<tr>
<td>C1H</td>
<td>M</td>
<td>4.06 5.84</td>
<td>0.16 0.23</td>
</tr>
<tr>
<td>C2H</td>
<td>N</td>
<td>5.84 8.13</td>
<td>0.23 0.32</td>
</tr>
<tr>
<td>D1H</td>
<td>P</td>
<td>8.13 11.18</td>
<td>0.32 0.44</td>
</tr>
<tr>
<td>D2H</td>
<td>Q</td>
<td>11.18 15.75</td>
<td>0.44 0.62</td>
</tr>
</tbody>
</table>

### Transducer track mount selection chart

<table>
<thead>
<tr>
<th>Transducer size (High Precision only)</th>
<th>Track mount, Single enclosure, reflect mount only</th>
<th>Track mount, Dual enclosure, reflect or direct mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A’H</td>
<td>M01</td>
<td>Not available</td>
</tr>
<tr>
<td>B’H</td>
<td>M02</td>
<td>M03</td>
</tr>
<tr>
<td>C’H</td>
<td>M04</td>
<td>M05</td>
</tr>
<tr>
<td>D’H</td>
<td>Not available</td>
<td>M06</td>
</tr>
</tbody>
</table>

### Transducer cable selection chart

<table>
<thead>
<tr>
<th>Cable length [m (ft)]</th>
<th>Standard (PVC jacket)</th>
<th>Plenum rated (Teflon jacket)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>K01</td>
<td>K21</td>
</tr>
<tr>
<td>15 (50)</td>
<td>K02</td>
<td>K22</td>
</tr>
<tr>
<td>30 (100)</td>
<td>K03</td>
<td>K23</td>
</tr>
<tr>
<td>46 (150)</td>
<td>K04</td>
<td>K24</td>
</tr>
<tr>
<td>61 (200)</td>
<td>K05</td>
<td>K25</td>
</tr>
<tr>
<td>91 (300)</td>
<td>K06</td>
<td>K26</td>
</tr>
</tbody>
</table>

Subject to export regulations AL: N, ECCN: EAR99H.
## Accessories/Spare parts for Clamp-on ultrasonic flowmeters

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal Portable Transducers</td>
<td>7ME3951-...</td>
</tr>
<tr>
<td>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 transducers. These can also be selected as a cost savings on applications where standard accuracy is sufficient.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Precision Transducers</td>
<td>7ME3950-...</td>
</tr>
<tr>
<td>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 applicable to steel pipes but no other metals, and are selected solely by wall thickness.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temperature transducers</td>
<td>7ME3950-...</td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weld Seal Mount</td>
<td>7ME3960-...</td>
</tr>
<tr>
<td>These provide the most secure and strongest mounting of the flow transducers. They are generally selected for “High End” meter types where maximum performance criteria applies. They accommodate high precision transducers 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).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting tracks</td>
<td>7ME3960-...</td>
</tr>
<tr>
<td>Typically used on smaller pipes for easier and more stable mounting for dedicated universal style transducer size A or B. Also available for dedicated high precision transducer size A or B.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacer Bars</td>
<td>7ME3960-...</td>
</tr>
<tr>
<td>Transducers 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 bar.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp-On RTD’s</td>
<td>7ME3950-...</td>
</tr>
<tr>
<td>1000 Ω 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 ºC) are supplied. Single RTD’s are also used with FUH and FUG meters to enable live calculations of “Liquident” and Standard Volume Correction.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert RTD’s</td>
<td>7ME3950-...</td>
</tr>
<tr>
<td>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 “skin temperature”. Since they project into the pipe they cannot be used in pipeline that undergo periodic “pigging”.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Cable (Flow Transducer or RTD)</td>
<td>7ME3960-...</td>
</tr>
<tr>
<td>Selected for general purpose installations where no special application requirements exist.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersible Cable (Flow Transducer)</td>
<td>7ME3960-...</td>
</tr>
<tr>
<td>Polyethylene jacketed, for locations that experience periodic or continual submersion of the flow transducers.</td>
<td></td>
</tr>
</tbody>
</table>

D) Subject to export regulations AL: N, ECCN: EAR99H.
### SITRANS F flowmeters

#### SITRANS F US

##### Accessories/Spare parts for clamp-on

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenum Cable (Flow Transducer or RTD)</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>For temperatures above 180 °F. Teflon jacketed to withstand high temperatures, is used when high temp transducers are specified.</td>
<td></td>
</tr>
<tr>
<td>Armored Cable (Flow Transducer)</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>Double shielded cable, selected when cable will not be installed in conduit between meter and transducers.</td>
<td></td>
</tr>
<tr>
<td>Temperature sensor cable</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>Cable to connect field installed RTD to flow meter, available in Teflon wrapped, plenum or submersible grade. Typically used for FUE, FUH and FUG series meters where a temperature sensor is employed.</td>
<td></td>
</tr>
<tr>
<td>Straps</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>Used to fasten transducers or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.</td>
<td></td>
</tr>
<tr>
<td>Chains (EZ clamps)</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>Used to fasten portable transducers or mounting frames to pipe. Thumbscrews eliminate need for hand tools when mounting transducers, and allow for easy on/off operations.</td>
<td></td>
</tr>
<tr>
<td>Ultrasonic Couplant</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>Fills any voids between transducer emitting surface and pipe wall to allow maximum energy transfer between transducer and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).</td>
<td></td>
</tr>
<tr>
<td>Dry Couplant</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>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).</td>
<td></td>
</tr>
<tr>
<td>Damping Material</td>
<td>D) 7ME3960-...</td>
</tr>
<tr>
<td>Used with gas meters, and required as part of their transducer installation. This material absorbs excess ultrasonic energy from the pipe wall to enable the meter to detect and operate with low amplitude transducer signals normally associated with Clamp-on Gas applications.</td>
<td></td>
</tr>
</tbody>
</table>

D) Subject to export regulations AL: N, ECCN: EAR99H.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Spare parts (System)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS clamp-on</td>
<td>7ME 3 9 4 0 -</td>
</tr>
</tbody>
</table>

### Power supplies, batteries and chargers

- **Power supply 110 ... 230 V AC**
  - for IP65 (NEMA 4X) or IP66 (NEMA 7 Wall mount) D) 0 PA 0 0
  - for FUS1020 D) 1 PA 0 0
  - for IP65 (NEMA 7) Compact D) 2 PA 0 0
- **Power supply 9 ... 36 V DC**
  - for IP65 (NEMA 4X) or IP66 (NEMA 7 Wall mount) K) 0 PB 0 0
  - for FUS1020 D) 1 PB 0 0
  - negative ground for NEMA 7 Compact D) 2 PJ 0 0
  - positive ground for NEMA 7 Compact D) 2 PK 0 0

### Portable meter batteries and accessories

- **Internal battery (Portable meters only)** D) 3 PP 0 0
- **External 4-hour battery for portable meters** D) 3 BB 0 0
- **Charger for external 4-hour battery (for US)** D) 3 BC 1 0
- **Charger for external 4-hour battery (for Europe)** D) 3 BC 2 0
- **4-hour battery charger adapter for NEMA 6, weatherproof portable** D) 3 BA 0 0

### IP67 Portable meter charger

- **Type A for Europe (CEE7/7)** D) 3 PC 0 0
- **Type C for Australia (AS3112)** D) 3 PD 0 0
- **Type D for UK (BS1363)** D) 3 PE 0 0
- **Type J for Japan (JIS8303)** D) 3 PF 0 0
- **Type K for US (NEMA 5-15P)** D) 3 PG 0 0
- **Type L for Switzerland (SEV1011)** D) 3 PH 0 0

### IP40 Portable meter charger

- **Type A for Europe (CEE7/7)** D) 4 PC 0 0
- **Type C for Australia (AS3112)** D) 4 PD 0 0
- **Type D for UK (BS1363)** D) 4 PE 0 0
- **Type J for Japan (JIS8303)** D) 4 PF 0 0
- **Type K for US (NEMA 5-15P)** D) 4 PG 0 0
- **Type L for Switzerland (SEV1011)** D) 4 PH 0 0

### Modbus system computer modules

- **Modbus converter module** CQO-1015N-5M
- **Mounting kit (type 1) for Modbus converter module** CQO-1015N-5M-MK1
- **Mounting kit (type 2) for Modbus converter module** CQO-1015N-5M-MK2
- **Mounting kit (type 3) for Modbus converter 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)** CQO-1012XMB-1
- **2 inch pipe mounting bracket for IP65 (NEMA 4X)** CQO-1012NMB-1

D) Subject to export regulations AL: N, ECCN: EAR99H.
K) Subject to export regulations AL: N, ECCN: 5A991X.
## Accessories/Spare parts for clamp-on

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Spare parts (Transducers)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS1020 clamp-on</td>
<td></td>
</tr>
</tbody>
</table>

#### Meter type

- Dedicated (FUS1010, FUG1010, FUH1010, FUE1010, FUS1020) D) **7M3950**
- Portable (FUP1010 or FUE1010) D) **7M3951**

#### Approvals

- UL, ULc, CE (FUS1020 and Portable only) 0
- FM/CSA hazardous (classified locations) 1
- ATEX Ex II 1G EEx ia IIIC T5 (not for RTDs) 2
- INMETRO (not for (RTDs) 3

### Spare transducer code

For liquid flow transducers pipe ranges please refer to transducer selection chart in the FUS1010 section.

#### Liquid flow transducers for use with mounting frames or tracks (including portable)

- **A2 universal** Trackmount and straps provided up to 75 mm (3”)
- **B3 universal** Trackmount and straps provided up to 125 mm (5”)
- **C3 universal** Mounting frame and straps provided up to 300 mm (12”)
- **D3 universal** Mounting frame and straps provided up to 600 mm (24”)
- **E2 universal** Mounting frame and straps provided up to 1200 mm (48”)

#### Meter type

- **A1H** (high precision)
- **A2H** (high precision)
- **A3H** (high precision)
- **B1H** (high precision)
- **B2H** (high precision)
- **B3H** (high precision)
- **C1H** (high precision)
- **C2H** (high precision)
- **D1H** (high precision)
- **D2H** (high precision)
- **D3H** (high precision)
- **E2 universal**

#### Meter type

- **D1H** (high precision FUS 1020) 1)
- **C2H** (high precision FUS 1020)
- **C1H** (high precision FUS 1020)
- **B2H** (high precision FUS 1020)
- **B1H** (high precision FUS 1020)
- **A3H** (high precision FUS 1020)
- **A2H** (high precision FUS 1020)
- **A1H** (high precision FUS 1020)

### High temperature universal liquid transducers

For liquid flow transducers pipe ranges please refer to transducer selection chart in the FUS1010 section.

#### High temperature universal liquid transducers

- **FUS1020** High precision liquid flow transducer
  - **A1H** (high precision)
  - **A2H** (high precision)
  - **A3H** (high precision)
  - **B1H** (high precision)
  - **B2H** (high precision)
  - **B3H** (high precision)
  - **C1H** (high precision)
  - **C2H** (high precision)
  - **D1H** (high precision)
  - **D2H** (high precision)
  - **D3H** (high precision)

#### High temperature gas flow transducers for use with mounting frames or tracks

- **E2 universal**
  - **B1H** (high precision)
  - **B2H** (high precision)
  - **B3H** (high precision)
  - **C1H** (high precision)
  - **C2H** (high precision)
  - **D1H** (high precision)
  - **D2H** (high precision)
  - **D3H** (high precision)
  - **E2 universal**

### High temperature gas transducer for weld seal enclosures

- **D1H** (high precision, weld seal)
- **D2H** (high precision, weld seal)
- **D3H** (high precision, weld seal)
- **D4H** (high precision, weld seal)

---

1) Supplied spacer bar supports pipes up to 1050 mm (42 inches). For pipes larger than 1050 mm (42 inches) purchase also, spare part 7ME3960-OMS40 (1012BN-4)

2) Supplied spacer bar supports pipes up to 750 mm (30 inches). For pipes larger than 750 mm (30 inches) purchase also, spare part 7ME3960-OMS40 (1012BN-4)

D) Subject to export regulations AL: N, ECCN: EAR99H
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Spare parts (Transducers)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS1020 clamp-on</td>
<td></td>
</tr>
<tr>
<td><strong>Meter type</strong></td>
<td></td>
</tr>
<tr>
<td>Dedicated (FUS1010, FUG1010, FUH1010, FUE1010, FUS1020)</td>
<td>D) 7ME3950 -</td>
</tr>
<tr>
<td>Portable (FUP1010 or FUE1010)</td>
<td>D) 7ME3951 -</td>
</tr>
<tr>
<td><strong>Standard RTD transducers (not for energy systems)</strong></td>
<td></td>
</tr>
<tr>
<td>Standard clamp-on RTD</td>
<td>1 TA 00</td>
</tr>
<tr>
<td>Submersible clamp-on RTD (not for portable)</td>
<td>1 TB 00</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 1), 140 mm (5.5 inch)</td>
<td>1 TJ 00</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 2), 216 mm (8.5 inch)</td>
<td>1 TJ 01</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 3), 292 mm (11.5 inch)</td>
<td>1 TJ 02</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 4), 368 mm (14.5 inch)</td>
<td>1 TJ 03</td>
</tr>
<tr>
<td><strong>Standard for energy system (matched pair)</strong></td>
<td></td>
</tr>
<tr>
<td>Standard clamp-on RTD</td>
<td>1 TA 10</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 1) for Energy system FUE1010, 140 mm (5.5 inch)</td>
<td>1 TJ 10</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 2) for Energy system FUE1010, 216 mm (8.5 inch)</td>
<td>1 TJ 11</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 3) for Energy system FUE1010, 292 mm (11.5 inch)</td>
<td>1 TJ 12</td>
</tr>
<tr>
<td>Insertion style RTD pair (size 4) for Energy system FUE1010, 368 mm (14.5 inch)</td>
<td>1 TJ 13</td>
</tr>
</tbody>
</table>

D) Subject to export regulations AL: N, ECCN: EAR99H.

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Spare parts (Miscellaneous)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS FUS clamp-on</td>
<td></td>
</tr>
<tr>
<td><strong>Meter design</strong></td>
<td></td>
</tr>
<tr>
<td>IP65 (NEMA 4X) or IP66 (NEMA 7 wall mount)</td>
<td></td>
</tr>
<tr>
<td>High precision transducer size A or B</td>
<td></td>
</tr>
<tr>
<td><strong>Transducer mounting frames for</strong></td>
<td></td>
</tr>
<tr>
<td>Universal transducer size B (for pipes &gt;125 mm (5 inch))</td>
<td>D) CQO-1012FN-PB</td>
</tr>
<tr>
<td>Universal transducer size C</td>
<td></td>
</tr>
<tr>
<td>Universal transducer size D</td>
<td></td>
</tr>
<tr>
<td>Universal transducer size E</td>
<td></td>
</tr>
<tr>
<td><strong>Mounting straps for mounting frames (slotted stainless steel)</strong></td>
<td></td>
</tr>
<tr>
<td>For pipes from DN 50 to DN 150</td>
<td>0 MD 00</td>
</tr>
<tr>
<td>For pipes from DN 50 to DN 300</td>
<td>0 MD 10</td>
</tr>
<tr>
<td>For pipes from DN 300 to DN 600</td>
<td>0 MD 20</td>
</tr>
<tr>
<td>For pipes from DN 600 to DN 1200</td>
<td>0 MD 30</td>
</tr>
<tr>
<td>For pipes from DN 1200 to DN 1500</td>
<td>0 MD 40</td>
</tr>
<tr>
<td>For pipes from DN 1500 to DN 2100</td>
<td>0 MD 50</td>
</tr>
<tr>
<td>For pipes from DN 2100 to DN 3000</td>
<td>0 MD 60</td>
</tr>
<tr>
<td>Spacer bars (for indexing transducers on pipe)</td>
<td></td>
</tr>
<tr>
<td>Spacers bars for pipes to 200 mm/8 inch (liquid), 600 mm / 24 inch (gas)</td>
<td>0 MS 10</td>
</tr>
<tr>
<td>Spacers bars for pipes to 500 mm/20 inch (liquid), DN 1200 / 48 inch (gas)</td>
<td>0 MS 20</td>
</tr>
<tr>
<td>Spacers bars for pipes to 800 mm/32 inch (liquid)</td>
<td>0 MS 30</td>
</tr>
<tr>
<td>Spacers bars for pipes to 1200 mm/48 inch (liquid)</td>
<td>0 MS 40</td>
</tr>
<tr>
<td>Only use in conjunction with 7ME3960-0MS30</td>
<td></td>
</tr>
</tbody>
</table>

**Weld seal mounting enclosures for liquid and gas transducers**

- Single enclosure for size B high precision | 0 WS 10   
- Single enclosure for size C high precision | 0 WS 20   
- Single enclosure for size D high precision | 0 WS 30   
- Single enclosure for size E universal | 0 WS 40   
- Dual enclosure for size C high precision | 0 WD 20   
- Dual enclosure for size D high precision | 0 WD 30   
- Dual enclosure for size E universal | 0 WD 40   

**Stainless steel straps for weld seal enclosure mounting**

- Mounting strap for pipe diameter to 300 mm (1 inch) | 0 SM 01   
- Mounting strap for pipe diameter to 600 mm (2 inch) | 0 SM 11   
- Mounting strap for pipe diameter to 1200 mm (48 inch) | 0 SM 21   
- Mounting strap for pipe diameter to 1500 mm (60 inch) | 0 SM 31   
- Mounting strap for pipe diameter to 2130 mm (84 inch) | 0 SM 41   
- Mounting strap for pipe diameter to 3050 mm (120 inch) | 0 SM 51   

© Siemens AG 2010

SITRANS F flowmeters
SITRANS F US

Accessories/Spare parts for clamp-on
## Accessories/Spare parts for clamp-on

### SITRANS FUS clamp-on

#### Stainless mounting tracks for high temp 991 transducers
- Size 1 high temp transducer pair
  - D) CQO-992MTNHMSH-1
- Size 2 high temp transducer pair
  - D) CQO-992MTNHMSH-2
- Size 3 high temp transducer pair
  - D) CQO-992MTNHMSH-3
- Size 4 high temp transducer pair
  - D) CQO-992MTNHMSH-4

#### Clamp-on RTD mounting hardware for dedicated systems
- RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)
  - 0 MR 0 0
- RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)
  - 0 MR 0 1
- RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)
  - 0 MR 0 2
- RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)
  - 0 MR 0 4
- Junction box for clamp on RTD’s
  - D) CQO-992ECJ

### Portable transducer mounting hardware

#### Transducer mounting tracks for portable transducers (aluminum with mounting chains) for pipes < 125 mm (5 inch) for
- Universal transducer size A or B
  - 3 MA 0 0
- High precision transducer size A or B
  - 3 MB 0 0

#### Transducer mounting frames
- Universal transducer size B (for pipes > 125 mm (5 inch))
  - D) CQO-1012FP-PB
- Universal transducer size C
  - 3 M C 0 0
- Universal transducer size D
  - 3 M C 0 1
- Universal transducer size E
  - 3 M C 0 2
- High precision transducer size B (for pipes > 125 mm (5 inch))
  - D) CQO-1012FPH-PB
- High precision transducer size C
  - 3 M D 0 0
- High precision transducer size D
  - 3 M D 0 1

#### Spacer bar (for indexing portable transducers
- Mounting chain and EZ clamp hardware
  - D) CQO-1012Z-1
- EZ clamp hardware set for DN 25 to DN 600 (1 to 24 inch): handles all transducers except “D” size HP and “E” size universal
  - D) CQO-1012Z-2
- Mounting chain for portable transducers: 4 x 760 mm lengths
  - 3 C M 1 0
- Mounting chain for portable transducers: 2 x 760 mm and 2 x 1500 mm lengths
  - 3 C M 2 0
- RTD mounting hardware for portable system
  - 3 M R 0 0

### Transducer connector adaptors
- “F” connector to BNC adapter (order 2 per transducer set)
  - D) CQO-1012NFPA

### SITRANS FUS1020 Transducer mounting hardware

#### SITRANS FUS1020 Mounting straps
- Mounting strap for dedicated transducers (DN50 to DN300)
  - CQO-1022MS-1
- Mounting strap for dedicated transducers (DN300 to DN600)
  - CQO-1022MS-2
- Mounting strap for dedicated transducers (DN600 to DN1200)
  - CQO-1022MS-3
- Mounting strap for dedicated transducers (DN1200 to DN1500)
  - CQO-1022MS-4
- Mounting strap for dedicated transducers (DN1500 to DN2100)
  - CQO-1022MS-5
- Mounting strap for dedicated transducers (DN2100 to DN3000)
  - CQO-1022MS-6

---

D) Subject to export regulations AL: N, ECCN: EAR99H.
### Accessories/Spares parts for clamp-on

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Spare parts (Miscellaneous)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insert RTD Thermowells</strong></td>
<td><strong>D) 7ME 3 96 0</strong></td>
</tr>
<tr>
<td>- Thermowell std. duty uninsulated pipe 140 mm (5.5 inch)</td>
<td><strong>CQO-1012TW-1</strong></td>
</tr>
<tr>
<td>- Thermowell std. duty uninsulated pipe 216 mm (8.5 inch)</td>
<td><strong>CQO-1012TW-2</strong></td>
</tr>
<tr>
<td>- Thermowell std. duty uninsulated pipe 292 mm (11.5 inch)</td>
<td><strong>CQO-1012TW-3</strong></td>
</tr>
<tr>
<td>- Thermowell std. duty with lagging 140 mm (5.5 inch)</td>
<td><strong>CQO-1012TW-1L</strong></td>
</tr>
<tr>
<td>- Thermowell std. duty with lagging 216 mm (8.5 inch)</td>
<td><strong>CQO-1012TW-2L</strong></td>
</tr>
<tr>
<td>- Thermowell std. duty with lagging 292 mm (11.5 inch)</td>
<td><strong>CQO-1012TW-3L</strong></td>
</tr>
</tbody>
</table>

#### Transducer cables for

(Use „Transducer cable selection chart“ to complete Order No. with ##)

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP65 (NEMA 4X) or IP66 (NEMA 7 wall mount)</strong></td>
</tr>
<tr>
<td><strong>IP65 (NEMA 4) FUS 1020</strong></td>
</tr>
<tr>
<td><strong>IP65 (NEMA 7) Compact</strong></td>
</tr>
<tr>
<td><strong>IP67 Weather proof portable</strong></td>
</tr>
<tr>
<td><strong>IP40 (NEMA 1) Energy portable</strong></td>
</tr>
</tbody>
</table>

#### RTD cables for

(Use „Transducer cable selection chart“ to complete Order No. with ##)

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All dedicated systems (except FUS 1020)</strong></td>
</tr>
<tr>
<td><strong>IP67 Weather proof portable</strong></td>
</tr>
<tr>
<td><strong>IP40 (NEMA 1) Energy portable</strong></td>
</tr>
</tbody>
</table>

#### Dedicated cable termination kits

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard, plenum and armored transducer cable (NEMA 4X and NEMA 7 wall)</strong></td>
</tr>
<tr>
<td><strong>Submersible transducer cable (NEMA 4X and NEMA 7 wall)</strong></td>
</tr>
<tr>
<td><strong>Standard and plenum transducer cable (FUS1020)</strong></td>
</tr>
<tr>
<td><strong>Standard, plenum and armored transducer cable (compact NEMA 7)</strong></td>
</tr>
<tr>
<td><strong>Submersible transducer cable (compact NEMA 7)</strong></td>
</tr>
<tr>
<td><strong>Clamp-on RTD cable termination kit for standard RTD</strong></td>
</tr>
<tr>
<td><strong>Clamp-on RTD cable termination kit for submersible RTD</strong></td>
</tr>
<tr>
<td><strong>Insert RTD cable termination kit</strong></td>
</tr>
</tbody>
</table>

### Ultrasonic couplants

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temporary water based for portable systems:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permanent synthetic polymer based:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permanent high temp fluoroether:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permanent high temp fluoroether:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permanent vulcanizing silicone rubber couplant:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permanent high temp silicone grease:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permanent high temp silicone grease:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Couplant for submersible transducer applications:</strong></td>
</tr>
<tr>
<td><strong>Dry coupling pads (qty of 10):</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### Pipe damping films for FUG gas systems

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B1, B2, B3, C1 and C2 transducers</strong></td>
</tr>
<tr>
<td><strong>D1 and D3 transducers</strong></td>
</tr>
<tr>
<td><strong>D2 transducer</strong></td>
</tr>
<tr>
<td><strong>D4 transducer</strong></td>
</tr>
</tbody>
</table>

### Serial RS232 Cables and I/O Adapters

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RS232 Cable for all dedicated meters</strong></td>
</tr>
<tr>
<td><strong>RS232 Cable for IP66 Weather proof portable meter</strong></td>
</tr>
<tr>
<td><strong>I/O adapter for IP66 Portable meter</strong></td>
</tr>
<tr>
<td><strong>I/O adapter for IP64 Weather proof portable meter</strong></td>
</tr>
</tbody>
</table>

### Universal Transducer Test Blocks

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test block for size A and B universal transducers</strong></td>
</tr>
<tr>
<td><strong>Test block for size C and D universal transducers</strong></td>
</tr>
</tbody>
</table>

### Field Manuals

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CD with documentation for SITRANS F US Clamp-on ultrasonic flowmeters (English)</strong></td>
</tr>
</tbody>
</table>

(D) Subject to export regulations AL: N, ECCN: EAR99H.
## Accessories/Spares parts for clamp-on

### Transducer cable selection chart (Dedicated, Pair)

<table>
<thead>
<tr>
<th>Cable length (m)</th>
<th>Standard: -40...+80 °C (-40...+176 °F)</th>
<th>Submersible: -40...+80 °C (-40...+176 °F)</th>
<th>Plenum: -40...+200 °C (-40...+392 °F)</th>
<th>Armored: -40...+80 °C (-40...+176 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>K01</td>
<td>K11</td>
<td>K21</td>
<td>K31</td>
</tr>
<tr>
<td>15 (50)</td>
<td>K02</td>
<td>K12</td>
<td>K22</td>
<td>K32</td>
</tr>
<tr>
<td>30 (100)</td>
<td>K03</td>
<td>K13</td>
<td>K23</td>
<td>K33</td>
</tr>
<tr>
<td>46 (150)</td>
<td>K04</td>
<td>K14</td>
<td>K24</td>
<td>K34</td>
</tr>
<tr>
<td>61 (200)</td>
<td>K05</td>
<td>K15</td>
<td>K25</td>
<td>K35</td>
</tr>
<tr>
<td>91 (300)</td>
<td>K06</td>
<td>K16</td>
<td>K26</td>
<td>K36</td>
</tr>
</tbody>
</table>

### Transducer cable selection chart (FUP1010, Portable FUE1010, pair)

<table>
<thead>
<tr>
<th>Cable length (m)</th>
<th>Standard: -40...+80 °C (-40...+176 °F)</th>
<th>Plenum: -40...+200 °C (-40...+392 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>K01</td>
<td>K21</td>
</tr>
<tr>
<td>15 (50)</td>
<td>K02</td>
<td>K22</td>
</tr>
<tr>
<td>30 (100)</td>
<td>K03</td>
<td>K23</td>
</tr>
</tbody>
</table>

### RTD cable selection chart (Dedicated, each)

<table>
<thead>
<tr>
<th>Cable length (m)</th>
<th>Standard: -40...+200 °C (-40...+392 °F)</th>
<th>Submersible: -40...+200 °C (-40...+392 °F)</th>
<th>for insert RTD -40...+200 °C (-40...+392 °F)</th>
<th>for submersible insert RTD -40...+200 °C (-40...+392 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>R01</td>
<td>R11</td>
<td>R21</td>
<td>R31</td>
</tr>
<tr>
<td>15 (50)</td>
<td>R02</td>
<td>R12</td>
<td>R22</td>
<td>R32</td>
</tr>
<tr>
<td>30 (100)</td>
<td>R03</td>
<td>R13</td>
<td>R23</td>
<td>R33</td>
</tr>
<tr>
<td>46 (150)</td>
<td>R04</td>
<td>R14</td>
<td>R24</td>
<td>R34</td>
</tr>
<tr>
<td>61 (200)</td>
<td>R05</td>
<td>R15</td>
<td>R25</td>
<td>R35</td>
</tr>
<tr>
<td>91 (300)</td>
<td>R06</td>
<td>R16</td>
<td>R26</td>
<td>R36</td>
</tr>
</tbody>
</table>

### RTD cable selection chart (FUP1010, Portable FUE1010, each)

<table>
<thead>
<tr>
<th>Cable length (m)</th>
<th>IP67: -40...+200 °C (-40...+392 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (20)</td>
<td>R11</td>
</tr>
<tr>
<td>15 (50)</td>
<td>R12</td>
</tr>
<tr>
<td>30 (100)</td>
<td>R13</td>
</tr>
</tbody>
</table>

### Accessories - Standard MLFB offering

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert RTD size 1</td>
<td>D) 7ME3950-1TJ10</td>
</tr>
<tr>
<td>Thermowell size 1 w/ lagging</td>
<td>D) CGQ:1012TW-1L</td>
</tr>
<tr>
<td>EZ Clamp 1 ... 24 inch</td>
<td>D) CGQ:1012Z-1</td>
</tr>
<tr>
<td>Junction Box for Clamp RTD</td>
<td>D) CGQ:992ECJ</td>
</tr>
<tr>
<td>Term kit standard, Plenum, Armored sensor cable</td>
<td>D) 7ME3960-0CT01</td>
</tr>
<tr>
<td>Term kit Submersible sensor cable</td>
<td>D) 7ME3960-0CT11</td>
</tr>
<tr>
<td>C1 Weld seal</td>
<td>D) 7ME3960-0WS20</td>
</tr>
<tr>
<td>D1 Weld Seal</td>
<td>D) 7ME3960-0WS30</td>
</tr>
<tr>
<td>C2 Weld Seal</td>
<td>D) 7ME3960-0WD20</td>
</tr>
<tr>
<td>D2 Weld Seal</td>
<td>D) 7ME3960-0WD30</td>
</tr>
<tr>
<td>Straps size 2</td>
<td>D) 7ME3960-0SM11</td>
</tr>
<tr>
<td>Straps size 3</td>
<td>D) 7ME3960-0SM21</td>
</tr>
<tr>
<td>Straps size 4</td>
<td>D) 7ME3960-0SM31</td>
</tr>
<tr>
<td>Weld seal transducers C2 FM</td>
<td>D) 7ME3950-1SN00</td>
</tr>
<tr>
<td>Weld seal transducers D1 FM</td>
<td>D) 7ME3950-1SP00</td>
</tr>
<tr>
<td>Weld seal transducers D2 FM</td>
<td>D) 7ME3950-1SQ00</td>
</tr>
<tr>
<td>Weld seal transducers D4 FM</td>
<td>D) 7ME3950-1SR00</td>
</tr>
<tr>
<td>Weld seal transducers C2 ATEX</td>
<td>D) 7ME3950-2SN00</td>
</tr>
<tr>
<td>Weld seal transducers D1 ATEX</td>
<td>D) 7ME3950-2SP00</td>
</tr>
<tr>
<td>Weld seal transducers D2 ATEX</td>
<td>D) 7ME3950-2SQ00</td>
</tr>
<tr>
<td>Weld seal transducers D4 ATEX</td>
<td>D) 7ME3950-2SR00</td>
</tr>
<tr>
<td>Weld seal transducers Gas C2 FM</td>
<td>D) 7ME3950-1HN00</td>
</tr>
<tr>
<td>Weld seal transducers Gas D1 FM</td>
<td>D) 7ME3950-1HP00</td>
</tr>
<tr>
<td>Weld seal transducers Gas D2 FM</td>
<td>D) 7ME3950-1HQ00</td>
</tr>
<tr>
<td>Weld seal transducers Gas D4 FM</td>
<td>D) 7ME3950-1HR00</td>
</tr>
<tr>
<td>Weld seal transducers Gas C2 ATEX</td>
<td>D) 7ME3950-2HN00</td>
</tr>
<tr>
<td>Weld seal transducers Gas D1 ATEX</td>
<td>D) 7ME3950-2HP00</td>
</tr>
<tr>
<td>Weld seal transducers Gas D2 ATEX</td>
<td>D) 7ME3950-2HQ00</td>
</tr>
<tr>
<td>Weld seal transducers Gas D4 ATEX</td>
<td>D) 7ME3950-2HR00</td>
</tr>
</tbody>
</table>

Standard MLFB product offering represents 4 to 6 weeks delivery time. 
D) Subject to export regulations AL: N, ECCN: EAR99H.
**Overview**

The OCM III is a high accuracy ultrasonic flow monitor for open channels.

**Benefits**
- Influent and effluent monitor
- BS 3680 calculations provide exceptional accuracy in measuring flow
- 1 to 24 months data log, subject to logging rate
- RS-232 serial communication
- High accuracy on unique or non-standard weirs and flumes
- AC and DC operation. Automatically switches to battery operation for uninterrupted power
- Dual power input
- Low power remote monitoring
- Flow Reporter software available for remote monitoring, configuration and data retrieval

**Application**

In addition to monitoring flowrate in sewage works, OCM III can monitor industrial discharge, rainfall/storm water studies, inflow/infiltration studies and sewer system evaluations. As well as being compatible with many standard weirs and flumes, the programmable head versus flow curve (up to 16 points) accurately defines flow rate on unique or non-standard weirs and flumes.

The OCM III has data logging and is adjustable from once per minute to once a day. It records the average flow rate for that time period. Daily, it records minimum/maximum of temperature and flow rates, and the time they occurred, as well as the daily total. Advanced functions include variable rate logging. It can be pre-programmed to log at a higher rate when needed. Under steady conditions, the OCM III automatically logs less frequently to conserve data log space.

The OCM III has two-way communication via RS-232 with a modem or a bi-polar current loop with a current-to-voltage communication converter. Data logs can be downloaded to a file that can be manipulated into a spreadsheet or ASCII format.

**Technical specifications**

<table>
<thead>
<tr>
<th>Mode of Operation</th>
<th>Measuring range</th>
<th>Output: Transducer</th>
<th>Echomax® XRS-5, 44 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operating conditions</td>
<td>Installation conditions</td>
<td>Location: Indoor/outdoor</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature (enclosure)</td>
<td>-20 to +50 °C (-5 to +122 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design: Weight</td>
<td>2.3 kg (5.1 lbs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material (enclosure)</td>
<td>Polycarbonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection (enclosure)</td>
<td>IP65/Type 4X/NEMA 4X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transducer and mA output signal</td>
<td>Transducer: coaxial to be RG62-A/U low capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mA output signal to be 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 to 0.75 mm² (22 to 18 AWG)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. separation between transducer and transceiver</td>
<td>183 m (600 ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displays and controls</td>
<td>LCD 5 x 7 dot matrix display with 2 lines of 40 characters each</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming</td>
<td>Via removable programmer and communication link</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>3 V battery (NEDA 5003LC or equivalent), operating life 1 year, SuperCap capacitor for back-up during battery replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>AC version: 100/115/200/230 V AC ± 15%, 50/60 Hz, 20 VA max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC version: 9 to 30 V DC, 8 W max.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SITRANS F flowmeters
Continuous measurement - Open channel flow

OCM III

Certificates and approvals
CE, FM, CSAus/c, MCERTS, C-TICK

Communication
RS-232 or ± 20 mA bipolar current loop, 300, 600, 1200, 2400, 4800, 9600, 19200 baud

Options
Temperature sensor TS-2
Remote monitoring
Flow Reporter, a Windows®-based configuration software and data extractor
Velocity sensor Consult with factory

1) Program range is defined as the empty distance to the face of the transducer plus any range extension
2) EMC performance available upon request
Windows® is a registered trademark of Microsoft Corporation

Selection and Ordering data

<table>
<thead>
<tr>
<th>OCM III</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High accuracy ultrasonic flow monitor for open channels.</td>
<td>7ML10020-1</td>
</tr>
</tbody>
</table>

Input voltage
AC, voltage selector switch

Enclosure
Wall mount, standard enclosure
Wall mount, 6 entries, M20 holes

Approvals
CSAus/c, FM, CE (EN61326), C-TICK
CE

Instruction manual
English C) 7ML1998-5AB01
French C) 7ML1998-1AB11
Spanish C) 7ML1998-1AB21
German C) 7ML1998-1AB31

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

Required equipment
TS-2 Temperature Sensor
TS-2, 1 m cable C) 7ML1812-1AA1
TS-2, 5 m cable C) 7ML1812-2AA1
TS-2, 10 m cable C) 7ML1812-3AA1
TS-2, 30 m cable C) 7ML1812-4AA1
TS-2, 50 m cable C) 7ML1812-5AA1
TS-2, 70 m cable C) 7ML1812-6AA1
TS-2, 90 m cable C) 7ML1812-7AA1
TS-2 Instruction manual C) 7ML1998-5EW01

Note: The TS-2 instruction manual should be ordered as a separate line item on the order.

Accessories
Handheld programmer 7ML1830-2AA
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure 7ML1930-1AC
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs) 7ML1830-1GM
Flow Reporter software license B) 7ML1930-1AK
Flow Reporter Kit (includes disk, authorization code and cable) B) 7ML1930-1AL

Spare parts
Card, Mother, main C) 7ML1830-1MG
Card, daughter/display C) 7ML1830-1LT
Card, LCD C) 7ML1830-1KY
Eprom C) 7ML1830-1KW
Battery C) 7ML1830-1JV
OCM III Lid overlay 7ML1830-1KV

1) Available with approval option 6 only
2) Available with enclosure option B only

B) Subject to export regulations AL: N, ECCN: EAR99S
C) Subject to export regulations AL: N, ECCN: EAR99
SITRANS F flowmeters
Continuous measurement - Open channel flow

OCM III

### Dimensional drawings

![Dimensional drawings](image)

- **OCCM III dimensions**

### Schematics

![Schematics](image)

- **OCM III connections**

**Notes:**

1. Use RG62-A/U Coaxial (or equivalent) for extensions up to 183 m (600 ft). Run in grounded metal conduit, separate from other wiring.
2. Each relay has 1 set of form 'C' (SPDT) contacts, relay rated at 5A, 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
   - Relay de-energized when in alarm conditions and energized for pump control.
SITRANS F flowmeters
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

- All devices have 2-wire technology and HART communication
- Temperature compensation for saturated steam as standard feature
- Integrated temperature and pressure measurement enabling direct compensation of density
- Pressure, temperature and flow can be read at a single point. No additional installation of pressure and temperature sensors
- Direct measurement of energy or energy consumption
- Optimum process reliability thanks to Intelligent Signal Processing (ISP) - stable readings, free of external perturbations
- Fully welded stainless steel construction with high corrosion, pressure and temperature resistance
- Maintenance-free sensor design
- Ready to use due to plug & play feature. No additional cabling work
- Minimal pressure drop
- Pressure and temperature compensation for fluctuating volume flows
- Measurement of consumption in compressed air systems
- No risk of deposits or damage (sensor in the turbulent area)
- All units parameterized prior to delivery

Application

The SITRANS FX300 is a compact 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).

System Overview

<table>
<thead>
<tr>
<th>Version</th>
<th>Single transmitter</th>
<th>Dual transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>Standard</td>
<td>Pressure sensor</td>
</tr>
<tr>
<td></td>
<td>Pressure sensor and isolation valve</td>
<td>Standard</td>
</tr>
<tr>
<td>Flange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sandwich</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 known as Von Karman’s vortex street principle: alternating vortices form behind an object in a stream. 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 placed downstream of the bluff body. The stress is picked up and counted as pressure surges by a dual Piezo crystal placed inside the wing.
The flowmeter calculates the flow velocity using the following equation:

\[ Q = A \cdot V = A \cdot d / St \cdot f = 101,93 \cdot f / K [m^3/h] \]

Where:
- \( Q \) = flow rate [m\(^3\)/h]
- \( f \) = vortex shedding frequency [Hz]
- \( K \) = calibration constant [ pulses/m\(^3\) ]
- \( d \) = width of the bluff body [m]
- \( St \) = Strouhal Number
- \( A \) = cross-section area [m\(^2\)]
- \( V \) = flow velocity [m/s]

**Requirements**

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)

**Design**

SITRANS FX300 volumetric and mass flowmeter is available in the following configurations:

- **SITRANS FX300 Single transmitter**
  - The single transmitter is available as a flange or sandwich solution in the following versions:
    - Vortex standard flowmeter
      - Measurement with integrated temperature sensor as standard feature
    - Vortex flowmeter with pressure sensor
      - Measurement with integrated temperature and pressure sensors for compensation of gases, wet gases, gas mixtures or steam (for energy measurement).
    - Vortex flowmeter with pressure sensor and isolation valve
      - Allowing 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. Using the built-in two-way valve, the pressure sensor can also be calibrated and tested at a later time.
  - **SITRANS FX300 Dual transmitter**
    - This is a genuine redundant system with two independent sensors and two converters providing twofold functional reliability and availability of the measurement. This variant is optimally suited for measurements in multi-product pipelines.
  - The dual converter is available as:
    - Vortex standard flowmeter
      - Measurement with temperature sensor for saturated steam compensation as standard feature

**Input**

- Measuring range limits: See „Dimensional Drawings“
- Media pressure: 1 ... 100 bar (Higher pressures on request)

**Output**

- Current output
  - Measuring range: 4 ... 20 mA
  - Over range: 20.8 mA ± 1 % (105 % ± 1 %)
  - Load: 100 \( \Omega \)
  - Error signal: NAMUR NE 43
  - Maximum output: 22 mA (112.5 %)
  - Multidrop mode: 4 mA
- Digital output
  - Communication: HART
  - Physical layer: FSK
  - Device category: Transmitter

**Pulse Output**

(Passive pulse output, needs separate power supply. Pulse output has to be defined in the Option menu Y47 totalizer or energy unit has to be entered. E.g.: 1 pulse/kg or 1 pulse/10 m\(^3\))

- Pulse frequency: Max. 0.5 Hz
- Power supply
  - Min. 24 V DC as NAMUR or 22 mA ± 1 % (105 % ± 1 %)
  - Non-Ex version
    - open < 1 mA, max. 36 V, closed 100 mA, \( U < 2 V \)
    - Ex version
      - open < 1 mA, max. 30 V, closed 100 mA, \( U < 2 V \)

**Accuracy**

- Standard version
  - For liquids:
    - \( Re \geq 20000 \) ± 0.75 %
  - For steam and gases:
    - \( Re \geq 20000 \) ± 1 %
  - For steam, gases and liquids:
    - \( 10000 < Re < 20000 \) ± 2 %
  - Pressure and temperature-compensated version
    - For liquids:
      - \( 10000 < Re < 20000 \) ± 2 %
      - \( Re \geq 20000 \) ± 0.75 %
    - For gases and steam:
      - \( 10000 < Re < 20000 \) ± 2.5 %
      - \( Re \geq 20000 \) ± 1.5 %
- 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: \( \geq 20 \times DN \)
- Outlet run: \( \geq 5 \times DN \)
SITRANS F flowmeters
SITRANS FX300

Software
Uncompensated for gases, steam and liquids, but temperature-compensated for saturated steam
Density-compensated by temperature and pressure for superheated steam, no energy calculation
Gross heat
When the device has to operate as a energy calculation device
In options Y51 to Y56 add information regarding:

Order option 1
• Uncompensated for gases, steam and liquids, but temperature-compensated for saturated steam
• Density-compensated by temperature and pressure for superheated steam, no energy calculation

Order option 4
• Order option 4

Order option 5
• Y51 Variable current output
• Y52 Power unit
  Select one of the following units from power units table in Y52: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom)
• Y53 Fullscale power value
• Y54 Variable pulse output
• Y55 Totalizer on/off
• Y56 Configures for totalizer
  Select one of the following units from energy units table in Y56: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom)

Gases and wet gases
Wet gases
FAD - Free Air Delivery
When the device has to operate close to a compressor
In Y81 to Y87 add information regarding:

Order option 7
• Y81 Inlet suction temperature
• Y82 Atmosphere pressure
• Y83 Pressure drop filter
• Y84 Inlet relative humidity
• Y85 Actual revolutions per minute of compressor
• Y86 Rated rpm of compressor
• Y87 Outlet relative humidity. This information is available from compressor supplier.

Mixed gases
When the fluid is a gas mixture, make an SDR request (sheet available on intranet) and fill in gas names and amount in %

Rated operation conditions
Ambient temperature
• Non-Ex version
  -40 … +85 °C (-40 … +185 °F)
• Ex version
  -40 … +65 °C (-40 … +149 °F)
Storage temperature
-50 … +240 °C (-58 … +464 °F)
Media temperature
-40 … +240 °C (-40 … +464 °F)
Density
Taken into consideration when rating the sensor
< 10 cP
Reynolds number
10 000 … 2 300 000
Media pressure limit
Max. 100 bar
(Higher pressure on request. Make an SDR request, sheet available on intranet)

Design
Material
• Sensor: house/pick-up
  1.4404(316L)/1.4435(316L)
  Hastelloy C22 available
  (make an SDR request, sheet available on intranet)
• Housing: transmitter
  Aluminium for increased requirements
• Sensor gaskets: for pick-up and pressure sensor
  1.4435(316L)/FPM or FFKM
  FPM (Viton®) by steam and non-aggressive gases.
  FFKM (Kalrez®) by chlorine and other aggressive gases (only available together with a pressure sensor)

Process connections
Flange norm EN 1092-1 form B1/B2 or ASME B16.5 RF
Other flanges on request.
Make an SDR request, sheet available on intranet

• Flange version
  DN 15 … 300 (½ … 12”)
• Sandwich version
  DN 15 … 100 (½ … 4”)
Degree of protection
IP66/IP67
Dimensions and weights
See „Dimensional Drawings“

Display and operating interface
Local display
2 lines, 10 characters per line
Languages
German, English, French

Power supply
• Standard version
  14 … 36 V DC
• Ex version
  14 … 30 V DC

Certificates and approvals
Explosion protection
• ATEX
  II 2G Ex d ia [ia] IIC T6
• FM US/C
  Class I, II, III, Div 1 & 2

Calibration
All flowmeters will be delivered with a 3 point calibration certificate

Material Certificate
Certificate of compliance, pressure test, material certificate, material in acc. of NACE and PMI of pressure bearing metal parts.

Cleaning
Choice Cleaning Class 1 when fluid is oxygen or contains chloride.

Certificates
X-ray test on pressurized weldings and dye penetration test on pressure bearing weldings
Dye penetration test
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Connection size</th>
<th>Sensor size</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15 (½&quot;)</td>
<td>DN 15</td>
<td>1A</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>DN 25</td>
<td>2B</td>
</tr>
<tr>
<td>DN 40 (1¼&quot;)</td>
<td>DN 40</td>
<td>2K</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>DN 50</td>
<td>2R</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>DN 80</td>
<td>3L</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>DN 100</td>
<td>3S</td>
</tr>
<tr>
<td>DN 150 (6&quot;)</td>
<td>DN 150</td>
<td>4M</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td>DN 200</td>
<td>4T</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td>DN 250</td>
<td>4W</td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td>DN 300</td>
<td>5E</td>
</tr>
</tbody>
</table>

### Flange norm and nominal pressure

<table>
<thead>
<tr>
<th>Form B1/B2</th>
<th>EN 1092-1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 10</td>
<td>DN 200 ... 300</td>
<td>1A</td>
</tr>
<tr>
<td>PN 16</td>
<td>DN 50 ... 300</td>
<td>1B</td>
</tr>
<tr>
<td>PN 25</td>
<td>DN 200 ... 300</td>
<td>1C</td>
</tr>
<tr>
<td>PN 40</td>
<td>DN 15 ... 300</td>
<td>1D</td>
</tr>
<tr>
<td>PN 63</td>
<td>DN 50 ... 150</td>
<td>1E</td>
</tr>
<tr>
<td>PN 100</td>
<td>DN 15 ... 150</td>
<td>1F</td>
</tr>
<tr>
<td>RF</td>
<td>ASME B16.5</td>
<td></td>
</tr>
<tr>
<td>150 lb</td>
<td>½ ... 12&quot;</td>
<td>J</td>
</tr>
<tr>
<td>300 lb</td>
<td>½ ... 12&quot;</td>
<td>K</td>
</tr>
<tr>
<td>600 lb</td>
<td>½ ... 6&quot;</td>
<td>L</td>
</tr>
</tbody>
</table>

### Sensor material/Gasket

- Stainless steel 1.4404 (316L)/1.4435 (316L)/FPM
- Stainless steel 1.4404 (316L)/1.4435 (316L)/FFKM

### Transmitter design

- Compact, none cable

### Approval and cable gland

- Non Ex, M20x1,5
- Non Ex, ½" NPT
- ATEX, M20x1,5
- ATEX, ½" NPT
- FM US/C, M20x1,5
- FM US/C, ½" NPT

### Transmitter, display and communication

- With display, HART

### Pressure sensor and isolation valve

- Without pressure sensor
  - 4 bar
  - 6 bar
  - 10 bar
  - 16 bar
  - 25 bar
  - 40 bar
  - 60 bar
  - 100 bar
- With isolation valve and pressure sensor, range:
  - 4 bar
  - 6 bar
  - 10 bar
  - 16 bar
  - 25 bar
  - 40 bar
  - 60 bar
  - 100 bar

### Software

- Uncompensated for gases, wet gases, steam and liquids, respectively, temperature compensation for saturated steam
- Density compensation for superheated steam
- Density compensation for superheated steam and setting of Gross heat Opt. Y51 ... Y56 for Energy measuring
- Density compensation for gases and wet gases and setting of Relative humidity at opt. Y49
- Density compensation for gases, wet gases and setting of FAD - free air delivery Opt. Y49 and Y81 ... Y87 for Compressor settings

### Further designs

Please add "-Z" to Order No. and specify Order code.

### Converter housing material

- Aluminium 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 pressure 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 pressure parts + PMI/certificate 3.1
  - C15

### Calibration certificate FX300

As standard the flow device has a 3-point calibration certificate.

### Calibration certificate (5 point)

- Calibration certificate (5 point)
  - D11

### Hardness test

- Hardness test on pressure bearing parts + 3.1
  - H30
- Equotip LD procedure according to NACE MR 0175-01

### Cleaning for oil and fat

- Class 1 increased requirement (customer-specified) and 3.1 (EN 10204)
  - K46
- Class 2 and 3.1 (EN 10204)
  - K48

### Certificates

- X-ray test on ppressure 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
SITRANS F flowmeters
SITRANS F X
SITRANS FX300

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Additional data</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code and plain text.</td>
<td>Y40, Y41, Y42, Y43, Y44, Y45, Y47, Y49, Y51, Y52, Y53, Y54, Y55, Y56</td>
</tr>
</tbody>
</table>

**Input process data**

- **Medium**: Specify steam, gas, liquid or customised - Y40
- **Temperature**: Specify max. operating temperature and units - Y41
- **Pressure**: Specify max. operating pressure and units - Y42
- **Density**: (only by customised medium): Specify medium density and units - Y43
- **Viscosity**: (only by customised medium): Specify medium viscosity and units - Y44
- **Flow rate**: Specify min./max. flow rate and units - Y45
- **Setting of pulse output**: Specify totalizer or energy unit (1 pulse/unit) - Y47
- **Relative humidity (amount in %)** - Y49

**Settings of gross heat**

- **Variable current output** - Y51
- **Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special(custom))** - Y52
- **Fullscale power value** - Y53
- **Variable pulse output** - Y54
- **Totalizer on/off** - Y55
- **Configure totalizer (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special(custom))** - Y56

**Settings of FAD**

- **Inlet suction temperature** - Y81
- **Atmosphere pressure** - Y82
- **Pressure drop filter** - Y83
- **Inlet relative humidity** - Y84
- **Actual revolutions per minute (of compressor)** - Y85
- **Rated Rpm of compressor** - Y86
- **Outlet relative humidity** - Y87

This information is available from compressor supplier.
## Selection and Ordering data

**Order No.**

<table>
<thead>
<tr>
<th>SITRANS FX300 Sandwich</th>
<th>Single transmitter and $T_{max} = 240 \degree C$ (464 \degree F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection size</td>
<td>Sensor size</td>
</tr>
<tr>
<td>DN 15 (½&quot;)</td>
<td>DN 15</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td>DN 25</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td>DN 40</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td>DN 50</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td>DN 80</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td>DN 100</td>
</tr>
</tbody>
</table>

### Nominal pressure

<table>
<thead>
<tr>
<th>EN</th>
<th>Nominal pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 16</td>
<td>DN 50 ... 100</td>
</tr>
<tr>
<td>PN 40</td>
<td>DN 15 ... 100</td>
</tr>
<tr>
<td>PN 63</td>
<td>DN 50 ... 100</td>
</tr>
<tr>
<td>PN 100</td>
<td>DN 15 ... 100</td>
</tr>
</tbody>
</table>

### ASME

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>150 lb</td>
<td>½ ... 4&quot;</td>
</tr>
<tr>
<td>300 lb</td>
<td>½ ... 4&quot;</td>
</tr>
<tr>
<td>600 lb</td>
<td>½ ... 4&quot;</td>
</tr>
</tbody>
</table>

### Sensor material/Gasket

| Stainless steel 1.4404 (316L)/1.4435 (316L)/FPM | 1 |
| Stainless steel 1.4404 (316L)/1.4435 (316L)/FFKM | 5 |

### Transmitter design

| Compact, no cable | 1 |

### Approval and cable gland

| Non Ex, M20x1,5   | 1 |
| Non Ex, ½ " NPT  | 2 |
| ATEX, M20x1,5    | 4 |
| ATEX, ½ " NPT    | 5 |
| FM USIC, M20x1,5 | 6 |
| FM USIC, ½ " NPT | 7 |

### Transmitter, display and communication

| With display, HART | A |

### Pressure sensor and isolation valve

<table>
<thead>
<tr>
<th>Without pressure sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 bar</td>
</tr>
<tr>
<td>6 bar</td>
</tr>
<tr>
<td>10 bar</td>
</tr>
<tr>
<td>16 bar</td>
</tr>
<tr>
<td>25 bar</td>
</tr>
<tr>
<td>40 bar</td>
</tr>
<tr>
<td>60 bar</td>
</tr>
<tr>
<td>100 bar</td>
</tr>
<tr>
<td>With isolation valve and pressure sensor, range:</td>
</tr>
<tr>
<td>4 bar</td>
</tr>
<tr>
<td>6 bar</td>
</tr>
<tr>
<td>10 bar</td>
</tr>
<tr>
<td>16 bar</td>
</tr>
<tr>
<td>25 bar</td>
</tr>
<tr>
<td>40 bar</td>
</tr>
<tr>
<td>60 bar</td>
</tr>
<tr>
<td>100 bar</td>
</tr>
</tbody>
</table>

### Software

| Uncompensated for gases, wet gases, steam and liquids respectively temperature compensation for saturated steam | 1 |
| Density compensation for superheated steam | 4 |
| Density compensation for gases, wet gases and setting of Relative humidity at opt. Y49 | 7 |
| Density compensation for gases, wet gases and setting of FAD - free air delivery Opt. Y49 and Y81 ... Y87 for Compressor settings | 8 |

---

### Further designs

Please add “-Z” to Order No. and specify Order code.

### Converter housing material

| Aluminium 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 pressure 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 pressure parts + PMI/certificate 3.1 | C15 |

### Calibration certificate FX300

As standard the flow device has a 3-point calibration certificate.

### Hardness test

| Hardness test on pressure bearing parts + 3.1 Equotip LD procedure according to NACE MR 0175-01 | H30 |

### Cleaning for oil and fat

| Class 1 increased requirement (customer-specified) and 3.1 (EN 10204) | K46 |
| Class 2 and 3.1 (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 |
## Additional data
Please add "-Z" to Order No. and specify Order code and plain text.

### Input process data
- Medium: Specify steam, gas, liquid and customised unit (Y40)
- Temperature: Specify max. operating temperature and units (Y41)
- Pressure: Specify max. operating pressure and units (Y42)
- Density: Specify medium density and units (Y43)
- Viscosity: Specify medium viscosity and units (Y44)
- Flow rate: Specify min./max. flow rate and units (Y45)
- Setting of pulse output: Specify totalizer or energy unit (1 pulse/unit) (Y47)
- Relative humidity (amount in %) (Y49)

### Settings of gross heat
- Variable current output (Y51)
- Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special(custom)) (Y52)
- Fullscale power value (Y53)
- Variable pulse output (Y54)
- Totalizer on/off (Y55)
- Configure totalizer (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special(custom)) (Y56)

### Settings of FAD
- Inlet suction temperature (Y81)
- Atmosphere pressure (Y82)
- Pressure drop filter (Y83)
- Inlet relative humidity (Y84)
- Actual revolutions per minute (of compressor) (Y85)
- Rated Rpm of compressor (Y86)
- Outlet relative humidity (Y87)

This information is available from compressor supplier.
### Selection and Ordering data

**Order No.**

Order No. for SITRANS FX300 Flanged Dual transmitter and Tmax = 240 °C (464 °F): 7 ME 2 8 0 0 -

<table>
<thead>
<tr>
<th>Connection size</th>
<th>Sensor size</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 40 (1½”)</td>
<td>DN 40</td>
</tr>
<tr>
<td>DN 50 (2”)</td>
<td>DN 50</td>
</tr>
<tr>
<td>DN 80 (3”)</td>
<td>DN 80</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>DN 100</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>DN 150</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>DN 200</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>DN 250</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>DN 300</td>
</tr>
</tbody>
</table>

**Flange norm and nominal pressure**

<table>
<thead>
<tr>
<th>Form B1/B2</th>
<th>EN 1092-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN 10</td>
<td>DN 200 ... 300</td>
</tr>
<tr>
<td>PN 16</td>
<td>DN 50 ... 300</td>
</tr>
<tr>
<td>PN 25</td>
<td>DN 200 ... 300</td>
</tr>
<tr>
<td>PN 40</td>
<td>DN 40 ... 300</td>
</tr>
<tr>
<td>PN 63</td>
<td>DN 50 ... 150</td>
</tr>
<tr>
<td>PN 100</td>
<td>DN 40 ... 150</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RF</th>
<th>ASME B16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 lb</td>
<td>1½ ... 12”</td>
</tr>
<tr>
<td>300 lb</td>
<td>1½ ... 12”</td>
</tr>
<tr>
<td>600 lb</td>
<td>1½ ... 6”</td>
</tr>
</tbody>
</table>

**Sensor material/Gasket**

Stainless steel 1.4404 (316L)/1.4435 (316L)/FPM

Stainless steel 1.4404 (316L)/1.4435 (316L)/FFKM

**Transmitter design**

Compact, no cable

**Approval and cable gland**

Non Ex, M20x1,5
Non Ex, ½” NPT
ATEX, M20x1,5
ATEX, ½” NPT
FM US/C, M20x1,5
FM US/C, ½” NPT

**Transmitter, display and communication**

With display, HART

**Pressure sensor and isolation valve**

Without pressure sensor

**Software**

Uncompensated for gases, wet gases, steam and liquids respectively temperature compensation for saturated steam

---

**Further designs**

Please add “Z” to Order No. and specify Order code.

### Converter housing material

Aluminium 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 pressure 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 pressure parts + PMI/certificate 3.1

C15

### Calibration certificate FX300

As standard the flow device has a 3-point calibration certificate.

Calibration certificate (5-point)

D11

### Hardness test

Hardness test on pressure bearing parts + 3.1

H30

Equotip LD procedure according to NACE MR 0175-01

### Cleaning for oil and fat

Class 1 increased requirement (customer-specified) and 3.1 (EN 10204)

K46

Class 2 and 3.1 (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

### Additional data

Please add “Z” to Order No. and specify Order code and plain text.

### Input process data

**Medium**: Specify steam, gas, liquid and customised

Y40

**Temperature**: Specify max. operating temperature and units

Y41

**Pressure**: Specify max. operating pressure and units

Y42

**Density**: (only by customised medium): Specify medium density and units

Y43

**Viscosity**: (only by customised medium): Specify medium viscosity and units

Y44

**Flow rate**: Specify min./max. flow rate and units

Y45

**Setting of pulse output**: Specify totalizer or energy unit (1 pulse/unit)

Y47

**Relative humidity (amount in %)**

Y49
### Accessories or spare parts for SITRANS FX300

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal disc 21.8-12-0,1</td>
<td>A5E02181439</td>
</tr>
<tr>
<td>Socket only for DN 15/25 ; ⅜”</td>
<td>On request</td>
</tr>
<tr>
<td>Socket only for DN 15/25 ; 1”</td>
<td>On request</td>
</tr>
<tr>
<td>Pickup 1.4404</td>
<td>On request</td>
</tr>
<tr>
<td>O-ring pickup</td>
<td>A5E02181464</td>
</tr>
<tr>
<td>O-ring for pressure screw 17,13 x 2,62-FPM-70</td>
<td>A5E02181488</td>
</tr>
<tr>
<td>Pressure sensor 4/8/10/16/25/40/60/100 bar</td>
<td>On request</td>
</tr>
<tr>
<td>Cover gasket O-Ring 91,67 x 3,5</td>
<td>A5E02181492</td>
</tr>
<tr>
<td>Converter housing gasket 59,35,5-2-N</td>
<td>A5E02181495</td>
</tr>
<tr>
<td>O-ring DIN3771-20 x 1-FPM for sensor</td>
<td>A5E02181515</td>
</tr>
<tr>
<td>O-ring 10x2-NBR for lead-through</td>
<td>A5E02181525</td>
</tr>
<tr>
<td>DUBOX plug, 5-pole-RM2</td>
<td>A5E02181527</td>
</tr>
</tbody>
</table>

#### Electronic
- Basic D-HART: A5E02181531
- Steam D-HART: A5E02181541
- Gas D-HART: A5E02181544

#### Display
- A5E02181558

#### 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. ⅜” socket): A5E02181087
- DN 25 (incl. 1” socket): A5E02181116
- DN 40 ... 100: A5E02181152
- DN 150 ... 300: A5E02275105

#### Pressure sensor replacement (incl. pressure sensor, DUBOX plug, 2 O-rings and calibration certificate)
- 4 bar (58 psi): A5E02181157
- 6 bar (87 psi): A5E02181175
- 10 bar (145 psi): A5E02181180
- 16 bar (232 psi): A5E02181221
- 25 bar (363 psi): A5E02181307
- 40 bar (580 psi): A5E02181316
- 60 bar (870 psi): A5E02181322
- 100 bar (1450 psi): A5E02181437

---

**Schematics**

**Load for HART communication**

![HART Load Schematic](image1)

**Connection pulse output**

![Connection Pulse Output Schematic](image2)

F) Subject to export regulations AL: 9I999, ECCN: N.
Dimensional drawings

Flange version, frontal view, \( a = 133 \text{ mm (5.24 inches)} \)

Flange version, frontal view, \( a = 133 \text{ mm (5.24 inches)} \)

Flange version, side view, \( b = 105 \text{ mm (4.13 inches)}, \ c = 179 \text{ mm (7.05 inches)} \)

Flange version, side view, \( b = 105 \text{ mm (4.13 inches)}, \ c = 179 \text{ mm (7.05 inches)} \)

Flange version, dual converter, specified weight + 2.80 kg (6.17 lb)
## SITRANS FX300

### Flange version EN1092-1

<table>
<thead>
<tr>
<th>Size DN</th>
<th>PN</th>
<th>d (mm)</th>
<th>D (mm)</th>
<th>L (mm)</th>
<th>H (mm)</th>
<th>I (mm)</th>
<th>Flowmeter (with pressure sensor)</th>
<th>Flowmeter (without pressure sensor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>40</td>
<td>17.3</td>
<td>95</td>
<td>200</td>
<td>265</td>
<td>144</td>
<td>6.1 (13.45)</td>
<td>5.5 (12.13)</td>
</tr>
<tr>
<td>15</td>
<td>100</td>
<td>17.3</td>
<td>105</td>
<td>200</td>
<td>265</td>
<td>144</td>
<td>7.1 (15.65)</td>
<td>6.5 (14.33)</td>
</tr>
<tr>
<td>25</td>
<td>40</td>
<td>28.5</td>
<td>115</td>
<td>200</td>
<td>265</td>
<td>144</td>
<td>7.9 (17.42)</td>
<td>7.3 (16.09)</td>
</tr>
<tr>
<td>25</td>
<td>100</td>
<td>28.5</td>
<td>140</td>
<td>200</td>
<td>265</td>
<td>144</td>
<td>9.9 (21.83)</td>
<td>9.3 (20.50)</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>43.1</td>
<td>150</td>
<td>200</td>
<td>270</td>
<td>144</td>
<td>10.8 (23.81)</td>
<td>10.2 (22.49)</td>
</tr>
<tr>
<td>40</td>
<td>100</td>
<td>42.5</td>
<td>170</td>
<td>200</td>
<td>270</td>
<td>144</td>
<td>14.8 (32.63)</td>
<td>14.2 (31.31)</td>
</tr>
<tr>
<td>50</td>
<td>16</td>
<td>54.5</td>
<td>165</td>
<td>200</td>
<td>275</td>
<td>144</td>
<td>12.7 (28.00)</td>
<td>12.1 (26.68)</td>
</tr>
<tr>
<td>50</td>
<td>40</td>
<td>54.5</td>
<td>165</td>
<td>200</td>
<td>275</td>
<td>144</td>
<td>12.9 (28.44)</td>
<td>12.3 (27.12)</td>
</tr>
<tr>
<td>63</td>
<td>50</td>
<td>54.5</td>
<td>180</td>
<td>200</td>
<td>275</td>
<td>144</td>
<td>16.9 (37.26)</td>
<td>16.3 (35.94)</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>53.9</td>
<td>195</td>
<td>200</td>
<td>275</td>
<td>144</td>
<td>18.4 (40.57)</td>
<td>17.8 (39.24)</td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>82.5</td>
<td>230</td>
<td>200</td>
<td>290</td>
<td>154</td>
<td>17.4 (38.36)</td>
<td>16.8 (37.04)</td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>82.5</td>
<td>250</td>
<td>200</td>
<td>290</td>
<td>154</td>
<td>19.4 (42.77)</td>
<td>18.8 (41.45)</td>
</tr>
<tr>
<td>80</td>
<td>63</td>
<td>81.7</td>
<td>250</td>
<td>200</td>
<td>290</td>
<td>154</td>
<td>23.4 (51.59)</td>
<td>22.8 (50.27)</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>80.9</td>
<td>280</td>
<td>200</td>
<td>290</td>
<td>154</td>
<td>27.4 (61.4)</td>
<td>26.8 (59.08)</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>107.1</td>
<td>320</td>
<td>250</td>
<td>310</td>
<td>250</td>
<td>22 (46.8)</td>
<td>21.4 (47.18)</td>
</tr>
<tr>
<td>100</td>
<td>40</td>
<td>107.1</td>
<td>325</td>
<td>250</td>
<td>310</td>
<td>250</td>
<td>25 (55.12)</td>
<td>24.4 (53.79)</td>
</tr>
<tr>
<td>100</td>
<td>63</td>
<td>106.3</td>
<td>330</td>
<td>250</td>
<td>310</td>
<td>250</td>
<td>30 (66.4)</td>
<td>29.4 (64.82)</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>104.3</td>
<td>360</td>
<td>250</td>
<td>310</td>
<td>250</td>
<td>36 (79.37)</td>
<td>35.4 (78.04)</td>
</tr>
<tr>
<td>150</td>
<td>16</td>
<td>159.3</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>36 (79.37)</td>
<td>35.2 (77.60)</td>
</tr>
<tr>
<td>150</td>
<td>40</td>
<td>159.3</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>41.8 (92.15)</td>
<td>41.2 (90.83)</td>
</tr>
<tr>
<td>150</td>
<td>63</td>
<td>157.1</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>59.8 (131.84)</td>
<td>59.2 (130.51)</td>
</tr>
<tr>
<td>150</td>
<td>100</td>
<td>154.1</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>67.8 (149.47)</td>
<td>67.2 (148.15)</td>
</tr>
<tr>
<td>200</td>
<td>10</td>
<td>206.5</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>84.4 (186.16)</td>
<td>83.8 (183.33)</td>
</tr>
<tr>
<td>200</td>
<td>16</td>
<td>206.5</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>94 (203.2)</td>
<td>93.8 (202.33)</td>
</tr>
<tr>
<td>200</td>
<td>25</td>
<td>206.5</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>105 (216.5)</td>
<td>104.8 (213.18)</td>
</tr>
<tr>
<td>200</td>
<td>40</td>
<td>206.5</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>116 (242.4)</td>
<td>115.4 (239.2)</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>260.4</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>127 (280.1)</td>
<td>126.5 (277.5)</td>
</tr>
<tr>
<td>250</td>
<td>16</td>
<td>260.4</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>138 (291.8)</td>
<td>137.4 (288.7)</td>
</tr>
<tr>
<td>250</td>
<td>25</td>
<td>260.4</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>149 (313.5)</td>
<td>148.4 (310.7)</td>
</tr>
<tr>
<td>250</td>
<td>40</td>
<td>260.4</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>160 (335.3)</td>
<td>159.8 (332.5)</td>
</tr>
<tr>
<td>300</td>
<td>10</td>
<td>307.9</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>182.8 (365.2)</td>
<td>182.3 (363.0)</td>
</tr>
<tr>
<td>300</td>
<td>16</td>
<td>307.9</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>194.1 (391.0)</td>
<td>193.7 (388.8)</td>
</tr>
<tr>
<td>300</td>
<td>25</td>
<td>307.9</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>205.4 (415.8)</td>
<td>205.0 (413.6)</td>
</tr>
<tr>
<td>300</td>
<td>40</td>
<td>307.9</td>
<td>420</td>
<td>300</td>
<td>325</td>
<td>174</td>
<td>216.7 (439.6)</td>
<td>216.3 (437.4)</td>
</tr>
<tr>
<td>Size</td>
<td>Pressure rating</td>
<td>Dimensions [mm (inches)]</td>
<td>Weight [kg (lb)]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>--------------------------</td>
<td>------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flowmeter (with pressure sensor)</td>
<td>Flowmeter (without pressure sensor)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D N</td>
<td>class</td>
<td>d</td>
<td>D</td>
<td>L</td>
<td>H</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½</td>
<td>150</td>
<td>15.8 (0.62)</td>
<td>90 (3.54)</td>
<td>200 (7.87)</td>
<td>265 (10.43)</td>
<td>144 (5.67)</td>
<td>5.1 (11.24)</td>
<td>4.5 (9.92)</td>
</tr>
<tr>
<td>½</td>
<td>300</td>
<td>15.8 (0.62)</td>
<td>95 (3.74)</td>
<td>200 (7.87)</td>
<td>265 (10.43)</td>
<td>144 (5.67)</td>
<td>5.5 (12.13)</td>
<td>4.9 (10.80)</td>
</tr>
<tr>
<td>½</td>
<td>600</td>
<td>13.9 (0.55)</td>
<td>95 (3.74)</td>
<td>200 (7.87)</td>
<td>265 (10.43)</td>
<td>144 (5.67)</td>
<td>5.7 (12.57)</td>
<td>5.1 (11.24)</td>
</tr>
<tr>
<td>1</td>
<td>150</td>
<td>26.6 (1.05)</td>
<td>110 (4.33)</td>
<td>200 (7.87)</td>
<td>265 (10.43)</td>
<td>144 (5.67)</td>
<td>6.8 (14.99)</td>
<td>6.2 (13.67)</td>
</tr>
<tr>
<td>1</td>
<td>300</td>
<td>26.6 (1.05)</td>
<td>125 (4.92)</td>
<td>200 (7.87)</td>
<td>265 (10.43)</td>
<td>144 (5.67)</td>
<td>7.8 (17.12)</td>
<td>7.2 (15.87)</td>
</tr>
<tr>
<td>1</td>
<td>600</td>
<td>24.3 (0.96)</td>
<td>125 (4.92)</td>
<td>200 (7.87)</td>
<td>265 (10.43)</td>
<td>144 (5.67)</td>
<td>8.1 (17.86)</td>
<td>7.5 (16.53)</td>
</tr>
<tr>
<td>1½</td>
<td>150</td>
<td>40.9 (1.61)</td>
<td>125 (4.92)</td>
<td>200 (7.87)</td>
<td>270 (10.63)</td>
<td>144 (5.67)</td>
<td>8.9 (19.26)</td>
<td>8.3 (18.30)</td>
</tr>
<tr>
<td>1½</td>
<td>300</td>
<td>40.9 (1.61)</td>
<td>155 (6.10)</td>
<td>200 (7.87)</td>
<td>270 (10.63)</td>
<td>144 (5.67)</td>
<td>11.0 (24.25)</td>
<td>10.4 (22.93)</td>
</tr>
<tr>
<td>1½</td>
<td>600</td>
<td>38.1 (1.50)</td>
<td>155 (6.10)</td>
<td>200 (7.87)</td>
<td>270 (10.63)</td>
<td>144 (5.67)</td>
<td>12.6 (26.46)</td>
<td>11.4 (25.13)</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>52.6 (2.07)</td>
<td>150 (5.91)</td>
<td>200 (7.87)</td>
<td>275 (10.83)</td>
<td>144 (5.67)</td>
<td>11.6 (25.57)</td>
<td>11 (24.25)</td>
</tr>
<tr>
<td>2</td>
<td>300</td>
<td>52.6 (2.07)</td>
<td>165 (6.50)</td>
<td>200 (7.87)</td>
<td>275 (10.83)</td>
<td>144 (5.67)</td>
<td>13.8 (28.66)</td>
<td>12.4 (27.34)</td>
</tr>
<tr>
<td>2</td>
<td>600</td>
<td>49.3 (1.94)</td>
<td>165 (6.50)</td>
<td>200 (7.87)</td>
<td>275 (10.83)</td>
<td>144 (5.67)</td>
<td>14.5 (31.97)</td>
<td>13.9 (30.64)</td>
</tr>
<tr>
<td>2½</td>
<td>150</td>
<td>78 (3.07)</td>
<td>190 (7.48)</td>
<td>200 (7.87)</td>
<td>290 (11.24)</td>
<td>154 (6.06)</td>
<td>20.4 (44.97)</td>
<td>19.8 (43.65)</td>
</tr>
<tr>
<td>2½</td>
<td>300</td>
<td>78 (3.07)</td>
<td>210 (8.27)</td>
<td>200 (7.87)</td>
<td>290 (11.24)</td>
<td>154 (6.06)</td>
<td>23.4 (51.59)</td>
<td>22.8 (50.27)</td>
</tr>
<tr>
<td>2½</td>
<td>600</td>
<td>73.7 (2.90)</td>
<td>210 (8.27)</td>
<td>200 (7.87)</td>
<td>290 (11.24)</td>
<td>154 (6.06)</td>
<td>24.4 (53.79)</td>
<td>23.8 (52.47)</td>
</tr>
<tr>
<td>3</td>
<td>150</td>
<td>102.4 (4.03)</td>
<td>230 (9.06)</td>
<td>250 (9.84)</td>
<td>310 (12.20)</td>
<td>164 (6.46)</td>
<td>24.5 (52.91)</td>
<td>23.4 (51.59)</td>
</tr>
<tr>
<td>3</td>
<td>300</td>
<td>102.4 (4.03)</td>
<td>255 (10.04)</td>
<td>250 (9.84)</td>
<td>310 (12.20)</td>
<td>164 (6.46)</td>
<td>32.0 (70.55)</td>
<td>31.4 (69.23)</td>
</tr>
<tr>
<td>3</td>
<td>600</td>
<td>97.2 (3.83)</td>
<td>275 (10.83)</td>
<td>250 (9.84)</td>
<td>310 (12.20)</td>
<td>164 (6.46)</td>
<td>41.0 (90.39)</td>
<td>40.4 (89.07)</td>
</tr>
<tr>
<td>4</td>
<td>150</td>
<td>154.2 (6.07)</td>
<td>280 (11.02)</td>
<td>300 (11.81)</td>
<td>325 (12.80)</td>
<td>174 (6.85)</td>
<td>36.8 (81.13)</td>
<td>36.2 (79.81)</td>
</tr>
<tr>
<td>4</td>
<td>300</td>
<td>154.2 (6.07)</td>
<td>320 (12.60)</td>
<td>300 (11.81)</td>
<td>325 (12.80)</td>
<td>174 (6.85)</td>
<td>51.8 (114.20)</td>
<td>51.2 (112.88)</td>
</tr>
<tr>
<td>4</td>
<td>600</td>
<td>146.3 (5.76)</td>
<td>355 (13.98)</td>
<td>300 (11.81)</td>
<td>325 (12.80)</td>
<td>174 (6.85)</td>
<td>76.8 (169.31)</td>
<td>46.2 (101.85)</td>
</tr>
<tr>
<td>5</td>
<td>150</td>
<td>202.7 (7.98)</td>
<td>345 (13.58)</td>
<td>300 (11.81)</td>
<td>350 (13.78)</td>
<td>194 (7.64)</td>
<td>50.6 (111.55)</td>
<td>50.0 (110.23)</td>
</tr>
<tr>
<td>5</td>
<td>300</td>
<td>202.7 (7.98)</td>
<td>380 (14.96)</td>
<td>300 (11.81)</td>
<td>350 (13.78)</td>
<td>194 (7.64)</td>
<td>75.4 (166.23)</td>
<td>74.8 (164.91)</td>
</tr>
<tr>
<td>5</td>
<td>600</td>
<td>254.5 (10.02)</td>
<td>405 (15.94)</td>
<td>380 (14.96)</td>
<td>370 (14.57)</td>
<td>224 (8.82)</td>
<td>75.0 (165.35)</td>
<td>74.4 (164.02)</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>304.8 (12.00)</td>
<td>485 (19.09)</td>
<td>450 (17.72)</td>
<td>395 (15.55)</td>
<td>244 (9.61)</td>
<td>106.9 (235.67)</td>
<td>106.3 (234.35)</td>
</tr>
<tr>
<td>6</td>
<td>300</td>
<td>304.8 (12.00)</td>
<td>520 (20.47)</td>
<td>450 (17.72)</td>
<td>395 (15.55)</td>
<td>244 (9.61)</td>
<td>151.9 (334.88)</td>
<td>151.3 (333.56)</td>
</tr>
</tbody>
</table>
SITRANS F flowmeters
SITRANS F X

SITRANS FX300

Sandwich version, front view, a = 133 mm (5.24 inches)

Sandwich version, front view, a = 133 mm (5.25 inches)

Sandwich version, side view, b = 105 mm (4.13 inches), c = 179 mm (7.05 inches)

Sandwich version, side view, b = 105 mm (4.13 inches), c = 179 mm (7.05 inches)
## Sandwich version EN

<table>
<thead>
<tr>
<th>Size</th>
<th>Pressure rating</th>
<th>Dimensions [mm (inches)]</th>
<th>Weight [kg (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flowmeter (with pressure sensor)</td>
</tr>
<tr>
<td>DN</td>
<td>PN</td>
<td>d</td>
<td>D</td>
</tr>
<tr>
<td>15</td>
<td>16 ... 100</td>
<td>16 (0.63)</td>
<td>45 (1.77)</td>
</tr>
<tr>
<td>25</td>
<td>16 ... 100</td>
<td>24 (0.94)</td>
<td>65 (2.56)</td>
</tr>
<tr>
<td>40</td>
<td>16 ... 100</td>
<td>38 (1.50)</td>
<td>82 (3.23)</td>
</tr>
<tr>
<td>50</td>
<td>16 ... 100</td>
<td>50 (1.97)</td>
<td>102 (4.02)</td>
</tr>
<tr>
<td>80</td>
<td>16 ... 100</td>
<td>74 (2.91)</td>
<td>135 (5.31)</td>
</tr>
<tr>
<td>100</td>
<td>16 ... 100</td>
<td>97 (3.82)</td>
<td>158 (6.22)</td>
</tr>
</tbody>
</table>

## Sandwich version ASME

<table>
<thead>
<tr>
<th>Size</th>
<th>Pressure rating</th>
<th>Dimensions [mm (inches)]</th>
<th>Weight [kg (lb)]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flowmeter (with pressure sensor)</td>
</tr>
<tr>
<td>DN</td>
<td>class</td>
<td>d</td>
<td>D</td>
</tr>
<tr>
<td>⅛&quot;</td>
<td>150, 300, 600</td>
<td>16 (0.63)</td>
<td>45 (1.77)</td>
</tr>
<tr>
<td>⅝&quot;</td>
<td>150, 300, 600</td>
<td>24 (0.94)</td>
<td>65 (2.56)</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>150, 300, 600</td>
<td>38 (1.50)</td>
<td>82 (3.23)</td>
</tr>
<tr>
<td>2&quot;</td>
<td>150, 300, 600</td>
<td>50 (1.97)</td>
<td>102 (4.02)</td>
</tr>
<tr>
<td>3&quot;</td>
<td>150, 300, 600</td>
<td>74 (2.91)</td>
<td>135 (5.31)</td>
</tr>
<tr>
<td>4&quot;</td>
<td>150, 300, 600</td>
<td>97 (3.82)</td>
<td>158 (6.22)</td>
</tr>
</tbody>
</table>
## Flow tables

### Measuring Range Limits

<table>
<thead>
<tr>
<th>Size</th>
<th>Q&lt;sub&gt;min&lt;/sub&gt;</th>
<th>Q&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Q&lt;sub&gt;min&lt;/sub&gt;</th>
<th>Q&lt;sub&gt;max&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EN 1092-1 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
<td>EN 1092-1 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
<td>ASME B16.5 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
<td>ASME B16.5 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>½&quot;</td>
<td>0.45</td>
<td>5.07</td>
<td>0.44</td>
</tr>
<tr>
<td>25</td>
<td>1&quot;</td>
<td>0.81</td>
<td>11.40</td>
<td>0.81</td>
</tr>
<tr>
<td>40</td>
<td>1½&quot;</td>
<td>2.04</td>
<td>28.58</td>
<td>2.04</td>
</tr>
<tr>
<td>50</td>
<td>2&quot;</td>
<td>3.53</td>
<td>49.48</td>
<td>3.53</td>
</tr>
<tr>
<td>80</td>
<td>3&quot;</td>
<td>7.74</td>
<td>108.37</td>
<td>7.74</td>
</tr>
<tr>
<td>100</td>
<td>4&quot;</td>
<td>13.30</td>
<td>186.22</td>
<td>13.30</td>
</tr>
<tr>
<td>150</td>
<td>6&quot;</td>
<td>30.13</td>
<td>421.86</td>
<td>30.13</td>
</tr>
<tr>
<td>200</td>
<td>8&quot;</td>
<td>56.6</td>
<td>792.42</td>
<td>56.60</td>
</tr>
<tr>
<td>250</td>
<td>10&quot;</td>
<td>90.48</td>
<td>1 266.8</td>
<td>90.48</td>
</tr>
<tr>
<td>300</td>
<td>12&quot;</td>
<td>131.41</td>
<td>1 839.8</td>
<td>131.41</td>
</tr>
</tbody>
</table>

Values based on water at 20 °C (68 °F) and 1.013 bar abs (14.7 psi abs)

<table>
<thead>
<tr>
<th>Size</th>
<th>Q&lt;sub&gt;min&lt;/sub&gt;</th>
<th>Q&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Q&lt;sub&gt;min&lt;/sub&gt;</th>
<th>Q&lt;sub&gt;max&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EN 1092-1 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
<td>EN 1092-1 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
<td>ASME B16.5 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
<td>ASME B16.5 [m&lt;sup&gt;3&lt;/sup&gt;/h]</td>
</tr>
<tr>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>½&quot;</td>
<td>6.80</td>
<td>25.33</td>
<td>6.72</td>
</tr>
<tr>
<td>25</td>
<td>1&quot;</td>
<td>10.20</td>
<td>81.43</td>
<td>10.20</td>
</tr>
<tr>
<td>40</td>
<td>1½&quot;</td>
<td>25.35</td>
<td>326.63</td>
<td>25.35</td>
</tr>
<tr>
<td>50</td>
<td>2&quot;</td>
<td>43.89</td>
<td>565.49</td>
<td>43.89</td>
</tr>
<tr>
<td>80</td>
<td>3&quot;</td>
<td>96.14</td>
<td>1 238.64</td>
<td>96.14</td>
</tr>
<tr>
<td>100</td>
<td>4&quot;</td>
<td>165.19</td>
<td>2 128.27</td>
<td>165.19</td>
</tr>
<tr>
<td>150</td>
<td>6&quot;</td>
<td>374.23</td>
<td>4 821.60</td>
<td>374.23</td>
</tr>
<tr>
<td>200</td>
<td>8&quot;</td>
<td>702.95</td>
<td>9 056.8</td>
<td>702.95</td>
</tr>
<tr>
<td>250</td>
<td>10&quot;</td>
<td>1 123.7</td>
<td>14 478.0</td>
<td>1 123.7</td>
</tr>
<tr>
<td>300</td>
<td>12&quot;</td>
<td>1 632.1</td>
<td>21 028.0</td>
<td>1 632.1</td>
</tr>
</tbody>
</table>

Values based on air at 20 °C (68 °F) and 1.013 bar abs (14.7 psi abs)

### Flow rate limits

<table>
<thead>
<tr>
<th>Product</th>
<th>Nominal diameters</th>
<th>Minimum flow rates</th>
<th>Maximum flow rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquids</td>
<td>to EN DN 15 ... DN 300</td>
<td>0.5 x (998ρ) &lt;sup&gt;0.5&lt;/sup&gt;</td>
<td>7 x (998ρ) &lt;sup&gt;0.47&lt;/sup&gt;</td>
</tr>
<tr>
<td>Gas, steam/vapor</td>
<td>to ASME DN ½&quot; ... DN 12&quot;</td>
<td>6 x (1.29ρ) &lt;sup&gt;0.5&lt;/sup&gt;</td>
<td>7 x (998ρ) &lt;sup&gt;0.47&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

ρ = operating density [kg/m<sup>3</sup>]

1) Minimum flow rate 0.4 m/s (1.3 ft/s), maximum flow rate 10 m/s (32.8 ft/s)
2) Minimum flow rate 2 m/s (6.6 ft/s), maximum flow rate 80 m/s (262 ft/s)
3) 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)
### Measuring range saturated steam: 1 to 7 bar

<table>
<thead>
<tr>
<th>Overpressure [bar]</th>
<th>1</th>
<th>3.5</th>
<th>5.2</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density [kg/m³]</td>
<td>1.13498</td>
<td>2.4258</td>
<td>3.27653</td>
<td>4.16732</td>
</tr>
<tr>
<td>Temperature [°C]</td>
<td>120.6</td>
<td>148.2</td>
<td>160.4</td>
<td>170.6</td>
</tr>
<tr>
<td>Flow [kg/h]</td>
<td>min.</td>
<td>max.</td>
<td>min.</td>
<td>max.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN to EN 1092-1</th>
<th>DN to ASME B16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 1/2</td>
<td>5.87  28.75</td>
</tr>
<tr>
<td>25 1</td>
<td>11.82 92.42</td>
</tr>
<tr>
<td>40 1¼</td>
<td>29.64 370.71</td>
</tr>
<tr>
<td>50 2</td>
<td>51.31 641.82</td>
</tr>
<tr>
<td>80 3</td>
<td>112.41 1405.8</td>
</tr>
<tr>
<td>100 4</td>
<td>193.14 2415.5</td>
</tr>
<tr>
<td>150 6</td>
<td>437.56 5472.4</td>
</tr>
<tr>
<td>200 8</td>
<td>821.9 10279</td>
</tr>
<tr>
<td>250 10</td>
<td>1313.9 16433</td>
</tr>
<tr>
<td>300 12</td>
<td>1908.3 23866</td>
</tr>
</tbody>
</table>

### Measuring range saturated steam: 10.5 to 20 bar

<table>
<thead>
<tr>
<th>Overpressure [bar]</th>
<th>10.5</th>
<th>14</th>
<th>17.5</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density [kg/m³]</td>
<td>5.88803</td>
<td>7.60297</td>
<td>9.31702</td>
<td>10.5442</td>
</tr>
<tr>
<td>Temperature [°C]</td>
<td>186.2</td>
<td>198.5</td>
<td>208.7</td>
<td>215</td>
</tr>
<tr>
<td>Flow [kg/h]</td>
<td>min.</td>
<td>max.</td>
<td>min.</td>
<td>max.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DN to EN 1092-1</th>
<th>DN to ASME B16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 1/2</td>
<td>12.78  149.17</td>
</tr>
<tr>
<td>25 1</td>
<td>26.93  479.46</td>
</tr>
<tr>
<td>40 1¼</td>
<td>67.51  1878.2</td>
</tr>
<tr>
<td>50 2</td>
<td>116.89 3251.7</td>
</tr>
<tr>
<td>80 3</td>
<td>256.03 7122.4</td>
</tr>
<tr>
<td>100 4</td>
<td>439.91 12238</td>
</tr>
<tr>
<td>150 6</td>
<td>996.62 2725</td>
</tr>
<tr>
<td>200 8</td>
<td>1872.1 5207</td>
</tr>
<tr>
<td>250 10</td>
<td>2992.7 83254</td>
</tr>
<tr>
<td>300 12</td>
<td>4346.5 120920</td>
</tr>
</tbody>
</table>
## SITRANS FX300

### Measuring range saturated steam: 15 to 100 psig

<table>
<thead>
<tr>
<th>Overpressure [psig]</th>
<th>15</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density [lbs/ft³]</td>
<td>0.0719</td>
<td>0.1497</td>
<td>0.2036</td>
<td>0.2569</td>
</tr>
<tr>
<td>Temperature [°F]</td>
<td>249.98</td>
<td>297.86</td>
<td>320.36</td>
<td>338.184</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow [lbs/h]</th>
<th>DN to EN 1092-1</th>
<th>DN to ASME B16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN to EN 1092-1</td>
<td>DN to ASME B16.5</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>½”</td>
<td>12.95</td>
</tr>
<tr>
<td></td>
<td>1”</td>
<td>26.25</td>
</tr>
<tr>
<td>40</td>
<td>1½”</td>
<td>65.81</td>
</tr>
<tr>
<td></td>
<td>2”</td>
<td>113.94</td>
</tr>
<tr>
<td>80</td>
<td>3”</td>
<td>249.57</td>
</tr>
<tr>
<td>100</td>
<td>4”</td>
<td>428.81</td>
</tr>
<tr>
<td>150</td>
<td>6”</td>
<td>971.47</td>
</tr>
<tr>
<td>200</td>
<td>8”</td>
<td>1 824.8</td>
</tr>
<tr>
<td>250</td>
<td>10”</td>
<td>2 917.2</td>
</tr>
<tr>
<td>300</td>
<td>12”</td>
<td>4 236.8</td>
</tr>
</tbody>
</table>

### Measuring range saturated steam: 150 to 300 psig

<table>
<thead>
<tr>
<th>Overpressure [psig]</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density [lbs/ft³]</td>
<td>0.3627</td>
<td>0.4681</td>
<td>0.5735</td>
<td>0.6792</td>
</tr>
<tr>
<td>Temperature [°F]</td>
<td>366.08</td>
<td>388.04</td>
<td>406.22</td>
<td>422.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow [lbs/h]</th>
<th>DN to EN 1092-1</th>
<th>DN to ASME B16.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN to EN 1092-1</td>
<td>DN to ASME B16.5</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>½”</td>
<td>27.79</td>
</tr>
<tr>
<td></td>
<td>1”</td>
<td>58.93</td>
</tr>
<tr>
<td>40</td>
<td>1½”</td>
<td>147.72</td>
</tr>
<tr>
<td></td>
<td>2”</td>
<td>255.75</td>
</tr>
<tr>
<td>80</td>
<td>3”</td>
<td>560.19</td>
</tr>
<tr>
<td>100</td>
<td>4”</td>
<td>962.54</td>
</tr>
<tr>
<td>150</td>
<td>6”</td>
<td>2 180.6</td>
</tr>
<tr>
<td>200</td>
<td>8”</td>
<td>4 096.1</td>
</tr>
<tr>
<td>250</td>
<td>10”</td>
<td>6 548.1</td>
</tr>
<tr>
<td>300</td>
<td>12”</td>
<td>9 510.2</td>
</tr>
</tbody>
</table>
# Level instruments

## Product overview

### Point level measurement
- Capacitance switches
  - Pointek CLS100
  - Pointek CLS200 - Standard
  - Pointek CLS200 - Digital
  - Pointek CLS300 - Standard
  - Pointek CLS300 - Digital
  - Pointek CLS300
  - Pointek CLS Specials
- Vibrating switches
  - SITRANS LVL100
  - SITRANS LVL200
  - SITRANS LV5100
  - SITRANS LV5200
- Rotating paddle switches
  - SITRANS LPS200
- Ultrasonic switch
  - Pointek ULS200

### Vibrating switches
- SITRANS LVL100
- SITRANS LVL200
- SITRANS LV5100
- SITRANS LV5200

### Rotating paddle switches
- SITRANS LPS200

### Ultrasonic switch
- Pointek ULS200

## Continuous level measurement

### Ultrasonic transmitters
- The Probe
- SITRANS Probe LU
- Ultrasonic controllers
- HydroRanger 200
- MultiRanger 100/200
- HydroRanger Plus
- SITRANS LUC500
- SITRANS LU01 and LU02
- SITRANS LU10
- SITRANS LU SAM
- SITRANS LU AO
- Ultrasonic transducers
- ST-H
- Echomax XRS-5
- Echomax XPS and XCT
- Echomax XLT
- Accessories for ultrasonic
- ES aiming devices
- FMS mounting brackets
- TS-3 temperature sensor

### Continuous level measurement (continued)
- Radar transmitters
- SITRANS Probe LR
- SITRANS LR200
- SITRANS LR200 and SITRANS LR300 Antennas
- SITRANS LR200 and LR300 Specials
- SITRANS LR250
- SITRANS LR260
- SITRANS LR400
- SITRANS LR460
- SITRANS LR260 and LR460 Specials
- Guided wave radar transmitters
- SITRANS LG200
- SITRANS LC300
- SITRANS LC500
- SITRANS LC300 and LC500 Specials

### Continuous measurement - Open channel flow
- Ultrasonic controller
- OCM III

### Communications and Displays
- SmartLinx module
- Dolphin Plus Software
- SITRANS RD100
- SITRANS RD200
- SITRANS RD500

---

You can download all instructions, catalogs and certificates for SITRANS L free of charge at the following internet address: [www.siemens.com/level](http://www.siemens.com/level)
## Overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Device description</th>
<th>Page</th>
<th>Programming Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Point level measurement - Capacitance switches</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powerful range of level switches suitable for a variety of industries</td>
<td><strong>Pointek CLS100/CLS200/CLS300/CLS500</strong>&lt;br&gt;• CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam&lt;br&gt;• 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&lt;br&gt;• 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&lt;br&gt;• 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</td>
<td>5/10, 5/15, 5/41, 5/61</td>
<td>- SIMATIC PDM - SIMATIC PDM - SIMATIC PDM - SIMATIC PDM</td>
</tr>
<tr>
<td><strong>Point level measurement - Vibrating switches</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable vibrating point level switches for liquid and slurry applications across all industries</td>
<td><strong>SITRANS LVL100/LVL200</strong>&lt;br&gt;• 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 protection&lt;br&gt;• 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 SIL-2 Safety Functions in terms of IEC 61511-1: First Edition 2003-01.</td>
<td>5/78, 5/84</td>
<td>-</td>
</tr>
<tr>
<td>Reliable vibrating point level switches for bulk solids in a wide variety of applications at a competitive price</td>
<td><strong>SITRANS LVS100/LVS200</strong>&lt;br&gt;• Vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications.</td>
<td>5/99</td>
<td>-</td>
</tr>
<tr>
<td><strong>Point level measurement - Rotating paddle switch</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable rotating point level switches for bulk solids in a wide variety of applications at a competitive price</td>
<td><strong>SITRANS LPS200</strong>&lt;br&gt;• LPS200: 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.</td>
<td>5/110</td>
<td>-</td>
</tr>
<tr>
<td><strong>Point level measurement - Ultrasonic switch</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries</td>
<td><strong>Pointek ULS200</strong>&lt;br&gt;• Rugged design, no moving parts and virtually maintenance-free&lt;br&gt;• Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals</td>
<td>5/122</td>
<td>-</td>
</tr>
</tbody>
</table>
## Continuous level measurement - Ultrasonic transmitters

<table>
<thead>
<tr>
<th>Application</th>
<th>Device description</th>
<th>Page</th>
<th>Programming Software</th>
</tr>
</thead>
</table>
| 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 5 m model 24 V DC  
- Two-wire system with current loop | 5/126 | - |
| 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels | SITRANS Probe LU  
- Continuous level measurement up to 12 m (40 ft) range  
- Patented Sonic Intelligence signal processing  
- Extremely high signal-to-noise ratio  
- Auto False-Echo Suppression of false echoes | 5/129 | SIMATIC PDM |

## Continuous level measurement - Ultrasonic controllers

<table>
<thead>
<tr>
<th>Application</th>
<th>Device description</th>
<th>Page</th>
<th>Programming Software</th>
</tr>
</thead>
</table>
| Ultrasonic level controller for up to six pumps - control, differential control and open channel flow monitoring | HydroRanger 200  
- An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today’s exacting standards  
- Auto False-Echo Suppression of false echoes | 5/133 | SIMATIC PDM |
| Versatile short- to medium-range ultrasonic single- and dual-vessel 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 | 5/138 | SIMATIC PDM |
| Non-contacting, cost-effective solution for reliable control of level and flow measurements in water and wastewater applications | HydroRanger Plus  
- Available as 19” rack, for panel mounting or in wall enclosure  
- Compatible with Echomax® ultrasonic transducers | 5/142 | Dolphin Plus |
| Complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms | SITRANS LUC500  
- Monitoring and control in one device  
- Integral telemetry interface (Modbus® RTU/ASCII)  
- Expandable platform to handle any liquid application from tank level measurement to pump control | 5/146 | Dolphin Plus |
| Ultrasonic long-range level monitoring system for liquids and solids | SITRANS LU01/LU02/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 | 5/151, 5/156 | Dolphin Plus |
| Output modules for SITRANS LU10 | SITRANS LU SAM/SITRANS LU AO  
- SITRANS LU SAM satellite alarm module provides up to 20 relay contacts for the measurement points connected to a SITRANS LU10  
- SITRANS LU AO analog output module provides remote analog outputs for the measurement points of the SITRANS LU10 transceiver | 5/159, 5/161 | - |
# Level instruments

## Product overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Device description</th>
<th>Page</th>
<th>Programming Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous level measurement - Ultrasonic transducers</td>
<td>ST-H: ETFE or PVDF transducer for chemicals XRS-5: Standard transducer for applications to 8 m (26 ft)</td>
<td>5/164</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ST-H/Echomax XRS-5</td>
<td>5/167</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• The narrow design of the ST-H allows the sensor to be mounted using a 2” connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids and slurries</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transducers for liquids and bulk solids</td>
<td>5/170</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Echomax XPS and XCT/XLT</td>
<td>5/180</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• XPS series offers versions for various distances up to 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• XCT series for applications at high temperatures, for measurement of levels at distances up to 12 m (40 ft) and temperatures of max. +145 °C (+293 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• XCT: measuring ranges from 0.9 to 60 m (1.8 to 200 ft) and temperatures up to +150 °C (+302 °F). Beam angle of just 5° provides accurate readings in solids storage bunkers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous level measurement - Radar transmitters</td>
<td>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)</td>
<td>5/191</td>
<td>SIMATIC PDM AMS</td>
</tr>
<tr>
<td></td>
<td>SITRANS Probe LR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Uni-Construction polypropylene rod antenna standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Patented Sonic Intelligence signal processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Auto False-Echo Suppression of false echoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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)</td>
<td>5/195</td>
<td>SIMATIC PDM AMS</td>
</tr>
<tr>
<td></td>
<td>SITRANS LR200</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in alphanumeric display with support in four languages</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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); ideal for small vessels and low dielectric media</td>
<td>5/210</td>
<td>SIMATIC PDM AMS</td>
</tr>
<tr>
<td></td>
<td>SITRANS LR250</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Simple operation using the graphical local user interface (LUI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plug-and-play setup using the intuitive Quick Start Wizard</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 25 GHz high frequency allows for small horn antennas and easy mounting in nozzels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Communication using HART® or PROFIBUS PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids up to 30 m (66 ft); ideal for measurement in extreme dust</td>
<td>5/218</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td></td>
<td>SITRANS LR260</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Simple operation using the graphical local user interface (LUI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plug-and-play setup using the intuitive Quick Start Wizard</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 25 GHz high frequency allows for small horn antennas and easy mounting in nozzels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Communication using HART® or PROFIBUS PA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media

**Device description:**
- SITRANS LR400
- Minimum maintenance requirements and wear as result of non-contacting measuring principle
- High long-term stability resulting from self-calibration with highly stable internal reference
- High measuring accuracy and repeatability as result of 24 GHz; narrow beam angle for tall, narrow vessels

**Page:** 5/223
**Programming Software:** 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

**Device description:**
- 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

**Page:** 5/230
**Programming Software:** SIMATIC PDM

## Guided wave radar transmitter

**Device description:**
- SITRANS LG200
- Measures accurately on materials with dielectric (dK) as low as 1.4
- Guided wave radar measurement for up to 2.5 mm (0.12") accuracy
- Measures level and interface on challenging applications including foam
- 3 button programming for quick setup
- Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F)

**Page:** 5/239
**Programming Software:** SIMATIC PDM

## Capacitance transmitter

**Device description:**
- SITRANS LC300
- Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes
- Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation

**Page:** 5/262

## Open channel flow - Ultrasonic controller

**Device description:**
- OCM III
- Compatible with most standard open channel weirs and flumes
- AC and DC operation
- Automatically switches to battery operation for uninterrupted power
- MCERTS approved device

**Page:** 5/298

---

### Continuous level measurement - Guided wave radar transmitters

- **SITRANS LG200**
- Measures accurately on materials with dielectric (dK) as low as 1.4
- Guided wave radar measurement for up to 2.5 mm (0.12") accuracy
- Measures level and interface on challenging applications including foam
- 3 button programming for quick setup
- Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F)

### Continuous level measurement - Capacitance transmitters

- **SITRANS LC300**
- Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes
- Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation

### Continuous level measurement - Open channel flow - Ultrasonic controller

- **OCM III**
- Compatible with most standard open channel weirs and flumes
- AC and DC operation
- Automatically switches to battery operation for uninterrupted power
- MCERTS approved device
## Level instruments
### Product overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Device description</th>
<th>Page</th>
<th>Programming Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communications and Displays</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| ![Image](image1.png) | **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 | 5/301 | - |
| | 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation and for hazardous locations | 5/303 | - |
| ![Image](image2.png) | **SITRANS RD100**  
- Versatile loop-powered meter that displays process variables in level, flow, pressure, temperature and weighing applications  
- FM and CSA approved device that can be installed in range of environments, including hazardous areas  
- Large, easy-to-read display  
- Easy to install and set up using quick two-step process | 5/304 | - |
| ![Image](image3.png) | **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  
- RD Software supporting remote configuration, monitoring and logging for up to 100 displays | 5/306 | - |
| ![Image](image4.png) | **SITRANS RD500**  
- Supports up to 128 devices with the flexible I/O modules and up to 247 Modbus serial devices, including field instruments  
- Out-of-the-box operation, no software required, works with standard web browser  
- Supports Ethernet, GSM, GPRS and PSTN communication  
- Data and alarming through FTP, Email, SMS, HTML and OPC  
- Up to 2 gig of data logging memory | 5/310 | - |
Overview

Introduction
Inverse frequency shift capacitance point level switches and continuous level transmitters 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.

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
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.

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.

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.
## Technical specifications

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Pointeck CLS100</th>
<th>Pointeck CLS200</th>
<th>Pointeck CLS300</th>
<th>Pointeck CLS500</th>
<th>SITRANS LC300</th>
<th>SITRANS LC500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical applications</td>
<td>Liquids, slurries, powders, granules, applications in constricted spaces</td>
<td>Liquids, slurries, powders, granules, foam, food and pharmaceuticals, petrochemicals</td>
<td>Liquids, slurries, powders, granules, relatively high pressure and temperature, hazardous areas</td>
<td>Water in oil, foam or liquid/foam level, glycol regenerators, high-pressure coalescers</td>
<td>Conductive or non-conductive liquids, foam or liquid/foam levels, water in oil levels</td>
<td>Water in oil, foam or liquid/foam level, high-pressure coalescers, LNG (Liquified Natural Gas)</td>
</tr>
<tr>
<td>Max. length including sensor</td>
<td>100 mm (4&quot;)</td>
<td>Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)</td>
<td>Rod: 1 m (40&quot;) Cable: 25 m (82 ft)</td>
<td>Rod: 1 m (40&quot;)</td>
<td>Rod: 5 m (18 ft) Cable: 25 m (82 ft)</td>
<td>Rod: 5.5 m (18 ft) Cable: 35 m (115 ft)</td>
</tr>
<tr>
<td>Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)</td>
<td>• 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: -50 ... +200 °C (-58 ... +392 °F) • -40 ... +200 °C (-40 ... +392 °F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.)</td>
<td>Up to 10 bar g (146 psi g)</td>
<td>Rod versions: Up to 25 bar g (365 psi g)</td>
<td>Up to 35 bar g (511 psi g)</td>
<td>Up to 150 bar g (2175 psi g)</td>
<td>Up to 35 bar g (511 psi g)</td>
<td>Up to 150 bar g (2175 psi g)</td>
</tr>
<tr>
<td>Output</td>
<td>Stainless steel cable or enclosure version: • 4 or 20/20 or 4 mA 2-wire current loop • Solid-state output Fully-synthetic version (PPS) • Relay output</td>
<td>CLS200 Standard: • 1 SPDT Form C relay, solid-state switch CLS200 Digital: • solid-state switch included</td>
<td>CLS300 Standard: • 1 SPDT Form C relay, solid-state switch CLS300 Digital: • solid-state switch included</td>
<td>CLS500 Standard: • 4 ... 20/20 ... 4 mA 2-wire current loop</td>
<td>Solid-state switch</td>
<td>4 ... 20/20 ... 4 mA 2-wire current loop</td>
</tr>
<tr>
<td>Communications</td>
<td>• Standard: 12 ... 33 V DC • Intrinsically Safe (Stainless steel version only): 10 ... 30 V DC</td>
<td>CLS200 Standard: 12 ... 250 V AC/DC, 0-60 Hz, 2 W max.</td>
<td>CLS200 Digital: - bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC - current consumption: 12.5 mA</td>
<td>CLS300 Standard: 12 ... 250 V AC/DC, 0-60 Hz, 2 W max.</td>
<td>CLS300 Digital: - bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC - current consumption: 12.5 mA</td>
<td>12 ... 32 V DC any polarity, 2-wire current loop circuit</td>
</tr>
<tr>
<td>Power Specifications</td>
<td>• Standard: 12 ... 33 V DC • Intrinsically Safe (Stainless steel version only): 10 ... 30 V DC</td>
<td>CLS200 Standard: 12 ... 250 V AC/DC, 0-60 Hz, 2 W max.</td>
<td>CLS200 Digital: - bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC - current consumption: 12.5 mA</td>
<td>CLS300 Standard: 12 ... 250 V AC/DC, 0-60 Hz, 2 W max.</td>
<td>CLS300 Digital: - bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC - current consumption: 12.5 mA</td>
<td>12 ... 32 V DC any polarity, 2-wire current loop circuit</td>
</tr>
<tr>
<td>Approvals</td>
<td>CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG</td>
<td>CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG, VLAREM II, SIL-2</td>
<td>CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG, VLAREM II, SIL-2</td>
<td>CE, CSA, FM, ATEX, C-TICK, Bureau Veritas, ABS, Current Signalling according to NAMUR NE 43, SIL-1</td>
<td>CE, CSA, FM, ATEX, C-TICK, Bureau Veritas, Current Signalling according to NAMUR NE 45, SIL-1</td>
<td>CE, CSA, FM, ATEX, C-TICK, Bureau Veritas, Current Signalling according to NAMUR NE 43, SIL-1</td>
</tr>
</tbody>
</table>
# Capacitance Application Questionnaire

## Customer information

<table>
<thead>
<tr>
<th>Contact:</th>
<th>Prepared By:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company:</td>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td>Notes on the Application:</td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zip/Postal Code:</td>
<td>Phone: ( )</td>
<td></td>
</tr>
<tr>
<td>E-mail:</td>
<td>Fax: ( )</td>
<td></td>
</tr>
</tbody>
</table>

## Tank/Vessel Information

(Supply sketch where possible) Sketch attached: ❑

<table>
<thead>
<tr>
<th>Type:</th>
<th>Storage</th>
<th>Process</th>
<th>Separator</th>
<th>FPSO</th>
<th>(Floating Processing Storage and Offloading)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Tank top:</th>
<th>Open</th>
<th>Flat</th>
<th>Conical</th>
<th>Parabolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank bottom:</td>
<td>Sloped</td>
<td>Flat</td>
<td>Conical</td>
<td>Parabolic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tank construction:</th>
<th>Metallic</th>
<th>Non-metallic</th>
<th>Agitated top, bottom or side</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Pressure:</th>
<th>Normal:</th>
<th>Maximum (relief):</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>Height:</th>
<th>Width/Diameter:</th>
</tr>
</thead>
</table>

## Critical Information

- **Nozzle Length:** _______ cm/in
- **Nozzle Diameter:** _______ cm/in

## Process Data

<table>
<thead>
<tr>
<th>Material being measured:</th>
<th>Liquid</th>
<th>Solid</th>
<th>Slurry</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Material temperature:</th>
<th>Norm:</th>
<th>Max:</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C/°F</td>
<td>°C/°F</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement type:</th>
<th>Point level</th>
<th>Continuous level</th>
<th>Interface level</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Constant dielectric:</th>
<th>No</th>
<th>Yes</th>
<th>DK Value</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Upper material:</th>
<th>DK Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower material:</td>
<td>DK Value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process pressure:</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Coating build-up:</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Conductive material:</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

## Installation

(indicate all that apply)

<table>
<thead>
<tr>
<th>Power available:</th>
<th>Output:</th>
<th>4 to 20 mA</th>
<th>Relay</th>
<th>Solid state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications:</td>
<td></td>
<td>HART ® / 4 to 20 mA</td>
<td>PROFIBUS PA</td>
<td></td>
</tr>
</tbody>
</table>

## Products recommended:

© Siemens Milltronics Process Instruments Inc.

www.siemens.com/processautomation

© Siemens AG 2010
Level instruments
Point level measurement - Capacitance switches

Pointek CLS100

Overview

Pointek CLS100 is a compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam.

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”) 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
## Technical specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Stainless steel process connection (integral cable or enclosure version) (7ML5501)</th>
<th>Fully synthetic process connection (enclosure version only) (7ML5610)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode of operation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring principle</td>
<td>Inverse frequency shift</td>
<td>Inverse frequency shift</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Change in picoFarad (pF)</td>
<td>Change in picoFarad (pF)</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Alarm output</td>
<td>4 or 20/20 or 4 mA 2-wire loop</td>
<td>4 or 20/20 or 4 mA 2-wire loop</td>
</tr>
<tr>
<td>• Switch output</td>
<td>Solid-state: 30 V DC/30 V AC, max. 82 mA</td>
<td>Max. switching voltage: 60 V DC/30 V AC, max. switching current: 1 A</td>
</tr>
<tr>
<td>• Fail-safe mode</td>
<td>Min. or max.</td>
<td>Min. or max.</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>2 mm (0.08&quot;)</td>
<td>2 mm (0.08&quot;)</td>
</tr>
<tr>
<td><strong>Rated operating conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Location</td>
<td>Indoor/outdoor</td>
<td>Indoor/outdoor</td>
</tr>
<tr>
<td>Ambient conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td>-30 ... +85 °C (-22 ... +185 °F)</td>
<td>-10 ... +85 °C (+14 ... +185 °F)</td>
</tr>
<tr>
<td>• Installation category</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>• Pollution degree</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Medium conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Relative dielectric constant εr</td>
<td>Min. 1.5</td>
<td>Min. 1.5</td>
</tr>
<tr>
<td>• Process temperature</td>
<td>-30 ... +100 °C (-22 ... +212 °F)</td>
<td>-10 ... +100 °C (+14 ... +212 °F)</td>
</tr>
<tr>
<td>• Pressure (vessel)</td>
<td>-1 ... +10 bar g (-14.6 ... +146 psi g), nominal</td>
<td>-1 ... +10 bar g (-14.6 ... +146 psi g), nominal</td>
</tr>
<tr>
<td>• Degree of protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Enclosure version</td>
<td>IP68/Type 4/NEMA 4</td>
<td>IP68/Type 4/NEMA 4</td>
</tr>
<tr>
<td>- Integral cable version</td>
<td>IP65/Type 4/NEMA 4</td>
<td>Not applicable</td>
</tr>
<tr>
<td>- Cable inlet</td>
<td>½&quot; NPT (M20x1.5 optional)</td>
<td>½&quot; NPT (M20x1.5 optional)</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Body (Enclosure version)</td>
<td>Thermoplastic polyester</td>
<td>Thermoplastic polyester</td>
</tr>
<tr>
<td>• Lid (Enclosure version)</td>
<td>Transparent thermoplastic polycarbonate (PC)</td>
<td>Transparent thermoplastic polycarbonate (PC)</td>
</tr>
<tr>
<td>• Integrated cable body (Integral cable version)</td>
<td>316L stainless steel</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Power supply
- **Standard**: 12 ... 33 V DC
- **Intrinsically Safe**: 10 ... 30 V DC (Intrinsically Safe barrier required)

### Certificates and approvals
- **General**: CE, CSA, FM, C-TICK
- **Marine**: Lloyd’s 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
- **Intrinsically Safe (barrier required)**: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G
- **ATEX II 1 GD 1/2GD**
- **ATEX II 1 GD 1/2GD**
- **Overfill protection**: WHG (Germany)

---

1) 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.

2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/13.

3) When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).
# Level instruments

## Point level measurement - Capacitance switches

### Pointek CLS100

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 M L S 0 1 - 0</td>
<td>Pointek CLS100, stainless steel process connection</td>
</tr>
<tr>
<td>7 M L 5 1 0 - 0</td>
<td>Pointek CLS100, PPS process connection</td>
</tr>
</tbody>
</table>

**Process connection**
- ¾” 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/FF (JIS-P), JIS B 0202]

**Approvals**
- General Purpose: CE, CSA, FM, C-TICK
- CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, T4
- ATEX II 1 GD 1/2GD Ex ia IIC T4 to T6 T107 °C
- CSA/FM Class II and III, Div. 1, Groups E, F, G

**Device version**
- Integral cable version (PPS probe)
- Enclosure version (PPS probe), ½” NPT cable inlet
- Enclosure version with PVDF probe body, M20x1.5 cable inlet

**WHG approval, German overfill protection**
- Not required: 0
- Required: 1

**Further designs**
- Please add “-Z” to Order No. and specify Order code(s).
- Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 20 characters) specify in plain text

**Instruction manual**
- Order No.: 7ML1998-5QJ81

**Options**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensguard, ¾” NPT (PPS)</td>
<td>7ML1830-1DL, 7ML1830-1DM</td>
</tr>
<tr>
<td>Sensguard, R 1” (BSPT) (PPS)</td>
<td>7NG4122-1AA10, 7ML1830-1JA, 7ML1830-1JC</td>
</tr>
</tbody>
</table>

---

1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

2) See Temperature restriction on page 5/13

C) Subject to export regulations AL: N, ECCN: EAR99
**Characteristic curves**

**Pressure/Temperature Curve**

**CLS100 (7ML5501)**

**Threaded Process Connections**

- **P** = Permitted Operating Pressures
- **T** = Permitted Operating Temperature

Example:
- Permitted operating pressure = 10 bar (145 psi) at 75 °C

**Dimensional drawings**

**Integral Cable Version**

- 36 mm (1.4")
- 50 mm (2.0")
- 120 mm (4.7")
- 98 mm (3.9") nominal

**Enclosure Version**

- 80 mm (3.1")
- 65 mm (2.6")
- 72.5 mm (2.8")
- 204 mm (8.0")

**Pointek CLS100 Process Pressure/Temperature derating curves**

**Pointek CLS100 dimensions**
Level instruments
Point level measurement - Capacitance switches

Pointek CLS100

Schematics

Integral Cable Version - Non Intrinsically Safe only

LOW/HIGH Alarm

4 to 20 mA Loop Alarm

Solid State Switch Version

Enclosure and Fully Synthetic Version

terminal operations
cable equivalent
- mA-current loop (+V or -V)
- ground
- solid state switch / relay*
- solid state switch / relay*
- red wire
- black wire
- cable shield
- white wire

* switch/relay normally open in unpowered state
* relay not available on Pointek CLS100 IS version (7ML5501)

Rmax = Vsupply - 10 V

Note:
When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual).
Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.
Level instruments
Point level measurement - Capacitance switches

Overview

Pointek CLS200 (standard version) is 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.

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
- SIL/IEC61508 compliant for use in safety integrated level applications for overfill protection (SIL-2)

Application
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms.

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.

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

Pointek CLS200 installation
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Technical specifications

**Mode of operation**

| Measuring principle | Inverse frequency shift capacitive level detection |

**Input**

| Measured variable | Change in picoFarad (pF) |

**Output**

**Output signal**

<table>
<thead>
<tr>
<th>Relay output</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Max. contact voltage</td>
</tr>
<tr>
<td>- 30 V DC</td>
</tr>
<tr>
<td>- 250 V AC</td>
</tr>
<tr>
<td>- Max. contact current</td>
</tr>
<tr>
<td>- 5 A (DC)</td>
</tr>
<tr>
<td>- 8 A (AC)</td>
</tr>
<tr>
<td>- Max. switching capacity</td>
</tr>
<tr>
<td>- 150 W (DC)</td>
</tr>
<tr>
<td>- 2000 VA (AC)</td>
</tr>
<tr>
<td>- Time delay (ON and/or OFF)</td>
</tr>
<tr>
<td>- 1 ... 60 s</td>
</tr>
<tr>
<td>- Solid-state output</td>
</tr>
<tr>
<td>- Output</td>
</tr>
<tr>
<td>- Galvanically isolated</td>
</tr>
<tr>
<td>- Voltage drop</td>
</tr>
<tr>
<td>- &lt; 1 V, typical at 50 mA</td>
</tr>
<tr>
<td>- Time delay (pre or post switching)</td>
</tr>
<tr>
<td>- 1 ... 60 s</td>
</tr>
</tbody>
</table>

**Rated operating conditions**

**Installation conditions**

<table>
<thead>
<tr>
<th>Location</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient conditions</td>
<td></td>
</tr>
<tr>
<td>- Ambient temperature</td>
<td></td>
</tr>
<tr>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>- 4</td>
<td></td>
</tr>
<tr>
<td>- Liquids, bulk solids, slurries and interfaces</td>
<td></td>
</tr>
<tr>
<td>- Min. 1.5</td>
<td></td>
</tr>
<tr>
<td>Medium conditions</td>
<td></td>
</tr>
<tr>
<td>- Relative dielectric constant $\varepsilon_r$</td>
<td></td>
</tr>
<tr>
<td>- Process temperature</td>
<td></td>
</tr>
<tr>
<td>- Without thermal isolator</td>
<td></td>
</tr>
<tr>
<td>- -40 ... +85 °C (-40 ... +185 °F)</td>
<td></td>
</tr>
<tr>
<td>- With thermal isolator</td>
<td></td>
</tr>
<tr>
<td>- -40 ... +125 °C (-40 ... +257 °F)</td>
<td></td>
</tr>
<tr>
<td>- Process pressure (rod version)</td>
<td></td>
</tr>
<tr>
<td>- -1 ... +25 bar g</td>
<td></td>
</tr>
<tr>
<td>- (-14.6 ... +365 psi g) (nominal)</td>
<td></td>
</tr>
<tr>
<td>- Process pressure (cable version)</td>
<td></td>
</tr>
<tr>
<td>- -1 ... +10 bar g</td>
<td></td>
</tr>
<tr>
<td>- (-14.6 ... +150 psi g) (nominal)</td>
<td></td>
</tr>
<tr>
<td>- Process pressure (sliding coupling version)</td>
<td></td>
</tr>
<tr>
<td>- -1 ... +10 bar g</td>
<td></td>
</tr>
<tr>
<td>- (-14.6 ... +150 psi g) (nominal)</td>
<td></td>
</tr>
</tbody>
</table>

**Design**

| Material |
| Epoxy-coated aluminum with gasket |
| Optional thermal isolator |
| 316L stainless steel |
| Connection |
| Removable terminal block, max. 2.5 mm² |
| Degree of protection |
| IP65/Type 4/NEMA 4 (optional IP68) |
| Cable inlet |
| 2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry) |

**Power supply**

| 12 ... 250 V AC/DC, 0 ... 60 Hz max. 2 W |

**Certificates and approvals**

| General Purpose |
| CSA, FM, CE, C-TICK |
| Dust Ignition Proof |
| ATEX II 1/2 D T100°C |
| Flameproof Enclosure With IS Probe |
| CSA/FM Class II, Div. 1, Gr. E, F, G |
| Dust Ignition Proof With IS Probe |
| CSA/FM Class III T4 |
| Explosion Proof Enclosure With IS Probe |
| CSA/FM Class I, Div. 1, Gr. A, B, C, D |
| Marine |
| Lloyd's Register of Shipping, Categories ENV1, ENV2 and ENV5 |
| Overfill Protection |
| WHG (Germany) |
| Others |
| SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)] |
| Pattern Approval (China) |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/34.

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 on page 5/34.
## Level instruments

### Point level measurement - Capacitance switches

#### Pointek CLS200 - Standard

<table>
<thead>
<tr>
<th>Design: Probe</th>
<th>Rod version</th>
<th>Sanitary version</th>
<th>Cable version</th>
<th>Sliding Coupling version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. length</td>
<td>5500 mm (216.53&quot;)</td>
<td>5500 mm (216.53&quot;)</td>
<td>30000 mm (1181.1&quot;)</td>
<td>5500 mm (216.53&quot;)</td>
</tr>
<tr>
<td>Process connection</td>
<td>R ¾&quot;, 1&quot;, 1¼&quot;, 1½&quot; [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>1½&quot;, 2&quot; sanitary fitting clamp</td>
<td>5000 mm (196.85&quot;) liquids and slurries</td>
<td>5000 mm (196.85&quot;) solids (under loads)</td>
</tr>
<tr>
<td>PFA coating 1)</td>
<td>5000 mm (196.85&quot;) solids (under loads)</td>
<td>316L stainless steel</td>
<td>R ¾&quot;, 1&quot;, 1¼&quot;, 1½&quot; [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td></td>
</tr>
<tr>
<td>Extension material</td>
<td>316L stainless steel</td>
<td>Fluoroethylene propylene (FEP) cable with stainless steel core</td>
<td>316L stainless steel</td>
<td></td>
</tr>
<tr>
<td>Sensor wetted parts</td>
<td>PPS (optional PVDF)</td>
<td>PPS (optional PVDF)</td>
<td>PPS (optional PVDF)</td>
<td></td>
</tr>
<tr>
<td>O-ring seal material</td>
<td>FKM (optional FFKM)</td>
<td>FKM (optional FFKM)</td>
<td>FKM (optional FFKM)</td>
<td></td>
</tr>
<tr>
<td>Thermal isolator 2)</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td>User selected length</td>
<td>User selected length</td>
<td>User selected length</td>
<td></td>
</tr>
</tbody>
</table>

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness.
2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

#### Options

**Optional Sensguard**

![Optional Sensguard dimensions](image_url)

- **Internal thread ¾" NPT**
- **Process connection ¾" NPT**
- **Process connection R 1" (BSPT)**
- **91 mm (3.6")**
- **70 mm (2.75")**
- **32 mm (1.26")**
- **32 mm (1.26")**
- **91 mm (3.6")**
- **70 mm (2.75")**
- **70 mm (2.75")**
## Pointek CLS200 - Standard

### Selection and Ordering data

**Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection**  
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.

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded, 316L stainless steel</td>
<td>C) 7 M L 5 6 3 0</td>
</tr>
<tr>
<td>¾” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 A</td>
</tr>
<tr>
<td>1” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 B</td>
</tr>
<tr>
<td>1⅜” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 C</td>
</tr>
<tr>
<td>1⅝” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 D</td>
</tr>
<tr>
<td>R ¼” (BSPT), EN 10226/PT (JIS-T), JIS B 0203</td>
<td>1 A</td>
</tr>
<tr>
<td>R 1” (BSPT), EN 10226/PT (JIS-T), JIS B 0203</td>
<td>1 B</td>
</tr>
<tr>
<td>G ¾” (BSPP), EN ISO 228-1-FF (JIS-P), JIS B 0202</td>
<td>1 D</td>
</tr>
<tr>
<td>G 1” (BSPP), EN ISO 228-1-FF (JIS-P), JIS B 0202</td>
<td>1 E</td>
</tr>
<tr>
<td>G 1⅜” (BSPP), EN ISO 228-1-FF (JIS-P), JIS B 0202</td>
<td>1 F</td>
</tr>
<tr>
<td>Welded flange, 316L stainless steel, raised face</td>
<td>1 G</td>
</tr>
<tr>
<td>1” ASME, 150 lb</td>
<td>5 A</td>
</tr>
<tr>
<td>1” ASME, 300 lb</td>
<td>5 B</td>
</tr>
<tr>
<td>1” ASME, 600 lb</td>
<td>5 C</td>
</tr>
<tr>
<td>1½” ASME, 150 lb</td>
<td>5 D</td>
</tr>
<tr>
<td>1½” ASME, 300 lb</td>
<td>5 E</td>
</tr>
<tr>
<td>1½” ASME, 600 lb</td>
<td>5 F</td>
</tr>
<tr>
<td>2” ASME, 150 lb</td>
<td>5 G</td>
</tr>
<tr>
<td>2” ASME, 300 lb</td>
<td>5 H</td>
</tr>
<tr>
<td>2” ASME, 600 lb</td>
<td>5 J</td>
</tr>
<tr>
<td>3” ASME, 150 lb</td>
<td>5 K</td>
</tr>
<tr>
<td>3” ASME, 300 lb</td>
<td>5 L</td>
</tr>
<tr>
<td>3” ASME, 600 lb</td>
<td>5 M</td>
</tr>
<tr>
<td>4” ASME, 150 lb</td>
<td>5 N</td>
</tr>
<tr>
<td>4” ASME, 300 lb</td>
<td>5 P</td>
</tr>
<tr>
<td>4” ASME, 600 lb</td>
<td>5 Q</td>
</tr>
<tr>
<td>Welded flange, 316L stainless steel, Type A flat faced</td>
<td>5 R</td>
</tr>
<tr>
<td>DN 25, PN 16</td>
<td>6 A</td>
</tr>
<tr>
<td>DN 25, PN 40</td>
<td>6 B</td>
</tr>
<tr>
<td>DN 40, PN 16</td>
<td>6 C</td>
</tr>
<tr>
<td>DN 40, PN 40</td>
<td>6 D</td>
</tr>
<tr>
<td>DN 50, PN 16</td>
<td>6 E</td>
</tr>
<tr>
<td>DN 50, PN 40</td>
<td>6 F</td>
</tr>
<tr>
<td>DN 80, PN 16</td>
<td>6 G</td>
</tr>
<tr>
<td>DN 80, PN 40</td>
<td>6 H</td>
</tr>
<tr>
<td>DN 100, PN 16</td>
<td>6 J</td>
</tr>
<tr>
<td>DN 100, PN 40</td>
<td>6 K</td>
</tr>
</tbody>
</table>

(Notes: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

### Probe length (length from flange face)

(All threads include process thread)  
Note: No Y01 needed in order code for standard lengths.

<table>
<thead>
<tr>
<th>Probe length lengths include process thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact [threaded 120 mm (4.72”), Flanged 98 mm (3.86”)] A</td>
</tr>
<tr>
<td>Extended rod, 250 mm (9.84”) B</td>
</tr>
<tr>
<td>Extended rod, 350 mm (13.78”) C</td>
</tr>
<tr>
<td>Extended rod, 500 mm (19.69”) D</td>
</tr>
<tr>
<td>Extended rod, 750 mm (29.53”) E</td>
</tr>
<tr>
<td>Extended rod, 1000 mm (39.37”) F</td>
</tr>
<tr>
<td>Extended rod, 1250 mm (49.21”) G</td>
</tr>
<tr>
<td>Extended rod, 1350 mm (53.15”) H</td>
</tr>
<tr>
<td>Extended rod, 1500 mm (59.06”) I</td>
</tr>
<tr>
<td>Extended rod, 1750 mm (68.90”) J</td>
</tr>
<tr>
<td>Extended rod, 2000 mm (78.74”) K</td>
</tr>
</tbody>
</table>

---

### Selection and Ordering data

**Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection**  
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.

Add order code Y01 and plain text:

- **Insertion length ... mm**
  - Extended rod, 200 ... 1000 mm (7.87 ... 39.37”)  
  - Extended rod, 1001 ... 2000 mm (39.41 ... 78.74”)  
  - Extended rod, 2001 ... 3000 mm (78.78 to 118.11”)  
  - Extended rod, 3001 ... 4000 mm (118.15 ... 157.48”)  
  - Extended rod, 4001 ... 5000 mm (157.52 ... 196.85”)  
  - Extended rod, 5001 ... 5500 mm (196.89 ... 216.53”)

- **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”) of cable
  - With 5 m (197”) of cable

- **Wetted Seals**
  - FKM
  - FFKM (for process temperatures above -20 °C (-4 °F))

- **Probe Material**
  - 316L Stainless Steel with PPS probe body
  - 316L Stainless Steel with PVDF probe body

- **Approvals**
  - General Purpose (CSA, FM, CE, C-TICK) with WHG Approval
  - Dust Ignition Proof:
    - CE, C-TICK, ATEX II 1/2 D T100 °C
  - Flameproof Enclosure with IS Probe:
    - CE, C-TICK, ATEX II 1 G Ex d[a] IIC T6...T4, ATEX II 1/2 D T100°C
    - CE, C-TICK, ATEX II 1/2 G Ex d[a] IIC T6...T4, ATEX II 1/2 D T100°C
  - Flameproof Enclosure with WHG Approval:
    - CE, C-TICK, ATEX II 1/2 G Ex d[a] IIC T6...T4, ATEX II 1/2 D T100°C
  - Dust Ignition Proof with IS Probe:
    - CSA/FM Class II, Div. 1, Gr. E, F, G
    - CSA/FM Class III T4
  - Explosion Proof Enclosure with IS Probe:
    - CSA/FM Class II, Div. 1, Gr. A, B, C, D
    - CSA/FM Class III T4
  - CSA/FM Class I, Div. 1, Gr. A, B, C, D
  - CSA/FM Class III T4

- **Enclosure and Lid**
  - Aluminum epoxy coated
  - 2 x ½” NPT via adapter - cable inlet, IP65
  - 2 x M20 x 1.5 cable inlet, IP65
  - 2 x ½” NPT via adapter - cable inlet, IP66
  - 2 x M20 x 1.5 cable inlet, IP68

---

© Siemens AG 2010
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection</strong></td>
<td>C) 7 M L 5 6 3 0 - 7</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>C) 7 M L 5 6 3 0 - 7</td>
<td></td>
</tr>
</tbody>
</table>

### Further designs

- Please add "Z" to Order No. and specify Order code(s).

- **Total insertion length**: enter the total insertion length in plain text description.
- **Stainless steel tag [69 x 50 mm (2.71 x 1.97")]**: Measuring-point number/identification (max. 16 characters) specify in plain text.
- **Acceptance test certificate**: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000.
- **Inspection Certificate Type 3.1 per EN 10204**.
- **SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]**.

### Instruction manual

- Note: The instruction manual should be ordered as a separate line on the order.
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.

### Accessories

- See page 5/33

---

C) Subject to export regulations AL: N, ECCN: EAR99
# Level instruments

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 5 6 3 1 -</td>
<td>Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection</td>
</tr>
</tbody>
</table>

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

### Process Connection

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 A</td>
<td>1/2” NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>0 B</td>
<td>1” NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>0 C</td>
<td>1¼” NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>0 D</td>
<td>1½” NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>1 A</td>
<td>R ¾” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
</tr>
<tr>
<td>1 B</td>
<td>R 1” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
</tr>
<tr>
<td>1 C</td>
<td>R 1½” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
</tr>
<tr>
<td>1 D</td>
<td>G ¾” [(BSPP), EN ISO 228-1/FF (JIS-P), JIS B 0202]</td>
</tr>
<tr>
<td>1 E</td>
<td>G 1” [(BSPP), EN ISO 228-1/FF (JIS-P), JIS B 0202]</td>
</tr>
<tr>
<td>1 F</td>
<td>G 1½” [(BSPP), EN ISO 228-1/FF (JIS-P), JIS B 0202]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 A</td>
<td>1” ASME, 150 lb</td>
</tr>
<tr>
<td>2 B</td>
<td>1” ASME, 300 lb</td>
</tr>
<tr>
<td>2 C</td>
<td>1” ASME, 600 lb</td>
</tr>
<tr>
<td>2 D</td>
<td>1½” ASME, 150 lb</td>
</tr>
<tr>
<td>2 E</td>
<td>1½” ASME, 300 lb</td>
</tr>
<tr>
<td>2 F</td>
<td>1½” ASME, 600 lb</td>
</tr>
<tr>
<td>2 G</td>
<td>2” ASME, 150 lb</td>
</tr>
<tr>
<td>2 H</td>
<td>2” ASME, 300 lb</td>
</tr>
<tr>
<td>2 I</td>
<td>2” ASME, 600 lb</td>
</tr>
<tr>
<td>2 J</td>
<td>3” ASME, 150 lb</td>
</tr>
<tr>
<td>2 K</td>
<td>3” ASME, 300 lb</td>
</tr>
<tr>
<td>2 L</td>
<td>3” ASME, 600 lb</td>
</tr>
<tr>
<td>2 M</td>
<td>4” ASME, 150 lb</td>
</tr>
<tr>
<td>2 N</td>
<td>4” ASME, 300 lb</td>
</tr>
<tr>
<td>2 O</td>
<td>4” ASME, 600 lb</td>
</tr>
</tbody>
</table>

#### Wetted Seals

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 A</td>
<td>FKM and PTFE</td>
</tr>
<tr>
<td>3 B</td>
<td>FKM and PTFE</td>
</tr>
</tbody>
</table>

#### Thermal Isolator

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Without thermal isolator</td>
</tr>
<tr>
<td>1</td>
<td>With thermal isolator</td>
</tr>
</tbody>
</table>

#### Remote mount electronics and mounting bracket

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>With 2 m (79”) of cable</td>
</tr>
<tr>
<td>3</td>
<td>With 5 m (197”) of cable</td>
</tr>
</tbody>
</table>

#### Probe Material

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>FEP jacketed cable with PPS probe body</td>
</tr>
<tr>
<td>1</td>
<td>FEP jacketed cable with PVDF probe body</td>
</tr>
</tbody>
</table>

#### Approvals

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>General Purpose (CSA, FM, CE, C-TICK)</td>
</tr>
<tr>
<td>B</td>
<td>General Purpose (CSA, FM, CE, C-TICK) with WHG Approval</td>
</tr>
<tr>
<td>C</td>
<td>Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C</td>
</tr>
<tr>
<td>D</td>
<td>Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1 G Ex d[ia] IIC T6...T4, ATEX II 1/2 D T100°C</td>
</tr>
<tr>
<td>E</td>
<td>Flameproof Enclosure with IS Probe, with WHG Approval: CE, C-TICK, ATEX II 1 G Ex d[ia] IIC T6...T4, ATEX II 1/2 D T100°C</td>
</tr>
<tr>
<td>F</td>
<td>Dust Ignition Proof with IS Probe: CSA/IEC Class II, Div. 1, Gr. E, F, G</td>
</tr>
<tr>
<td>G</td>
<td>Explosion Proof Enclosure with IS Probe: CSA/IEC Class II, Div. 1, Gr. E, F, G</td>
</tr>
</tbody>
</table>

#### Enclosure and Lid

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 A</td>
<td>CSA/IEC Class II, Div. 1, Gr. E, F, G</td>
</tr>
<tr>
<td>2 B</td>
<td>CSA/IEC Class IV, Div. 1, Gr. E, F, G</td>
</tr>
<tr>
<td>2 C</td>
<td>CSA/IEC Class IV, Div. 1, Gr. E, F, G</td>
</tr>
<tr>
<td>2 D</td>
<td>CSA/IEC Class IV, Div. 1, Gr. E, F, G</td>
</tr>
<tr>
<td>2 E</td>
<td>CSA/IEC Class IV, Div. 1, Gr. E, F, G</td>
</tr>
<tr>
<td>2 F</td>
<td>CSA/IEC Class IV, Div. 1, Gr. E, F, G</td>
</tr>
</tbody>
</table>

#### Additional Features

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>FEP jacketed cable with PPS probe body</td>
</tr>
<tr>
<td>B</td>
<td>FEP jacketed cable with PVDF probe body</td>
</tr>
</tbody>
</table>

#### Further designs

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 A</td>
<td>FEP jacketed cable with PPS probe body</td>
</tr>
<tr>
<td>3 B</td>
<td>FEP jacketed cable with PVDF probe body</td>
</tr>
</tbody>
</table>

Total insertion length: enter the total insertion length in plain text description.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]</td>
</tr>
<tr>
<td>B</td>
<td>Measuring-point number/identification (max. 16 characters) specify in plain text</td>
</tr>
<tr>
<td>C</td>
<td>Insertion length in plain text description</td>
</tr>
<tr>
<td>D</td>
<td>All other characteristics specify in plain text</td>
</tr>
<tr>
<td>E</td>
<td>All other characteristics specify in plain text</td>
</tr>
<tr>
<td>F</td>
<td>All other characteristics specify in plain text</td>
</tr>
<tr>
<td>G</td>
<td>All other characteristics specify in plain text</td>
</tr>
</tbody>
</table>

### Installation manual

Note: The installation manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics Start and instruction manual library.

### Accessories

See page 5/33

C) Subject to export regulations AL: N, ECCN: EAR99
## Selection and Ordering data

### Pointek CLS200 - Standard - Rod with Sanitary process connection
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary 316L stainless steel</td>
<td>8A</td>
</tr>
<tr>
<td>1” sanitary fitting clamp</td>
<td>8B</td>
</tr>
<tr>
<td>1½” sanitary fitting clamp</td>
<td>8C</td>
</tr>
<tr>
<td>2” sanitary fitting clamp</td>
<td>8D</td>
</tr>
<tr>
<td>2½” sanitary fitting clamp</td>
<td>8E</td>
</tr>
<tr>
<td>3” sanitary fitting clamp</td>
<td>8F</td>
</tr>
</tbody>
</table>

(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

<table>
<thead>
<tr>
<th>Length</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact 98 mm (3.86”)</td>
<td>A</td>
</tr>
<tr>
<td>Extended rod, 250 mm (9.84”)</td>
<td>B</td>
</tr>
<tr>
<td>Extended rod, 350 mm (13.78”)</td>
<td>C</td>
</tr>
<tr>
<td>Extended rod, 500 mm (19.69”)</td>
<td>D</td>
</tr>
<tr>
<td>Extended rod, 750 mm (29.53”)</td>
<td>E</td>
</tr>
<tr>
<td>Extended rod, 1000 mm (39.37”)</td>
<td>F</td>
</tr>
<tr>
<td>Extended rod, 1250 mm (49.21”)</td>
<td>G</td>
</tr>
<tr>
<td>Extended rod, 1350 mm (53.15”)</td>
<td>H</td>
</tr>
<tr>
<td>Extended rod, 1500 mm (59.06”)</td>
<td>J</td>
</tr>
<tr>
<td>Extended rod, 1750 mm (68.90”)</td>
<td>L</td>
</tr>
<tr>
<td>Extended rod, 2000 mm (78.74”)</td>
<td>N</td>
</tr>
</tbody>
</table>

Add order code Y01 and plain text:

- Insertion length: enter the total insertion length in plain text description
- Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]
- Measuring-point number/identification (max. 16 characters) specify in plain text

### Enclosure and Lid

- Aluminum epoxy coated
- Without thermal isolator
- With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]

### Remote mount electronics and mounting bracket

- Remote mount electronics with 2 m (79”) of cable
- Remote mount electronics with 5 m (197”) of cable

### Wetted Seals

- FKM
- FFKM
  
  [for process temperatures above -20°C (-4°F)]

### Probe Material

- 316L Stainless Steel with PPS probe body
- 316L Stainless Steel with PVDF probe body

### Approvals

- General Purpose (CSA, FM, CE, C-TICK)
- General Purpose (CSA, FM, CE, C-TICK) with WHG Approval
- Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C
- Flameproof Enclosure with IS Probe: CE, C-TICK, 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: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C

### Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class II, Div. 1, Gr. A, B, C, D

### Explosion Proof Enclosure with IS Probe:

- CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4

### Further designs

Please add “-Z” to Order No. and specify Order code(s).

### Total insertion length: enter the total insertion length in plain text description

- Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]
- Measuring-point number/identification (max. 16 characters) specify in plain text

### Inspection Certificate Type 3.1 per EN 10204 SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]

### Installation Manual

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

See page 5/33

© Siemens AG 2010
# Pointek CLS200 - Standard

## Selection and Ordering data

**Order No.** 7 ML 5 6 3 3 - 0

### Order Code Y01

**Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection**

Versatile inverse frequency shift capacitance level switch with configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

### Process Connection

- Threaded, 316L stainless steel
- ¾” NPT (Taper), ANSI/ASME B1.20.1
- 1” NPT (Taper), ANSI/ASME B1.20.1
- 1¼” 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
- JIS B 0202

### Probe length (length from flange face)

(Thraeded lengths include process thread)

<table>
<thead>
<tr>
<th>Code</th>
<th>Probe length (length from flange face)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>350 mm (13.78”)</td>
</tr>
<tr>
<td>B</td>
<td>500 mm (19.69”)</td>
</tr>
<tr>
<td>C</td>
<td>750 mm (29.53”)</td>
</tr>
<tr>
<td>D</td>
<td>1000 mm (39.37”)</td>
</tr>
<tr>
<td>E</td>
<td>1250 mm (49.21”)</td>
</tr>
<tr>
<td>F</td>
<td>1500 mm (59.06”)</td>
</tr>
<tr>
<td>G</td>
<td>1750 mm (68.90”)</td>
</tr>
<tr>
<td>H</td>
<td>2000 mm (78.74”)</td>
</tr>
<tr>
<td>I</td>
<td>350 mm (13.78”) with extension</td>
</tr>
<tr>
<td>J</td>
<td>500 mm (19.69”) with extension</td>
</tr>
<tr>
<td>K</td>
<td>750 mm (29.53”) with extension</td>
</tr>
<tr>
<td>L</td>
<td>1000 mm (39.37”) with extension</td>
</tr>
<tr>
<td>M</td>
<td>1250 mm (49.21”) with extension</td>
</tr>
<tr>
<td>N</td>
<td>1500 mm (59.06”) with extension</td>
</tr>
<tr>
<td>O</td>
<td>1750 mm (68.90”) with extension</td>
</tr>
<tr>
<td>P</td>
<td>2000 mm (78.74”) with extension</td>
</tr>
<tr>
<td>Q</td>
<td>350 mm (13.78”) extended</td>
</tr>
<tr>
<td>R</td>
<td>500 mm (19.69”) extended</td>
</tr>
<tr>
<td>S</td>
<td>750 mm (29.53”) extended</td>
</tr>
<tr>
<td>T</td>
<td>1000 mm (39.37”) extended</td>
</tr>
<tr>
<td>U</td>
<td>1250 mm (49.21”) extended</td>
</tr>
<tr>
<td>V</td>
<td>1500 mm (59.06”) extended</td>
</tr>
<tr>
<td>W</td>
<td>1750 mm (68.90”) extended</td>
</tr>
<tr>
<td>X</td>
<td>2000 mm (78.74”) extended</td>
</tr>
</tbody>
</table>

**Add order code Y01 and plain text: Insertion length...mm**

<table>
<thead>
<tr>
<th>Code</th>
<th>Insertion length...mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>350 mm (13.78”)</td>
</tr>
<tr>
<td>B</td>
<td>500 mm (19.69”)</td>
</tr>
<tr>
<td>C</td>
<td>750 mm (29.53”)</td>
</tr>
<tr>
<td>D</td>
<td>1000 mm (39.37”)</td>
</tr>
<tr>
<td>E</td>
<td>1250 mm (49.21”)</td>
</tr>
<tr>
<td>F</td>
<td>1500 mm (59.06”)</td>
</tr>
<tr>
<td>G</td>
<td>1750 mm (68.90”)</td>
</tr>
<tr>
<td>H</td>
<td>2000 mm (78.74”)</td>
</tr>
</tbody>
</table>

### 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”) of cable
- With 5 m (197”) of cable

### Wetted Seals

- FKM and PTFE
- FFKM and PTFE for process temperatures above 20 °C (+4 °F)

### Probe Material

- 316L Stainless Steel with PPS probe body
- 316L Stainless Steel with PVDF probe body

### Approvals

- General Purpose (CSA, FM, CE, C-TICK)
- General Purpose (CSA, FM, CE, C-TICK) with WHG Approval

**Dust Ignition Proof with IS Probe:**
- CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G

**Explosion Proof Enclosure with IS Probe:**
- CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G

**Enclosure and Lid**

- Aluminum epoxy coated

**Accessories**

- See page 5/33

### Further designs

Please add “Z” to Order No. and specify Order code(s).

**Total insertion length:** enter the total insertion length in plain text description

**Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:**

Measuring-point number/identification (max. 16 characters) specify in plain text

**Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000**

**Inspection Certificate Type 3.1 per EN 10204**

**SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]**

**Instruction manual**

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**See page 5/33**

### Other information

- C) Subject to export regulations AL: N, ECCN: EAR99

---

**攫取文本**

液体，固体，悬浮液，泡沫和界面

和可配置的输出，理想用于检测开关

具有可选的过程连接选择

通用电容式液位检测

点深度电容式液位检测

Pointek CLS200 - Standard - Sliding Coupling

ATEX II 1/2 D T100 °C

CE, C-TICK, ATEX II 1/2 G Ex d [ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C

**ATEX II 1/2 G EEx d [ia] IIC T6...T4, Approval:**

Flameproof Enclosure with IS Probe, CE, C-TICK, ATEX II 1/2 D, T100 °C

Flameproof Enclosure with IS Probe, with WHG Approval:

CE, C-TICK, ATEX II 1/2 G Ex d [ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C

---

© Siemens AG 2010

[Siemens FI 01 · 2010 US Edition]
**Pointek CLS200 - Standard**

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 56 34</td>
<td>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</td>
</tr>
</tbody>
</table>

**Process Connection**

- Welded flange, 316L stainless steel, raised face
  - 1” ASME, 150 lb
  - 1” ASME, 300 lb
  - 1” ASME, 600 lb
  - 1½” ASME, 150 lb
  - 1½” ASME, 300 lb
  - 1½” ASME, 600 lb
  - 2” ASME, 150 lb
  - 2” ASME, 300 lb
  - 2” ASME, 600 lb
  - 3” ASME, 150 lb
  - 3” ASME, 300 lb
  - 3” ASME, 600 lb
  - 4” ASME, 150 lb
  - 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
  - DN 40, PN 16
  - DN 40, PN 40
  - DN 50, PN 16
  - DN 50, PN 40
  - DN 80, PN 16
  - DN 80, PN 40
  - DN 100, PN 16
  - DN 100, PN 40

**Probe length**

- (Lengths include process thread)
  - Compact (Threaded 98 mm (3.86”))
  - Extended rod, 250 mm (9.84”)
  - Extended rod, 500 mm (19.69”)
  - Extended rod, 750 mm (29.53”)
  - Extended rod, 1000 mm (39.37”)
  - Extended rod, 1250 mm (49.21”)
  - Extended rod, 1500 mm (59.06”)
  - Extended rod, 1750 mm (68.90”)
  - Extended rod, 2000 mm (78.74”)
- Add order code Y01 and plain text: Insertion length (mm)
  - Extended rod, 200...1000 mm (7.87...39.33”)
  - Extended rod, 1001...2000 mm (39.41...78.74”)
  - Extended rod, 2001...3000 mm (78.78...118.11”)
  - Extended rod, 3001...4000 mm (118.15...157.48”)
  - Extended rod, 4001...5000 mm (157.52...196.85”)
  - Extended rod, 5001...6000 mm (196.89...236.53”)

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 56 34</td>
<td>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</td>
</tr>
</tbody>
</table>

**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”) of cable
- With 5 m (197”) of cable

**Wetted Seals**

- FKM
- FFKM (for process temperatures above -20°C [-4°F])

**Probe Material**

- PFA Coated 316L Stainless Steel with PPS probe body
- PFA Coated 316L Stainless Steel with PVDF probe body

**Approvals**

- General Purpose (CSA, FM, CE, C-TICK)
  - General Purpose (CSA, FM, CE, C-TICK) with WHG Approval
  - Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C
  - Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1 G Ex d[i]a IIC T6...T4, ATEX II 1/2 D T100°C
  - Flameproof Enclosure with IS Probe, With WHG Approval: CE, C-TICK, ATEX II 1 G Ex d[i]a IIC T6...T4, ATEX II 1/2 D T100°C
  - Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G
  - CSA/FM Class III T4
  - Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
  - CSA/FM Class II, Div. 1, Gr. E, F, G
  - CSA/FM Class III T4

**Enclosure and Lid**

- Aluminum epoxy coated
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4

**Further designs**

- Please add “-Z” to Order No. and specify Order code(s).

- Total insertion length: enter the total insertion length in plain text description
  - Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]
  - Measuring-point number/identification (max. 16 characters) specify in plain text
  - Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
  - Inspection Certificate Type 3.1 per EN 10204
  - SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]

**Instruction manual**

- The instruction manual should be ordered as a separate line on the order
- This device is shipped with the Siemens Milltronics Start and instruction manual library.

**Accessories**

- See page 5/33

C) Subject to export regulations AL: N, ECCN: EAR99
Pointek CLS200 (digital version) is 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. 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.

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas
## Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Measured variable</td>
<td>Output signal</td>
</tr>
<tr>
<td>Inverse frequency shift capacitive level detection</td>
<td>Change in picoFarad (pF)</td>
<td>Galvanically isolated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Against reversed polarity (bipolar)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 30 V (DC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 30 V peak (AC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 1 V, typical at 50 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Programmable by user (0 ... 100 s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min. or max</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Removable terminal block</td>
</tr>
</tbody>
</table>

### Rated operating conditions

#### Installation conditions
- **Location**
  - Indoor/outdoor
- **Ambient conditions**
  - **Ambient temperature**
    - Min: -40 °C (-40 °F) to +85 °C (+185 °F)
  - **Installation category**
    - II
  - **Pollution degree**
    - 4
- **Medium conditions**
  - Liquids, bulk solids, slurries and interfaces
  - Relative dielectric constant (εr)
    - Min: 1.5
  - **Process temperature**
    - Min: -40 °C (-40 °F) to +85 °C (+185 °F)
  - **Process pressure**
    - (rod version)
      - Min: -1 ... +25 bar g (-14.6 ... +365 psi g)
    - (cable version)
      - Min: -1 ... +10 bar g (-14.6 ... +150 psi g)
  - **Process temperature**
    - (sliding coupling version)
      - Min: -1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)

### Design

- **Material**
  - Enclosure
    - Epoxy-coated aluminum with gasket
  - Optional thermal isolator
    - 316L stainless steel
  - Connection
    - Removable terminal block, max. 2.5 mm²
  - **Degree of protection**
    - IP65/Type 4/NEMA 4 (optional IP68)
  - **Cable inlet**
    - 2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)

### Power supply

- **Bus voltage**
  - Standard: 12 ... 30 V DC
  - Intrinsically Safe: 12 ... 24 V DC
- **Current consumption**
  - 12.5 mA

### Certificates and approvals

- **General Purpose**
  - CSA, FM, CE, C-TICK
- **Dust Ignition Proof**
  - CSA/FM Class II, Div. 1, Gr. E, F, G
  - CSA/FM Class III T4
- **Dust Ignition Proof with IS Probe**
  - CSA/FM Class I, Div. 1, Gr. A, B, C, D
  - CSA/FM Class II, Div. 1, Gr. E, F, G
  - CSA/FM Class III T4
- **Flameproof Enclosure with IS Probe**
  - CSA/FA Class I, Div. 1, Gr. A, B, C, D
  - CSA/FA Class II, Div. 1, Gr. E, F, G
  - CSA/FA Class III T4
- **Explosion Proof with IS Probe**
  - CSA/FA Class I, Div. 1, Gr. A, B, C, D
  - CSA/FA Class II, Div. 1, Gr. E, F, G
  - CSA/FA Class III T4
- **Non-incendive**
  - CSA/FA Class I, Div. 2, Gr. A, B, C, D
  - CSA/FA Class II, Div. 2, Gr. E, F, G
  - CSA/FA Class III T4 or T6
- **Non-Sparking**
  - CSA/FA Class I, Div. 2, Gr. A, B, C, D
  - CSA/FA Class II, Div. 2, Gr. E, F, G
  - CSA/FA Class III T4
- **Marine**
  - Lloyd’s 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

---

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/34.
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 on page 5/34.
4) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection.
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200 - Digital

### Design: Probe

<table>
<thead>
<tr>
<th></th>
<th>Rod version</th>
<th>Sanitary version</th>
<th>Cable version</th>
<th>Sliding Coupling version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. length</td>
<td>5500 mm (216.53&quot;)</td>
<td>5500 mm (216.53&quot;)</td>
<td>30000 mm (1181.1&quot;) liquids and slurries</td>
<td>5500 mm (216.53&quot;)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5500 mm (196.85&quot;) solids (under loads)</td>
<td>5500 mm (196.85&quot;) solids (under loads)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>316L stainless steel ASME/EN flange</td>
<td>316L stainless steel ASME/EN flange</td>
<td>316L stainless steel ASME/EN flange</td>
<td>316L stainless steel ASME/EN flange</td>
</tr>
<tr>
<td>Extension material</td>
<td>316L stainless steel, optional PFA coated</td>
<td>316L stainless steel</td>
<td>Fluoroethylene propylene (FEP) cable with stainless steel core</td>
<td>316L stainless steel</td>
</tr>
<tr>
<td>Sensor wetted parts</td>
<td>PPS (optional PVDF)</td>
<td>PPS (optional PVDF)</td>
<td>PPS (optional PVDF)</td>
<td>PPS (optional PVDF)</td>
</tr>
<tr>
<td>O-ring seal material</td>
<td>FKM (optional FFKM)</td>
<td>FKM (optional FFKM)</td>
<td>FKM (optional FFKM)</td>
<td>FKM (optional FFKM)</td>
</tr>
<tr>
<td>Thermal isolator</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Extension</td>
<td>User selected length</td>
<td>User selected length</td>
<td>Cable extension</td>
<td>User selected length</td>
</tr>
</tbody>
</table>

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness
2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

### Options

**Optional Sensguard**

Sensguard dimensions
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces</td>
<td>7 ML 5 6 4 0 -</td>
</tr>
</tbody>
</table>

### Process Connection

<table>
<thead>
<tr>
<th>Threaded, 316L stainless steel</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 A</td>
</tr>
<tr>
<td>1” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 B</td>
</tr>
<tr>
<td>1¼” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 C</td>
</tr>
<tr>
<td>1½” NPT (Taper), ANSI/ASME B1.20.1</td>
<td>0 D</td>
</tr>
<tr>
<td>R ¾” (BSPT), EN 10226/PT (JIS-T), JIS B 0203</td>
<td>0 E</td>
</tr>
<tr>
<td>R 1” (BSPT), EN 10226/PT (JIS-T), JIS B 0203</td>
<td>0 F</td>
</tr>
<tr>
<td>R 1½” (BSPT), EN 10226/PT (JIS-T), JIS B 0203</td>
<td>0 G</td>
</tr>
<tr>
<td>G ¾” (BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202</td>
<td>0 H</td>
</tr>
<tr>
<td>G 1” (BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202</td>
<td>0 I</td>
</tr>
<tr>
<td>G 1½” (BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202</td>
<td>0 J</td>
</tr>
</tbody>
</table>

### Wetted Seals

<table>
<thead>
<tr>
<th>Enclosure and Lid</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum epoxy coated</td>
<td>2 A</td>
</tr>
<tr>
<td>2 x ½” NPT via adapter - cable inlet, IP65</td>
<td>2 B</td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP65</td>
<td>2 C</td>
</tr>
<tr>
<td>2 x ½” NPT via adapter - cable inlet, IP68</td>
<td>2 D</td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP68</td>
<td>2 E</td>
</tr>
</tbody>
</table>

### Probe length (length from flange face)

<table>
<thead>
<tr>
<th>Probe length (threaded lengths include process thread)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: No Y01 needed in order code for standard lengths</td>
<td>0</td>
</tr>
<tr>
<td>Compact (threaded 120 mm (4.72”), Flanged 98 mm (3.86’))</td>
<td>0 A</td>
</tr>
<tr>
<td>Extended rod, 250 mm (9.84”)</td>
<td>0 B</td>
</tr>
<tr>
<td>Extended rod, 350 mm (13.78”)</td>
<td>0 C</td>
</tr>
<tr>
<td>Extended rod, 500 mm (19.69”)</td>
<td>0 D</td>
</tr>
<tr>
<td>Extended rod, 750 mm (29.53”)</td>
<td>0 E</td>
</tr>
<tr>
<td>Extended rod, 1000 mm (39.37”)</td>
<td>0 F</td>
</tr>
<tr>
<td>Extended rod, 1250 mm (49.21”)</td>
<td>0 G</td>
</tr>
<tr>
<td>Extended rod, 1350 mm (53.15”)</td>
<td>0 H</td>
</tr>
<tr>
<td>Extended rod, 1500 mm (59.06”)</td>
<td>0 J</td>
</tr>
<tr>
<td>Extended rod, 1750 mm (68.90”)</td>
<td>0 K</td>
</tr>
<tr>
<td>Extended rod, 2000 mm (78.74”)</td>
<td>0 L</td>
</tr>
</tbody>
</table>

### Thermal Isolator

<table>
<thead>
<tr>
<th>Thermal Isolator</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without thermal isolator</td>
<td>0</td>
</tr>
<tr>
<td>With thermal isolator (for process connection temperatures over +85 °C (+185 °F))</td>
<td>0</td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>Approvals</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose (CSA, FM, CE, C-TICK)</td>
<td>0</td>
</tr>
<tr>
<td>Non-Sparking:</td>
<td>0</td>
</tr>
<tr>
<td>CE, C-TICK, ATEX II 3 G Ex ia II T6...T4, ATEX II 2 D IP6X T100 °C</td>
<td>0</td>
</tr>
<tr>
<td>Dust Ignition Proof:</td>
<td>0</td>
</tr>
<tr>
<td>CE, C-TICK, ATEX II 1/2 D T100 °C</td>
<td>0</td>
</tr>
<tr>
<td>Intrinsically Safe:</td>
<td>0</td>
</tr>
<tr>
<td>CE, C-TICK, ATEX II 1/2 G Ex d ia II T6...T4, ATEX II 1/2 D IP6X T100 °C</td>
<td>0</td>
</tr>
<tr>
<td>Flameproof Enclosure with IS Probe:</td>
<td>0</td>
</tr>
<tr>
<td>CE, C-TICK, ATEX II 1/2 G Ex d ia IIC T6...T4, ATEX II 1/2 D T100 °C</td>
<td>0</td>
</tr>
<tr>
<td>Non-incendive:</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class I, Div. 2, Gr. A, B, C, D</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class II, Div. 2, Gr. F</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class III T4 or T6</td>
<td>0</td>
</tr>
<tr>
<td>Dust Ignition Proof with IS Probe:</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class II, Div. 1, Gr. E, F, G</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class III T4</td>
<td>0</td>
</tr>
<tr>
<td>Intrinsically Safe:</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class I, Div. 1, Gr. A, B, C, D</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class II, Div. 1, Gr. E, F, G</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class III T4</td>
<td>0</td>
</tr>
<tr>
<td>Explosion Proof with IS Probe:</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class I, Div. 1, Gr. A, B, C, D</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class II, Div. 1, Gr. E, F, G</td>
<td>0</td>
</tr>
<tr>
<td>CSA/IFM Class III T4</td>
<td>0</td>
</tr>
</tbody>
</table>
# Pointek CLS200 - Digital

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection</strong></td>
<td>Order code</td>
</tr>
<tr>
<td>Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces</td>
<td>7ML5640</td>
</tr>
</tbody>
</table>

### Further designs

Please add "-Z" to Order No. and specify Order code(s).

- Total insertion length: enter the total insertion length in plain text description
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
- Inspection Certificate Type 3.1 per EN 10204

### Instruction manual

Note: The instruction manual should be ordered as a separate line on the order.

### Accessories

See page 5/33

1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection</strong></td>
</tr>
<tr>
<td>Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces</td>
</tr>
</tbody>
</table>

### Process Connection

<table>
<thead>
<tr>
<th>Threaded, 316L stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾” NPT [Taper], ANSI/ASME B1.20.1</td>
</tr>
<tr>
<td>1” NPT [Taper], ANSI/ASME B1.20.1</td>
</tr>
<tr>
<td>1¼” NPT [Taper], ANSI/ASME B1.20.1</td>
</tr>
<tr>
<td>1½” NPT [Taper], ANSI/ASME B1.20.1</td>
</tr>
<tr>
<td>R ¾” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
</tr>
<tr>
<td>R 1” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
</tr>
<tr>
<td>R 1½” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
</tr>
<tr>
<td>G ¾” [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
</tr>
<tr>
<td>G 1” [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
</tr>
</tbody>
</table>

### Welded flange, 316L stainless steel, raised face

<table>
<thead>
<tr>
<th>Threaded, 316L stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1” ASME, 150 lb</td>
</tr>
<tr>
<td>1” ASME, 300 lb</td>
</tr>
<tr>
<td>1” ASME, 600 lb</td>
</tr>
<tr>
<td>1¼” ASME, 150 lb</td>
</tr>
<tr>
<td>1¼” ASME, 300 lb</td>
</tr>
<tr>
<td>1¼” ASME, 600 lb</td>
</tr>
<tr>
<td>2” ASME, 150 lb</td>
</tr>
<tr>
<td>2” ASME, 300 lb</td>
</tr>
<tr>
<td>2” ASME, 600 lb</td>
</tr>
<tr>
<td>3” ASME, 150 lb</td>
</tr>
<tr>
<td>3” ASME, 300 lb</td>
</tr>
<tr>
<td>3” ASME, 600 lb</td>
</tr>
<tr>
<td>4” ASME, 150 lb</td>
</tr>
<tr>
<td>4” ASME, 300 lb</td>
</tr>
<tr>
<td>4” ASME, 600 lb</td>
</tr>
</tbody>
</table>

### Welded flange, 316L stainless steel, Type A flat faced

<table>
<thead>
<tr>
<th>Threaded, 316L stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25, PN 16</td>
</tr>
<tr>
<td>DN 25, PN 40</td>
</tr>
<tr>
<td>DN 40, PN 16</td>
</tr>
<tr>
<td>DN 40, PN 40</td>
</tr>
<tr>
<td>DN 50, PN 16</td>
</tr>
<tr>
<td>DN 50, PN 40</td>
</tr>
<tr>
<td>DN 80, PN 16</td>
</tr>
<tr>
<td>DN 80, PN 40</td>
</tr>
<tr>
<td>DN 100, PN 16</td>
</tr>
<tr>
<td>DN 100, PN 40</td>
</tr>
</tbody>
</table>

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

### Probe length

<table>
<thead>
<tr>
<th>Threaded lengths include process thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>(length from flange face)</td>
</tr>
<tr>
<td>Note: No Y01 needed in order code for standard lengths</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extended cable, 3000 mm (118.11”)</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>(threaded lengths include process thread)</td>
<td></td>
</tr>
<tr>
<td>Add order code Y01 and plain text: “Insertion length ... mm”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extended cable, 5000 mm (196.85”)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended cable, 10001 ... 15000 mm (393.74 ... 590.55”)</td>
<td>E</td>
</tr>
<tr>
<td>Extended cable, 15001 ... 20000 mm (590.59 ... 787.4”)</td>
<td>F</td>
</tr>
<tr>
<td>Extended cable, 20001 ... 25000 mm (787.44 ... 984.25”)</td>
<td>G</td>
</tr>
<tr>
<td>Extended cable, 25001 ... 30000 mm (984.29 ... 1181.1”)</td>
<td>H</td>
</tr>
</tbody>
</table>
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 M 5 6 4 1 0</td>
<td>Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection</td>
</tr>
</tbody>
</table>

### Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

#### 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") of cable: 2
- With 5 m (197") of cable: 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
- **General Purpose** (CSA, FM, CE, C-TICK): A
- **Non-Sparking**:
  - CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C: B
  - Dust Ignition Proof:
    - CE, C-TICK, ATEX II 1/2 D T100 °C: C
    - Intrinsically Safe:1)
      - CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100°C: D
- **Flameproof Enclosure with IS Probe**:
  - CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C: E
- **Non-incendive**:
  - CSA/FM Class I, Div. 2, Gr. A, B, C, D: F
  - CSA/FM Class II, Div. 2, Gr. F, G: G
  - CSA/FM Class III T4 or T6: H
  - Dust Ignition Proof with IS Probe:
    - CSA/FM Class II, Div. 1, Gr. E, F, G: I
    - CSA/FM Class III T4: J
  - Intrinsically Safe:1)
    - CSA/FM Class I, Div. 1, Gr. A, B, C, D: K
    - CSA/FM Class II, Div. 1, Gr. E, F, G: L
  - Explosion Proof with IS Probe:
    - CSA/FM Class I, Div. 1, Gr. A, B, C, D: M
    - CSA/FM Class II, Div. 1, Gr. E, F, G: N
    - CSA/FM Class III T4: O

### Enclosure and Lid
- Aluminum epoxy coated: 
  - 2 x ½" NPT via adapter - cable inlet, IP65: A
  - 2 x M20x1.5 cable inlet, IP65: B
  - 2 x ½" NPT via adapter - cable inlet, IP68: C
  - 2 x M20x1.5 cable inlet, IP68: D

### Further designs
- Please add "Z" to Order No. and specify Order code(s): Y01, Y15, C11, C12

### Total insertion length: enter the total insertion length in plain text description

- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
  - Measuring-point number/identification (max. 16 characters) specify in plain text

### Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000

### Inspection Certificate Type 3.1 per EN 10204

---

1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

---

### Instruction manual

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

See page 5/33

© Siemens AG 2010
## Pointek CLS200 - Digital

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Pointek CLS200 - Digital - Rod with Sanitary process connection</th>
</tr>
</thead>
</table>

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

#### Process Connection

- Sanitary 316L stainless steel
- 1" sanitary fitting clamp
- 1½" sanitary fitting clamp
- 2" sanitary fitting clamp
- 2½" sanitary fitting clamp
- 3" sanitary fitting clamp

(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)

#### Probe length (length from process connection face)

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact 98 mm (3.86&quot;)</td>
<td>A</td>
</tr>
<tr>
<td>Extended rod, 250 mm (9.84&quot;)</td>
<td>B</td>
</tr>
<tr>
<td>Extended rod, 350 mm (13.78&quot;)</td>
<td>C</td>
</tr>
<tr>
<td>Extended rod, 500 mm (19.69&quot;)</td>
<td>D</td>
</tr>
<tr>
<td>Extended rod, 750 mm (29.53&quot;)</td>
<td>E</td>
</tr>
<tr>
<td>Extended rod, 1000 mm (39.37&quot;)</td>
<td>F</td>
</tr>
<tr>
<td>Extended rod, 1250 mm (49.21&quot;)</td>
<td>G</td>
</tr>
<tr>
<td>Extended rod, 1500 mm (59.06&quot;)</td>
<td>H</td>
</tr>
<tr>
<td>Extended rod, 1750 mm (68.90&quot;)</td>
<td>I</td>
</tr>
<tr>
<td>Extended rod, 2000 mm (78.74&quot;)</td>
<td>J</td>
</tr>
</tbody>
</table>

Add order code Y01 and plain text:

- Insertion length: [A-J] 110 ... 350 mm (4.3 ... 13.78")
- Insertion length: [A-J] 351 ... 1000 mm (13.82 ... 39.33")
- Insertion length: [A-J] 1001 ... 2000 mm (39.41 ... 78.74")
- Insertion length: [A-J] 2001 ... 3000 mm (78.78 ... 118.11")
- Insertion length: [A-J] 3001 ... 4000 mm (118.15 ... 157.48")
- Insertion length: [A-J] 4001 ... 5000 mm (157.52 ... 196.85")
- Insertion length: [A-J] 5001 ... 5500 mm (196.89 ... 216.53")

#### Further designs

Please add 'Z' to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description.

#### Enclosure and Lid

- Aluminum epoxy coated
- 2 x ½" NPT via adapter - cable inlet, IP65
- 2 x M20x1.5 cable inlet, IP65

#### Approvals

- General Purpose (CSA, FM, CE, C-TICK)
- Non-Sparking: CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C
- Dust Ignition Proof: CE, C-TICK, ATEX II 2 D T100 °C
- Intrinsically Safe: CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C
- Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C
- Non-incendive: CSA/FM Class I, Div. 2, Gr. A, B, C, D
- CSA/FM Class II, Div. 2, Gr. F, G
- CSA/FM Class III T4 or T6
- Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- Intrinsically Safe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- Enclosure and Lid: Aluminum epoxy coated
- 2 x ½" NPT via adapter - cable inlet, IP65
- 2 x M20x1.5 cable inlet, IP65

#### Wetted Seals

- FKM
- FFKM [for process temperatures above -20°C (-4°F)]

#### Probe Material

- 316L Stainless Steel with PPS probe body
- 316L Stainless Steel with PVDF probe body

#### Remote mount electronics and mounting bracket

- With 2 m (79") of cable
- With 5 m (197") of cable

#### Thermal Isolator

- Without thermal isolator
- With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]

#### Probe

- Thermally insulated probe
- Probes with PPS or PVDF bodies

#### Approvals

- General Purpose (CSA, FM, CE, C-TICK)
- Non-Sparking: CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C
- Dust Ignition Proof: CE, C-TICK, ATEX II 2 D T100 °C
- Intrinsically Safe: CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C
- Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C
- Non-incendive: CSA/FM Class I, Div. 2, Gr. A, B, C, D
- CSA/FM Class II, Div. 2, Gr. F, G
- CSA/FM Class III T4 or T6
- Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- Intrinsically Safe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- Enclosure and Lid: Aluminum epoxy coated
- 2 x ½" NPT via adapter - cable inlet, IP65
- 2 x M20x1.5 cable inlet, IP65

#### Further designs

Please add 'Z' to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description.

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text.

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000

Inspection Certificate Type 3.1 per EN 10204

1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

© Siemens AG 2010
### Selection and Ordering data

**Pointek CLS200 - Digital - Rod with Sliding**

**Process Connection**
- Threaded, 316L stainless steel
- ¾" NPT [1/2" (Taper), ANSI/ASME B1.20.1]
- 1¼" NPT [1/2" (Taper), ANSI/ASME B1.20.1]
- 1½" NPT [1/2" (Taper), ANSI/ASME B1.20.1]
- R 1½" [BSPT], EN 10226/PT (JIS-T), JIS B 0203
- R 1" [BSPT], EN 10226/PT (JIS-T), JIS B 0203
- G ¾" [BSPP], EN ISO 228-1/PP (JIS-P), JIS B 0202
- G 1" [BSPP], EN ISO 228-1/PP (JIS-P), JIS B 0202

**Probe length** (length from flange face)
- Extended rod, 350 mm (13.78")
- Extended rod, 500 mm (19.69")
- Extended rod, 750 mm (29.53")
- Extended rod, 1000 mm (39.37")
- Extended rod, 1250 mm (49.21")
- Extended rod, 1350 mm (53.15")
- Extended rod, 1500 mm (59.06")
- Extended rod, 1750 mm (68.90")
- Extended rod, 2000 mm (78.74")
- Add order code Y01 and plain text: *Insertion length ... mm*

**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") of cable
- With 5 m (197") of cable

**Wetted Seals**
- FKM and PTFE
- FFKM and PTFE [for process temperatures above -20°C (-4°F)]

**Probe Material**
- 316L Stainless Steel with PPS probe body
- 316L Stainless Steel with PVDF probe body

**Approvals**
- General Purpose (CSA, FM, CE, C-Tick)
- Non-Sparking: CE, C-Tick, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C
- Dust Ignition Proof: CE, C-Tick, ATEX II 1/2 D T100 °C
- Flameproof Enclosure with IS Probe: CE, C-Tick, ATEX II 1 G Ex de [ia] IIC T6...T4, ATEX II 1/2 D IP6X T100 °C
- Flameproof Enclosure with IS Probe: CE, C-Tick, ATEX II 1/2 G Ex d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C

**Expansion data**

**Selection and Ordering data**

**Order No.**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y01</td>
<td>No Y01 needed in order code for standard lengths</td>
</tr>
</tbody>
</table>

- **Verifiable insertion length**
- **Add order code Y01 and plain text:** *Insertion length ... mm*

- **Extended rod**
  - 350 mm (13.78")
  - 500 mm (19.69")
  - 750 mm (29.53")
  - 1000 mm (39.37")
  - 1250 mm (49.21")
  - 1350 mm (53.15")
  - 1500 mm (59.06")
  - 1750 mm (68.90")
  - 2000 mm (78.74")

- **Enclosure and Lid**
  - Aluminum epoxy coated
  - CSA/FM Class III  T4
  - CSA/FM Class II, Div. 1, Gr. E, F, G
  - CSA/FM Class I, Div. 1, Gr. A, B, C, D
  - CSA/FM Class IF
  - CSA/FM Class IZ

- **Further designs**
  - Please add "-Z" to Order No. and specify Order code(s).

- **Total insertion length**
  - Enter the total insertion length in plain text description

- **Stainless steel tag**
  - [69 x 50 mm (2.71 x 1.97")]
  - Measuring-point number/identification (max. 16 characters) specify in plain text

- **Acceptance test certificate**
  - Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
  - Inspection Certificate Type 3.1 per EN 10204

- **Instruction manual**
  - Note: The instruction manual should be ordered as a separate line on the order
  - This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library

- **Accessories**
  - See page 5/33

- **C) Subject to export regulations**
  - AL: N, ECCN: EAR99
### Level instruments

#### Point level measurement - Capacitance switches

**Pointek CLS200 - Digital**

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection</strong></td>
<td>C 7 ML 5 64 4 - 00</td>
</tr>
</tbody>
</table>

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

**Process Connection**

- Welded flange; PFA coated, 316L stainless steel, raised face
- 1" ASME, 150 lb
- 1" ASME, 300 lb
- 1" ASME, 600 lb
- 1.5" ASME, 150 lb
- 1.5" ASME, 300 lb
- 1.5" ASME, 600 lb
- 2" ASME, 150 lb
- 2" ASME, 300 lb
- 2" ASME, 600 lb
- 3" ASME, 150 lb
- 3" ASME, 300 lb
- 3" ASME, 600 lb
- 4" ASME, 150 lb
- 4" ASME, 300 lb
- 4" ASME, 600 lb
- Welded flange; PFA coated, 316L stainless steel, Type A flat faced

**Probe length** (length from process connection face)

- Compact (Threaded 98 mm (3.86")
- Extended rod, 250 mm (9.84")
- Extended rod, 350 mm (13.78")
- Extended rod, 500 mm (19.69")
- Extended rod, 750 mm (29.53")
- Extended rod, 1000 mm (39.37")
- Extended rod, 1250 mm (49.21")
- Extended rod, 1350 mm (53.15")
- Extended rod, 1500 mm (59.06")
- Extended rod, 1750 mm (68.90")
- Extended rod, 2000 mm (78.74")

Add order code Y01 and plain text:

- Insertion length ... mm
- Extended rod, 200 ... 1000 mm (7.87 ... 39.33")
- Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")
- Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")
- Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")
- Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")
- Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")

**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") of cable
- With 5 m (197") of cable

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 7 ML 5 64 4 - 00</td>
</tr>
</tbody>
</table>

**Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection**

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

**Wetted Seals**

- FKM
- FFKM [for process temperatures above -20°C (-4°F)]

**Probe Material**

- PFA Coated 316L Stainless Steel with PPS probe body
- PFA Coated 316L Stainless Steel with PVDF probe body

**Approvals**

- General Purpose (CSA, FM, CE, C-TICK)
- Non-Sparking:
  - CSA/FM Class I, Div. 2, Gr. A, B, C, D
  - CSA/FM Class II, Div. 2, Gr. F, G
  - CSA/FM Class III T4 or T6
- Intrinsically Safe:
  - CSA/FM Class III T4
- Explosion Proof with IS Probe:
  - CSA/FM Class III T4
- Intrinsically Safe:
  - CSA/FM Class I, Div. 1, Gr. A, B, C, D
  - CSA/FM Class II, Div. 1, Gr. E, F, G
  - CSA/FM Class III T4

**Enclosure and Lid**

- Aluminum epoxy coated
- 2 x 1/2" 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
- Total insertion length: enter the total insertion length in plain text description

**Further designs**

Please add "-Z" to Order No. and specify Order code(s).

**Instruction manual**

Note: The instruction manual should be ordered as a separate line on the order.

- This device is shipped with the Siemens Milltronics Start and instruction manual library.
- The instruction manual should be ordered as a separate line on the order.
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Accessories**

See page 5/33
Level instruments

Point level measurement - Capacitance switches

## Selection and Ordering data

### Instruction manual - Standard

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-SJH01</td>
<td>Note: The instruction manual should be ordered as a separate line on the order.</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-SJH31</td>
<td>Note: Due to ATEX regulations, one Quick Start manual is included with every product.</td>
</tr>
</tbody>
</table>

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Instruction manual - Digital

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-SJJ01</td>
<td>Note: The instruction manual should be ordered as a separate line on the order.</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-SJJ31</td>
<td>Note: Due to ATEX regulations, one Quick Start manual is included with every product.</td>
</tr>
</tbody>
</table>

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensguard, ¾&quot; NPT (PPS)</td>
<td>7ML1830-1DL</td>
</tr>
<tr>
<td>Only available for CLS200 with ¾&quot; NPT thread</td>
<td></td>
</tr>
<tr>
<td>Sensguard, R 1&quot; (BSPT) (PPS)</td>
<td>7ML1830-1DM</td>
</tr>
<tr>
<td>Only available for CLS200 with ¾&quot; NPT thread</td>
<td></td>
</tr>
<tr>
<td>¼&quot; NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47&quot;) -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)</td>
<td>7ML1830-1JA</td>
</tr>
<tr>
<td>½&quot; NPT cable gland, brass, ATEX II 2GD EEEx d IIC and EEEx e II, fits cable diameter 6.5 ... 14 mm (0.26 ... 0.55&quot;), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)</td>
<td>7ML1830-1JB</td>
</tr>
<tr>
<td>M20x1.5 cable gland, PA polyamide, ATEX II 2G EEEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47&quot;), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)</td>
<td>7ML1830-1JC</td>
</tr>
<tr>
<td>M20x1.5 cable gland, brass, ATEX II 2GD EEEx d IIC and EEEx e II, fits cable diameter 10.5 ... 15.9 mm (0.41 ... 0.63&quot;), under armour cable diameter 6.1 ... 11.5 mm (0.24 ... 0.45&quot;), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)</td>
<td>7ML1830-1JD</td>
</tr>
<tr>
<td>One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F)</td>
<td>7ML1930-1AP</td>
</tr>
<tr>
<td>One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFINET PA)</td>
<td>7ML1930-1AQ</td>
</tr>
</tbody>
</table>

### Blind threaded flanges

Blind threaded flanges are available. Please contact nacc.smpi@siemens.com with a completed application data sheet on page 5/9

### Spare parts

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test magnet (digital version)</td>
<td>7ML1830-1JE</td>
</tr>
<tr>
<td>Amplifier/power supply, standard version</td>
<td>7ML1830-1DJ</td>
</tr>
<tr>
<td>Amplifier/power supply, digital version</td>
<td>7ML1830-1JF</td>
</tr>
<tr>
<td>LCD display (digital version)</td>
<td>7ML1830-1JK</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200

Characteristic curves

Pressure/Temperature Curve
CLS200 Sliding Coupling
Threaded Process Connections
(7ML5633 and 7ML5643)

- P = Permitted Operating Pressures
- T = Permitted Operating Temperature

Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pressure/Temperature Curve
CLS200 Cable
Threaded Process Connections
(7ML5631 and 7ML5641)

- P = Permitted Operating Pressures
- T = Permitted Operating Temperature
Level instruments

Point level measurement - Capacitance switches

Pointek CLS200

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
Threaded Process Connections
(7ML5630 and 7ML5640)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 or 7ML5640)

Pressure/Temperature Curve
CLS200 Compact and Extended Sanitary Type
Sanitary Process Connections
(7ML5632 and 7ML5642)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5632 and 7ML5642)
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
ASME Flanged Process Connections (7ML5630 and 7ML5640)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
EN Flanged Process Connections (7ML5630 and 7ML5640)

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200

Dimensional drawings

Compact version
Threaded
(7ML5630 and 7ML5640)

Sanitary compact version
Sanitary fitting (7ML5632 and 7ML5642)

Extended rod version
Threaded
(7ML5630 and 7ML5640)

Extended cable version
Threaded
(7ML5631 and 7ML5641)

Sanitary extended version
Sanitary fitting (7ML5632 and 7ML5642)

Sliding coupling version
Threaded (7ML5633 and 7ML5643)

PPS or optional PVDF probe

98 mm (3.8“)

316L stainless steel
sanitary process connection

92 mm (3.6“)

PPS or optional PVDF probe

22 mm (0.87“)

120 mm (4.7“)

2 cable entries

1/4” NPT or M20x1.5

M20: 135 mm (5.32“)

1/2” NPT: 150 mm (5.91“)

lid with window

lid without window

290 mm (11.4“)

275 mm (10.8“)

185 mm (7.2“)

145 mm (5.7“)

thermal isolator

Min. insertion length = 200 mm (7.8“)
Max. insertion length = 5500 mm (216“)

Min. insertion length = 500 mm (19.6“)
Max. insertion length = 3000 mm (118“)
Applicable for liquids and solids applications.
Cable can be shortened on site.

Min. insertion length = 110 mm (4.3“)
Max. insertion length = 5500 mm (216“)

Min. insertion length = 350 mm (13.8“)
Max. insertion length = 5500 mm (216“)

© Siemens AG 2010
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200 dimensions - Flanged Process Connections

Insertion length does not include any raised face/gasket face dimension (see Flange Facing table above).
Level instruments
Point level measurement - Capacitance switches

Pointek CLS200

Schematics

Wiring: Pointek CLS200 Standard

Connect PE Ground to enclosure at K1. Grounded to enclosure at K2.

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 a Siemens representative for detailed wiring information.

Wiring: Pointek CLS200 Digital

Notes:
Refer to the Instruction Manual or contact a Siemens representative 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.
Overview

Pointek CLS300 (standard version) is an 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.

Benefits

- Patented 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 (+185 °F)
- SIL/IEC61508 compliant for use in safety integrated level applications for overfill protection (SIL-2)

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
Level instruments
Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Technical specifications

Mode of operation
Measuring principle
Inverse frequency shift capacitive level detection

Input
Measured variable
Change in picoFarad (pF)

Output

- Relay output
  - Max. contact voltage
    • 30 V DC
    • 250 V AC
  - Max. contact current
    • 5 A (DC)
    • 8 A (AC)
  - Max. switching capacity
    • 150 W (DC)
    • 2000 VA (AC)
  - Time delay (ON and/or OFF)
    1 ... 60 s

- Solid-state output
  - Output
    Galvanically isolated
  - Protection
    Against reversed polarity (bipolar)
  - Max. switching voltage
    • 30 V (DC)
    • 30 V peak (AC)
  - Max. load current
    82 mA
  - Voltage drop
    < 1 V, typical at 50 mA
  - Time delay
    (pre or post switching)
    1 ... 60 s

Accuracy

Resolution
- Min. sensitivity (pF)
  1% change in actual capacitance
- Max. temperature error
  0.2% of actual capacitance value

Rated operating conditions

Installation conditions
Location
Indoor/outdoor

Ambient conditions

- Ambient temperature
  -40 ... +85 °C (-40 ... +185 °F)

Medium conditions
Liquids, bulk solids, slurries and interfaces, and applications with viscous materials

Relative dielectric constant \( \varepsilon_r \)
Min. 1.5

Process temperature
- Rod/Cable version
  -40 ... +200 °C (-40 ... +392 °F)
- High-temperature version
  -40 ... +400 °C (-40 ... +752 °F)

Process pressure
-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/IP66
  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, C-TICK

- Flameproof Enclosure with IS Probe
  ATEX II 1/2 G Ex[ia] IIC T6...T1
  ATEX II 1/2 D T100°C

- Dust Ignition Proof with IS Probe
  CSA/FM Class II, Div. 1, Gr. E, F, G
  CSA/FM Class III T4

- Explosion Proof Enclosure with IS Probe
  CSA/FM Class I, Div. 1, Gr. A, B, C, D
  CSA/FM Class II, Div. 1, Gr. E, F, G
  CSA/FM Class III T4

- Marine
  Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5

- Overfill Protection
  WHG (Germany)
  VLAREM II

- Others
  SIL/EIC61508 Declaration of Conformity [SIL-2 (overfill)]
  Pattern Approval (China)

Design: Probe

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Rod version</th>
<th>High Temperature version</th>
<th>Cable version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Min. 250 mm (9.8”), max. 1000 mm (40”)</td>
<td>Min. 250 mm (9.8”), max. 1000 mm (40”)</td>
<td>Min. 1000 mm (40”), max. 25000 mm (984”)</td>
</tr>
<tr>
<td>Sensor wetted parts</td>
<td>PFA (no insulation on active probe), 316L stainless steel</td>
<td>Ceramic (ZrO₂)¹(no insulation on active probe), 316L stainless steel</td>
<td>316 stainless steel, optional PFA</td>
</tr>
<tr>
<td>O-ring seal material</td>
<td>FKM (optional FFKM)</td>
<td>Graphite Standard</td>
<td>FKM (optional FFKM)</td>
</tr>
<tr>
<td>Thermal isolator</td>
<td>Optional</td>
<td>Standard</td>
<td>Optional</td>
</tr>
<tr>
<td>Extension</td>
<td>User selectable length</td>
<td>User selectable length</td>
<td>User selectable cable length</td>
</tr>
</tbody>
</table>

¹ Zirconium Oxide
### Level instruments

#### Point level measurement - Capacitance switches

**Pointek CLS300 - Standard**

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>C) 7 ML 5 65 0 -</th>
<th>C) 7 ML 5 65 0 -</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS300 - Standard - Rod Version with Threaded or Flanged connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process Connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threaded, 316L stainless steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 A</td>
<td>0 E</td>
</tr>
<tr>
<td>1&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 B</td>
<td>0 F</td>
</tr>
<tr>
<td>1¼&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 C</td>
<td>0 G</td>
</tr>
<tr>
<td>1½&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 D</td>
<td>0 H</td>
</tr>
<tr>
<td>R ¾&quot; [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>1 A</td>
<td>1 J</td>
</tr>
<tr>
<td>R 1&quot; [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>1 B</td>
<td>1 K</td>
</tr>
<tr>
<td>R 1½&quot; [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>1 C</td>
<td>1 L</td>
</tr>
<tr>
<td>G ¾&quot; [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>2 A</td>
<td>2 M</td>
</tr>
<tr>
<td>G 1&quot; [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>2 B</td>
<td>2 N</td>
</tr>
<tr>
<td>G 1½&quot; [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>2 C</td>
<td>2 O</td>
</tr>
<tr>
<td>G 2&quot; [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>2 D</td>
<td>2 P</td>
</tr>
<tr>
<td><strong>Welded flange, 316L stainless steel, raised face</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot; ASME, 150 lb</td>
<td>5 A</td>
<td>5 J</td>
</tr>
<tr>
<td>1&quot; ASME, 300 lb</td>
<td>5 B</td>
<td>5 K</td>
</tr>
<tr>
<td>1&quot; ASME, 600 lb</td>
<td>5 C</td>
<td>5 L</td>
</tr>
<tr>
<td>1¼&quot; ASME, 150 lb</td>
<td>5 D</td>
<td>5 M</td>
</tr>
<tr>
<td>1¼&quot; ASME, 300 lb</td>
<td>5 E</td>
<td>5 N</td>
</tr>
<tr>
<td>1¼&quot; ASME, 600 lb</td>
<td>5 F</td>
<td>5 O</td>
</tr>
<tr>
<td>2&quot; ASME, 150 lb</td>
<td>5 G</td>
<td>5 P</td>
</tr>
<tr>
<td>2&quot; ASME, 300 lb</td>
<td>5 H</td>
<td>5 Q</td>
</tr>
<tr>
<td>2&quot; ASME, 600 lb</td>
<td>5 I</td>
<td>5 R</td>
</tr>
<tr>
<td>3&quot; ASME, 150 lb</td>
<td>5 J</td>
<td>5 S</td>
</tr>
<tr>
<td>3&quot; ASME, 300 lb</td>
<td>5 K</td>
<td>5 T</td>
</tr>
<tr>
<td>3&quot; ASME, 600 lb</td>
<td>5 L</td>
<td>5 U</td>
</tr>
<tr>
<td>4&quot; ASME, 150 lb</td>
<td>5 M</td>
<td>5 V</td>
</tr>
<tr>
<td>4&quot; ASME, 300 lb</td>
<td>5 N</td>
<td>5 W</td>
</tr>
<tr>
<td>4&quot; ASME, 600 lb</td>
<td>5 O</td>
<td>5 X</td>
</tr>
<tr>
<td><strong>Welded flange, 316L stainless steel, Type A flat faced</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25, PN 16</td>
<td>6 A</td>
<td>6 J</td>
</tr>
<tr>
<td>DN 25, PN 40</td>
<td>6 B</td>
<td>6 K</td>
</tr>
<tr>
<td>DN 40, PN 16</td>
<td>6 C</td>
<td>6 L</td>
</tr>
<tr>
<td>DN 40, PN 40</td>
<td>6 D</td>
<td>6 M</td>
</tr>
<tr>
<td>DN 50, PN 16</td>
<td>6 E</td>
<td>6 N</td>
</tr>
<tr>
<td>DN 50, PN 40</td>
<td>6 F</td>
<td>6 O</td>
</tr>
<tr>
<td>DN 80, PN 16</td>
<td>6 G</td>
<td>6 P</td>
</tr>
<tr>
<td>DN 80, PN 40</td>
<td>6 H</td>
<td>6 Q</td>
</tr>
<tr>
<td>DN 100, PN 16</td>
<td>6 I</td>
<td>6 R</td>
</tr>
<tr>
<td>DN 100, PN 40</td>
<td>6 J</td>
<td>6 S</td>
</tr>
<tr>
<td><strong>Probe length (length from flange face)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Threaded lengths include process thread)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: No Y01 needed in order code for standard lengths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard version, rod 350 mm (13.78&quot;)</td>
<td>0 A</td>
<td>4 J</td>
</tr>
<tr>
<td>Extended rod, length 500 mm (19.69&quot;)</td>
<td>0 B</td>
<td>4 K</td>
</tr>
<tr>
<td>Extended rod, length 750 mm (29.53&quot;)</td>
<td>0 C</td>
<td>4 L</td>
</tr>
<tr>
<td>Extended rod, length 1000 mm (39.37&quot;)</td>
<td>0 D</td>
<td>4 M</td>
</tr>
</tbody>
</table>

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>C) 7 ML 5 65 0 -</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS300 - Standard - Rod Version with Threaded Flanged process connection</strong></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td><strong>Add order code Y01 and plain text:</strong></td>
<td></td>
</tr>
<tr>
<td>Insertion length ... mm</td>
<td></td>
</tr>
<tr>
<td>Extended rod, factory adjusted length 250 ... 499 mm (9.8...19.6&quot;)</td>
<td>E</td>
</tr>
<tr>
<td>Extended rod, factory adjusted length 500 ... 749 mm (19.69...29.49&quot;)</td>
<td>F</td>
</tr>
<tr>
<td>Extended rod, factory adjusted length 750 ... 999 mm (29.53...39.3&quot;)</td>
<td>G</td>
</tr>
<tr>
<td><strong>Thermal Isolator</strong></td>
<td></td>
</tr>
<tr>
<td>Without thermal isolator</td>
<td>0</td>
</tr>
<tr>
<td>With thermal isolator (for process connection temperatures over +85 °C (+185 °F))</td>
<td>1</td>
</tr>
<tr>
<td><strong>Wetted Seals</strong></td>
<td></td>
</tr>
<tr>
<td>FKM</td>
<td></td>
</tr>
<tr>
<td>FKM (for process temperatures above -20°C (-4°F))</td>
<td></td>
</tr>
<tr>
<td><strong>Probe Material</strong></td>
<td></td>
</tr>
<tr>
<td>316L Stainless steel with PFA lining and PEEK isolators</td>
<td>0</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
</tr>
<tr>
<td>General Purpose (CSA, FM, CE, C-TICK)</td>
<td>A</td>
</tr>
<tr>
<td>General Purpose (CSA, FM, CE, C-TICK) with WHG Approval</td>
<td>B</td>
</tr>
<tr>
<td>Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C</td>
<td>C</td>
</tr>
<tr>
<td>Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G Ex e IIC T6...T1, ATEX II 1/2 D T100 °C</td>
<td>D</td>
</tr>
<tr>
<td>Flameproof Enclosure with IS Probe, with WHG Approval: CE, C-TICK, ATEX II 1/2 G Ex e IIC T6...T1, ATEX II 1/2 D T100 °C</td>
<td>E</td>
</tr>
<tr>
<td>Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4</td>
<td>F</td>
</tr>
<tr>
<td><strong>Enclosure and Lid</strong></td>
<td></td>
</tr>
<tr>
<td>Aluminum epoxy coated</td>
<td></td>
</tr>
<tr>
<td>2 x ½&quot; NPT via adapter - cable inlet, IP65</td>
<td>A</td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP65</td>
<td>B</td>
</tr>
<tr>
<td>2 x ½&quot; NPT via adapter - cable inlet, IP68</td>
<td>C</td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP68</td>
<td>D</td>
</tr>
<tr>
<td><strong>Active Shield Length</strong></td>
<td></td>
</tr>
<tr>
<td>Standard length - (125 mm threaded, 105 mm flanged)</td>
<td>0</td>
</tr>
<tr>
<td>Extended shield - (250 mm threaded, 230 mm flanged)</td>
<td>1</td>
</tr>
<tr>
<td>Extended shield - (400 mm threaded, 380 mm flanged)</td>
<td>2</td>
</tr>
</tbody>
</table>

1) Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]
2) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]
### Pointek CLS300 - Standard

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7 M L 5 6 5 0 - 0</td>
<td>Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection</td>
</tr>
</tbody>
</table>

- **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.**

- **Further designs**
  - Please add "-Z" to Order No. and specify Order code(s).
  - **Total insertion length:** enter the total insertion length in plain text description
  - **Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:** Measuring-point number/identification (max. 16 characters) specify in plain text
  - **Acceptance test certificate:** Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
  - **Inspection Certificate Type 3.1 per EN 10204**
  - **SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]**

#### Instruction manual

Note: The instruction manual should be ordered as a separate line on the order.

- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

#### Accessories

- See page 5/54

---

C) Subject to export regulations AL: N, ECCN: EAR99
## Selection and Ordering data

### Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection

<table>
<thead>
<tr>
<th>Order No.</th>
<th>7 ML 5 6 5 1 -</th>
</tr>
</thead>
</table>

**Inverse frequency shift capacitance level switch**

**Process Connection**

- Threaded, 316L stainless steel
- 1/4" NPT (Taper), ANSI/ASME B1.20.1
- 1/8" NPT (Taper), ANSI/ASME B1.20.1
- R 1 1/2" (BSPT), EN 10226/PT (JIS-T), JIS B 0203
- G 1 1/2" (BSPP), EN ISO 228-1/FF (JIS-P), JIS B 0202

- Welded flange, 316L stainless steel, raised face
- 1 1/4" ASME, 150 lb
- 1 1/4" ASME, 300 lb
- 1 1/4" ASME, 600 lb
- 2" ASME, 150 lb
- 2" ASME, 300 lb
- 2" ASME, 600 lb
- 3" ASME, 150 lb
- 3" ASME, 300 lb
- 3" ASME, 600 lb
- 4" ASME, 150 lb
- 4" ASME, 300 lb
- 4" ASME, 600 lb

- Welded flange, 316L stainless steel, Type A flat face
- DN 40, PN 16
- DN 40, PN 40
- DN 50, PN 16
- DN 50, PN 40
- DN 80, PN 16
- DN 80, PN 40
- DN 100, PN 16
- DN 100, PN 40

**Probe length**

- Length from flange face
- (threaded lengths include process thread)

**Wetted Seals**

- FKM
- FFKM [for process temperatures above -20°C (-4°F)]

**Materials**

- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]
- PFA coated cable, PEKE isolators and 316L stainless steel cable weight

**Approvals**

- General Purpose (CSA, FM, CE, C-TICK)
- General Purpose (CSA, FM, CE, C-TICK) with WHG
- Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C
- Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C

**Enclosure and Lid**

- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- CSA/FM Class III T4

**Active Shield Length**

- Standard length - (125 mm threaded, 105 mm flanged)
- Extended shield - (250 mm threaded, 230 mm flanged)\(^1\)
- Extended shield - (400 mm threaded, 380 mm flanged)\(^1\)

**Further designs**

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y01</td>
<td>Total insertion length: enter the total insertion length in plain text description</td>
</tr>
<tr>
<td>Y15</td>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
</tr>
<tr>
<td>C11</td>
<td>Acceptance test certificate: Manufacturer's test certificate M to DIN 53380, Part 18 and ISO 9000</td>
</tr>
<tr>
<td>C12</td>
<td>Inspection Certificate Type 3.1 per EN 10204</td>
</tr>
<tr>
<td>C20</td>
<td>SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]</td>
</tr>
</tbody>
</table>

\(^1\) Available with Probe version options A, B, F to K, only [≥ 1000 mm (39.7")]

---

### Selection and Ordering data

**Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection**

**Inverse frequency shift capacitance level switch**

**Process Connection**

- Threaded, 316L stainless steel
- 1/4" NPT (Taper), ANSI/ASME B1.20.1
- 1/8" NPT (Taper), ANSI/ASME B1.20.1
- R 1 1/2" (BSPT), EN 10226/PT (JIS-T), JIS B 0203
- G 1 1/2" (BSPP), EN ISO 228-1/FF (JIS-P), JIS B 0202

- Welded flange, 316L stainless steel, raised face
- 1 1/4" ASME, 150 lb
- 1 1/4" ASME, 300 lb
- 1 1/4" ASME, 600 lb
- 2" ASME, 150 lb
- 2" ASME, 300 lb
- 2" ASME, 600 lb
- 3" ASME, 150 lb
- 3" ASME, 300 lb
- 3" ASME, 600 lb
- 4" ASME, 150 lb
- 4" ASME, 300 lb
- 4" ASME, 600 lb

- Welded flange, 316L stainless steel, Type A flat face
- DN 40, PN 16
- DN 40, PN 40
- DN 50, PN 16
- DN 50, PN 40
- DN 80, PN 16
- DN 80, PN 40
- DN 100, PN 16
- DN 100, PN 40

**Probe length**

- Length from flange face
- (threaded lengths include process thread)

**Wetted Seals**

- FKM
- FFKM [for process temperatures above -20°C (-4°F)]

**Materials**

- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]
- PFA coated cable, PEKE isolators and 316L stainless steel cable weight

**Approvals**

- General Purpose (CSA, FM, CE, C-TICK)
- General Purpose (CSA, FM, CE, C-TICK) with WHG
- Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C
- Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C

**Enclosure and Lid**

- CSA/FM Class II, Div. 1, Gr. E, F, G
- CSA/FM Class III T4
- CSA/FM Class III T4

**Active Shield Length**

- Standard length - (125 mm threaded, 105 mm flanged)
- Extended shield - (250 mm threaded, 230 mm flanged)\(^1\)
- Extended shield - (400 mm threaded, 380 mm flanged)\(^1\)

**Further designs**

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y01</td>
<td>Total insertion length: enter the total insertion length in plain text description</td>
</tr>
<tr>
<td>Y15</td>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
</tr>
<tr>
<td>C11</td>
<td>Acceptance test certificate: Manufacturer's test certificate M to DIN 53380, Part 18 and ISO 9000</td>
</tr>
<tr>
<td>C12</td>
<td>Inspection Certificate Type 3.1 per EN 10204</td>
</tr>
<tr>
<td>C20</td>
<td>SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]</td>
</tr>
</tbody>
</table>

\(^1\) Available with Probe version options A, B, F to K, only [≥ 1000 mm (39.7")]
## Level instruments
### Point level measurement - Capacitance switches

#### Pointek CLS300 - Standard

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection</td>
<td>7 M L 5 6 5 1 -</td>
</tr>
</tbody>
</table>

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.

**Instruction manual**

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Accessories**

See page 5/54

C) Subject to export regulations AL: N, ECCN: EAR99

---

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 M L 5 6 5 2 -</td>
</tr>
</tbody>
</table>

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.

**Process Connection**

Threaded, 316L stainless steel

- ¾" NPT [(Taper), ANSI/ASME B1.20.1] 0 A
- 1" NPT [(Taper), ANSI/ASME B1.20.1] 0 B
- 1¼" 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] A 1
- R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] B 1
- R 1¼" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] C 1
- R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] D 1
- G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] A 3
- G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] B 3
- G 1¼" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] C 3

**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
- 1¼" ASME, 150 lb 5 D
- 1¼" ASME, 300 lb 5 E
- 1¼" 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 5 P
- 4" ASME, 600 lb 5 Q

**Welded flange, 316L stainless steel, Type A flat faced**

- DN 25, PN 16 6 A
- DN 25, PN 40 6 B
- 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

(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

<table>
<thead>
<tr>
<th>Rod 350 mm (13.78&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>Extended rod, length 500 mm (19.69&quot;)</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>Extended rod, length 750 mm (29.53&quot;)</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>Extended rod, length 1000 mm (39.37&quot;)</td>
</tr>
<tr>
<td>D</td>
</tr>
</tbody>
</table>
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>C</th>
<th>M</th>
<th>L</th>
<th>5</th>
<th>6</th>
<th>5</th>
<th>2</th>
<th>-</th>
<th>0</th>
<th>0</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foams and interfaces in demanding conditions where high pressure and temperatures are present.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add order code Y01 and plain text:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion length ... mm</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65&quot;)</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49&quot;)</td>
<td>G</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3&quot;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetted Seals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphite</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>316L Stainless steel with ceramic (ZrO₂) isolators</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Purpose (CSA, FM, CE, C-TICK)</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Purpose (CSA, FM, CE, C-TICK) with WHG Approval</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flameproof Enclosure with IS Probe, with WHG Approval: CE, C-TICK, ATEX II 1/2 G EEEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSA/FM Class III T4</td>
<td>G</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSA/FM Class II, Div. 1, Gr. E, F, G</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSA/FM Class III T4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure and Lid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum epoxy coated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x ½&quot; NPT via adapter - cable inlet, IP65</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP65</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x ½&quot; NPT via adapter - cable inlet, IP68</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP68</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Shield Length</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard length - (125 mm threaded, 105 mm flanged)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended shield - (250 mm threaded, 230 mm flanged)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended shield - (400 mm threaded, 380 mm flanged)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further designs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please add “-Z” to Order No. and specify Order code(s).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total insertion length: enter the total insertion length in plain text description</td>
<td>Y01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
<td>Y15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204 SIL/EC61508 Declaration of Conformity [SIL-2 (overfill)]</td>
<td>C11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Notice

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

1) Available with Probe version options B to D, F, G only [≥ 500 mm (19.69”)]
2) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53”)]

C) Subject to export regulations AL: N, ECCN: EAR99H
Pointek CLS300 (digital version) is an 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. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

**Benefits**
- Patented 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.

**Configuration**

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
### Technical specifications

**Mode of operation**
- Measuring principle: Inverse frequency shift capacitive level detection

**Input**
- Measured variable: Change in picoFarad (pF)
- Output:
  - Solid-state output: Galvanically isolated
  - Voltage drop: < 1 V, typical at 50 mA
  - Max. load current: 82 mA
  - Voltage peak (AC): 30 V peak
  - Time delay: Programmable by user (0 ... 100 s)
  - Fail-safe mode: Min. or max.
  - Connection: Removable terminal block

**Accuracy**
- Resolution: 1% change in actual capacitance
- Max. temperature error: 0.2% of actual capacitance value

**Rated operating conditions**

<table>
<thead>
<tr>
<th>Installation conditions</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient conditions</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Medium conditions</td>
<td>Liquids, bulk solids, slurries and interfaces, and applications with viscous materials</td>
</tr>
<tr>
<td>Relative dielectric constant ( \varepsilon )_r</td>
<td>Min. 1.5</td>
</tr>
<tr>
<td>Process temperature</td>
<td>-40 ... +200 °C (-40 ... +392 °F)</td>
</tr>
<tr>
<td></td>
<td>-40 ... +400 °C (-40 ... +752 °F)</td>
</tr>
<tr>
<td>Process pressure</td>
<td>-1 ... +35 bar g (-14.6 ... +511 psi g)</td>
</tr>
</tbody>
</table>

**Design**
- Material (enclosure): Powder-coated aluminum with gasket
- Degree of protection: Standard: Type 4/NEMA 4/Ip65
- Cable inlet: 2 x M20x1.5 thread (option: 2 x ½” NPT conduit entry including 1 plugged entry)

**Controls and displays**
- Local display
- Configuration
- LCD
- Remotely, using SIMATIC PDM (for installation on a network)

**Power supply**
- Bus voltage (at process connection): Standard: 12 ... 30 V DC
- Current consumption: Intrinsic Safe: 12 ... 24 V DC, 12.5 mA

**Certificates and approvals**
- General Purpose: CSA, FM, CE, C-TICK
- Dust Ignition Proof: ATEX II 1/2 D, 2 D IP6X T100°C
- Flameproof Enclosure With IS Probe: ATEX II 1/2 G Ex d ia IIC T100°C
- Intrinsically Safe: ATEX II 1 G Ex ia IIC T6...T4
- Non-incendive: CSA/FM Class I, Div. 2, Gr. A, B, C, D
- Explosion Proof With IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
- Marine: Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
- Others: Pattern Approval (China)

**Communication**
- PROFIBUS PA (IEC 61158 CP3 CF3/2)
- Bus physical layer: IEC 61158-2 MBP-(IS)
- Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B

**Design: Probe**

<table>
<thead>
<tr>
<th>Rod version</th>
<th>High Temperature version</th>
<th>Cable version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Min. 250 mm (9.8”), max. 1000 mm (40”)</td>
<td>Min. 250 mm (9.8”), max. 1000 mm (40”)</td>
</tr>
<tr>
<td>Sensor wetted parts</td>
<td>PFA (no insulation on active probe), 316L stainless steel</td>
<td>Ceramic (ZrO2)(^1) (no insulation on active probe), 316L stainless steel</td>
</tr>
<tr>
<td>O-ring seal material</td>
<td>FKM (optional FFKM)</td>
<td>Graphite</td>
</tr>
<tr>
<td>Thermal isolator</td>
<td>Optional</td>
<td>Standard</td>
</tr>
<tr>
<td>Extension</td>
<td>User selectable length</td>
<td>User selectable length</td>
</tr>
</tbody>
</table>

\(^1\) Zirconium Oxide

---

© Siemens AG 2010
**Level instruments**

**Point level measurement - Capacitance switches**

---

### Pointek CLS300 - Digital

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5660-0</td>
<td>Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, and interfaces in demanding conditions where high pressure and temperatures are present.</td>
</tr>
</tbody>
</table>

#### Process Connection

- Threaded, 316L stainless steel:
  - ½" NPT ([Taper), ANSI/ASME B1.20.1] (E)
  - 1" NPT ([Taper), ANSI/ASME B1.20.1] (F)
  - 1½" NPT ([Taper), ANSI/ASME B1.20.1] (G)
  - R ¾" ([BSPT), EN 10226/PT (JIS-T), JIS B 0203] (A)
  - R 1½" ([BSPT), EN 10226/PT (JIS-T), JIS B 0203] (B)
  - G ¼" ([BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] (D)
  - G ½" ([BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] (C)

#### Extended rod, factory adjusted length:

- 750 mm (29.53") (E)
- 500 mm (19.69") (F)
- 250 mm (9.8") (G)

#### Wetted Seals

- FKM (H)
- FFKM (I)

#### Probe Material

- 316L Stainless steel with PFA lining and PEEK isolators (J)

#### Approvals

- General Purpose (CSA, FM, CE, C-TICK) (K)
- Dust Ignition Proof: CSA/FM Class II, Div. 1, Gr. A, B, C, D (L)
- Intrinsically Safe: CSA/FM Class III, T4 (M)
- Flameproof-with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D (N)
- Explosion Proof Enclosure With IS Probe: CSA/FM Class II, Div. 1, Gr. A, B, C, D (O)

### Enclosure and Lid

- Aluminum epoxy coated (P)

---

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5660-0</td>
<td>Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, and interfaces in demanding conditions where high pressure and temperatures are present.</td>
</tr>
</tbody>
</table>

#### Thermal Isolator

- Without thermal isolator (Q)
- With thermal isolator [for process connection temperatures over +85 °C (+185 °F)] (R)

---

**Order No.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version, rod 350 mm (13.78&quot;)</td>
<td>A</td>
</tr>
<tr>
<td>Extended rod, length 500 mm (19.69&quot;)</td>
<td>B</td>
</tr>
<tr>
<td>Extended rod, length 750 mm (29.53&quot;)</td>
<td>C</td>
</tr>
<tr>
<td>Extended rod, length 1000 mm (39.37&quot;)</td>
<td>D</td>
</tr>
</tbody>
</table>

---

**Insertion length in mm**

- 350 mm (A)
- 400 mm (B)
- 450 mm (C)
- 500 mm (D)
- 550 mm (E)
- 600 mm (F)
- 750 mm (G)
- 1000 mm (H)
- 1250 mm (I)

---

**Thermal Isolator**

- Add order code Q01 and plain text:
  - Insertion length in mm:
    - 350 mm: (A)
    - 400 mm: (B)
    - 450 mm: (C)
    - 500 mm: (D)
    - 550 mm: (E)
    - 600 mm: (F)
    - 750 mm: (G)
    - 1000 mm: (H)
    - 1250 mm: (I)

---

**Probe length**

- (length from flange face)
- (threaded lengths include process thread)

**Probe Material**

- 316L Stainless steel with PFA lining and PEEK isolators

**Approvals**

- General Purpose (CSA, FM, CE, C-TICK)
- Dust Ignition Proof: CSA/FM Class II, Div. 1, Gr. A, B, C, D
- Intrinsically Safe: CSA/FM Class III, T4
- Flameproof-with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D
- Explosion Proof Enclosure With IS Probe: CSA/FM Class II, Div. 1, Gr. A, B, C, D

**Enclosure and Lid**

- Aluminum epoxy coated

---

**Wetted Seals**

- FKM
- FFKM (for process temperatures above -20°C (-4°F))

---

**Enclosure and Lid**

- Aluminum epoxy coated
Level instruments

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

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 where high pressure and temperatures are present.

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text

Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204

Instruction manual

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

Selection and Ordering data

Order No.

Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection

C) 7 ML 5 66 0 - Q

Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection

C) 7 ML 5 66 1 - Q

Accessories

See page 5/54

© Siemens AG 2010
# Level instruments

## Point level measurement - Capacitance switches

### Pointek CLS300 - Digital

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection</td>
<td>C) 7 M 5 6 6 1 - 0</td>
</tr>
</tbody>
</table>

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

<table>
<thead>
<tr>
<th>Thermal Isolator</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without thermal isolator</td>
<td>1</td>
</tr>
<tr>
<td>With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetted Seals</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>FKM</td>
<td>1</td>
</tr>
<tr>
<td>FFKM [for process temperatures above -20°C (-4°F)]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probe Material</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose (CSA, FM, CE, C-TICK)</td>
<td></td>
</tr>
<tr>
<td>Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100°C</td>
<td></td>
</tr>
<tr>
<td>Intrinsically Safe: CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100°C</td>
<td></td>
</tr>
<tr>
<td>Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100°C</td>
<td></td>
</tr>
</tbody>
</table>

| Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G | |
| CSA/FM Class III T4 | |
| Intrinsically Safe: CSA/FM Class I, Div. 1, Gr. A, B, C, D | |
| CSA/FM Class II, Div. 1, Gr. E, F, G | |
| CSA/FM Class III T4 | |
| Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D | |
| CSA/FM Class II, Div. 1, Gr. E, F, G | |
| CSA/FM Class III T4 | |

<table>
<thead>
<tr>
<th>Enclosure and Lid</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum epoxy coated</td>
<td></td>
</tr>
<tr>
<td>2 x ½&quot; NPT via adapter - cable inlet, IP65</td>
<td></td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP65</td>
<td></td>
</tr>
<tr>
<td>2 x ½&quot; NPT via adapter - cable inlet, IP68</td>
<td></td>
</tr>
<tr>
<td>2 x M20x1.5 cable inlet, IP68</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Active Shield Length</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard length - (125 mm threaded, 105 mm flanged)</td>
<td></td>
</tr>
<tr>
<td>Extended shield - 250 mm threaded, 230 mm flanged</td>
<td></td>
</tr>
<tr>
<td>Extended shield - (400 mm threaded, 380 mm flanged)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Further designs</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add <code>-Z</code> to Order No. and specify Order code(s).</td>
<td></td>
</tr>
<tr>
<td>Total insertion length: enter the total insertion length in plain text description</td>
<td></td>
</tr>
<tr>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97”): Measuring-point number/identification (max. 16 characters) specify in plain text</td>
<td></td>
</tr>
<tr>
<td>Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204</td>
<td></td>
</tr>
</tbody>
</table>

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection</td>
<td>C) 7 M 5 6 6 1 - 0</td>
</tr>
</tbody>
</table>

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

<table>
<thead>
<tr>
<th>Instruction manual</th>
<th>See page 5/54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The instruction manual should be ordered as a separate line on the order.</td>
<td></td>
</tr>
<tr>
<td>This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.</td>
<td></td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>See page 5/54</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection</td>
<td></td>
</tr>
<tr>
<td>2) Available with Probe version options A, B and, F to K only [ ≥ 1000 mm (39.7”)]</td>
<td></td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99

---

© Siemens AG 2010
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>C)</td>
<td></td>
</tr>
</tbody>
</table>

### Process Connection

<table>
<thead>
<tr>
<th>Threaded, 316L stainless steel</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾” NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 A</td>
</tr>
<tr>
<td>1” NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 B</td>
</tr>
<tr>
<td>1¼” NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>0 C</td>
</tr>
<tr>
<td>R ¾” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>0 D</td>
</tr>
<tr>
<td>R 1” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>1 A</td>
</tr>
<tr>
<td>R 1½” [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]</td>
<td>1 B</td>
</tr>
<tr>
<td>G ¾” [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>3 A</td>
</tr>
<tr>
<td>G 1” [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>3 B</td>
</tr>
<tr>
<td>G 1½” [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]</td>
<td>3 C</td>
</tr>
<tr>
<td>Welded flange, 316L stainless steel, raised face</td>
<td>5 A</td>
</tr>
<tr>
<td>1” ASME, 150 lb</td>
<td>5 B</td>
</tr>
<tr>
<td>1” ASME, 300 lb</td>
<td>5 C</td>
</tr>
<tr>
<td>1” ASME, 600 lb</td>
<td>5 D</td>
</tr>
<tr>
<td>1¼” ASME, 150 lb</td>
<td>5 E</td>
</tr>
<tr>
<td>1¼” ASME, 300 lb</td>
<td>5 F</td>
</tr>
<tr>
<td>1¼” ASME, 600 lb</td>
<td>5 G</td>
</tr>
<tr>
<td>2” ASME, 150 lb</td>
<td>5 H</td>
</tr>
<tr>
<td>2” ASME, 300 lb</td>
<td>5 I</td>
</tr>
<tr>
<td>2” ASME, 600 lb</td>
<td>5 J</td>
</tr>
<tr>
<td>3” ASME, 150 lb</td>
<td>5 K</td>
</tr>
<tr>
<td>3” ASME, 300 lb</td>
<td>5 L</td>
</tr>
<tr>
<td>3” ASME, 600 lb</td>
<td>5 M</td>
</tr>
<tr>
<td>4” ASME, 150 lb</td>
<td>5 N</td>
</tr>
<tr>
<td>4” ASME, 300 lb</td>
<td>5 P</td>
</tr>
<tr>
<td>4” ASME, 600 lb</td>
<td>5 Q</td>
</tr>
<tr>
<td>Welded flange, 316L stainless steel, Type A flat faced</td>
<td>7 A</td>
</tr>
<tr>
<td>DN 25, PN 16</td>
<td>7 B</td>
</tr>
<tr>
<td>DN 25, PN 40</td>
<td>7 C</td>
</tr>
<tr>
<td>DN 40, PN 16</td>
<td>7 D</td>
</tr>
<tr>
<td>DN 40, PN 40</td>
<td>7 E</td>
</tr>
<tr>
<td>DN 50, PN 16</td>
<td>7 F</td>
</tr>
<tr>
<td>DN 50, PN 40</td>
<td>7 G</td>
</tr>
<tr>
<td>DN 80, PN 16</td>
<td>7 H</td>
</tr>
<tr>
<td>DN 80, PN 40</td>
<td>7 I</td>
</tr>
<tr>
<td>DN 100, PN 16</td>
<td>7 J</td>
</tr>
<tr>
<td>DN 100, PN 40</td>
<td>7 K</td>
</tr>
</tbody>
</table>

(Click here for more information on probe connection types)

### Probe Material

- 316L Stainless steel with ceramic (ZrO₂) isolators

### Approvals

- General Purpose (CSA, FM, CE, C-TICK)
- Dust Ignition Proof:\ CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100°C
- Intrinsically Safe:\ CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100°C
- Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100°C
- Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4

### Enclosure and Lid

- Aluminum epoxy coated
- 2 x ½” NPT via adapter - cable inlet, IP65
- 2 x M20x1.5 cable inlet, IP65
- 2 x M20x1.5 NPT via adapter - cable inlet, IP68
- 2 x M20x1.5 cable inlet, IP68

### Active Shield Length

- Standard length - (125 mm threaded, 105 mm flanged)
- Extended shield - (250 mm threaded, 230 mm flanged)
- Extended shield - (400 mm threaded, 380 mm flanged)

---

**Note:** No Y01 needed in order code for standard lengths.
**Level instruments**

Point level measurement - Capacitance switches

---

### Pointek CLS300

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 5 6 6 2</td>
<td><strong>Pointek CLS300</strong> - Digital - High Temperature Rod version with Threaded or Flanged process connection</td>
</tr>
<tr>
<td>Y01</td>
<td>Total insertion length: enter the total insertion length in plain text description</td>
</tr>
<tr>
<td>Y15</td>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
</tr>
<tr>
<td>C11</td>
<td>Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000</td>
</tr>
<tr>
<td>C12</td>
<td>Inspection Certificate Type 3.1 per EN 10204</td>
</tr>
</tbody>
</table>

**Further designs**

Please add ‘-Z’ to Order No. and specify Order code(s).

1. Total insertion length: enter the total insertion length in plain text description
2. Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
3. Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
4. Inspection Certificate Type 3.1 per EN 10204

---

**Instruction manual**

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

---

**Accessories**

1. Barrier or Intrinsically safe power supply required for Intrinsically Safe protection
2. Available with Probe version options B to D, F, G only [≤ 500 mm (19.69")]
3. Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML1998-5JH01</td>
<td>Standard Version - Instruction manual</td>
</tr>
<tr>
<td>7 ML1998-5JH31</td>
<td>English</td>
</tr>
<tr>
<td>7 ML1998-5H31</td>
<td>German</td>
</tr>
<tr>
<td>7 ML1998-5QY81</td>
<td>Standard version Quick Start guide, multi-language</td>
</tr>
<tr>
<td>7 ML1998-5JH01</td>
<td>Digital Version - Instruction manual</td>
</tr>
<tr>
<td>7 ML1998-5JJ01</td>
<td>English</td>
</tr>
<tr>
<td>7 ML1998-5JJ31</td>
<td>German</td>
</tr>
<tr>
<td>7 ML1998-5XA81</td>
<td>Note: The instruction manual should be ordered as a separate line on the order.</td>
</tr>
</tbody>
</table>

---

Accessories

1. ½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47") -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)
2. ½" NPT cable gland, brass, ATEX II 2GD Ex d IIC and Ex e II, fits cable diameter 6.5 ... 14 mm (0.26 ... 0.55"), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)
3. M20x1.5 cable gland, PA polyamide, ATEX II 2G Ex e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47") -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)
4. M20x1.5 cable gland, brass, ATEX II 2GD Ex d IIC and Ex e II, fits cable diameter 10.5 ... 15.9 mm (0.41 ... 0.63"), under armour cable diameter 6.1 ... 11.5 mm (0.24 ... 0.45"), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)
5. One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)

---

Blind threaded flanges are available. Please contact nacc.smpi@siemens.com with a completed application data sheet found on page 5/9

---

**Spare parts**

1. Test magnet (digital version)
2. Amplifier/power supply, standard version
3. Amplifier/power supply, digital version
4. LCD display (digital version)

---

(C) Subject to export regulations AL: N, ECCN: EAR99
Characteristic curves

Pressure/Temperature Curve

CLS300 Extended Rod and Cable Probes
Threaded Process Connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

Example:
Permitted operating pressure = 30 bar (435 psi) at 75 °C

Pressure/Temperature Curve

CLS300 High Temperature Rod Probes
Threaded Process Connections (7ML5652 and 7ML5662)

P = Permitted Operating Pressures
T = Permitted Operating Temperature
Pressure/Temperature Curve
CLS300 Extended Rod and Cable Probes
ASME Flanged Process Connections
(7ML5650, 7ML5651, 7ML5660, and 7ML5661)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

Pressure/Temperature Curve
CLS300 High Temperature Rod Probes
ASME Flanged Process Connections
(7ML5652 and 7ML5662)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)
Level instruments
Point level measurement - Capacitance switches

Pointek CLS300

Pressure/Temperature Curve
CLS300 Extended Rod and Cable Probes EN Flanged Process Connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)

\[
\begin{align*}
P &= \text{Permitted Operating Pressures} \\
T &= \text{Permitted Operating Temperature}
\end{align*}
\]

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

Pressure/Temperature Curve
CLS300 High Temperature Rod Probes
EN Flanged Process Connections (7ML5652 and 7ML5662)

\[
\begin{align*}
P &= \text{Permitted Operating Pressures} \\
T &= \text{Permitted Operating Temperature}
\end{align*}
\]

1) The curve denotes the minimum allowable flange class for the shaded area below.
Level instruments
Point level measurement - Capacitance switches

Pointek CLS300

Dimensional drawings

Rod version Threaded (7ML5650 and 7ML5660)

- Probe: ø 19 mm (0.75")
- Measuring length Y02: min. = 250 mm (9.8") max. = 1000 mm (39.37")

High temperature rod version Threaded (7ML5652 and 7ML5662)

- Probe: ø 19 mm (0.75")
- Measuring length Y02: min. = 250 mm (9.8") max. = 1000 mm (39.37")
- Lid with window
- Lid without window
- Thermal isolator
- 2 cable entries ½" NPT or M20x1.5

Cable version, non-insulated Threaded (7ML5651 and 7ML5661)

- Probe: ø 19 mm (0.75")
- Measuring length Y01 (insertion length): min. = 500 mm (20") max. = 25000 mm (984")
- Stainless steel cable: ø 6 mm (0.24")
- Stainless steel weight: ø 32 mm (1.26")

Cable version, insulated Threaded (7ML5651 and 7ML5661)

- Probe: ø 19 mm (0.75")
- Measuring length Y01 (insertion length): min. = 500 mm (20") max. = 25000 mm (984")
- Insulated cable: PFA insulated cable: ø 10 mm (0.35")
- Stainless steel weight: ø 32 mm (1.26")

Note:
1) Extended Active Shield (Y02): standard length 125 mm (4.92")
   Optional active shield lengths: 250 mm (9.84") or 400 mm (15.75")
Pointek CLS300 dimensions - Flanged Process Connections

**Rod version Welded flange (7ML5650 and 7ML5660)**

- Probe: ø 19 mm (0.75")
- Measuring length: min. = 250 mm (9.8") max. = 25000 mm (984")

**High temperature rod version Welded flange (7ML5652 and 7ML5662)**

- Measuring length: min. = 250 mm (9.8") max. = 25000 mm (984")
- Lid with window: 165 mm (6.50")
- Lid without window: 275 mm (10.83")
- Measuring length: min. = 250 mm (9.8") max. = 25000 mm (984")

**Cable version, non-insulated Welded flange (7ML5651 and 7ML5661)**

- Stainless steel cable: ø 6 mm (0.24")
- Measuring length: min. = 300 mm (11.8") max. = 3000 mm (118.1")

**Cable version, insulated Welded flange (7ML5651 and 7ML5661)**

- PFA insulated cable: ø 10 mm (0.35")
- Measuring length: min. = 300 mm (11.8") max. = 2500 mm (98.4")

**Notes:**

1) Extended Active Shield (Y02): standard length 105 mm (4.13")
   Optional active shield lengths: 230 mm (9.06") or 380 mm (14.96")
2) Insertion length does not include any raised face/gasket face dimension (see Flange Facing table above).

**Flange Facing (raised face)**

<table>
<thead>
<tr>
<th>Flange class</th>
<th>Facing thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ ASME 150/300</td>
<td>2 mm (0.08&quot;)</td>
</tr>
<tr>
<td>Δ ASME 600/900</td>
<td>7 mm (0.28&quot;)</td>
</tr>
<tr>
<td>Δ PN 16/40</td>
<td>2 mm (0.08&quot;)</td>
</tr>
</tbody>
</table>
Level instruments
Point level measurement - Capacitance switches

Pointek CLS300

Schematics

Wiring: Pointek CLS300 Standard

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 a Siemens representative for detailed wiring information.

Wiring: Pointek CLS300 Digital

Note:
Refer to the Instruction Manual or contact a Siemens representative 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 CLS500 is an inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure.

**Benefits**
- Patented Active-Shield technology so measurement is unaffected by material buildup in active shield section
- 2-wire loop powered with solid-state switch or 4...20/20...4 mA output
- Simple push-button calibration and integrated local display
- Full function diagnostics
- HART communications for remote commissioning and inspection
- SIL/IEC61508 compliant for use in safety integrated level applications [SIL-1(overfill or underfill)]

**Application**
Patented Active-Shield technology ensures that measurement is unaffected by vapours, 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.
- Install probe at least 50 mm (2") from tank wall.
# Level instruments

## Point level measurement - Capacitance switches

### Pointek CLS500

<table>
<thead>
<tr>
<th>Technical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
</tr>
<tr>
<td>Measuring range</td>
</tr>
<tr>
<td>Span</td>
</tr>
<tr>
<td><strong>Output</strong></td>
</tr>
<tr>
<td>Solid-state switch</td>
</tr>
<tr>
<td>- Output</td>
</tr>
<tr>
<td>- Protection</td>
</tr>
<tr>
<td>- Max. switching voltage</td>
</tr>
<tr>
<td>- Max. load current</td>
</tr>
<tr>
<td>- Voltage drop</td>
</tr>
<tr>
<td>- Time delay</td>
</tr>
<tr>
<td>Current loop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Accuracy (transmitter)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature stability</td>
</tr>
<tr>
<td>Non-linearity and repeatability</td>
</tr>
<tr>
<td>Accuracy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Rated operating conditions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation conditions</strong></td>
</tr>
<tr>
<td>- Location</td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
</tr>
<tr>
<td>• Ambient temperature (transmitter)</td>
</tr>
<tr>
<td>• Installation category</td>
</tr>
<tr>
<td>• Pollution degree</td>
</tr>
<tr>
<td><strong>Medium conditions</strong></td>
</tr>
<tr>
<td>• Relative dielectric constant (\varepsilon_r)</td>
</tr>
<tr>
<td>• Process temperature</td>
</tr>
<tr>
<td>- Standard (PFA)</td>
</tr>
<tr>
<td>- High temperature stainless steel version with enamel insulation and thermal isolator</td>
</tr>
<tr>
<td>- High temperature stainless steel version with thermal isolator</td>
</tr>
<tr>
<td>- Cryogenic version</td>
</tr>
<tr>
<td><strong>Process pressure</strong></td>
</tr>
<tr>
<td>• Standard (PFA)</td>
</tr>
<tr>
<td>• High temperature version (Enamel)</td>
</tr>
<tr>
<td>• High temperature version (Stainless steel)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Design</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
</tr>
<tr>
<td>• Wetted parts material</td>
</tr>
<tr>
<td>- Standard rod</td>
</tr>
<tr>
<td>- Probe isolation (rod)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Probe diameter</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Standard rod version (PFA)</td>
</tr>
<tr>
<td>• High temperature rodversion (Enamel)</td>
</tr>
<tr>
<td>• High temperature rod version (Stainless steel)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Probe length</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Standard rod version (PFA)</td>
</tr>
<tr>
<td>• High temperature rodversion (Enamel)</td>
</tr>
<tr>
<td>• High temperature rod version (Stainless steel)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Process connection of probe</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Threaded mounting</td>
</tr>
<tr>
<td>• Flange mounting</td>
</tr>
<tr>
<td>• Material</td>
</tr>
<tr>
<td>• Cable inlet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Power supply</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 33 V DC</td>
</tr>
</tbody>
</table>

### Features

- Measurement current signalling: NAMUR NE 43
- Safety: Inputs/outputs fully galvanically isolated, Polarity-insensitive current loop, Fully potted, Integrated safety barrier
- Diagnostics with fault alarm: 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, C-TICK
- Dust Ignition Proof: CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD Ex d [ib] IIC T6 to T1 T100 °C
- Explosion Proof: FM Class 1, Div. 1, Groups A, B, C, D T4 ATEX II 1/2 GD Ex d [ia] IIC T6 to T1 T100 °C
- Marine: Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3, ENV5, Bureau Veritas
- Other: SIL/IEC61508 Declaration of Conformity [SIL-1(overfill or underfill)]

---

\(^1\) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.

\(^2\) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)

See also: Pressure/Temperature curves on page 5/67.
<table>
<thead>
<tr>
<th>Pointek CLS500 probe version</th>
<th>Standard (PFA) (7ML5601, 7ML5602, 7ML5603)</th>
<th>High Temperature (Enamel or Stainless steel) (7ML5604)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process connection types</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threaded</td>
<td>Available as standard</td>
<td></td>
</tr>
<tr>
<td>Flange</td>
<td>Available as standard</td>
<td></td>
</tr>
<tr>
<td><strong>Process connection materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>316L stainless steel</td>
<td>Available as standard</td>
<td>Available as standard</td>
</tr>
<tr>
<td><strong>Probe insulation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>–</td>
<td>HT Stainless: available as standard</td>
</tr>
<tr>
<td>PFA</td>
<td>Available as standard</td>
<td>–</td>
</tr>
<tr>
<td>Enamel</td>
<td></td>
<td>HT Enamel: available as standard</td>
</tr>
<tr>
<td><strong>Length parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rod length</td>
<td>1000 mm (40&quot;)</td>
<td>1000 mm (40&quot;)</td>
</tr>
<tr>
<td><strong>Process conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. process pressure</td>
<td>150 bar g (2175 psi g)</td>
<td>Stainless steel:&lt;sup&gt;2&lt;/sup&gt; 35 bar g (507 psi g)</td>
</tr>
<tr>
<td></td>
<td>+200 °C (+392 °F)</td>
<td>Enamel:&lt;sup&gt;2&lt;/sup&gt; 345 bar g (5004 psi g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+400 °C (+752 °F)</td>
</tr>
</tbody>
</table>

<sup>1</sup> When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/67.

<sup>2</sup> Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.

– Not available as standard
Pointek CLS500

Selection and Ordering data

**Order No.**

Pointek CLS500, threaded

- Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

**Electronic transmitter**

- No transmitter supplied

**Process connection**

- ¾”
- 1”
- 1½”
- 2”

**Threaded connection and rating**

- ANSI/ASME B1.20.1
- EN 10226/PT (JIS-T) JIS B 0203
- EN ISO 228-1/VP (JIS-P), JIS B 0202

**Probe insulation/material of process connection**

- PFA insulation/316L stainless steel

**Approvals**

- CSA/ASME Class I, Div. 2, Groups A, B, C, D T4;
- ATEX II 3G 2D EEx nA (ib) IIC T6 to T4 T100 °C;
- CSA/ASME Class II and III Div. 1, Groups E, F, G T4

**Probe/electrode diameter**

- 16 mm (0.63”) rigid rod, minimum insertion length 200 mm (7.9”), maximum insertion length 1000 mm (39.4”)

**Thermal isolator/remote version**

- Rigid thermal isolator [for process temperature over +85 °C (+185 °F)]
- No thermal isolator

**Further designs**

Please add “Z” to Order No. and specify Order code(s).

**Insertion length, specify in plain text:**

- Y01: ... mm [minimum 200 mm (7.87”)]
- Y02: ... mm

**Stainless steel tag [69 x 50 mm (2.71 x 1.97”):**

- Measuring-point number/identification (max. 16 characters) specify in plain text

**Acceptance test certificate:**

- Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
- Inspection Certificate Type 3.1 per EN 10204
- SIL/IEC61508 Declaration of Conformity [SIL-1 (overfill or underfill)]

**Instruction manual**

See page 5/66

**Accessories**

C) Subject to export regulations AL: N, ECCN: EAR99

---

Pointek CLS500, welded flange

- Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

**Electronic transmitter**

- No transmitter supplied

**Process connection and pressure rating**

- Welded flange, 316L stainless steel, raised face
  - 2” ASME, 150 lb
  - 2” ASME, 300 lb
  - 3” ASME, 150 lb
  - 3” ASME, 300 lb
  - 4” ASME, 150 lb
  - 4” ASME, 300 lb
  - 6” ASME, 150 lb
  - 6” ASME, 300 lb

**Welded flange, 316L stainless steel, Type A flat faced**

- DIN 50 PN 16
- DIN 50 PN 25
- DIN 80 PN 16
- DIN 80 PN 25
- DIN 100 PN 16
- DIN 125 PN 16

**Approvals**

- CSA/ASME Class I, Div. 2, Groups A, B, C, D T4;
- ATEX II 3G 2D EEx nA (ib) IIC T6 to T4 T100 °C;
- CSA/ASME Class II and III Div. 1, Groups E, F, G T4

**Probe/electrode diameter**

- 16 mm (0.63”) rigid rod, minimum length 200 mm (7.9”), maximum length 1000 mm (39.4”)

**Thermal isolator**

- Rigid thermal isolator [for process temperature over +85 °C (+185 °F)]
- No thermal isolator

**Further designs**

Please add “Z” to Order No. and specify Order code(s).

**Insertion length, specify in plain text:**

- Y01: ... mm [minimum 200 mm (7.87”)]
- Y02: ... mm

**Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]:**

- Measuring-point number/identification (max. 16 characters) specify in plain text

**Acceptance test certificate:**

- Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
- Inspection Certificate Type 3.1 per EN 10204
- SIL/IEC61508 Declaration of Conformity [SIL-1 (overfill or underfill)]

**Instruction manual**

See page 5/66

**Accessories**

C) Subject to export regulations AL: N, ECCN: EAR99

---

1) Custom shipping methods required. Contact factory for more details

2) See dimension drawings on page 5/9 for further explanation of Y02
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Pointek CLS500, single piece flange</th>
<th>Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7 M L 6 0 3 - A 0</td>
<td>Pointek CLS500, single piece flange</td>
<td>Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.</td>
</tr>
</tbody>
</table>

### Electronic transmitter

- No transmitter supplied
- MSP 2002-1 (330 pF)

### Process connection and pressure rating

<table>
<thead>
<tr>
<th>Single piece flange, 316L stainless steel, raised face</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; ASME, 150 lb</td>
</tr>
<tr>
<td>2&quot; ASME, 300 lb</td>
</tr>
<tr>
<td>3&quot; ASME, 150 lb</td>
</tr>
<tr>
<td>3&quot; ASME, 300 lb (1)</td>
</tr>
<tr>
<td>4&quot; ASME, 150 lb (1)</td>
</tr>
<tr>
<td>4&quot; ASME, 300 lb (1)</td>
</tr>
<tr>
<td>6&quot; ASME, 150 lb (1)</td>
</tr>
<tr>
<td>6&quot; ASME, 300 lb (1)</td>
</tr>
</tbody>
</table>

### Further designs

- Insertion length, specify in plain text:
  - Y01: ... mm [minimum 200 mm (7.87")]
- Active Shield length - minimum length is 50 mm, Y02: ... mm (2)
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
- Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000
- Inspection Certificate Type 3.1 per EN 10204 SIL/ECEx1508 Declaration of Conformity [SIL-1 (overfill or underfill)]

### Instruction manual

- See page 5/66

### Accessories

- See page 5/66

1) Custom shipping methods required. Contact factory for more details
2) See dimension drawings on page 5/73 for further explanation of Y02
C) Subject to export regulations AL: N, ECCN: EAR99
## Pointek CLS500

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS500 High temperature</strong></td>
<td>C) 7ML5604 -</td>
</tr>
<tr>
<td>Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.</td>
<td></td>
</tr>
<tr>
<td><strong>Electronic transmitter</strong></td>
<td></td>
</tr>
<tr>
<td>No transmitter supplied</td>
<td></td>
</tr>
<tr>
<td>MSP 2002-1 (330 pF)</td>
<td></td>
</tr>
<tr>
<td><strong>Process connection and pressure rating</strong></td>
<td></td>
</tr>
<tr>
<td>316L stainless steel, raised face</td>
<td>A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, D1, D2, D3, D4, E1, E2, E3, E4, F1, F2, F3, F4, G1, G2, G3, G4, H1, H2, H3, H4</td>
</tr>
<tr>
<td>2&quot; ASME, 150 lb</td>
<td>A1</td>
</tr>
<tr>
<td>2&quot; ASME, 300 lb</td>
<td>A2</td>
</tr>
<tr>
<td>2&quot; ASME, 600 lb</td>
<td>A3</td>
</tr>
<tr>
<td>2&quot; ASME, 900 lb</td>
<td>A4</td>
</tr>
<tr>
<td>3&quot; ASME, 150 lb</td>
<td>B1</td>
</tr>
<tr>
<td>3&quot; ASME, 300 lb</td>
<td>B2</td>
</tr>
<tr>
<td>3&quot; ASME, 600 lb</td>
<td>B3</td>
</tr>
<tr>
<td>3&quot; ASME, 900 lb</td>
<td>B4</td>
</tr>
<tr>
<td>4&quot; ASME, 150 lb</td>
<td>C1</td>
</tr>
<tr>
<td>4&quot; ASME, 300 lb</td>
<td>C2</td>
</tr>
<tr>
<td>4&quot; ASME, 600 lb</td>
<td>C3</td>
</tr>
<tr>
<td>4&quot; ASME, 900 lb</td>
<td>C4</td>
</tr>
<tr>
<td>6&quot; ASME, 150 lb</td>
<td>D1</td>
</tr>
<tr>
<td>6&quot; ASME, 300 lb</td>
<td>D2</td>
</tr>
<tr>
<td>6&quot; ASME, 600 lb</td>
<td>D3</td>
</tr>
<tr>
<td>6&quot; ASME, 900 lb</td>
<td>D4</td>
</tr>
<tr>
<td>316L stainless steel, Type B1 raised face</td>
<td>E1, E2, E3, E4, F1, F2, F3, F4, G1, G2, G3, G4, H1, H2, H3, H4</td>
</tr>
<tr>
<td><strong>Probe insulation/material of process connection</strong></td>
<td></td>
</tr>
<tr>
<td>No insulation/316L stainless steel</td>
<td>Y01, Y02</td>
</tr>
<tr>
<td>Enamel insulated/316L stainless steel</td>
<td>Y01, Y02</td>
</tr>
<tr>
<td><strong>Stilling well</strong></td>
<td></td>
</tr>
<tr>
<td>No stilling well</td>
<td></td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
</tr>
<tr>
<td>General Purpose</td>
<td></td>
</tr>
<tr>
<td>CSA/FM Class I, Div. 2, Groups A, B, C, D T4</td>
<td></td>
</tr>
<tr>
<td>ATEX II 3G 2D Ex e IA [ib] IIC T6 to T4 T100 °C</td>
<td></td>
</tr>
<tr>
<td>CSA/FM Class II and III Div. 1, Groups E, F, G T4</td>
<td></td>
</tr>
<tr>
<td>ATEX II 1/2 GD Ex d [ia] IIC T6 to T1 T100 °C</td>
<td></td>
</tr>
<tr>
<td>FM Class I, Div. 1, Groups A, B, C, D T4</td>
<td></td>
</tr>
<tr>
<td><strong>Probe/electrode diameter</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum length 1000 mm (39.37&quot;)</td>
<td></td>
</tr>
<tr>
<td><strong>Thermal isolator</strong></td>
<td></td>
</tr>
<tr>
<td>Rigid thermal isolator</td>
<td></td>
</tr>
</tbody>
</table>

### Further designs

- Insertion length, specify in plain text: Y01: ... mm
- Y15
- Order code(s)
- Active Shield length, specify in plain text:
- Y02: ... mm
- Y01
- Minimum insertion length depends on probe version selected.
- See dimension drawings on page 5/73 for more details.

### Accessories

- Instruction manual
  - See page 5/66
- passports
- 
- SIL/IEC61508 Declaration of Conformity
  - [SIL-1 (overfill or underfill)]
- 
- Other Certificates
  - Inspection Certificate Type 3.1 per EN 10204
  - Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000
  - Certificate M to EN 10204

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS500 High temperature</strong></td>
<td>C) 7ML5604 -</td>
</tr>
<tr>
<td>Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.</td>
<td></td>
</tr>
<tr>
<td><strong>Further designs</strong></td>
<td></td>
</tr>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code(s).</td>
<td></td>
</tr>
<tr>
<td><strong>Insertion/active shield length ... mm</strong></td>
<td>Y01, Y02</td>
</tr>
<tr>
<td><strong>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SIL/IEC61508 Declaration of Conformity</strong></td>
<td></td>
</tr>
<tr>
<td>[SIL-1 (overfill or underfill)]</td>
<td></td>
</tr>
</tbody>
</table>

### Accessories

- Instruction manual
  - See page 5/66
- Transmitter, MSP 2002-1, 330 PF
  - 7ML1998-5GG01
  - 7ML1998-5GG11
  - 7ML1998-5GG41

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pointek CLS500 High temperature</strong></td>
<td>C) 7ML5604 -</td>
</tr>
<tr>
<td>Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.</td>
<td></td>
</tr>
<tr>
<td><strong>Transmitter, MSP 2002-1, 330 PF</strong></td>
<td></td>
</tr>
<tr>
<td>7ML1998-5GG01</td>
<td></td>
</tr>
<tr>
<td>7ML1998-5GG11</td>
<td></td>
</tr>
<tr>
<td>7ML1998-5GG41</td>
<td></td>
</tr>
</tbody>
</table>

### Approvals

- General Purpose
  - CSA/FM Class I, Div. 2, Groups A, B, C, D T4
  - ATEX II 3G 2D Ex e IA [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 Ex d [ia] IIC T6 to T1 T100 °C
  - FM Class I, Div. 1, Groups A, B, C, D T4

- **Probe/electrode diameter**
  - Maximum length 1000 mm (39.37")

- **Thermal isolator**
  - Rigid thermal isolator
Level instruments
Point level measurement - Capacitance switches
Pointen CLS500

Characteristic curves

Pressure/Temperature Curve
CLS500 Rod Probes
Threaded Process Connections (7ML5601)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

Example
Permitted operating pressure = 137 bar (1988 psi) at 75°C

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5601)
Level instruments
Point level measurement - Capacitance switches

Pointek CLS500

Pressure/Temperature Curve
CLS500 Rod Probes
ASME Flanged Process Connections (7ML5602 and 7ML5603)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.
Level instruments
Point level measurement - Capacitance switches

Pointek CLS500

Pressure/Temperature curve
CLS500 Rod Probes
EN Flanged process connections (7ML5602 and 7ML5603)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)
Level instruments
Point level measurement - Capacitance switches

Pointek CLS500

Pressure/Temperature Curve
CLS500 High Temperature (no insulation)
ASME Flanged Process Connections (7ML5604)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)
Pressure/Temperature Curve
CLS500 High Temperature Enamel Rod Probes
ASME Flanged Process Connections
(7ML5604)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

1) The curve denotes the minimum allowable flange class for the shaded area below.
**Dimensional drawings**

**Standard Rod version**

*Threaded (7ML5601)*

- Diameter: 30 mm (1.18")
- Measuring length:
  - Max.: 250 mm (9.8")
  - Min.: 100 mm (3.9")
- PFA insulated probe
- Inactive tip
- Diameter: 16 mm (0.63")

**Standard configuration**

*Threaded (7ML5601)*

- Diameter: 20 mm (0.79")
- Measuring length:
  - Max.: 205 mm (8.1")
- Transmitter/electronics

**With thermal isolator option**

(all versions)

- Diameter: 16 mm (0.63")
- ¼" NPT: 220 mm (8.7")

**With explosion-proof seal option**

(all versions)

- Diameter: 16 mm (0.63")
- ¼" NPT: 220 mm (8.7")

---

Pointek CLS500 dimensions - Threaded Process Connections

© Siemens AG 2010
Level instruments

Point level measurement - Capacitance switches

Pointek CLS500

**Standard Rod version**

Welded Flange (7ML5602)

Single Piece Flange (7ML5603)

- Transmitter/electronics
- PFA insulated probe
- Inactive tip
  - Ø 16 mm (0.63")
  - 30 mm (1.18")

**Standard configuration**

(7ML5602, 7ML5603)

- 205 mm (8.1")

**With thermal isolator option**

(all versions)

- ¼" NPT 230 mm (9.1")

**With explosion-proof seal option**

(all versions)

- 270 mm (10.6")

- 400 mm (15.7")

High temperature rod version

- Welded Flange (7ML5604)
- Stainless steel rod

High temperature rod version

- Single Piece Flange (7ML5604)
- Enamel rod

**Flange Facing (raised face)**

<table>
<thead>
<tr>
<th>Flange Class</th>
<th>Facing thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASME 150/300</td>
<td>2 mm (0.08&quot;)</td>
</tr>
<tr>
<td>ASME 600/900</td>
<td>7 mm (0.28&quot;)</td>
</tr>
<tr>
<td>PN16/25/40/84</td>
<td>2 mm (0.08&quot;)</td>
</tr>
</tbody>
</table>

**Notes:**

1. Minimum Y02 (active shield length) = 80 mm (3.15")
2. Minimum Y02 (active shield length) = 105 mm (4.13")
3. Minimum Y02 (active shield length) = 100 mm (3.94")
4. Non-conductive materials only

Insertion length does not include any raised face/gasket face dimension (see Flange Facing table above).
Level instruments
Point level measurement - Capacitance switches

Schematics

Pointek CLS500 connections
# Level instruments

## Point level measurement - Capacitance switches

### Pointek CLS Specials

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLS100 Polycarbonate Lid and Gasket, FKM</td>
<td>A5E01163671</td>
</tr>
<tr>
<td>Kit, Lid and gasket, CLS100 enclosure version</td>
<td>F) A5E01163672</td>
</tr>
<tr>
<td>CLS100 Miscellaneous Parts</td>
<td></td>
</tr>
<tr>
<td>Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x</td>
<td></td>
</tr>
<tr>
<td>CLS200 Gasket (IP65), Synprene</td>
<td></td>
</tr>
<tr>
<td>Spare gasket, enclosure version (IP65 versions only)</td>
<td>F) A5E01163673</td>
</tr>
<tr>
<td>CLS200 Gasket (IP68), Silicone</td>
<td></td>
</tr>
<tr>
<td>Spare gasket, enclosure version (IP68 versions only)</td>
<td>F) A5E01163672</td>
</tr>
<tr>
<td>CLS200 Blind Lid</td>
<td>A5E01163674</td>
</tr>
<tr>
<td>Spare aluminum blind lid (for standard versions only)</td>
<td></td>
</tr>
<tr>
<td>CLS200 Lid with window</td>
<td></td>
</tr>
<tr>
<td>Spare aluminum lid with window</td>
<td></td>
</tr>
<tr>
<td>CLS200 Sensor Kit for cable units</td>
<td></td>
</tr>
</tbody>
</table>

### Pointek Specials. See note 1.

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit, Sensor for cable units, PVDF, Standard, FKM</td>
<td>C) A5E01163663</td>
</tr>
<tr>
<td>Kit, Sensor for cable units, PVDF, Digital, FKM</td>
<td>C) A5E01163664</td>
</tr>
<tr>
<td>CLS200 Mounting Bracket, 316L stainless steel</td>
<td></td>
</tr>
<tr>
<td>Spare mounting bracket</td>
<td></td>
</tr>
<tr>
<td>CLS200 PROFIBUS Connector (IP65)</td>
<td></td>
</tr>
<tr>
<td>Spare, PROFIBUS connector (IP65 versions only)</td>
<td></td>
</tr>
<tr>
<td>CLS200 Miscellaneous Parts</td>
<td></td>
</tr>
<tr>
<td>CLS200 with FFKM O-rings (any version)</td>
<td></td>
</tr>
<tr>
<td>CLS300 Cable Extensions, 316L stainless steel</td>
<td></td>
</tr>
<tr>
<td>Kit, Stainless steel cable extension, 1 m, adjustable by customer</td>
<td>A5E01163688</td>
</tr>
<tr>
<td>Kit, Stainless steel cable extension, 3 m, adjustable by customer</td>
<td>A5E01163689</td>
</tr>
<tr>
<td>Kit, Stainless steel cable extension, 5 m, adjustable by customer</td>
<td>A5E01163690</td>
</tr>
<tr>
<td>Kit, Stainless steel cable extension, 10 m, adjustable by customer</td>
<td>A5E01163691</td>
</tr>
<tr>
<td>Kit, Stainless steel cable extension, 15 m, adjustable by customer</td>
<td>A5E01163693</td>
</tr>
<tr>
<td>Kit, Stainless steel cable extension, 20 m, adjustable by customer</td>
<td>A5E01163695</td>
</tr>
<tr>
<td>CLS300 Cable Extensions, 316 stainless steel with PFA coating</td>
<td></td>
</tr>
<tr>
<td>Kit, PFA cable extension, 1 m, adjustable by customer</td>
<td>A5E01163697</td>
</tr>
<tr>
<td>Kit, PFA cable extension, 3 m, adjustable by customer</td>
<td>A5E01163698</td>
</tr>
<tr>
<td>Kit, PFA cable extension, 5 m, adjustable by customer</td>
<td>A5E01163699</td>
</tr>
<tr>
<td>Kit, PFA cable extension, 10 m, adjustable by customer</td>
<td>A5E01163700</td>
</tr>
<tr>
<td>Kit, PFA cable extension, 15 m, adjustable by customer</td>
<td>A5E01163701</td>
</tr>
<tr>
<td>Kit, PFA cable extension, 20 m, adjustable by customer</td>
<td>A5E01163702</td>
</tr>
</tbody>
</table>
## Pointek Specials. See note 1.

### CLS300 Rod Kits, 316L stainless steel

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Kit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163719</td>
<td>Kit, Stainless steel rod 180 mm (7.09&quot;) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78&quot;).</td>
</tr>
<tr>
<td>A5E01163720</td>
<td>Kit, Stainless steel rod 330 mm (12.99&quot;) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69&quot;).</td>
</tr>
<tr>
<td>A5E01163721</td>
<td>Kit, Stainless steel rod 580 mm (22.83&quot;) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53&quot;).</td>
</tr>
<tr>
<td>A5E01163722</td>
<td>Kit, Stainless steel rod 830 mm (32.68&quot;) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1000 mm (39.37&quot;).</td>
</tr>
<tr>
<td>A5E01163723</td>
<td>Kit, Stainless steel rod 1330 mm (52.36&quot;) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1500 mm (59.06&quot;).</td>
</tr>
<tr>
<td>A5E01163724</td>
<td>Kit, Stainless steel rod 1830 mm (72.05&quot;) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2000 mm (78.74&quot;).</td>
</tr>
<tr>
<td>A5E01163725</td>
<td>Kit, Stainless steel rod customized length up to 1 m</td>
</tr>
<tr>
<td>A5E01163726</td>
<td>Kit, Stainless steel rod customized length up to 2 m</td>
</tr>
</tbody>
</table>

### CLS300 Electronics Kits with drivers (for rod or cable versions)

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Kit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163723</td>
<td>Kit, Electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m. See note 3 and 4.</td>
</tr>
<tr>
<td>A5E01163725</td>
<td>Kit, Electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m. See note 3 and 4.</td>
</tr>
</tbody>
</table>

### CLS300 Electronics Kits with drivers (for cable versions)

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Kit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163724</td>
<td>Kit, Electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. See note 3 and 4.</td>
</tr>
<tr>
<td>A5E01163726</td>
<td>Kit, Electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. See note 3 and 4.</td>
</tr>
</tbody>
</table>

## Pointek CLS Specials

### CLS300 Weight Kit, 316L stainless steel

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Kit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163727</td>
<td>Kit, Spare stainless steel weight. To be used in any cable version of CLS300</td>
</tr>
</tbody>
</table>

### CLS500 Gasket (IP65), Silicone

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Kit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163728</td>
<td>Spare gasket, CLS500 enclosure version, IP65</td>
</tr>
</tbody>
</table>

### CLS500 Blind Lid

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Kit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163729</td>
<td>Spare CLS500 aluminum blind lid</td>
</tr>
</tbody>
</table>

### Note 1:
Special flange sizes and facings are available. Please contact nacc.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 5/8.

### Note 2:
Please contact nacc.smpi@siemens.com for part number and pricing.

### Note 3:
For General Purpose approvals only.

### Note 4:
To maintain approvals, qualified trained Siemens personnel required for part replacement. Please contact nacc.smpi@siemens.com for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99

F) Subject to export regulations AL: 91999, ECCN: N
SITRANS LVL100 is a compact vibrating level switch for use 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.

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57") 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

SITRANS LVL100 Installation

Horizontal mounting

Vertical mounting

Horizontal mounting in viscous or adhesive applications

Moisture protection

NOTE: Welded socket for flush mount optional

Ensure cable gland faces downward to avoid water ingress.

SITRANS LVL100 Installation

Key Applications: For use in liquids and slurries, for level measurement, overfill, and dry run protection
### Technical specifications

**Mode of operation**
- Measuring principle: Vibrating point level switch

**Input**
- Measured variable: High and low and demand

**Output**
- Output options:
  - Contactless electronic switch
  - Transistor output PNP

**Measuring Accuracy**
- Hysteresis: approx. 2 mm (0.08") with vertical installation
- Switching delay: approx. 500 ms (on/off)
- Frequency: approx. 1200 Hz

**Rated operating conditions**

<table>
<thead>
<tr>
<th>Installation conditions</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-40 ... +70 °C (-40 ... +158 °F)</td>
</tr>
<tr>
<td>Installation category</td>
<td>III</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
</tr>
<tr>
<td><strong>Medium conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>- Standard</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
</tr>
<tr>
<td>- High temperature option</td>
<td>-40 ... +150 °C (-40 ... +302 °F)</td>
</tr>
<tr>
<td>Pressure (vessel)</td>
<td>-1 ... 64 bar g (-14.5 ... 928 psi g)</td>
</tr>
<tr>
<td>Density</td>
<td>0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lbs/in³)</td>
</tr>
</tbody>
</table>

**Design**
- Material:
  - Enclosure: 316L and Plastic PEI
  - Tuning fork: 316L (1.4404 or 1.4435)
  - Process connection (threaded): 316L (1.4404 or 1.4435)
  - Process seal: Klingersil C-4400
- Process connection:
  - Pipe thread, cylindrical (ISO 228 T1): G ¾" A or G 1" A
  - Pipe thread, tapered: ¾" NPT or 1" NPT
  - Hygienic fittings: Bolting DN40 PN40
  - 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
- Power consumption: 1 ... 8 VA (AC), approx. 1.3 W (DC)

**Certificates and approvals**
- Overfill protection (WHG)
- Shipping approvals

---

### Options

**LVL100 Threaded Welded Socket**

- G ¾" A / 316L
- G 1" A / 316L

**SITRANS LVL100 Welded socket**
### Level instruments

**Point level measurement - Vibrating switches**

#### SITRANS LVL100

**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.

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVL100</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML 5 4 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Approvals**

- Without approvals
- Shipping approvals

**Process temperature**

- Standard: -40 ... +100 °C (-40 ... +212 °F)
- Extended: -40 ... +150 °C (-40 ... +302 °F)

**Process connection**

- Thread ¾” A PN64/316L
- Thread ¾” NPT PN64/316L
- Thread 1” NPT PN64/316L
- Tri-Clamp 1” DIN 32676/316L
- Bolting DN25 PN40 DIN 11851/316L
- Hygienic fitting with compression nut F40 PN25/316L

**Electronics**

- Contactless electronic switch 20 ... 250 V AC/DC
- Transistor output PNP

**Housing**

- 316L

**Electrical connection/Protection**

- M12x1/IP67
- According to DIN 43650 including plug/IP65
- Acc. to DIN 43650 incl. plug with QuickOn connection/IP65
- M12x1 incl. 5 m cable/IP68 (0.2 bar)

**Further designs**

- Please add ‘-Z’ to Order No. and specify Order code(s).

**Cleaning including Certificate**

- (oil, grease and silicone free)

**Identification Label, foil laser marking**

**Acceptance test certificate 3.1 for instrument**

**Acceptance test certificate 2.2 for instrument**

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVL100</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML 5 4 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional instruction manual**

- Order No.
- LVL100 (Contactless electronic switch), English
- LVL100 (Contactless electronic switch), French
- LVL100 (Contactless electronic switch), Spanish
- LVL100 (Transistor PNP), English
- LVL100 (Transistor PNP), French
- LVL100 (Transistor PNP), Spanish
- LVL100 (Transistor PNP), German

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

### Spare Parts

<table>
<thead>
<tr>
<th>Order No.</th>
<th>LVL100 Threaded Welded Socket G ¾” A / 316L with FKM Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1930-1EE</td>
<td>G ¾” A / 316L with FKM Seal</td>
</tr>
<tr>
<td>7ML1930-1EF</td>
<td>G ¾” A / 316L with EPDM Seal</td>
</tr>
<tr>
<td>7ML1930-1EH</td>
<td>G ¾” A / 316L with EPDM Seal</td>
</tr>
<tr>
<td>7ML1930-1EL</td>
<td>G 1 A / 316L with EPDM Seal</td>
</tr>
<tr>
<td>7ML1930-1EK</td>
<td>G 1 A / 316L with EPDM Seal</td>
</tr>
</tbody>
</table>

1) Available with Process Temperature option A only
2) Available with Electronics option 2 only
3) Available with process connection A0, A2, A4, and A6 only
4) Available with process connection A1, A3, A5, and A7 to B6 only
5) Available with Electrical connection/Protection option B and C only
Characteristic curves

SITRANS LVL100 Ambient Temperature/Process Temperature derating curves

SITRANS LVL100 Ambient Temperature/Process Temperature derating curves
**Level instruments**

**Point level measurement - Vibrating switches**

**SITRANS LVL100**

### Dimensional drawings

**SITRANS LVL100 (standard)**

- **Thread**
  - G ¾" A, G 1" A (DIN ISO 228/1), ¾" NPT or 1" NPT (valve plug DIN 43650)

**SITRANS LVL100 (extended)**

- **Thread**
  - G ¾" A, ¾" NPT, G 1" A, 1" NPT (valve plug DIN 43650)

**SITRANS LVL100 (extended, high temperature)**

- **Thread**
  - G ¾" A, ¾" NPT, G 1" A, 1" NPT (valve plug DIN 43650)

**SITRANS LVL100 (standard with M12 connector)**

- **Thread**
  - G ¾" A, ¾" NPT, G 1" A, 1" NPT (valve plug DIN 43650)

**SITRANS LVL100 dimensions**

- **SITRANS LVL100 (standard)**
  - Length with G ¾" A, ¾" NPT: 66 mm (2.6")
  - Length with G 1" A, 1" NPT: 69 mm (2.7")

- **SITRANS LVL100 (extended)**
  - Length with G ¾" A, ¾" NPT: 66 mm (2.6")
  - Length with G 1" A, 1" NPT: 69 mm (2.7")

- **SITRANS LVL100 (extended, high temperature)**
  - Length with G ¾" A, ¾" NPT: 66 mm (2.6")
  - Length with G 1" A, 1" NPT: 69 mm (2.7")

- **SITRANS LVL100 dimensions**
  - Length with bolting: 53 mm (2.1")
  - Length with SMS 1145: 53 mm (2")
Level instruments
Point level measurement - Vibrating switches

SITRANS LVL200

Overview

SITRANS LVL200 is a standard vibrating level switch for use 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") for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- SIL 2 qualified for high level and dry run applications
- 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"), 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 lbs/in³). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or strong 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 approx. 1200 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

Horizontal mounting

marked with screwed version on top, with flange versions directed to the flange holes

Vertical mounting

switching point
[approx. 13 mm (0.51”)]
switching point with lower density

switching point with higher density

Mount away from filling openings or agitation.

Moisture protection

Ensure cable gland faces downward to avoid water ingress.

NOTE: Welded socket for flush mount optional

SITRANS LVL200 installation
**Technical specifications**

**Mode of operation**
- Measuring principle: Vibrating point level switch

**Input**
- Measured variable: High and low and demand (via mode switch)

**Output**
- Output options: Relay output (DPDT), 2 floating SPDTs, Contactless electronic switch

**Measuring Accuracy**
- Repeatability: 0.1 mm (0.004")
- Hysteresis: approx. 2 mm (0.08") with vertical installation
- Switching delay: approx. 500 ms (on/off)
- Frequency: approx. 1200 Hz

**Rated operating conditions**

<table>
<thead>
<tr>
<th>Installations conditions</th>
<th>Indoor/Outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient conditions</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-40 … +70 °C (-40 … +158 °F)</td>
</tr>
<tr>
<td>Installation category</td>
<td>III</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
</tr>
</tbody>
</table>

**Medium conditions**

| Temperature | - LVL200S Standard: -50 ... +150 °C (-58 ... +302 °F) |
|            | - LVL200S High temperature option: -50 ... +250 °C (-58 ... +482 °F) |
|            | - LVL200E Standard: with 316L/Hastelloy C4 (2.4610): -50 ... +150 °C (-58 ... +302 °F) |
|            | - LVL200E High temperature option: with 316L/Hastelloy C4 (2.4610): -50 ... +250 °C (-58 ... +482 °F) |
| Pressure (vessel) | -1 ... 64 bar g (-14.5 ... 928 psi g) |
| Density     | 0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lbs/in³); 0.5 ... 2.5 g/cm³ (0.018 ... 0.09 lbs/in³) by switching over |

**Design**

- Material:
  - Enclosure: Aluminum die-cast AISI10Mg, powder-coated, basis: Polyester
  - Tuning fork: 316L (1.4404 or 1.4435), Hastelloy C4 (2.4602)
  - Extension tube: [ø 21.3 mm (0.839")]
  - Process connection: threaded 316L (1.4404 or 1.4435), Hastelloy C4 (2.4602)
  - Process connection: flange 316L (1.4404 or 1.4435), Hastelloy with Hastelloy C4, ECTFE, or PFA coating
  - Process seal: Klingersil C-4400

**Power supply**

- Supply voltage:
  - Relay DPDT: 20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC [at U>60 V DC, the ambient temperature can be max. +50 °C (+122 °F)]
  - Contactless: 20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC

| Power consumption | 1 ... 8 VA (AC), approx. 1.3 W (DC) |
| Contactless       | 1 ... 8 VA (AC), approx. 1.3 W (DC) |

**Weight**

- Device weight: approx. 0.8 … 4 kg (0.18 … 8.82 lbs)
- Tube extension (extended version): approx 920 g/m (10 oz/ft)

**Certificates and approvals**

- CE
- Overfill protection (WHG)
- FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D
- FM (Explosion-Proof) Class I, Div. 1, Groups A, B, C, D; (Dust Ignition-Proof) Class II, III, Div. 1, Groups E, F, G
- IECEx d II2G T6...T2 Ga/Gb EHEDG
- ATEX II 1/2G, EEx d IIC T6
- Shipping approvals: ABS, DNV, LR, RINA, GL, CCS
- SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]
## SITRANS LVL200

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A00</td>
<td>Electronics Contactless electronic switch 20...250 V AC/DC Double relay (DPDT) 20 ... 72 V DC/20...250 V AC</td>
</tr>
<tr>
<td>A01</td>
<td>Approvals Without approvals Overfill protection (WHG) ATEX II 1/2G, 2G Ex d IIC T6 + WHG ATEX II 1/2G, 2G Ex d IIC T6 + shipping approvals</td>
</tr>
<tr>
<td>A02</td>
<td>Shipping approvals FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G</td>
</tr>
<tr>
<td>A03</td>
<td>FM (NI) Class I, Div. 2, Groups A, B, C, D ISO 10531-2016 IIC6606</td>
</tr>
<tr>
<td>A04</td>
<td>IECEx d IIC T6...T2 Ga/Gb</td>
</tr>
<tr>
<td>A05</td>
<td>Process connection Thread G3/4”, A, PN64/316L Thread G3/4”, A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A06</td>
<td>Thread ¾” NPT, PN64/316L Thread ¾” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A07</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A08</td>
<td>Thread G1” A, PN64/316L ECTFE coated MB1982 Thread G1” A, PN64/316L ECTFE coated MB1982</td>
</tr>
<tr>
<td>A09</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A10</td>
<td>Thread 1” NPT, PN64/316L Thread 1” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A11</td>
<td>Thread 1” NPT, PN64/316L ECTFE coated Thread 1” NPT, PN64/316L ECTFE coated</td>
</tr>
<tr>
<td>A12</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A13</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A14</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L ECTFE coated Thread 1½” NPT, PN64/316L ECTFE coated</td>
</tr>
<tr>
<td>A15</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A16</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A17</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A18</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A19</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A20</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A21</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A22</td>
<td>Thread G1” A, PN64/316L Thread G1” A, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A23</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A24</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A25</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A26</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A27</td>
<td>Thread 1½” NPT, PN64/316L Thread 1½” NPT, PN64/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A28</td>
<td>Thread 2¨ A, PN64/316L Thread 2¨ A, PN64/316L</td>
</tr>
<tr>
<td>A29</td>
<td>Thread M27x1.5, PN64/316L Thread M27x1.5, PN64/316L</td>
</tr>
<tr>
<td>A30</td>
<td>Conus DN25, PN40/316L Ra&lt;0.8μm Conus DN25, PN40/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A31</td>
<td>Conus DN25, PN40/316L Ra&lt;0.8μm Conus DN25, PN40/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A32</td>
<td>Conus DN25, PN40/ECTFE (ZB3033) Conus DN25, PN40/ECTFE (ZB3033)</td>
</tr>
<tr>
<td>A33</td>
<td>Conus M25, PN40/316L Conus M25, PN40/316L</td>
</tr>
<tr>
<td>A34</td>
<td>Conus M25, PN40/316L Conus M25, PN40/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A35</td>
<td>Conus M25, PN40/316L Conus M25, PN40/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A36</td>
<td>Tri-Clamp 1”, PN16/316L Ra&lt;0.8μm Tri-Clamp 1”, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A37</td>
<td>Tri-Clamp 1”, PN16/316L Ra&lt;0.8μm Tri-Clamp 1”, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A38</td>
<td>Tri-Clamp 1”, PN16/316L Ra&lt;0.8μm Tri-Clamp 1”, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A39</td>
<td>Tri-Clamp 1½”, PN16/316L Ra&lt;0.8μm Tri-Clamp 1½”, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A40</td>
<td>Tri-Clamp 1½”, PN16/316L Ra&lt;0.8μm Tri-Clamp 1½”, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A41</td>
<td>Tri-Clamp 1½”, PN16/316L Ra&lt;0.8μm Tri-Clamp 1½”, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A42</td>
<td>Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A43</td>
<td>Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A44</td>
<td>Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm</td>
</tr>
<tr>
<td>A45</td>
<td>Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm Tri-Clamp 2¨, PN16/316L Ra&lt;0.8μm</td>
</tr>
</tbody>
</table>

---

**Level instruments**

**Point level measurement - Vibrating switches**

**SITRANS LVL200**

Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Flange DN</th>
<th>PN40 Form C</th>
<th>DIN 2501/316L</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN40</td>
<td>B100</td>
<td>C2(4.610)</td>
<td>B16</td>
</tr>
<tr>
<td>DN50</td>
<td>B125</td>
<td>C2(4.610)</td>
<td>B26</td>
</tr>
<tr>
<td>DN65</td>
<td>B140</td>
<td>C2(4.610)</td>
<td>B36</td>
</tr>
<tr>
<td>DN80</td>
<td>B150</td>
<td>C2(4.610)</td>
<td>B42</td>
</tr>
<tr>
<td>DN100</td>
<td>B165</td>
<td>C2(4.610)</td>
<td>B52</td>
</tr>
<tr>
<td>DN125</td>
<td>B180</td>
<td>C2(4.610)</td>
<td>B62</td>
</tr>
<tr>
<td>DN150</td>
<td>B200</td>
<td>C2(4.610)</td>
<td>B72</td>
</tr>
<tr>
<td>DN200</td>
<td>B250</td>
<td>C2(4.610)</td>
<td>B77</td>
</tr>
<tr>
<td>DN250</td>
<td>B300</td>
<td>C2(4.610)</td>
<td>B82</td>
</tr>
<tr>
<td>DN300</td>
<td>B350</td>
<td>C2(4.610)</td>
<td>B87</td>
</tr>
<tr>
<td>DN400</td>
<td>B400</td>
<td>C2(4.610)</td>
<td>B92</td>
</tr>
<tr>
<td>DN500</td>
<td>B500</td>
<td>C2(4.610)</td>
<td>B97</td>
</tr>
</tbody>
</table>

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Flange DN</th>
<th>PN40 Form C</th>
<th>DIN 2501/ECTFE</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN25</td>
<td>B100</td>
<td>C2(4.610)</td>
<td>B16</td>
</tr>
<tr>
<td>DN50</td>
<td>C2(4.610)</td>
<td>B26</td>
<td></td>
</tr>
<tr>
<td>DN80</td>
<td>C2(4.610)</td>
<td>B42</td>
<td></td>
</tr>
<tr>
<td>DN100</td>
<td>C2(4.610)</td>
<td>B52</td>
<td></td>
</tr>
<tr>
<td>DN125</td>
<td>C2(4.610)</td>
<td>B62</td>
<td></td>
</tr>
<tr>
<td>DN150</td>
<td>C2(4.610)</td>
<td>B72</td>
<td></td>
</tr>
<tr>
<td>DN200</td>
<td>C2(4.610)</td>
<td>B82</td>
<td></td>
</tr>
<tr>
<td>DN250</td>
<td>C2(4.610)</td>
<td>B92</td>
<td></td>
</tr>
</tbody>
</table>

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B16</td>
</tr>
<tr>
<td>B26</td>
</tr>
<tr>
<td>B42</td>
</tr>
<tr>
<td>B52</td>
</tr>
<tr>
<td>B62</td>
</tr>
<tr>
<td>B72</td>
</tr>
<tr>
<td>B92</td>
</tr>
</tbody>
</table>

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B17</td>
</tr>
<tr>
<td>B27</td>
</tr>
<tr>
<td>B37</td>
</tr>
<tr>
<td>B47</td>
</tr>
<tr>
<td>B57</td>
</tr>
<tr>
<td>B67</td>
</tr>
<tr>
<td>B77</td>
</tr>
<tr>
<td>B87</td>
</tr>
</tbody>
</table>

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B18</td>
</tr>
<tr>
<td>B28</td>
</tr>
<tr>
<td>B38</td>
</tr>
<tr>
<td>B48</td>
</tr>
<tr>
<td>B58</td>
</tr>
<tr>
<td>B68</td>
</tr>
<tr>
<td>B78</td>
</tr>
<tr>
<td>B88</td>
</tr>
</tbody>
</table>

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B20</td>
</tr>
<tr>
<td>B30</td>
</tr>
<tr>
<td>B40</td>
</tr>
<tr>
<td>B50</td>
</tr>
<tr>
<td>B60</td>
</tr>
<tr>
<td>B70</td>
</tr>
<tr>
<td>B80</td>
</tr>
<tr>
<td>B90</td>
</tr>
</tbody>
</table>

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B21</td>
</tr>
<tr>
<td>B31</td>
</tr>
<tr>
<td>B41</td>
</tr>
<tr>
<td>B51</td>
</tr>
<tr>
<td>B61</td>
</tr>
<tr>
<td>B71</td>
</tr>
<tr>
<td>B81</td>
</tr>
<tr>
<td>B91</td>
</tr>
</tbody>
</table>
## Level instruments

### SITRANS LVL200

#### Selection and Ordering data

| Flange DN100, PN16 Form B1, EN 1092-1/316L | C 38 |
| Flange DN100, PN16 Form B1, EN 1092-1/600lb RF, ANSI B16.5/ECTFE1) | C 40 |
| Flange DN150, PN16 Form B1, EN 1092-1/316L | C 41 |
| Flange DN100, PN40 Form B1, EN 1092-1/316L | C 42 |
| Flange DN100, PN40 Form C, EN 1092-1/316L | C 43 |
| Flange DN150, PN63 Form B2, EN 1092-1/316L | C 44 |
| Flange DN150, PN16 Form B1, EN 1092-1/316L | C 45 |
| Flange DN150, PN16 Form B1, EN 1092-1/316L | C 46 |
| Flange DN150, PN40 Form B1, EN 1092-1/316L | C 47 |
| Flange DN150, PN40 Form B1, EN 1092-1/316L | C 48 |
| Flange 1½“ 150lb RF, ANSI B16.5/316L | C 50 |
| Flange 1½“ 150lb RF, ANSI B16.5/316L | C 51 |
| Flange 1½“ 150lb RF, ANSI B16.5/316L | C 52 |
| Flange 1½“ 150lb RF, ANSI B16.5/316L | C 53 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 54 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 55 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 56 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 57 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 58 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 59 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C 60 |
| Flange 1½“ 150lb RF, ANSI B16.5/316L | C 61 |
| Flange 1½“ 150lb RF, ANSI B16.5/316L | C 62 |
| Flange D4 (4.0610) | D 06 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 07 |
| Flange 2” 300lb RF, ANSI B16.5/316L | D 08 |
| Flange 2” 300lb RF, ANSI B16.5/316L | D 09 |
| Flange 2½“ 150lb RF, ANSI B16.5/316L | D 10 |
| Flange 2½“ 300lb RF, ANSI B16.5/316L | D 11 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 12 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 13 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 14 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 15 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 16 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 17 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 18 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 19 |
| Flange 3 150lb RF, ANSI B16.5/316L | D 20 |
| Flange 3 300lb RF, ANSI B16.5/316L | D 21 |
| Flange 3 300lb RF, ANSI B16.5/316L | D 22 |
| Flange 3 300lb RF, ANSI B16.5/316L | D 23 |
| Flange 3 300lb RF, ANSI B16.5/316L | D 24 |
| Flange 3 300lb RF, ANSI B16.5/316L | D 25 |
| Flange 3 600lb RF, ANSI B16.5/316L | D 26 |
| Flange 3 600lb RF, ANSI B16.5/316L | D 27 |
| Flange 3 600lb RF, ANSI B16.5/316L | D 28 |
| Flange 4 150lb RF, ANSI B16.5/316L | D 29 |
| Flange 4 150lb RF, ANSI B16.5/316L | D 30 |
| Flange 4 150lb RF, ANSI B16.5/316L | D 31 |
| Flange 4 150lb RF, ANSI B16.5/316L | D 32 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 33 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 34 |
| Flange 4 150lb LT, ANSI B16.5/316L | D 35 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 36 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 37 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 38 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 39 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 40 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 41 |
| Flange 4 300lb RF, ANSI B16.5/316L | D 42 |
| Flange 4 600lb RF, ANSI B16.5/316L | D 43 |
| Flange 4 600lb RF, ANSI B16.5/316L | D 44 |
| Flange 6 150lb RF, ANSI B16.5/316L | D 45 |
| Flange 6 150lb RF, ANSI B16.5/316L | D 46 |
| Flange 6 150lb RF, ANSI B16.5/316L | D 47 |
| Flange 6 150lb RF, ANSI B16.5/316L | D 48 |
| Flange 6 150lb RF, ANSI B16.5/316L | D 49 |
| Flange 8 150lb RF, ANSI B16.5/316L | D 50 |
| Flange 8 150lb RF, ANSI B16.5/316L | D 51 |
| Flange 1” 150lb SS, ANSI B16.5/ECEFT1) | D 52 |
| Flange 1” 150lb SS, ANSI B16.5/ECEFT1) | D 53 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 54 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 55 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 56 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 57 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 58 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 59 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 60 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 61 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 62 |
| Flange 1” 300lb SS, ANSI B16.5/SS161 | D 63 |

Compact vibrating level switch for use 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.

© Siemens AG 2010
Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5746</td>
<td>A0</td>
</tr>
</tbody>
</table>

**SITRANS LVL200, Standard**
Compact vibrating level switch for use 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.

**Adapter/Process temperature**

- Without adapter/-50 ... +150 °C (-58 ... +302 °F)  
- With adapter/-50 ... +200 °C (-58 ... +392 °F)  
- 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)

**Housing/ Cable entry**

- Aluminium IP66/IP67/M20x1.5  
- Aluminium IP66/IP67/½” NPT

**Further designs**
Please add "-Z" to Order No. and specify Order code(s).

**Cleaning including Certificate (oil, grease and silicone free)**

- W01

**Identification Label (measurement loop)**

- SS  
- Foil

**Acceptance test certificate 3.1 NACE MR 0775 for material EN10204**

- D07

**Acceptance test certificate 3.1 for instrument EN10204**

- C12

**Acceptance test certificate 2.2 for instrument EN10204**

- C14

**Acceptance test certificate 2.2 for material EN10204**

- C15

**SIL/IEC61508 Certificate of conformity (SIL-2/3 min. and max. detection)**

- C20

**Additional instruction manual**

- LVL200 (DPDT Relay), English  
- 7ML1998-5KR01  
- LVL200 (DPDT Relay), French  
- 7ML1998-5KR11  
- LVL200 (DPDT Relay), Spanish  
- 7ML1998-5KR21  
- LVL200 (DPDT Relay), German  
- 7ML1998-5KR31  
- LVL200 (Contactless electronic switch), English  
- 7ML1998-5KQ01  
- LVL200 (Contactless electronic switch), French  
- 7ML1998-5KQ11  
- LVL200 (Contactless electronic switch), Spanish  
- 7ML1998-5KQ21  
- LVL200 (Contactless electronic switch), German  
- 7ML1998-5KQ31  
- Electronics module LVL200 Relay, English  
- 7ML1998-5LS01  
- Electronics module LVL200 Relay, French  
- 7ML1998-5LS11  
- Electronics module LVL200 Relay, Spanish  
- 7ML1998-5LS21  
- Electronics module LVL200 Relay, German  
- 7ML1998-5LS31

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Spare Parts**

- Electronics module SITRANS LVL200 Relay  
- 7ML1830-1NC  
- LVL200 Threaded Welded Socket  
- G ¾” A / 316L with FKM Seal  
- 7ML1930-1EE  
- G 1 A / 316L with FKM Seal  
- 7ML1930-1EF  
- M27x1.5 / 316L with FKM Seal  
- 7ML1930-1EG  
- G ¾ A / 316L with EPDM Seal  
- 7ML1930-1EH  
- G 1 A / 316L with EPDM Seal  
- 7ML1930-1EJ  
- M27x1.5 / 316L with EPDM Seal  
- 7ML1930-1EK

1) Available with Housing/Cable entry option B only
2) Available with Adapter/Process temperature options 1 and 4 only
3) Available with Adapter/Process temperature options 1, 2, and 4 only
4) Available with enamelled Process connection options only
### SITRANS LVL200

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LVL200, Rigid extension</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.</td>
<td>7 ML 5 74 7 -</td>
</tr>
</tbody>
</table>

#### Electronics

- Contactless electronic switch 20...250 V AC/DC
- Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC

#### Approvals

- Without approvals
- Overfill protection (WHG)
- ATEX II 1/2G, 2G Ex d IIC T6 + WHG
- ATEX II 1/2G, 2G Ex d IIC T6 + shipping approvals

#### Shipping approvals

- FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP)
- Class II, III, Div. 1, Groups E, F, G
- FM (NI) Class I, Div. 2, Groups A, B, C, D
- IECEx d IIC T6..72 Ga/Gb

#### Process connection

- Thread G ¾" A, PN64/316L
- Thread G ¾" A, PN64/316L Ra<0.8μm
- Thread G ¾" A, PN64/316L Ra<0.3μm
- Thread G ¾" A, PN64/316L PFA coated
- Thread A ⅜" A, PN64/316L
- Thread A ⅜" A, PN64/316L Ra<0.8μm
- Thread A ⅜" A, PN64/316L Ra<0.3μm
- Thread A ⅜" A, PN64/316L PFA coated

#### Flanges

- Flange DN40 PN6 Form C, DIN 2501/ECTFE
- Flange DN40 PN6 Form C, DIN 2501/316L
- Flange DN32 PN40 Form C, DIN 2501/ECTFE
- Flange DN32 PN40 Form C, DIN 2501/316L
- Flange DN25 PN40 V13, DIN 2501/Monel solid
- Flange DN25 PN40 V13, DIN 2501/316L
- Flange DN40 PN40 DIN11851/316L Ra<0.8μm
- Flange DN40 PN40 DIN11851/316L Ra<0.3μm
- Flange DN40 PN40 DIN11851/316L Ra<0.8μm
- Flange DN40 PN40 DIN11851/316L Ra<0.3μm

#### Threaded connections

- Thread M27x1.5 PN40/316L
- Cyl. socket/316Ti/1.4581 ECTFE coated ZB3052
- Thread G ¾" A, PN64/316L
- Thread G ¾" A, PN64/316L Ra<0.8μm
- Thread G ¾" A, PN64/316L Ra<0.3μm
- Thread G ¾" A, PN64/316L PFA coated

#### Threaded compression fittings

- Swagelok VCR screwing F40 PN25/316L
- Swagelok VCR screwing F40 PN25/316L Ra<0.3μm
- Swagelok VCR screwing F40 PN25/316L
- Swagelok VCR screwing F40 PN25/316L Ra<0.8μm

#### Bolted connections

- Bolting DN50 PN25 DIN11851/316L Ra<0.8μm
- Bolting DN50 PN25 DIN11851/316L Ra<0.3μm
- Bolting DN50 PN25 DIN11864-1 A/316L Ra<0.8μm
- Bolting DN50 PN25 DIN11864-1 A/316L Ra<0.3μm
- Bolting DN50 PN25 DIN11864-1 A/316L Ra<0.8μm
- Bolting DN50 PN25 DIN11864-1 A/316L Ra<0.3μm
- Bolting DN50 PN25 DIN11864-1 A/316L Ra<0.8μm
- Bolting DN50 PN25 DIN11864-1 A/316L Ra<0.3μm

#### Hygienic connections

- Hygienic fl. DN50 PN64/316L
- Hygienic fl. DN50 PN64/316L Ra<0.8μm
- Hygienic fl. DN50 PN64/316L Ra<0.3μm
- Hygienic fl. DN50 PN64/316L Ra<0.8μm
- Hygienic fl. DN50 PN64/316L Ra<0.3μm

#### End connections

- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/PFA
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/Monel
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
- Flange DN25 PN6 Form C, DIN 2501/316L
### Selection and Ordering data

| Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications. |
|-----------------|------------------|-----------------|
| **Order No.** | **Flange DN40 PN40 Form C, DIN 2501/ Hastelloy C4(2.4610)** | B 15 |
| | **Flange DN40 PN40 Form C, DIN 2501/ECTFE** | B 16 |
| | **Flange DN40 PN40 Form C, DIN 2501/PFA** | B 17 |
| | **Flange DN40 PN40 Form C, DIN 2501/Enamelled** | B 18 |
| | **Flange DN40 PN40 Form F, DIN 2501/316L** | B 20 |
| | **Flange DN40 PN40 Form N, DIN 2501/316L** | B 21 |
| | **Flange DN40 PN40 Form E, DIN 2501/316L** | B 22 |
| | **Flange DN40 PN40 V13, DIN 2501/316L** | B 23 |
| | **Flange DN50 PN40 Form C, DIN 2501/316L** | B 24 |
| | **Flange DN50 PN40 Form C, DIN 2501/ Hastelloy C4(2.4610)** | B 25 |
| | **Flange DN50 PN40 Form C, DIN 2501/ECTFE** | B 26 |
| | **Flange DN50 PN40 Form C, DIN 2501/PFA** | B 27 |
| | **Flange DN50 PN40 Form D, DIN 2501/316L** | B 30 |
| | **Flange DN50 PN40 Form D, DIN 2501/ Hastelloy C4(2.4610)** | B 31 |
| | **Flange DN50 PN40 Form F, DIN 2501/316L** | B 32 |
| | **Flange DN50 PN40 Form N, DIN 2501/316L** | B 33 |
| | **Flange DN50 PN40 Form N, DIN 2501/ Hastelloy C4(2.4610)** | B 34 |
| | **Flange DN50 PN40 Form E, DIN 2501/316L** | B 35 |
| | **Flange DN50 PN40 V13, DIN 2501/316L** | B 36 |
| | **Flange DN50 PN40 R13, DIN 2501/316L** | B 37 |
| | **Flange DN50 PN64 Form F, DIN 2501/316L** | B 38 |
| | **Flange DN50 PN64 Form N, DIN 2501/ Hastelloy C4(2.4610)** | B 39 |
| | **Flange DN50 PN64 Form C, DIN 2501/316L** | B 40 |
| | **Flange DN50 PN64 Form L, DIN 2501/316L** | B 41 |
| | **Flange DN50 PN100 Form E, DIN 2501/316L** | B 42 |
| | **Flange DN50 PN100 Form L, DIN 2501/316L** | B 43 |
| | **Flange DN50 PN100 Form N, DIN 2501/316L** | B 44 |
| | **Flange DN65 PN40 Form C, DIN 2501/ Hastelloy C4(2.4610)** | B 46 |
| | **Flange DN65 PN40 Form C, DIN 2501/ECTFE** | B 47 |
| | **Flange DN65 PN40 Form C, DIN 2501/PFA** | B 48 |
| | **Flange DN65 PN40 Form F, DIN 2501/316L** | B 50 |
| | **Flange DN65 PN64 Form F, DIN 2501/316L** | B 51 |
| | **Flange DN80 PN40 Form C, DIN 2501/316L** | B 52 |
| | **Flange DN80 PN40 Form C, DIN 2501/ Hastelloy C4(2.4610)** | B 53 |
| | **Flange DN80 PN40 Form C, DIN 2501/ECTFE** | B 54 |
| | **Flange DN80 PN40 Form C, DIN 2501/PFA** | B 55 |
| | **Flange DN80 PN40 Form F, DIN 2501/316L** | B 56 |
| | **Flange DN80 PN40 Form N, DIN 2501/316L** | B 57 |
| | **Flange DN80 PN40 Form N, DIN 2501/ Hastelloy C4(2.4610)** | B 58 |
| | **Flange DN100 PN16 Form C, DIN 2501/316L** | B 60 |
| | **Flange DN100 PN16 Form C, DIN 2501/ Hastelloy C4(2.4610)** | B 61 |
| | **Flange DN100 PN16 Form C, DIN 2501/ECTFE** | B 62 |
| | **Flange DN100 PN16 Form C, DIN 2501/PFA** | B 63 |
| | **Flange DN100 PN16 Form D, DIN 2501/316L** | B 64 |
| | **Flange DN100 PN16 Form F, DIN 2501/316L** | B 65 |
| | **Flange DN100 PN16 Form N, DIN 2501/316L** | B 66 |
| | **Flange DN100 PN16 Form N, DIN 2501/316L** | B 67 |
| | **Flange DN100 PN40 Form C, DIN 2501/ECTFE** | B 70 |
| | **Flange DN100 PN40 Form C, DIN 2501/ PFA** | B 71 |
| | **Flange DN100 PN40 Form F, DIN 2501/316L** | B 72 |
### Level instruments

#### Point level measurement - Vibrating switches

**SITRANS LVL200**

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LVL200, Rigid extension</td>
<td>7ML 5747 -</td>
</tr>
</tbody>
</table>

- Compact vibrating level switch for use 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 DN100 PN40 Form B1, EN 1092-1/Enamelled | C38 |
| Flange DN100 PN40 Form C, EN 1092-1/316L | C40 |
| Flange DN150 PN63 Form B2, EN 1092-1/316L | C41 |
| Flange DN150 PN16 Form B1, EN 1092-1/316L | C42 |
| Flange DN150 PN16 Form B1, EN 1092-1/PFA | C43 |
| Flange DN150 PN40 Form B1, EN 1092-1/316L | C44 |
| Flange 1½” 150lb RF, ANSI B16.5/316L | C46 |
| Flange 1” 150lb RF, ANSI B16.5/ECTFE | C48 |
| Flange 1½” 150lb RF, ANSI B16.5/Monel ZB2977 | C50 |
| Flange 1” 150lb RF, ANSI B16.5/ELECTFE | C51 |
| Flange 1½” 150lb RF, ANSI B16.5/PFA | C52 |
| Flange 1” 150lb RF, ANSI B16.5/Enamelled | C53 |
| Flange 1” 300lb RF, ANSI B16.5/316L | C54 |
| Flange 1” 300lb RF, ANSI B16.5/ECTFE | C55 |
| Flange 1½” 600lb RF, ANSI B16.5/316L | C56 |
| Flange 1½” 150lb RF, ANSI B16.5/316L | C57 |
| Flange 1½” 150lb RF, ANSI B16.5/316L | C58 |
| Flange 1½” 150lb RF, ANSI B16.5/ELECTFE | C60 |
| Flange 1½” 150lb RF, ANSI B16.5/PFA | C61 |
| Flange 1½” 150lb RF, ANSI B16.5/Enamelled | C62 |
| Flange 1½” 150lb RF, ANSI B16.5/ELECTFE | C63 |
| Flange 1½” 300lb RF, ANSI B16.5/41 |
| Flange 1½” 300lb RF, ANSI B16.5/316L | C65 |
| Flange 1½” 300lb RF, ANSI B16.5/Monel ZB2977 | C66 |
| Flange 1½” 600lb RF, ANSI B16.5/ECTFE | C67 |
| Flange 2” 150lb RF, ANSI B16.5/316L | C68 |
| Flange 2” 150lb RF, ANSI B16.5/316L | C70 |
| Flange 2” 150lb RF, ANSI B16.5/Monel ZB2977 | C71 |
| Flange 2” 150lb RF, ANSI B16.5/ELECTFE | C72 |
| Flange 2” 150lb RF, ANSI B16.5/PFA | C73 |
| Flange 2” 150lb RF, ANSI B16.5/Enamelled | C74 |
| Flange 2” 150lb FF, ANSI B16.5/316L | C75 |
| Flange 2” 150lb FF, ANSI B16.5/ELECTFE | C76 |
| Flange 2” 150lb SG (small groove), ANSI B16.5/316L | C77 |
| Flange 2” 300lb RF, ANSI B16.5/316L | C78 |
| Flange 2” 300lb RF, ANSI B16.5/316L | C80 |
| Flange 2” 300lb RF, ANSI B16.5/316L | C81 |
| Flange 2” 300lb RF, ANSI B16.5/316L | C82 |
| Flange 2” 300lb RF, ANSI B16.5/ELECTFE | C83 |
| Flange 2” 300lb RF, ANSI B16.5/PFA | C84 |
| Flange 2” 300lb RF, ANSI B16.5/Enamelled | C85 |
| Flange 2” 300lb ST, ANSI B16.5/316L | C86 |
| Flange 2” 300lb LG (large groove), ANSI B16.5/316L | C87 |
| Flange 2” 300lb LT, ANSI B16.5/316L | C88 |
| Flange 2” 600lb RF, ANSI B16.5/316L | D00 |
| Flange 2” 600lb RF, ANSI B16.5/Monel ZB2977 | D01 |
| Flange 2” 600lb RF, ANSI B16.5/ELECTFE | D02 |
| Flange 2” 600lb RF, ANSI B16.5/PFA | D03 |
| Flange 2” 600lb RF, ANSI B16.5/Enamelled | D04 |
| Flange 2” 900lb RF, ANSI B16.5/316L | D05 |
| Flange 2¼” 150lb RF, ANSI B16.5/316L | D06 |
| Flange 2¼” 300lb RF, ANSI B16.5/316L | D07 |

#### Adapter/Process temperature

- Without adapter/-50 ... +150 °C
- With adapter/-50 ... 200 °C
- With adapter/-50 ... 250 °C
- With gas-tight leadthrough/-50...+150 °C
- With gas-tight leadthrough/-50...+250 °C
## Selection and Ordering data

### SITRANS LVL200, Rigid extension

<table>
<thead>
<tr>
<th>Rigid Extension 316L</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 ... 500 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>501 ... 1000 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>1001 ... 1500 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>1501 ... 2000 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>2001 ... 2500 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>2501 ... 3000 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>3001 ... 3500 mm</td>
<td>7ML5747A</td>
</tr>
<tr>
<td>3501 ... 4000 mm</td>
<td>7ML5747A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rigid Extension ECTFE coated&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 ... 500 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>501 ... 1000 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>1001 ... 1500 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>1501 ... 2000 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>2001 ... 2500 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>2501 ... 3000 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>3001 ... 3500 mm</td>
<td>7ML5747B</td>
</tr>
<tr>
<td>3501 ... 4000 mm</td>
<td>7ML5747B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rigid Extension PFA coated&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 ... 500 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>501 ... 1000 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>1001 ... 1500 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>1501 ... 2000 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>2001 ... 2500 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>2501 ... 3000 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>3001 ... 3500 mm</td>
<td>7ML5747C</td>
</tr>
<tr>
<td>3501 ... 4000 mm</td>
<td>7ML5747C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rigid Extension 316L Ra ≤ 0.8 µm</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 ... 500 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>501 ... 1000 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>1001 ... 1500 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>1501 ... 2000 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>2001 ... 2500 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>2501 ... 3000 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>3001 ... 3500 mm</td>
<td>7ML5747D</td>
</tr>
<tr>
<td>3501 ... 4000 mm</td>
<td>7ML5747D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rigid Extension 316L Ra ≤ 0.3 µm</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 ... 500 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>501 ... 1000 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>1001 ... 1500 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>1501 ... 2000 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>2001 ... 2500 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>2501 ... 3000 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>3001 ... 3500 mm</td>
<td>7ML5747E</td>
</tr>
<tr>
<td>3501 ... 4000 mm</td>
<td>7ML5747E</td>
</tr>
</tbody>
</table>

## Housing/ Cable entry

- Aluminium IP66/IP67/M20x1.5
- Aluminium IP66/IP67/½” NPT

### NOTE:

- When selecting a Rigid Extension option, the Extension coating must match the Process connection coating and surface roughness type.

### Further designs

- Please add “-Z” to Order No. and specify Order code(s).

### Additional instruction manual

- Order No. 7ML1998-5KW01
- Order No. 7ML1998-5KW11
- Order No. 7ML1998-5KW21
- Order No. 7ML1998-5KW31
- Order No. 7ML1998-5KV01
- Order No. 7ML1998-5KV11
- Order No. 7ML1998-5KV21
- Order No. 7ML1998-5KV31
- Order No. 7ML1998-5LS01
- Order No. 7ML1998-5LS11
- Order No. 7ML1998-5LS21
- Order No. 7ML1998-5LS31

### Spare Parts

- Order No. 7ML1930-1NC
- Order No. 7ML1930-1DQ
- Order No. 7ML1930-1DR
- Order No. 7ML1930-1DS
- Order No. 7ML1930-1DT
- Order No. 7ML1930-1DU
- Order No. 7ML1930-1DV
- Order No. 7ML1930-1DE
- Order No. 7ML1930-1EA
- Order No. 7ML1930-1EB
- Order No. 7ML1930-1EC
- Order No. 7ML1930-1ED

<sup>1)</sup> Available with Housing/Cable entry option B only

<sup>2)</sup> Available with Adapter/Process temperature options 1 and 4 only

<sup>3)</sup> Available with Adapter/Process temperature options 1, 2, and 4 only

<sup>4)</sup> Available with enameled Process connection and Extension options only

---

Point level measurement - Vibrating switches

SITRANS LVL200

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

For use in SIL-2 and hazardous applications, as well as pump protection.

- Order code
- Acceptance test certificate 3.1 for instrument EN10204
- Acceptance test certificate 2.2 for instrument EN10204
- Acceptance test certificate 2.2 for material EN10204
- SIL/IEC61508 Certificate of conformity (SIL-2 min. and max. detection)
- Acceptance test certificate 3.1 NACE MR 0775 for material EN10204
- Cleaning including Certificate (oil, grease and silicone free)
- Enter the total insertion length in plain text description, max. 4000 mm (157.48")
- Identification Label (measurement loop) SS
- Identification Label (measurement loop) Foil

Further designs

- Please add “-Z” to Order No. and specify Order code(s).

Additional instruction manual

- Order No. 7ML1998-5KW01
- Order No. 7ML1998-5KW11
- Order No. 7ML1998-5KW21
- Order No. 7ML1998-5KW31
- Order No. 7ML1998-5KV01
- Order No. 7ML1998-5KV11
- Order No. 7ML1998-5KV21
- Order No. 7ML1998-5KV31
- Order No. 7ML1998-5LS01
- Order No. 7ML1998-5LS11
- Order No. 7ML1998-5LS21
- Order No. 7ML1998-5LS31

Spare Parts

- Order No. 7ML1930-1NC
- Order No. 7ML1930-1DQ
- Order No. 7ML1930-1DR
- Order No. 7ML1930-1DS
- Order No. 7ML1930-1DT
- Order No. 7ML1930-1DU
- Order No. 7ML1930-1DV
- Order No. 7ML1930-1DE
- Order No. 7ML1930-1EA
- Order No. 7ML1930-1EB
- Order No. 7ML1930-1EC
- Order No. 7ML1930-1ED

1) Available with Housing/Cable entry option B only

2) Available with Adapter/Process temperature options 1 and 4 only

3) Available with Adapter/Process temperature options 1, 2, and 4 only

4) Available with enameled Process connection and Extension options only
Level instruments
Point level measurement - Vibrating switches

SITRANS LVL200

Options

SITRANS LVL200 welded socket and lock fitting
Level instruments
Point level measurement - Vibrating switches

Characteristic curves

SITRANS LVL200 Process Pressure/Process Temperature/Ambient Temperature derating curves
Level instruments
Point level measurement - Vibrating switches

SITRANS LVL200

Dimensional drawings

SITRANS LVL200 (Standard)

Threaded

Cone DN25

Temperature adapter

Bolting DN40

Flange

Gas-tight leadthrough

SITRANS LVL200 (Standard) dimensions
SITRANS LVL200

**Schematics**

- **Relay (DPDT)**
- **Control lamp**
- **DIL switch for mode adjustment**
- **DIL switch for switching point adaptation**
- **Ground terminal**
- **Connection terminals**

- **Contactless**
- **Relay output**
- **Voltage supply**

**SITRANS LVL200 connections**
Level instruments
Point level measurement - Vibrating switches

SITRANS LVS100

Overview

SITRANS LVS100 is a vibrating point level switch for bulk solids.

Benefits

- High resistance to mechanical forces
- Strong resistance to external vibrations
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 60 g/l (3.8 lb/ft³)
- Customer desired extensions up to 2000 mm (78.74")

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

<table>
<thead>
<tr>
<th>max. deviation from vertical O</th>
<th>max. length L</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>4 m</td>
</tr>
<tr>
<td>45°</td>
<td>1.2 m</td>
</tr>
<tr>
<td>&gt;45°</td>
<td>0.6 m</td>
</tr>
</tbody>
</table>
# Technical specifications

<table>
<thead>
<tr>
<th>Mode of Operation</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>19 to 230 V AC, +10%, 50 to 60 Hz, 8 VA</td>
</tr>
<tr>
<td>Input</td>
<td>19 to 50 V DC, +10%, 1.5 W</td>
</tr>
<tr>
<td>Measured variable</td>
<td>Certificates and approvals</td>
</tr>
<tr>
<td>Measuring frequency</td>
<td>CSA/FM General Purpose</td>
</tr>
<tr>
<td>Output</td>
<td>CE</td>
</tr>
<tr>
<td>Relays</td>
<td>CSA/FM Dust Ignition Proof</td>
</tr>
<tr>
<td>Relay delay</td>
<td>C-TICK</td>
</tr>
<tr>
<td>Signal delay</td>
<td>ATEX II 1/2 D</td>
</tr>
<tr>
<td>Relay fail-safe</td>
<td>High or low, switch selectable</td>
</tr>
<tr>
<td>Alarm output</td>
<td>High or low, switch selectable</td>
</tr>
<tr>
<td>Signal delay</td>
<td>High or low, switch selectable</td>
</tr>
</tbody>
</table>

## 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 to 2 seconds
- Signal delay:
  - Probe uncovered to covered: approximately 1 second
  - Probe covered to uncovered: approximately 1 to 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

## Rated operating conditions

### Installation conditions
- **Location:** Indoor/outdoor
- **Ambient conditions:**
  - Ambient temperature: -40 ... +60 °C (-40 ... +140 °F)
  - Installation category: III
  - Pollution degree: 2

### Process conditions
- **Process temperature:** -40 ... +150 °C (-40 ... +302 °F)
- **Max. threaded bushing temperature:** +80 °C (+176 °F)
- **Max. enclosure surface temperature** (Category 2D): +90 °C (+194 °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:** approx. 60 g/l (3.8 lb/ft³)

### Design
- **Material**
  - Enclosure: Epoxy coated aluminum
- **Process connection**
  - Thread 1¼" NPT [(Taper), ANSI/ASME B1.20.1], R 1½" [(BSPT), EN 10226]
  - Thread R 1½" [(BSPT), EN 10226], ½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]
  - 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 ½" NPT
- **Weight:** Standard version, no extensions: approx. 1.7 kg (3.7 lbs)
Level instruments

Point level measurement - Vibrating switches

SITRANS LVS100

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVS100, standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5735-0</td>
<td>Vibrating point level switch for high or low level detection of bulk solids Sensitivity &gt; 60 g/l.</td>
</tr>
</tbody>
</table>

Input Voltage

- DPDT Relay - 19 ... 230 V AC, 19 ... 50 V DC

Process temperature

- up to +150 °C (+302 °F)

Process connection

- Threaded
  - R 1½" [(BSPT), EN 10226]
  - 1¼" NPT [(Taper), ANSI/ASME B1.20.1]
  - R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve - min. length 500 mm (19.69")
  - 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]

Extension length

- Stainless steel 316TI (1.4571)
  - Standard length, 170 mm (6.69")

- Stainless steel 304 (1.4301)
  - 300 ... 500 mm (11.81 ... 19.69")
  - 501 ... 1000 mm (19.72 ... 39.37")
  - 1001 ... 1500 mm (39.41 ... 59.06")
  - 1501 ... 2000 mm (59.09 ... 78.74")

Approvals

- CSA/FM General Purpose, CE, C-TICK
- CSA/FM Class II, Div. 1, Group E,F, G, Class III, ATEX II 1/2 D, C-TICK

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: Enter the total insertion length in plain text description, max. 2000 mm (78.74")

Signal bulb inserted in M20 cable gland

Instruction manual

- Multi-language
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

Spare parts

- Replacement Electronics Module LVS100 DPDT Relay (19 to 253 V AC, 19 to 55 V DC)
- R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve
- 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]

Dimensional drawings

Schematics

Universal voltage (DPDT relay)

- AC: terminal 1: L, terminal 2: N
  - 19 to 230 V AC, +10%, 50 to 60 Hz, 8 VA
- DC: terminal 1: +, terminal 2: -
  - 19 to 50 V DC, +10 %, 2W
**Level instruments**

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
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³); liquid/solid interface version, 50 g/l (3 lb/ft³), and low density option min. 5 g/l (0.3 lb/ft³)
- Customer desired extensions up to 20000 mm (787”)
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5”) 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” pipe.

SITRANS LVS200 has an optional 4 to 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)

### Technical specifications

**Mode of operation**

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Vibrating point level switch</th>
</tr>
</thead>
</table>

**Input**

<table>
<thead>
<tr>
<th>Measured variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>High, low and demand</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
</tr>
<tr>
<td>125 Hz</td>
</tr>
<tr>
<td>Liquid/solid interface and</td>
</tr>
<tr>
<td>short fork version</td>
</tr>
<tr>
<td>350 Hz</td>
</tr>
</tbody>
</table>

**Output**

- PNP
- 2-wire without contact

**Relays**

- Version with 1 relay
- Version with 2 relays
- SPDT relay
- DPDT relay

**Relay delay**

| From loss of vibration:        |
| approximately 1 second        |
| From resumption of vibration: |
| approximately 1 to 2 seconds  |

**Signal delay**

| Probe uncovered to covered:    |
| approximately 1 to 2 seconds   |
| Probe covered to uncovered:    |
| approximately 1 to 2 seconds   |

**Relay fail-safe**

- Alarm output
- mA output
- Resolution
- 4 ... 20 mA ± 0.1 mA

**Sensitivity**

- High or low, switch selectable

**Rated operating conditions**

**Installation conditions**

<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor/outdoor</td>
</tr>
</tbody>
</table>

**Ambient conditions**

<table>
<thead>
<tr>
<th>Ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40 ... +60 °C (-40 ... +140 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Installation catagory</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pollution degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
</tr>
</tbody>
</table>
### Medium conditions
- **Process temperature**
  - All except CSA Class II, Group G: -40 ... +150 °C (-40 ... +302 °F)
  - CSA Class II, Group G: -40 ... +140 °C (-40 ... +284 °F), CSA temperature code T5B
  - Max. threaded bushing temperature: +80 °C (+176 °F)
  - Max. enclosure surface temperature (Category 2D): +90 °C (+194 °F)
  - Max. extension surface temperature (Category 1D): +150 °C (+302 °F)
- **Pressure (vessel)**
  - Max. 10 bar g (145 psi g)
- **Minimum material density**
  - Standard version: approx. 20 g/l (1.2 lb/ft³)
  - Liquid/solid interface version: approx. 50 g/l (3 lb/ft³)
  - Optional low density version: approx. 5 g/l (0.3 lb/ft³)

### Design
- **Material**
  - Enclosure: Epoxy coated aluminum
  - Thread: 1½” NPT [(Taper), ANSI/ASME B1.20.1], R ½” [(BSPT), EN 10226] and flange options
- **Process connection**
  - 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 316TI (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 ½” NPT
- **Weight**
  - Standard version, no extensions: approx. 2.0 kg (4.4 lbs)
  - Liquid/solid interface version: approx. 1.9 kg (4.2 lbs)

### Power supply
- **19 ... 230 V AC, +10%, 50 ... 60 Hz, 8 VA**
- **19 ... 55 V DC, +10%**

### Certificates and approvals
- CSA/FM General Purpose
- CE
- CSA/FM Dust Ignition Proof
- C-TICK
- 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 iia IIC, available only with power supply option 5 and 6
- ATEX II 1G and 1/2 G Ex e IIC, ATEX II 1D and 1/2 D, available only with power supply option 5

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVS200, standard</th>
<th>SITRANS LVS200 is a vibrating point level switch for high, low or demand level detection of bulk solids.</th>
</tr>
</thead>
</table>

#### Power supply
- Without temperature isolator
  - Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process +180 °C (+356 °F), max. temperature electronics +80 °C (+176 °F)]
  - Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process +180 °C (+356 °F), max. temperature electronics +80 °C (+176 °F)]

#### Process connection
- **Threaded**
  - 1½” NPT [(Taper), ANSI/ASME B1.20.1]
  - G 2” [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69”)]
- **Flanged**
  - DN 100 PN 16, EN 1092-1 (1.4541/321)
  - 2” ASME 150 lbs B16.5 (1.4541/321)
  - 3” ASME 150 lbs B16.5 (1.4541/321)
  - 4” ASME 150 lbs B16.5 (1.4541/321)

#### Extension length
- Stainless steel 304 (1.4301)
- Standard length, 230 mm (9.06”) [Order code Y01 and plain text: "Insertion length ... mm"]
  - 300 ... 500 mm (11.81 ... 19.69”) (Requires NAMUR switch amplifier)
  - 501 ... 750 mm (19.72 ... 29.53”) (Requires NAMUR switch amplifier)
  - 751 ... 1000 mm (29.57 ... 39.37”) (Requires NAMUR switch amplifier)
  - 1001 ... 1250 mm (39.41 ... 49.21”) (Requires NAMUR switch amplifier)
  - 1251 ... 1500 mm (49.25 ... 59.09”) (Requires NAMUR switch amplifier)
  - 1501 ... 1750 mm (59.09 ... 68.90”) (Requires NAMUR switch amplifier)
  - 1751 ... 2000 mm (68.94 ... 78.74”) (Requires NAMUR switch amplifier)
  - 2001 ... 2250 mm (78.78 ... 88.58”) (Requires NAMUR switch amplifier)
  - 2251 ... 2500 mm (88.62 ... 98.43”) (Requires NAMUR switch amplifier)
  - 2501 ... 2750 mm (98.46 ... 108.27”) (Requires NAMUR switch amplifier)
  - 2751 ... 3000 mm (108.31 ... 118.11”) (Requires NAMUR switch amplifier)
  - 3001 ... 3250 mm (118.15 ... 127.95”) (Requires NAMUR switch amplifier)
  - 3251 ... 3500 mm (127.99 ... 137.80”) (Requires NAMUR switch amplifier)
  - 3501 ... 3750 mm (137.83 ... 147.64”) (Requires NAMUR switch amplifier)
  - 3751 ... 4000 mm (147.68 ... 157.48”) (Requires NAMUR switch amplifier)
# Level instruments

## Point level measurement - Vibrating switches

**SITRANS LVS200**

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVS200, standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5731-7AA11-1BA0</td>
<td>SITRANS LVS200 is a vibrating point level switch for high, low or demand level detection of bulk solids.</td>
</tr>
</tbody>
</table>

**Available ex stock**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVS200, standard, power supply 7, process temperature A, process connection A, extension length 11, material process connection/extension 1, and approval A</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5731-7AB11-1AA0</td>
<td>SITRANS LVS200, standard, power supply 7, process temperature B, process connection B, extension length 11, material process connection/extension 1, and approval A</td>
</tr>
</tbody>
</table>

1) Available with approval options A to D only

2) Available with approval options E, F only

3) Available only with process temperature option A (process connection A with approval option B, or process connection B with approval option A), extension length 11 and material process connection 1

4) Basic version is cost effective and offers fast delivery.

5) Not available with extension length options 11 and 12

6) Available with Material process connection/extension option 1 only

7) Available with Material process connection/extension option 2 only

8) Available with power supply option 5 and 6 only

9) Available with approval options C, D only

## Material process connection/extension

<table>
<thead>
<tr>
<th>Code</th>
<th>Material process connection/extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stainless steel 304 (1.4301)</td>
</tr>
<tr>
<td>2</td>
<td>Stainless steel 316 TI (1.4571)</td>
</tr>
</tbody>
</table>

### Approvals

- **CSA/FM Dust Ignition Proof, C-TICK**
- **ATEX II 1/2 D, C-TICK**
- **CSA/FM General Purpose, C-TICK**
- **CE, C-TICK**
- **CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Ex ia IIC, C-TICK**
- **ATEX II 1G and 1/2G Eex ia IIC, ATEX II 1D and 1/2D, C-TICK**

### Further designs

- **Total insertion length**: Enter the total insertion length in plain text description, max. 4000 mm (157.48")
- **Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68")**
- **Enhanced sensitivity < 5 g/l via electronics, increased fork length to 195 mm (7.68")**, and increased aluminum fork width (available only with universal voltage, SPDT, CE/FM and CSA General Purpose approvals)
- **Signal bulb inserted in M20 cable gland**
- **NAMUR 8/16 mA switch amplifiers**

### Instruction manual

- **Multi-language**

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Spare parts

- **Replacement Electronics Module (125 Hz)**
  - [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)]
  - Sliding sleeve, 2" BSP (ISO 228)
  - Sliding sleeve, 2" NPT ([Taper], ANSI/ASME B1.20.1]
### Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LVS200, short fork for liquids/solids interface</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements</td>
<td>7 ML 5 7 3 2 -</td>
</tr>
</tbody>
</table>

#### Power supply
- 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)
- 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)
- 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

#### Process temperature
- Without temperature isolator
- With temperature isolator

---

**Standard length, 165 mm (6.50")**

**Stainless Steel 316 TI (1.4571)**

**Extension length**

**Stainless steel 304 (1.4301)**

**Standard length, 165 mm (6.50")**

---

**Order code**

Add order code Y01 and plain text:

**Insertion length ...mm**

- 200 ... 500 mm (7.87 ... 19.69")
- 501 ... 750 mm (19.72 ... 29.53")
- 751 ... 1000 mm (29.57 ... 39.37")
- 1001 ... 1250 mm (39.41 ... 49.21")
- 1251 ... 1500 mm (49.25 ... 59.06")
- 1501 ... 1750 mm (59.09 ... 68.90")
- 1751 ... 2000 mm (68.94 ... 78.74")
- 2001 ... 2250 mm (78.78 ... 88.58")
- 2251 ... 2500 mm (88.62 ... 98.43")
- 2501 ... 2750 mm (98.46 ... 108.27")
- 2751 ... 3000 mm (108.31 ... 118.11")
- 3001 ... 3250 mm (118.15 ... 127.95")
- 3251 ... 3500 mm (127.99 ... 137.80")
- 3501 ... 3750 mm (137.83 ... 147.64")
- 3751 ... 4000 mm (147.68 ... 157.48")

**Material process connection/extension**

- Stainless steel 304 (1.4301)
- Stainless steel 316 Ti (1.4571)

**Approvals**

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

---

**Material process connection/extension**

**Order code**

- Y01
- A20

**Order No.**

**7ML1830-1KM**

**7ML1830-1JM**

**7ML1830-1JN**

**Multi-language**

**Further designs**

Please add "Z" to Order No. and specify Order code(s).

**Total insertion length:** Enter the total insertion length in plain text description, max. 4000 mm (157.48")

**Signal bulb inserted in M20 cable gland**

---

**Instruction manual**

- Multi-language

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Instruction manual library.

---

**Spare parts**

- Replacement Electronics Module (350 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)]
- Sliding sleeve, 2" [BSPP, EN ISO 228-1]
- Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]

---

1) Available with approval options B, C, D only
2) Available with material process connection/extension option 1 only
3) Available with material process connection/extension option 2 only
4) Available with approval options C, D only

---

**Point level measurement - Vibrating switches**

**SITRANS LVS200**

**Level instruments**

**Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements**

---

**Approvals**

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

---

**Order code**

- Y01
- A20

**Order No.**

**7ML1830-1KM**

**7ML1830-1JM**

**7ML1830-1JN**

---

**Further designs**

Please add "Z" to Order No. and specify Order code(s).

---

**Total insertion length:** Enter the total insertion length in plain text description, max. 4000 mm (157.48")

**Signal bulb inserted in M20 cable gland**

---

**Instruction manual**

- Multi-language

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Instruction manual library.

---

**Spare parts**

- Replacement Electronics Module (350 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)]
- Sliding sleeve, 2" [BSPP, EN ISO 228-1]
- Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]

---

1) Available with approval options B, C, D only
2) Available with material process connection/extension option 1 only
3) Available with material process connection/extension option 2 only
4) Available with approval options C, D only

---

**Approvals**

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

---

**Order code**

- Y01
- A20

**Order No.**

**7ML1830-1KM**

**7ML1830-1JM**

**7ML1830-1JN**

---

**Further designs**

Please add "Z" to Order No. and specify Order code(s).

---

**Total insertion length:** Enter the total insertion length in plain text description, max. 4000 mm (157.48")

**Signal bulb inserted in M20 cable gland**

---

**Instruction manual**

- Multi-language

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Instruction manual library.

---

**Spare parts**

- Replacement Electronics Module (350 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)]
- Sliding sleeve, 2" [BSPP, EN ISO 228-1]
- Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]

---

1) Available with approval options B, C, D only
2) Available with material process connection/extension option 1 only
3) Available with material process connection/extension option 2 only
4) Available with approval options C, D only
## Level instruments
### Point level measurement - Vibrating switches

#### SITRANS LVS200

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LVS200, pipe extension</td>
<td>7ML 5 7 3 3 -</td>
</tr>
<tr>
<td>Vibrating point level switch for high or low levels of bulk solids</td>
<td>A 0</td>
</tr>
<tr>
<td>Extended using 1” pipe extension (customer supplied)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)</td>
<td>1</td>
</tr>
<tr>
<td>19 to 230 V AC, 19 to 55 V DC, two relay outputs (DPDT)</td>
<td>2</td>
</tr>
<tr>
<td>18 to 50 V DC PNP</td>
<td>3</td>
</tr>
<tr>
<td>19 to 230 V AC/DC without contact, 2-wire loop powered</td>
<td>4</td>
</tr>
<tr>
<td>7 to 9 V DC (requires NAMUR switch amplifier)</td>
<td>5</td>
</tr>
<tr>
<td>NAMUR IEC 60947-5-6, 2-wire</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process temperature</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to +150 °C (+302 °F)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>A</td>
</tr>
<tr>
<td>R 1½” [(BSPT), EN 10226]</td>
<td>B</td>
</tr>
<tr>
<td>1½” NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td></td>
</tr>
<tr>
<td>Flanged</td>
<td></td>
</tr>
<tr>
<td>DN 100 PN 6, EN1092-1 (1.4541/321)</td>
<td>C</td>
</tr>
<tr>
<td>DN 100 PN 16, EN1092-1 (1.4541/321)</td>
<td>D</td>
</tr>
<tr>
<td>2” ASME 150 lbs B16.5 (1.4541/321)</td>
<td>E</td>
</tr>
<tr>
<td>3” ASME 150 lbs B16.5 (1.4541/321)</td>
<td>F</td>
</tr>
<tr>
<td>4” ASME 150 lbs B16.5 (1.4541/321)</td>
<td>G</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection material</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel 304 (1.4301)</td>
<td>1</td>
</tr>
<tr>
<td>Stainless steel 316 Ti (1.4571)</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extension length</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer supplied 1” pipe extension</td>
<td></td>
</tr>
<tr>
<td>Length: 300 to 3800 mm (11.81 to 149.61”)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry bulk solids (125 Hz)</td>
<td>1</td>
</tr>
<tr>
<td>Liquids/solids interface (350 Hz)</td>
<td>2</td>
</tr>
<tr>
<td>Liquids/solids interface or short fork high load applications (350 Hz)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA/FM Dust Ignition Proof, C-TICK</td>
<td>A</td>
</tr>
<tr>
<td>ATEX II 1/2 D, C-TICK</td>
<td>B</td>
</tr>
<tr>
<td>CSA/FM General Purpose, C-TICK</td>
<td>C</td>
</tr>
<tr>
<td>CE, C-TICK</td>
<td>D</td>
</tr>
<tr>
<td>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, C-TICK</td>
<td>E</td>
</tr>
<tr>
<td>ATEX II 1G and 1/2G Ex ia IIC, ATEX II 1D and 1/2D, C-TICK</td>
<td>F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Further designs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add “-Z” to Order No. and specify Order code(s).</td>
<td></td>
</tr>
<tr>
<td>Enter the total insertion length in plain text description, min. 300 mm (11.81”) max. 3800 mm (149.61”)</td>
<td></td>
</tr>
<tr>
<td>Enhanced sensitivity &gt; 5 g/l via electronics and increased fork length to 195 mm (7.68”)</td>
<td></td>
</tr>
<tr>
<td>Signal bulb inserted in M20 cable gland</td>
<td></td>
</tr>
<tr>
<td>NAMUR 8 to 16 mA switch amplifiers</td>
<td></td>
</tr>
</tbody>
</table>

---

© Siemens AG 2010
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVS200, cable extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 5 7 3 4 -</td>
<td>Vibrating point level switch for high or low level detection of bulk solids materials</td>
</tr>
</tbody>
</table>

### Power supply
- 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)
- 3) 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)
- 4) 18 ... 50 V DC PNP
- 5) 19 ... 230 V AC/DC without contact, 2-wire loop powered
- 7) 7 ... 9 V DC (requires NAMUR switch amplifier)
- 8) 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire

### Process temperature
Up to +80 °C (+176 °F)

### Process connection
- Threaded: R 1½" [(BSPT), EN 10226] 1/½" NPT [(Taper), ANSI/ASME B1.20.1]
- Flanged: DN 100 PN 6, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321)
- 3" ASME 150 lbs B16.5 (1.4541/321)
- 4" ASME 150 lbs B16.5 (1.4541/321)

### Extension length
700 ... 1000 mm (19.7 ... 39.4") [max. length 10000 mm (393.70")]

---

### Application type
- Dry bulk solids (125 Hz)
- Liquid/solids interface (350 Hz)

---

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LVS200, cable extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 5 7 3 4 -</td>
<td>Vibrating point level switch for high or low level detection of bulk solids materials</td>
</tr>
</tbody>
</table>

### Approvals
- CSA/FM Dust Ignition Proof, C-TICK
- CE, C-TICK
- CSA/FM General Purpose, C-TICK
- CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, C-TICK
- ATEX II 1G and 1/2G Ex ia IIC; ATEX II 1D and 1/2D, C-TICK

### Further designs
- Please add "-Z" to Order No. and specify Order code(s).
- Enter the total insertion length in plain text description, 4000 mm (157.48")
- Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68")
- Signal bulb inserted in M20 cable gland
- NAMUR 8 to 16 mA switch amplifiers

### Instruction manual
- Multi-language
- Order No. 7ML1998-5FT62

### Spare parts
- Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]
- Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]

---

1) Available with approval options A to D only
2) Available with approval options C and D only
3) Cable length is limited to 10000 mm (393.70")
4) Available with approval options C, D only
5) Cable length is limited to 7000 mm (275.59")
6) Available with power supply option 5 and application type 1 only
Level instruments
Point level measurement - Vibrating switches

SITRANS LVS200

Dimensional drawings

Notes:
* The clamping screws of the sliding bushing must be tightened to 10 Nm.
** Cable version with Liquids/solids interface model option length to 7000 mm (275.59").
   Cable version with NAMUR electronics length to 10 000 mm (393.7").
See drawing 23650563 for pipe extended version details. (Pipe is customer supplied.)

SITRANS LVS200 dimensions
Level instruments
Point level measurement - Vibrating switches

SITRANS LVS200 connections

2-wire

NAMUR IEC 60947-5-6 8/16 mA or 4 to 20 mA

Universal voltage (DPDT relay)

3-wire PNP

AC
terminal 1: L, terminal 2: N
19 to 230 V AC, +10 %, 50 to 60 Hz, 18 VA
DC
terminal 1: +, terminal 2: -
19 to 230 V DC, +10 %, 1 W

DC
terminal 1: +, terminal 2: -
18 to 50 V DC, +10 %, 1.5 W

PE + L N

PE + L N

PE + L N

ca. 7 to 9 V DC, intrinsically safe (IEC 60947-5-6)

Siemens FI 01 · 2010 US Edition

5/109
Level instruments
Point level measurement - Rotating paddle switch

SITRANS LPS200 is a rotary paddle switch for point level 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
- Rotatable enclosure
- Optional paddle for use with low density materials
- Simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration

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/ft³) with the optional rectangular vane or 100 g/l (6.25 lb/ft³) 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

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Rotating point level switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Rotating point level switch</td>
</tr>
<tr>
<td>Input</td>
<td>Measured variable</td>
</tr>
<tr>
<td>Output</td>
<td>Output signal</td>
</tr>
<tr>
<td>- Alarm output</td>
<td>Microswitch 5 A at 250 V AC, non-inductive</td>
</tr>
<tr>
<td>- Pickup delay</td>
<td>Standard (1 rpm model): approx. 1.3 seconds</td>
</tr>
<tr>
<td>Optional process applications</td>
<td>Optional process applications</td>
</tr>
<tr>
<td>(5 rpm model): approx. 0.26 seconds</td>
<td></td>
</tr>
<tr>
<td>- Sensitivity</td>
<td>Adjustable via reset force of spring or geometry of measuring vane</td>
</tr>
</tbody>
</table>

Rated operating conditions

<table>
<thead>
<tr>
<th>Installation conditions</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient conditions</td>
<td></td>
</tr>
<tr>
<td>- Ambient temperature</td>
<td>-25 ... +60 °C (-13 ... +140 °F)</td>
</tr>
<tr>
<td>- Installation category</td>
<td>Ill</td>
</tr>
<tr>
<td>- Pollution degree</td>
<td>2</td>
</tr>
<tr>
<td>Medium conditions</td>
<td>Bulk solids</td>
</tr>
<tr>
<td>- Temperature</td>
<td>-25 ... +80 °C (-13 ... +176 °F)</td>
</tr>
<tr>
<td>- Pressure (vessel)</td>
<td>Max. 0.5 bar g (7.25 psi g)</td>
</tr>
<tr>
<td>- Minimum material density</td>
<td>Can detect down to 100 g/l (6.25 lb/ft³)</td>
</tr>
<tr>
<td>- Optional measuring vane</td>
<td>Can detect down to 15 g/l (2.19 lb/ft³)</td>
</tr>
</tbody>
</table>

Design

- Material |
- Enclosure |
- Process connection, measuring shaft and vane |
- Process connection |
- Degree of protection |
- Conduit entry | 2 x M20x1.5 or 2 x ½" NPT |

Power supply
- Jumper selectable |
- 115 V AC, ±15%, 50 ... 60 Hz, 4 VA or 230 V AC, ±15%, 50 Hz, 6 VA, or 48 V AC, or 24 V AC |
- DC, ±15%, 2.5 W |

Certificates and approvals
- CSA/FM General Purpose |
- CE |
- CSA/FM Dust Ignition Proof |
- ATEX II 1/2 D |
- C-TICK |
Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LPS200, compact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary paddle switch for level detection in bulk solids</td>
</tr>
<tr>
<td>Compact design for side or top mounted applications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to +80 °C (+176 °F)</td>
</tr>
<tr>
<td>Up to +150 °C (+302 °F)</td>
</tr>
<tr>
<td>Up to +250 °C (+482 °F)</td>
</tr>
<tr>
<td>Up to +350 °C (+662 °F)</td>
</tr>
<tr>
<td>Up to +80 °C (+176 °F) basic version stainless steel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V AC, 1 rev/min.</td>
</tr>
<tr>
<td>230 V AC, 5 rev/min.</td>
</tr>
<tr>
<td>24 V AC</td>
</tr>
<tr>
<td>24 V DC, 1 rev/min.</td>
</tr>
<tr>
<td>24 V DC, 5 rev/min.</td>
</tr>
<tr>
<td>Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.</td>
</tr>
<tr>
<td>Process connection</td>
</tr>
<tr>
<td>Threaded</td>
</tr>
<tr>
<td>G 1½” [BSPP], EN ISO 228-1</td>
</tr>
<tr>
<td>G 1” [BSPP], EN ISO 228-1</td>
</tr>
<tr>
<td>G ½” [BSPP], EN ISO 228-1</td>
</tr>
<tr>
<td>1” NPT ([Taper], ANSI/ASME B1.20.1)</td>
</tr>
<tr>
<td>1½” NPT ([Taper], ANSI/ASME B1.20.1)</td>
</tr>
<tr>
<td>Flanged</td>
</tr>
<tr>
<td>DN 32 PN 6, EN1092-1 (1.4541/321)</td>
</tr>
<tr>
<td>DN 100 PN 6, EN1092-1 (1.4541/321)</td>
</tr>
<tr>
<td>DN 100 PN 16, EN1092-1 (1.4541/321)</td>
</tr>
<tr>
<td>2” ASME 150 lbs B16.5 (1.4541/321)</td>
</tr>
<tr>
<td>3” ASME 150 lbs B16.5 (1.4541/321)</td>
</tr>
<tr>
<td>4” ASME 150 lbs B16.5 (1.4541/321)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 0.5 bar (7.25 psi)</td>
</tr>
<tr>
<td>Up to 5 bar (72.5 psi)</td>
</tr>
<tr>
<td>Up to 10 bar (145 psi)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
</tr>
<tr>
<td>Stainless steel 303 (1.4305)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extension length</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mm (3.94”)</td>
</tr>
<tr>
<td>150 mm (5.91”)</td>
</tr>
<tr>
<td>200 mm (7.87”)</td>
</tr>
<tr>
<td>250 mm (9.84”)</td>
</tr>
<tr>
<td>300 mm (11.81”)</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LPS200, compact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary paddle switch for level detection in bulk solids</td>
</tr>
<tr>
<td>Compact design for side or top mounted applications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring vane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot shaped, 35 x 106 mm (1.38 x 4.17”)</td>
</tr>
<tr>
<td>Hinged vane, 65 x 210 mm (2.56 x 8.27”)</td>
</tr>
<tr>
<td>Rectangular 50 x 150 mm (1.97 x 5.91”)</td>
</tr>
<tr>
<td>Rectangular 50 x 250 mm (1.97 x 9.84”)</td>
</tr>
<tr>
<td>Rectangular 98 x 150 mm (3.86 x 5.91”)</td>
</tr>
<tr>
<td>Rectangular 98 x 250 mm (3.86 x 9.84”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA/FM Dust Ignition Proof, C-TICK</td>
</tr>
<tr>
<td>ATEX II 1/2 D, C-TICK</td>
</tr>
<tr>
<td>CSA/FM General Purpose, C-TICK</td>
</tr>
<tr>
<td>CE, C-TICK</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Further design(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code(s).</td>
</tr>
<tr>
<td>Heating of enclosure</td>
</tr>
<tr>
<td>Signal bulb inserted in M20 cable gland</td>
</tr>
<tr>
<td>SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional instruction manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-language</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spare parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor gear /PLC, multi-voltage</td>
</tr>
<tr>
<td>Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17”)</td>
</tr>
<tr>
<td>Hinged vane, 65 x 210 mm (2.56 x 8.27”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rigid extension kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(includes spring coupling, rigid tube extension and required pins)</td>
</tr>
<tr>
<td>Extension: 500 mm, 400 mm, 300 mm (19.7”, 15.8”, 11.8”)</td>
</tr>
<tr>
<td>Extension: 1000 mm, 800 mm, 700 mm, 600 mm (39.4”, 31.5”, 27.6”, 23.6”)</td>
</tr>
<tr>
<td>Extension: 1500 mm, 1400 mm, 1300 mm, 1200 mm, 1100 mm (59.1”, 51.2”, 47.2”, 43.3”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available ex stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 C</td>
</tr>
<tr>
<td>SITRANS LPS200, compact for up to +80 °C (+176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spare parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor gear /PLC, multi-voltage</td>
</tr>
<tr>
<td>Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17”)</td>
</tr>
<tr>
<td>Hinged vane, 65 x 210 mm (2.56 x 8.27”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rigid extension kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(includes spring coupling, rigid tube extension and required pins)</td>
</tr>
<tr>
<td>Extension: 500 mm, 400 mm, 300 mm (19.7”, 15.8”, 11.8”)</td>
</tr>
<tr>
<td>Extension: 1000 mm, 800 mm, 700 mm, 600 mm (39.4”, 31.5”, 27.6”, 23.6”)</td>
</tr>
<tr>
<td>Extension: 1500 mm, 1400 mm, 1300 mm, 1200 mm, 1100 mm (59.1”, 51.2”, 47.2”, 43.3”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available ex stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 C</td>
</tr>
<tr>
<td>SITRANS LPS200, compact for up to +80 °C (+176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML 5725-0</td>
</tr>
</tbody>
</table>
### Level instruments

**Point level measurement - Rotating paddle switch**

#### SITRANS LPS200

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LPS200, compact</td>
<td>7ML5725-</td>
</tr>
<tr>
<td>Rotary paddle switch for level detection in bulk solids</td>
<td>6QC12-2AB0</td>
</tr>
<tr>
<td>Compact design for side or top mounted applications</td>
<td>7ML5725-</td>
</tr>
<tr>
<td>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</td>
<td>6QE12-2AA0</td>
</tr>
</tbody>
</table>

1) Available with approval option C and D only, up to max. 0.8 bar
2) Basic version is cost effective and offers fast delivery
3) Available only with power supply option A and with process connection C, and approval D, or power supply E with process connection E, and approval C, and then process pressure 1, process connection material 1, extension length 2, measuring vane A
4) Available only with power supply option Q, process connection C with approval B, or process connection E with approval A, and then process pressure 1, process connection material 2, extension length 2 and measuring vane A
5) Available with process connections A to F, process pressure option 1, and process temperature option 1 only
6) Available with measuring vane options A, C to G, only
7) Add 16 mm (0.63") to extension length
8) Available with extension length options 2 to 5 only
9) Available with process connections G, H, J to M, only
10) Available with approval options C, D only
11) Available with power supply options A to H, J to N, P only

- Available ex stock.
## Selection and Ordering data

**SITRANS LPS200, Extended**
Rotary paddle switch for level detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection.

### Process temperature
- Up to +80 °C (+176 °F)
- Up to +150 °C (+302 °F)
- Up to +250 °C (+482 °F)
- Up to +350 °C (+662 °F)

### Power supply
- 230 V AC, 1 rev/min.
- 230 V AC, 5 rev/min.
- 115 V AC, 1 rev/min.
- 115 V AC, 5 rev/min.
- 48 V AC
- 24 V AC
- 24 V DC, 1 rev/min.
- 24 V DC, 5 rev/min.
- Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.
- Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.

### Process connection
- Threaded
  - G 1⅛" [BSPP], EN ISO 228-1
  - G 1¼" [BSPP], EN ISO 228-1
- Flanged
  - DN 32 PN 6, EN1092-1 (1.4541/321)
  - DN 100 PN 6, EN1092-1 (1.4541/321)
  - 2" ASME 150 lbs B16.5 (1.4541/321)
  - 3" ASME 150 lbs B16.5 (1.4541/321)
  - 4" ASME 150 lbs B16.5 (1.4541/321)

### Process pressure
- Up to 0.5 bar (7.25 psi)
- Up to 5 bar (72.5 psi)
- Up to 10 bar (145 psi)

### Process connection material
- Aluminum
- Stainless steel 303 (1.4305)

### Extension length
- 150 mm (5.91")
- 200 mm (7.87")
- 250 mm (9.84")
- 300 mm (11.81")

### Extension material (protection tube)
- Aluminum
- Stainless steel 303 (1.4305)

### Process temperature

### Approvals
- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

### Further designs

---

**Selection and Ordering data**

**SITRANS LPS200, Extended**
Rotary paddle switch for level detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection.

### Measuring vane
- Boot shaped 35 x 106 mm (1.38 x 4.17")
- Hinged vane 65 x 210 mm (2.56 x 8.27")
- Rectangular 50 x 150 mm (1.97 x 5.91")
- Rectangular 50 x 250 mm (1.97 x 9.84")
- Rectangular 98 x 150 mm (3.86 x 5.91")
- Rectangular 98 x 250 mm (3.86 x 9.84")

### Approvals
- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

### Further designs

---

Please add "Z" to Order No. and specify Order code(s).
Point level measurement - Rotating paddle switch

**SITRANS LPS200**

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML57Z27-</td>
<td>7ML57Z27-</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>J</td>
<td>J</td>
</tr>
<tr>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Q</td>
<td>Q</td>
</tr>
<tr>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

#### Process temperature

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to +80 °C (+176 °F)</td>
<td>1</td>
</tr>
<tr>
<td>Up to +150 °C (+302 °F)</td>
<td>2</td>
</tr>
<tr>
<td>Up to +250 °C (+482 °F)</td>
<td>3</td>
</tr>
<tr>
<td>Up to +350 °C (+662 °F)</td>
<td>4</td>
</tr>
<tr>
<td>Up to +80 °C (+176 °F) basic version</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Power supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V AC, 1 rev/min.</td>
<td>A</td>
</tr>
<tr>
<td>230 V AC, 1 rev/min., fail-safe</td>
<td>B</td>
</tr>
<tr>
<td>230 V AC, 5 rev/min.</td>
<td>C</td>
</tr>
<tr>
<td>230 V AC, 5 rev/min., fail-safe</td>
<td>D</td>
</tr>
<tr>
<td>115 V AC, 1 rev/min.</td>
<td>E</td>
</tr>
<tr>
<td>115 V AC, 1 rev/min., fail-safe</td>
<td>F</td>
</tr>
<tr>
<td>115 V AC, 5 rev/min.</td>
<td>G</td>
</tr>
<tr>
<td>115 V AC, 5 rev/min., fail-safe</td>
<td>H</td>
</tr>
<tr>
<td>48 V AC</td>
<td>I</td>
</tr>
<tr>
<td>24 V AC</td>
<td>J</td>
</tr>
<tr>
<td>24 V DC, 1 rev/min.</td>
<td>K</td>
</tr>
<tr>
<td>24 V DC, 1 rev/min., fail-safe</td>
<td>L</td>
</tr>
<tr>
<td>24 V DC, 5 rev/min.</td>
<td>M</td>
</tr>
<tr>
<td>24 V DC, 5 rev/min., fail-safe</td>
<td>N</td>
</tr>
</tbody>
</table>

#### Process connection

<table>
<thead>
<tr>
<th>Connection</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>G 1½” (BSP), EN ISO 228-1</td>
</tr>
<tr>
<td>Threaded</td>
<td>G 1½” (BSP), EN ISO 228-1</td>
</tr>
<tr>
<td>Threaded</td>
<td>1¼” NPT ([Taper], ANSI/ASME B1.20.1)</td>
</tr>
<tr>
<td>Threaded</td>
<td>1½” NPT ([Taper], ANSI/ASME B1.20.1)</td>
</tr>
<tr>
<td>Flanged</td>
<td>DN 32 PN 6, EN1092-1 (1.4541/321)</td>
</tr>
<tr>
<td>Flanged</td>
<td>DN 100 PN 6, EN1092-1 (1.4541/321)</td>
</tr>
<tr>
<td>Flanged</td>
<td>DN 100 PN 16, EN1092-1 (1.4541/321)</td>
</tr>
<tr>
<td>Flanged</td>
<td>2” ASME 150 lbs B16.5 (1.4541/321)</td>
</tr>
<tr>
<td>Flanged</td>
<td>3” ASME 150 lbs B16.5 (1.4541/321)</td>
</tr>
<tr>
<td>Flanged</td>
<td>4” ASME 150 lbs B16.5 (1.4541/321)</td>
</tr>
</tbody>
</table>

#### Process pressure

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 0.5 bar (7.25 psi)</td>
<td>1</td>
</tr>
<tr>
<td>Up to 5 bar (72.5 psi)</td>
<td>2</td>
</tr>
<tr>
<td>Up to 10 bar (118.11 psi)</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Process connection material

<table>
<thead>
<tr>
<th>Material</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>1</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>2</td>
</tr>
</tbody>
</table>

### Cable extension length

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard cable length, 2000 mm (78.74”)</td>
<td>0</td>
</tr>
<tr>
<td>Add order code Y01 and plain text: “Insertion length, mm”</td>
<td>1</td>
</tr>
<tr>
<td>500 ...1000 mm (19.69...39.37”)</td>
<td>2</td>
</tr>
<tr>
<td>1001...2000 mm (39.41...78.74”)</td>
<td>3</td>
</tr>
<tr>
<td>2001...3000 mm (78.78...118.11”)</td>
<td>4</td>
</tr>
<tr>
<td>3001...4000 mm (118.15...157.48”)</td>
<td>5</td>
</tr>
<tr>
<td>4001...5000 mm (157.52...196.85”)</td>
<td>6</td>
</tr>
<tr>
<td>5001...6000 mm (196.89...236.22”)</td>
<td>7</td>
</tr>
<tr>
<td>6001...7000 mm (236.26...275.59”)</td>
<td>8</td>
</tr>
</tbody>
</table>

**Additional instruction manual**

- Multi-language
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Spare parts**

- Motor gear / PLC, multi-voltage
- Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17”)
- Hinged vane, 65 x 210 mm (2.56 x 8.27”)
- Rope extension kit, 2 m (6.56 ft)

**Additional information**

- Please add “-Z” to Order No. and specify Order code(s).

#### Total insertion length

- Enter the total insertion length in plain text description
- max. 10000 mm (393.70”)

#### Reinforced cable

- max. 28 kN pulling force

#### Heating of enclosure

- max. 10000 mm (393.70”)

**Approvals**

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

**Further designs**

- Available with approval option C and D only, up to max. 0.8 bar
- Available with process connections E to H, J, K, only
- Available with power supply options A to H, J to N, and P, only
- Available with process connections A to D, process pressure option 1 only
- Available with multivoltage, 1 rev/min.
- Available with multivoltage, 5 rev/min., fail-safe

**Available ex stock**

- 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 A

**Order code**

- Y01
- P01
- A35
- A20

**Order No.**

- 7ML1998-5FS62
- 7ML1830-1KH
- 7ML1830-1KJ
- 7ML1830-1KK
- 7ML57Z27-5QBC12-0A0B
- 7ML57Z27-5QC12-0AA0

**Spare parts**

- Motor gear / PLC, multi-voltage
- Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17”)
- Hinged vane, 65 x 210 mm (2.56 x 8.27”)
- Rope extension kit, 2 m (6.56 ft)

**Additional information**

- Please add “-Z” to Order No. and specify Order code(s).

#### Total insertion length

- Enter the total insertion length in plain text description
- max. 10000 mm (393.70”)

#### Reinforced cable

- max. 28 kN pulling force

#### Heating of enclosure

- max. 10000 mm (393.70”)

**Approvals**

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

**Further designs**

- Available with approval option C and D only, up to max. 0.8 bar
- Available with process connections E to H, J, K, only
- Available with process connections A to D, process pressure option 1 only
- Available with multivoltage, 1 rev/min.
- Available with multivoltage, 5 rev/min., fail-safe

**Available ex stock**

- 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 A

**Order No.**

- 7ML1998-5FS62
- 7ML1830-1KH
- 7ML1830-1KJ
- 7ML1830-1KK
- 7ML57Z27-5QBC12-0A0B
- 7ML57Z27-5QC12-0AA0

**Spare parts**

- Motor gear / PLC, multi-voltage
- Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17”)
- Hinged vane, 65 x 210 mm (2.56 x 8.27”)
- Rope extension kit, 2 m (6.56 ft)

**Additional information**

- Please add “-Z” to Order No. and specify Order code(s).

#### Total insertion length

- Enter the total insertion length in plain text description
- max. 10000 mm (393.70”)

#### Reinforced cable

- max. 28 kN pulling force

#### Heating of enclosure

- max. 10000 mm (393.70”)

**Approvals**

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

**Further designs**

- Available with approval option C and D only, up to max. 0.8 bar
- Available with process connections E to H, J, K, only
- Available with process connections A to D, process pressure option 1 only
- Available with multivoltage, 1 rev/min.
- Available with multivoltage, 5 rev/min., fail-safe
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LPS200, angled extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 5 7 2 8 -</td>
<td>Rotary paddle switch with robust design for level detection in bulk solids; ideal for heavy or sticky applications. Angled extension designed to avoid falling material in side mount applications.</td>
<td></td>
</tr>
</tbody>
</table>

#### Process temperature

- Up to +80 °C (+176 °F)
- Up to +150 °C (+302 °F)
- Up to +250 °C (+482 °F)

#### Power supply

- 230 V AC, 1 rev/min.
- 230 V AC, 5 rev/min.
- 115 V AC, 1 rev/min.
- 115 V AC, 5 rev/min.
- 48 V AC
- 24 V AC
- 24 V DC, 1 rev/min.
- 24 V DC, 1 rev/min., fail-safe
- 24 V DC, 5 rev/min.
- 24 V DC, 5 rev/min., fail-safe

#### Switch selectable

- 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.
- 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.

#### Process connection

- Flanged
- DN 100 PN 6, EN1092-1 (1.4541/321)
- DN 100 PN 16, EN1092-1 (1.4541/321)
- 4” ASME 150 lbs B16.5 (1.4541/321)

#### Process pressure

- Up to 0.5 bar (7.25 psi)
- Up to 5 bar (72.5 psi)
- Up to 10 bar (145 psi)

#### Process connection material

- Stainless steel 303 (1.4305)

#### Extension length

- 125 mm (4.92”)
- 150 mm (5.91”)
- 200 mm (7.87”)
- 250 mm (9.84”)
- 300 mm (11.81”)

#### Measuring vane

- Rectangular vane, 50 x 98 mm (1.97 x 3.86”)
- Rectangular vane, 50 x 150 mm (1.97 x 5.91”)
- Rectangular vane, 50 x 250 mm (1.97 x 9.84”)
- Rectangular vane 98 x 150 mm (3.86 x 5.91”)
- Rectangular vane 98 x 250 mm (3.86 x 9.84”)
- Hinged vane, 65 x 210 mm (2.56 x 8.27”)

#### Approvals

- CSA/FM Dust Ignition Proof, C-TICK
- ATEX II 1/2 D, C-TICK
- CSA/FM General Purpose, C-TICK
- CE, C-TICK

### Further designs

- Please add “-Z” to Order No. and specify Order code(s).
- Heating of enclosure
- Signal bulb inserted in M20 cable gland

### Additional instruction manual

- Multi-language
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Spare parts

- Motor gear / PLC, multi-voltage
- Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17”)
- Hinged vane, 65 x 210 mm (2.56 x 8.27”)

1) Available with approval options C, D only
2) Available with power supply options A to H, J to N, P only
Level instruments
Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data

Order No. 7ML5730 -

SITRANS LPS200, rigid extension
Rotary paddle switch for top mount point level detection in bulk solids

Process temperature
Up to +80 °C (+176 °F)
Up to +150 °C (+302 °F)
Up to +250 °C (+482 °F)
Up to +350 °C (+662 °F)

Power supply
230 V AC, 1 rev/min.
230 V AC, 5 rev/min.
115 V AC, 1 rev/min.
115 V AC, 5 rev/min.

Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.
Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.

Process connection
Threaded
1¼" NPT [Taper], ANSI/ASME B1.20.1
1½" NPT [Taper], ANSI/ASME B1.20.1

Flanged
DN 50 PN 6, EN1092-1 (1.4541/321)
DN 100 PN 6, EN1092-1 (1.4541/321)
DN 100 PN 16, EN1092-1 (1.4541/321)
2" ASME 150 lbs B16.5 (1.4541/321)
3" ASME 150 lbs B16.5 (1.4541/321)
4" ASME 150 lbs B16.5 (1.4541/321)

Process pressure
Up to 0.5 bar (7.25 psi)
Up to 2 bar (29.03 psi)
Up to 5 bar (72.5 psi)

Process connection material
Aluminum
Stainless steel 303 (1.4305)

Extension material (protection tube)
Aluminum
Stainless steel 303 (1.4305)

Extension length
Aluminum
250 ... 500 mm (9.84 ... 19.69")
501 ... 750 mm (19.72 ... 29.53")
751 ... 1000 mm (29.57 ... 39.37")
1001 ... 1250 mm (39.41 ... 48.21")
1251 ... 1500 mm (49.25 ... 59.06")
1501 ... 1750 mm (59.09 ... 68.90")
1751 ... 2000 mm (68.94 ... 78.74")
2001 ... 2250 mm (78.78 ... 88.58")
2251 ... 2500 mm (88.62 ... 98.43")
2501 ... 2750 mm (98.46 ... 108.27")
2751 ... 3000 mm (108.31 ... 118.11")
3001 ... 3250 mm (118.15 ... 127.95")
3251 ... 3500 mm (127.99 ... 137.80")
3501 ... 3750 mm (137.83 ... 147.64")
3751 ... 4000 mm (147.67 ... 157.48")

Selection and Ordering data

Order No. 7ML5730 -

SITRANS LPS200, rigid extension
Rotary paddle switch for top mount point level detection in bulk solids

Stainless steel 303 (1.4305)
250 ... 500 mm (9.84 ... 19.69")
501 ... 750 mm (19.72 ... 29.53")
751 ... 1000 mm (29.57 ... 39.37")
1001 ... 1500 mm (39.41 ... 59.05")
1501 ... 2000 mm (59.09 ... 78.74")
2001 ... 2500 mm (78.78 ... 98.42")
2501 ... 3000 mm (98.46 ... 118.11")
3001 ... 4000 mm (118.14.78 ... 157.48")

Measuring vane
Boot shaped, 35 x 106 mm (1.38 x 4.17")
Hinged vane, 60 x 200 mm (2.36 x 7.87")
Rectangular 50 x 150 mm (1.97 x 5.91")
Rectangular 50 x 250 mm (1.97 x 9.84")
Rectangular 90 x 150 mm (3.54 x 5.91")
Rectangular 90 x 250 mm (3.54 x 9.84")

Approvals
CSA/FM Dust Ignition Proof, C-TICK
ATEX II 1/2 D, C-TICK
CSA/FM General Purpose, C-TICK
CE, C-TICK

Further designs
Please add "Z" to Order No. and specify Order code(s).

Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")

Heating of enclosure
Signal bulb inserted in M20 cable gland
SITRANS LPS200 designed for food applications
Seal at tube end for ingress protection and shaft stability
- Max. temperature +80 °C (+176 °F)
- Max. temperature +150 °C (+302 °F)
- Max. temperature +250 °C (+482 °F)
- Max. temperature +350 °C (+662 °F)

Sliding sleeve (standard, max. pressure 0.8 bar)
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered)

Additional instruction manual
Multi-language
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

Spare parts
Motor gear /PLC, multi-voltage
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17")
Hinged vane, 65 x 210 mm (2.56 x 8.27")

Order No. 7ML1980-1KG
7ML1980-1KH
7ML1980-1KJ

1) Available with approval options 3 and 4 only, up to max. 0.8 bar
2) Available with process connections A to D only
3) Available with process pressure option 1 only
4) Available with extension length options A to Q only
5) Available with extension length options R to Y only
6) Available with process connection material option 1 only
7) Available with process temperature option 1 only
8) Add 16 mm (0.63") to extension length
9) Available with process pressure option 1 only
10) Available with power supply options A to H, J to N, P, only
11) Available when ordered with ingress protection seal P06 to P09 only
12) Available when ordered with ingress protection seal P06 to P09 only

To Order No. and specify Order code(s).

Order code Y01 A35 A20 K01 P06 P07 P08 P09 P12 P13

Additional instruction manual
Multi-language
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

Spare parts
Motor gear /PLC, multi-voltage
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17")
Hinged vane, 65 x 210 mm (2.56 x 8.27")

Order No. 7ML1980-1KG
7ML1980-1KH
7ML1980-1KJ
Level instruments

Point level measurement - Rotating paddle switch

SITRANS LPS200

Dimensional drawings

Standard model: compact version

High Temperature Model: compact version

Measuring Vanes

Standard

Hinged

Rectangular vane options

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mm (1.97&quot;)</td>
<td>98 mm (3.86&quot;)</td>
</tr>
<tr>
<td>50 mm (1.97&quot;)</td>
<td>150 mm (5.90&quot;)</td>
</tr>
<tr>
<td>250 mm (9.84&quot;)</td>
<td></td>
</tr>
<tr>
<td>98 mm (3.86&quot;)</td>
<td>150 mm (5.90&quot;)</td>
</tr>
<tr>
<td>98 mm (3.86&quot;)</td>
<td>250 mm (9.84&quot;)</td>
</tr>
</tbody>
</table>

Rectangular

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 mm (2.56&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

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.

1. For 35 X 106 mm boot shaped and 65 X 210 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.
Level instruments
Point level measurement - Rotating paddle switch

SITRANS LPS200

Schematics

Switch Selectable Connection

AC or DC version, SPDT relay, fail-safe

Switching and timing behaviour:
If the vane is not covered, the rotating vane shaft will send pulses at 20 second intervals.
In case of fault, the pulses are missed. After 30 seconds, the alarm relay will open.

Voltage Selector

24 V DC
115 V AC
230 V AC

SITRANS LPS200 connections
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 20000 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 patented 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.
# Technical specifications

## Ultrasonics Transmitter/Controller Selection Guide

<table>
<thead>
<tr>
<th>Criteria</th>
<th>SITRANS Probe LU</th>
<th>HydroRanger 200</th>
<th>MultiRanger 100/200</th>
<th>SITRANS LUC500</th>
<th>SITRANS LU</th>
<th>OCM III</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td>6 m (20 ft) or 12 m (40 ft)</td>
<td>15 m (50 ft) transducer and application dependent</td>
<td>15 m (50 ft) transducer and application dependent</td>
<td>15 m (50 ft) transducer and application dependent</td>
<td>60 m (200 ft) transducer and application dependent</td>
<td>3 m (10 ft)</td>
</tr>
<tr>
<td><strong>Typical applications</strong></td>
<td>Chemical storage vessels, filter beds, liquid storage vessels</td>
<td>Wet wells, flumes/weirs, bar screen control</td>
<td>Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crucible bins, dry solids storage</td>
<td>Wet well lift station control, weirs/flumes, open channels</td>
<td>Chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets</td>
<td>Open channel measurement</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>HART model: 4 ... 20 mA HART PROFIBUS PA model: PROFIBUS</td>
<td>6 relays standard, two 4 ... 20 mA outputs (isolated)</td>
<td>1 relay (option on MultiRanger 100) 3 relays standard 6 relays (option) Two 4 ... 20 mA outputs (isolated)</td>
<td>5 relays, 4 ... 20 mA (option)</td>
<td>4 relays (LU01, LU02) Up to 40 relays (LU10) 4 ... 20 mA isolated</td>
<td>3 relays, 4 ... 20 mA</td>
</tr>
<tr>
<td><strong>Power specifications</strong></td>
<td>HART: 4 ... 20 mA, 24 V DC nominal, max. 550 Ω, 30 V DC max. PROFIBUS PA: 12, 13, 15, or 20 mA, dependent on programming</td>
<td>AC version: 100 ... 230 V AC ±15%, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W</td>
<td>AC version: 100 ... 230 V AC ±15%, 50/60 Hz, 30 VA/17 W DC version: 12 ... 30 V DC, 20 W</td>
<td>AC version: 100 ... 230 V AC ±15%, 50/60 Hz, 30 VA/17 W DC version: 12 ... 30 V DC, 20 W</td>
<td>AC version: 100 ... 230 V AC ±15%, 50/60 Hz, 30 VA/17 W DC version: 12 ... 30 V DC, 20 W</td>
<td>AC version: 100 ... 230 V AC ±15%, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>CE, CSA, cPTC, FM, C-TICK, ATEX, ANZEx, IECEx</td>
<td>CE, CSA, cPTC, UL Listed, FM, C-TICK</td>
<td>CE, CSA, cPTC, UL Listed, FM, C-TICK</td>
<td>CE, CSA, cPTC, UL Listed</td>
<td>CE, CSA, cPTC, FM, Lloyd’s Register</td>
<td>CE, CSA, cPTC, FM</td>
</tr>
</tbody>
</table>

---

**Note:** To order the 13 version of this hand programmer, order 7ML830-2AH.

Handheld programmer selection guide
# SIEMENS

## Ultrasonic Level Application Questionnaire

### Customer information

Contact: ___________________________  Prepared By: ___________________________

Company: ___________________________  Date: ___________________________

Address: ___________________________  Notes on the Application: ___________________________

City: ___________________________  Country: ___________________________

Zip/Postal Code: ___________________________  Phone: ( )

E-mail: ___________________________  Fax: ( )

### Tanks/Vessel information

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions:</th>
<th>Critical Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Height: ___________ m/ft</td>
<td>Nozzle Length: ___________ cm/in</td>
</tr>
<tr>
<td></td>
<td>Width/Diameter: ___________ m/ft</td>
<td>Nozzle Diameter: ___________ cm/in</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tank top:</th>
<th>Tank bottom:</th>
<th>Internal equipment and/or obstructions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Sloped</td>
<td>(E.g. Agitator, Heating coils, Supports, Other)</td>
</tr>
<tr>
<td>Flat</td>
<td>Flat</td>
<td></td>
</tr>
<tr>
<td>Conical</td>
<td>Conical</td>
<td></td>
</tr>
<tr>
<td>Parabolic</td>
<td>Parabolic</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement type:</th>
<th>Area safety classification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point Level</td>
<td>(specify code required)</td>
</tr>
</tbody>
</table>

### Material

Material being measured: ___________________________  Slurry  Liquid  Solid

Material temperature:  Norm: ___________ °C/°F  Max: ___________ °C/°F

Atmosphere:  Air  Other  Homogenous: Yes  No

Dust:  None  Light  Heavy

### Installation

Power available: ___________________________

Inputs required:  Outputs required:  Communications:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 20 mA</td>
<td>4 to 20 mA</td>
<td>HART ® /4 to 20 mA</td>
</tr>
<tr>
<td>Pump Interlocks ( #): _________</td>
<td>Relays ( #): _________</td>
<td>AB Remote I/O</td>
</tr>
</tbody>
</table>

Products recommended:

© Siemens Milltronics Process Instruments Inc.  www.siemens.com/processautomation
Overview

The Pointek ULS200 is an 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.

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 3A approved sanitary fitting clamp process connections
- Polycarbonate or aluminum enclosures, 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

Design

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" (BSP), EN 10226 or PF2 and can be fitted with the optional 75 mm (3") 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.

Configuration

Pointek ULS200 Mounting

Parabolic Mounting

Flat Mounting and Beam Angle

Pointek ULS200 Mounting
## Technical 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, resistive load
- **DC Version (relay)**: 2 SPDT Form C contacts rated 5 A at 48 V DC
- **DC Version (transistor)**: 2 switches, rated max. 100 mA, 48 V DC

### Accuracy
- **AC/DC version**
  - **Resolution**: 3 mm (0.1")
  - **Repeatability**: 0.25% of measuring range

### Rated operation conditions

#### Installation conditions
- **Location**: Indoors/outdoors
- **Beam angle**: 12°

#### Ambient conditions
- **Ambient temperature**: -40 ... +60 °C (-40 ... +140 °F)
- **If mounted in metal threads**: -20 ... +60 °C (-5 ... +140 °F)

#### Medium conditions
- **Process pressure**: 0.5 bar (7.25 psi) max.

### Design
- **Material**: Polycarbonate or epoxy-coated aluminum with gasket
- **Weight**: Approx. 1.5 kg (3.3 lbs)
- **Transducer material**: PVDF copolymer
- **Threaded mounting**: 2" NPT ([Taper], ANSI/ASME B1.20.1] R 2" [BSPT], EN 10226] or G 2" [BSPP], EN ISO 228-1]
- **Optional flange adapter**: For 3" ASME, DN 65, PN 10 and JIS 10K 3B
- **Sanitary mounting**: 4" sanitary fitting clamp according to 3A guidelines

### Power supply
- **AC version**: 100 ... 230 V AC, ± 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") high, for display of distance between sensor face and material, multisegment graphic for operating state
- **Memory**: EEPROM, non-volatile
- **Programming**: 2 keys

### Electronics/enclosure
- **Connection**: terminal block, max. 2.5 mm² (14 AWG) solid/1.5 mm² (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), CSAUS/FM
- CSA/FM Class I, II, III, Div. 1, Gr A, B, C, D, E, F, G T4
- ATEX II 2G EEEx md IIC T5
- 3A Approval
- C-TICK
- INMETRO: Br-EEEx md IIC T5
- Functional Safety to SIL-1 in accordance with IEC 61508 and IEC 61511-1 Safe Failure Fraction (SFF) of 70% (Third party FMEDA Analysis - hardware only)

### Options

#### Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ANSI, DN 65 PN10, and JIS 10K 3B flanges
- 148.8 mm (5.86") bolt hole circle diameter
- 190.2 mm (7.49") diameter

---

© Siemens AG 2010
# Level instruments

## Point level measurement - Ultrasonic switch

### Pointek ULS200

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order code</strong></td>
<td>7ML1510-0</td>
</tr>
</tbody>
</table>

**Pointek ULS200**

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

<table>
<thead>
<tr>
<th>Power supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V DC, relay output</td>
<td>1</td>
</tr>
<tr>
<td>24 V DC, transistor output</td>
<td>2</td>
</tr>
<tr>
<td>100 ... 230 V AC, relay output</td>
<td>3</td>
</tr>
</tbody>
</table>

**Approvals**

CE, C-TICK, INMETRO, ATEX II 2G EEx md IIC T5
CE, C-TICK, CSA Class I, II, III, Div. 1
CE, C-TICK, FM Class I, II, III, Div. 1
CE, C-TICK, CUS, FM, 3A
CE, C-TICK, CSA Class I, II, Div. 2

**Transducer/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
PVDVF copolymer, 2” NPT (Taper), ANSI/ASME B1.20.1
PVDVF copolymer, R 2” (BSPT), EN 10226
PVDVF copolymer, G (BSPP), EN ISO 228-1
PVDVF copolymer, 4” sanitary mounting, 3A approved

**Enclosure/cable inlet**

- Polycarbonate
  - Cable inlet PG 13.5 | 1 |
  - Cable inlet ½” NPT | 2 |
- Aluminum
  - Cable inlet PG 13.5 | 3 |
  - Cable inlet ½” NPT | 4 |

**Instruction manual**

Additional Multi-language Quick Start manual | 7ML1998-1XB82 |

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Further designs**

Please add “_Z_” to Order No. and specify Order code(s).

SIL Declaration of Conformity for SIL-1 Proven in Use | C20 |

**Accessories**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tag, stainless steel, 12 x 45 mm (0.47 x 1.77”), one text line, suitable for enclosures</td>
</tr>
<tr>
<td>Universal Box Bracket Mounting Kit</td>
</tr>
<tr>
<td>3” ASME, DN 65, PN 10, JIS 10K 3B ETFE Flange adapter for 2” NPT</td>
</tr>
<tr>
<td>3” ASME, DN 65, PN 10, JIS 10K 3B ETFE Flange adapter for 2” BSPT</td>
</tr>
<tr>
<td>2” BSPT Locknut, plastic</td>
</tr>
<tr>
<td>2” NPT Locknut</td>
</tr>
<tr>
<td>4” sanitary mounting clamp</td>
</tr>
</tbody>
</table>

**Spare Parts**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polycarbonate Lid</td>
</tr>
<tr>
<td>Aluminum Lid</td>
</tr>
</tbody>
</table>

---

1) Available with enclosure/cable inlet option 4 only
2) Available with enclosure/cable inlet option 4 only and process connection options A and E only
3) Available with enclosure/cable inlet options 2 and 4 only
4) Available with approval option H only
C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments

Point level measurement - Ultrasonic switch

Pointek ULS200

Dimensional drawings

Threaded

Sanitary

Schematics

Relay Output

100 to 230 V AC
50/60 Hz

or

18 to 30 V DC

Two Form C (SPDT) relays can switch external devices such as alarms, relays, contractors, PLCs, DCSs, etc.

Transistor Output: DC version only

18 to 30 V DC

Two non-polarized transistor outputs are suitable for connection to PLCs, DCSs, or customer supplied relays.

Pointek ULS200 connections
Level instruments
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
- Patented 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

Parabolic Mounting

Flat Mounting and Beam Angle

The Probe mounting
### Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Three-wire version</th>
<th>Two-wire version (standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Ultrasonic level measurement</td>
<td>Ultrasonic level measurement</td>
</tr>
<tr>
<td>Input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.25 ... 5 m (0.8 ... 16.4 ft)</td>
<td>0.25 ... 5 m (0.8 ... 16.4 ft)</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mA</td>
<td>4 ... 20 mA</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td>- Span</td>
<td>Proportional/inversely proportional</td>
<td>Proportional/inversely proportional</td>
</tr>
<tr>
<td>- Max. load</td>
<td>750 Ω at 24 V DC</td>
<td>600 Ω in the loop at 24 V DC</td>
</tr>
<tr>
<td>Relay</td>
<td>For level alarm or fault</td>
<td>No</td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>18 ... 30 V DC, max. 0.2 A</td>
<td>12 ... 28 V DC, 0.1 A surge</td>
</tr>
<tr>
<td>Max. power consumption</td>
<td>5 W (200 mA at 24 V DC)</td>
<td>0.75 W (25 mA at 24 V DC)</td>
</tr>
<tr>
<td>Certificates and approvals</td>
<td>CE, C-TICK, CSA, FM, 3A</td>
<td>CE, C-TICK, CSA, 3A</td>
</tr>
</tbody>
</table>

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>The Probe</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7ML1201</td>
<td>Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels</td>
<td></td>
</tr>
<tr>
<td>7ML1201-00</td>
<td>Measuring range</td>
<td>5 m (16.4 ft)</td>
</tr>
<tr>
<td>Transducer/Process connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVDF copolymer, 2” NPT ([Taper], ANSI/ASME B1.20.1)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>PVDF copolymer, R 2” ([BSPT], EN 10226)</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>PVDF copolymer, G 2” ([BSPP], EN ISO 228-1)</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>PVDF copolymer, 4” Sanitary mounting, 3A approved</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

### Model/Approval

| 3 Wire, 24 V DC, CE, C-TICK, CSA, FM | E |
| 2 Wire, 24 V DC, CE, C-TICK, CSA | F |

### Further designs

<table>
<thead>
<tr>
<th>Order code</th>
<th>Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75”)]: Measuring-point number/identification (max. 20 characters) specify in plain text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y17</td>
<td></td>
</tr>
</tbody>
</table>

### Accessories

| 7ML1830-1BK | Universal Box Bracket Mounting kit |
| 7ML1830-1BR | Sanitary 4” mounting clamp |
| 7ML1930-1AA | Power Supply, 24 V DC, 200 mA for 2 probes (105 to 125 V AC input) |
| 7ML1930-1AB | Three-way, 24 V DC, 100 mA for 1 probe (105 to 125 V AC input) |
| 7ML1830-1BT | 2” NPT locknut, plastic |
| 7ML1830-1DU | 2” BSPT locknut, plastic |
| 7ML1930-1DQ | Plastic M20 cable gland with metal locknut |
| 7ML1930-1DB | SITRANS RD100 Remote display - see RD100 on page 5/304 |
| 7ML1900-5GD61 | SITRANS RD200 Remote display - see RD200 on page 5/306 |

C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous level measurement - Ultrasonic transmitters

The Probe

Options

Flange adapter for mating 2” NPT or 2” BSP process connections to 3” ANSI, DN 65 PN10, and JIS 10K 3B flanges

The Probe Optional Flange Adapter

The Probe with Optional Mounting Bracket

Schematics

3 Wire Model
(Standard and Sanitary Models)

2 Wire Model
(Standard and Sanitary Models)

Display

The Probe connections

Dimensional drawings

The Probe dimensions

© Siemens AG 2010
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
- Patented Sonic Intelligence signal processing
- Extremely high signal-to-noise ratio
- 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 and chemical storage vessels.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Auto False-Echo Suppression for fixed obstruction avoidance, as well as an improved signal-to-noise ratio and improved accuracy of 0.15% of range or 6 mm (0.25”), the Probe LU provides unmatched reliability.

SITRANS Probe LU includes Sonic Intelligence® signal processing from the field-proven Probe and incorporates new echo processing features and the latest micro-processor and communications technology. 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

Parabolic Mounting

Flat Mounting and Beam Angle

SITRANS Probe LU mounting
## Technical specifications

### Mode of operation

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Ultrasonic level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application</td>
<td>Level measurement in storage vessels and simple process vessels</td>
</tr>
</tbody>
</table>

### Inputs

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>6 m (20 ft) model</th>
<th>12 m (40 ft) model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.25 ... 6 m (10&quot; ... 20 ft)</td>
<td>0.25 ... 12 m (10&quot; ... 40 ft)</td>
</tr>
<tr>
<td>Frequency</td>
<td>54 kHz</td>
<td></td>
</tr>
</tbody>
</table>

### Outputs

<table>
<thead>
<tr>
<th>mA/HART®</th>
<th>4 ... 20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± 0.02 mA</td>
</tr>
<tr>
<td>PROFIBUS PA</td>
<td></td>
</tr>
</tbody>
</table>

### Performance

<table>
<thead>
<tr>
<th>Resolution</th>
<th>≤ 3 mm (0.12&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± the greater of 0.15 % of range or 6 mm (0.24&quot;)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>≤3 mm (0.12&quot;)</td>
</tr>
<tr>
<td>Blanking distance</td>
<td>0.25 m (10&quot;)</td>
</tr>
<tr>
<td>Update time</td>
<td>≤ 5 seconds</td>
</tr>
<tr>
<td>4/20 mA/HART version</td>
<td>≤ 5 seconds at 4 mA</td>
</tr>
<tr>
<td>PROFIBUS version</td>
<td>≤ 4 seconds at 15 mA current loop</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>Built-in to compensate over temperature range</td>
</tr>
<tr>
<td>Beam angle</td>
<td>10°</td>
</tr>
</tbody>
</table>

### Rated operating conditions

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Temperature</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td>- Relative humidity/ingress protection</td>
<td>Suitable for outdoor</td>
</tr>
<tr>
<td>- Installation category</td>
<td>1</td>
</tr>
<tr>
<td>- Pollution degree</td>
<td>4</td>
</tr>
<tr>
<td>Medium conditions</td>
<td></td>
</tr>
<tr>
<td>- Temperature at flange or threads</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>- Pressure (vessel)</td>
<td>0.5 bar g (7.25 psi g)</td>
</tr>
</tbody>
</table>

### 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 lbs) |
| Cable inlet          | 2 x M20x1.5 cable gland or 2 x ½" NPT thread |
| 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" (80 mm) universal flange |
| Other connection   | FMS 200 mounting bracket (see page 5/185) or customer supplied mount |

### Display and Controls

| Interface | Local: LCD display with bar graph |
| Configuration | Remote: Available via HART or PROFIBUS PA |
| Memory   | Non-volatile EEPROM |

### Power supply

| Nominal 24 V DC with 550 Ω 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 | CSAUS/C, FM, CE, C-TICK |
| Marine (only applies to HART communication option) | Lloyd’s Register of Shipping |
| Hazardous | ABS Type Approval |
| Intrinsically Safe (Europe) | ATEX II 1G Ex ia IIC T4 |
| Intrinsically Safe (USA/Canada) | CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III |
| Intrinsically Safe (Australia/New Zealand) | ANZEx ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68 |
| Intrinsically Safe (International) | IECEx T3A 04.0020X Ex ia IIC T4 |
| Non-incendive (USA) | FM (no barrier required) TS: Class I, Div. 2, Groups A,B,C, D |

### Handheld Programmer

| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| Approvals for handheld programmer | IS model with ATEX Ex ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D |
| Ambient temperature | -20 ... +40 °C (-5 ... +104 °F) |
| Interface | Proprietary infrared pulse signal 3 V lithium battery (non-replaceable) |
Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

Level instruments

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS Probe LU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>SITRANS Probe LU</td>
</tr>
<tr>
<td>2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enclosure/Cable Inlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic (PBT), 2 x M20x1.5 (check Approvals for cable gland details)</td>
</tr>
<tr>
<td>Plastic (PBT), 2 x ½&quot; NPT (no cable glands supplied)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range/Transducer material</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 meter (20 ft), ETFE</td>
</tr>
<tr>
<td>6 meter (20 ft), PVDF Copolymer</td>
</tr>
<tr>
<td>12 meter (40 ft), ETFE</td>
</tr>
<tr>
<td>12 meter (40 ft), PVDF Copolymer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>R 2&quot; [(BSPT), EN 10226]</td>
</tr>
<tr>
<td>G 2&quot; [(BSPP), EN ISO 228-1]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA, HART®</td>
</tr>
<tr>
<td>PROFIBUS PA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose, FM, CSA, CE, C-TICK</td>
</tr>
<tr>
<td>Intrinsically Safe, FM Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Groups E, F, G, Class III, ATEX II 1G EEex ia IIC T4, ANZEex, IECEx (HART model only)</td>
</tr>
<tr>
<td>Intrinsically Safe, CSA Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Group G; Class III (HART model only)</td>
</tr>
<tr>
<td>FM, Class I, Div. 2. (Enclosure option 2 only)</td>
</tr>
<tr>
<td>Intrinsically Safe, CSA/ FM Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Groups E, F, G; Class III (PROFIBUS PA model only)</td>
</tr>
<tr>
<td>Intrinsically Safe, ATEX II 1G EEex ia IIC T4 (PROFIBUS PA model only)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Further designs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please add &quot;-Z&quot; to Order No. and specify Order code(s)</td>
</tr>
<tr>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instruction manual for HART/mA device</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
</tr>
<tr>
<td>French</td>
</tr>
<tr>
<td>German</td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered as a separate item on the order.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handheld programmer, Intrinsically Safe, EEx ia</td>
</tr>
<tr>
<td>Handheld programmer, General Purpose approvals</td>
</tr>
<tr>
<td>Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA</td>
</tr>
<tr>
<td>HART modem/RS-232</td>
</tr>
<tr>
<td>(for use with PC and SIMATIC PDM)</td>
</tr>
<tr>
<td>HART modem/USB</td>
</tr>
<tr>
<td>(for use with a PC and SIMATIC PDM)</td>
</tr>
<tr>
<td>2&quot; NPT locknut, plastic</td>
</tr>
<tr>
<td>2&quot; BSPT locknut, plastic</td>
</tr>
<tr>
<td>3&quot; ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2&quot; NPT</td>
</tr>
<tr>
<td>3&quot; ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2&quot; BSPT</td>
</tr>
<tr>
<td>One General Purpose polymeric cable gland M20x1.5, rated for -30...+80 °C (-4...+176 °F)</td>
</tr>
<tr>
<td>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)</td>
</tr>
<tr>
<td>One metallic cable gland M20x1.5, rated -40...+80 °C (-40...+176 °F) with integrated shield connection (available for PROFIBUS PA)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spare Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic lid</td>
</tr>
</tbody>
</table>

Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ANSI, DN 65 PN10, and JIS 10K 3B flanges

SITRANS Probe LU optional flange adapter

SITRANS Probe LU with FMS 200 Mounting Bracket

SITRANS Probe LU with optional mounting bracket
Level instruments
Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

Dimensional drawings

Note: Above model is shown without M20 cable glands or 1/2" NPT conduit connectors.

SITRANS Probe LU dimensions

Schematics

Notes:
- 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 EC/2010-1 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
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 today'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
### Technical specifications

<table>
<thead>
<tr>
<th>Mode of Operation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Ultrasonic level measurement</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.3 ... 15 m (1 ... 50 ft), transducer dependent</td>
</tr>
<tr>
<td>Measuring points</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog</td>
<td>0 ... 20 mA or 4 ... 20 mA, from alternate device, scaleable (6 relay model)</td>
</tr>
<tr>
<td>Discrete</td>
<td>10 ... 50 V DC switching level Logical 0 = &lt; 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Echomax® Transducer</td>
<td>44 kHz</td>
</tr>
<tr>
<td>Ultrasonic transducer</td>
<td>Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relays</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Model with 1 relay</td>
<td>1 SPST Form A</td>
</tr>
<tr>
<td>- Model with 3 relays</td>
<td>2 SPST Form A/1 SPDT Form C</td>
</tr>
<tr>
<td>- Model with 6 relays</td>
<td>4 SPST Form A/2 SPDT Form C</td>
</tr>
<tr>
<td>mA output</td>
<td>0 ... 20 mA or 4 ... 20 mA</td>
</tr>
<tr>
<td>• Max. load</td>
<td>750 Ω isolated</td>
</tr>
<tr>
<td>• Resolution</td>
<td>0.1 % of range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accuracy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Error in measurement</td>
<td>0.25% of range or 6 mm (0.24”), whichever is greater</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1% of measuring range or 2 mm (0.08”), whichever is greater</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>-50 ... +150 °C (-58 ... +302 °F) Integral temperature sensor in transducer External TS-3 temperature sensor (optional) Programmable fixed temperature values</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation conditions</td>
<td>indoor / outdoor</td>
</tr>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Installation category</td>
<td>II</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>4</td>
</tr>
<tr>
<td>Ambient conditions</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature (enclosure)</td>
<td>-20 ... +50 °C (-4 ... +122 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>• Wall mount</td>
<td>1.37 kg (3.02 lbs)</td>
</tr>
<tr>
<td>• Panel mount</td>
<td>1.50 kg (3.31 lbs)</td>
</tr>
<tr>
<td>Material (enclosure)</td>
<td>Polycarbonate</td>
</tr>
<tr>
<td>Degree of protection (enclosure)</td>
<td></td>
</tr>
<tr>
<td>• Wall mount</td>
<td>IP65/Type 4X/NEMA 4X</td>
</tr>
<tr>
<td>• Panel mount</td>
<td>IP54/Type 3/NEMA 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable</th>
<th>Transducer and mA output signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-core copper conductor, twisted, shielded, 300 V RMS, 0.82 mm² (18 AWG), Belden® 8760 or equivalent is acceptable</td>
<td></td>
</tr>
</tbody>
</table>

| Max. separation between transducer and transceiver | 365 m (1200 ft) |

<table>
<thead>
<tr>
<th>Displays and controls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x 40 mm (4 x 1.5”) multi-block LCD with backlighting</td>
<td></td>
</tr>
</tbody>
</table>

| Programming |  |
| Programming using handheld programmer or via PC with SIMATIC PDM software |

<table>
<thead>
<tr>
<th>Power supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC version</td>
<td>100 ... 230 V AC ± 15%, 50/60 Hz, 36 VA (17 W)</td>
</tr>
<tr>
<td>DC version</td>
<td>12 ... 30 V DC (20 W)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certificates and approvals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• CE, C-TICK(5)</td>
<td></td>
</tr>
<tr>
<td>• Lloyd’s Register of Shipping</td>
<td></td>
</tr>
<tr>
<td>• ABS Type Approval</td>
<td></td>
</tr>
<tr>
<td>• FM, CSAUSC-UL listed</td>
<td></td>
</tr>
<tr>
<td>• CSAUSC Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only)</td>
<td></td>
</tr>
<tr>
<td>• MCERTS Class 1 approved for Open Channel Flow</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• RS-232 with Modbus RTU or ASCII via RJ-11 connector</td>
<td></td>
</tr>
<tr>
<td>• RS-485 with Modbus RTU or ASCII via terminal blocks</td>
<td></td>
</tr>
<tr>
<td>• Optional: SmartLinx® cards for - PROFIBUS DP - DeviceNet™ - Allen-Bradley® Remote I/O</td>
<td></td>
</tr>
</tbody>
</table>

---

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
3) 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
Selection and Ordering data

Order No. \( 7 \text{ML} \ 5 \text{M} \ 3 \text{4} \ 4 \)

**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 model code below.

### Mounting

- **Wall mount, standard enclosure**
- **Wall mount, 4 entries, 4 M20 cable glands included**

### Power supply

- **100 ... 230 V AC**
- **12 ... 30 V DC**

### Number of measurement points

- **Single point model, 6 relays**
- **Dual point model, level only, 1 relay**
- **Single point model, level only, 3 relays**

### Communication (SmartLinx)

- **Without module**
- **SmartLinx® Allen-Bradley® Remote I/O module**
- **SmartLinx PROFIBUS DP module**
- **SmartLinx DeviceNet™ module**

See SmartLinx product page 5/301 for more information.

### Approvals

- **General Purpose CE, FM, CSA, UL listed, C-TICK**
- **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)**

### Further designs

Please add “-Z” to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text.

### Instruction manual

- **Order No.**
  - **English** \( 7 \text{ML} \ 1998-\text{5FC02} \)
  - **French** \( 7 \text{ML} \ 1998-\text{5FC11} \)
  - **German** \( 7 \text{ML} \ 1998-\text{5FC32} \)

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

### Other instruction manuals

- **SmartLinx Allen-Bradley Remote I/O, English** \( 7 \text{ML} \ 1998-1\text{AP02} \)
- **SmartLinx PROFIBUS DP, English** \( 7 \text{ML} \ 1998-1\text{AQ03} \)
- **SmartLinx DeviceNet, English** \( 7 \text{ML} \ 1998-1\text{AH02} \)

Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.
HydroRanger 200

**Selection and Ordering data**

**Order No.**

**Milltronics 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 model code below.

### Mounting

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wall mount, standard enclosure</td>
</tr>
<tr>
<td>2</td>
<td>Wall mount, 4 entries, 4 M20 cable glands included</td>
</tr>
<tr>
<td>3</td>
<td>Panel mount (1)</td>
</tr>
</tbody>
</table>

### Power supply

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 ... 230 V AC</td>
</tr>
<tr>
<td>B</td>
<td>12 ... 30 V DC</td>
</tr>
</tbody>
</table>

### Communication (SmartLinx)

**Without module**

**SmartLinx® Allen-Bradley® Remote I/O module**

**SmartLinx PROFIBUS-DP module**

**SmartLinx DeviceNet™ module**

See SmartLinx product page 5/301 for more information.

### Approvals

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General Purpose CE, FM, CSA, UL listed, C-TICK</td>
</tr>
<tr>
<td>2</td>
<td>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)</td>
</tr>
</tbody>
</table>

### Number of measurement points

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single point model, 6 relays</td>
</tr>
<tr>
<td>2</td>
<td>Dual point model, 6 relays</td>
</tr>
<tr>
<td>3</td>
<td>Single point model, level only, 1 relay (2)</td>
</tr>
<tr>
<td>4</td>
<td>Single point model, level only, 3 relays (2)</td>
</tr>
</tbody>
</table>

### Further designs

Please add "-Z" to Order No. and specify Order code(s).

- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
  - Order code: Y15

- **Instruction manual**
  - English: 7ML1998-1FC05
  - French: 7ML1998-1FC14
  - German: 7ML1998-1FC34

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

- **Handheld programmer**

- **Tag, stainless steel, 12 x 45 mm (0.47 x 1.77")**, one text line, suitable for enclosure

- **TS-3 Temperature Sensor**

- **SITRANS RD100 Remote display**

- **SITRANS RD200 Remote display**

See SmartLinx product page 5/301 for more information.

1) Available with approval option 1 only

2) This model is level control only; no open channel flow, differential level, or volume conversion functions

C) Subject to export regulations AL: N, ECCN: EAR99

L) Subject to export regulations AL: N, ECCN: 3A991X

© Siemens AG 2010
### Dimensional drawings

**Wall Mount Version**

- 14.9 mm (0.58")
- 15.2 mm (0.6")
- 160.3 mm (6.325")
- 130 mm (5.125")
- 91 mm (3.58")
- 6.6 mm (0.26")
- Ø 4.3 mm (0.17")

**Panel Mount Version**

- 198 mm (7.8")
- 36 mm (1.4")
- 278 mm (10.94")

### Schematics

**HydroRanger 200 connections**

**Notes**

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 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.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.
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.
## Technical specifications

<table>
<thead>
<tr>
<th>Mode of Operation</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Weight</td>
</tr>
<tr>
<td>Continuous level measurement</td>
<td>1.37 kg (3.02 lbs)</td>
</tr>
<tr>
<td>Measuring range</td>
<td>Panel mount</td>
</tr>
<tr>
<td>0.3 ... 15 m (1 ... 50 ft)</td>
<td>1.50 kg (3.31 lbs)</td>
</tr>
<tr>
<td>Measuring points</td>
<td>Material (enclosure)</td>
</tr>
<tr>
<td>1 or 2</td>
<td>Polycarbonate</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td>Degree of protection (enclosure)</td>
</tr>
<tr>
<td>• Analog (MultiRanger 200 only)</td>
<td>Wall mount</td>
</tr>
<tr>
<td>0 ... 20 mA or 4 ... 20 mA, from alternate device, scaleable</td>
<td></td>
</tr>
<tr>
<td>• Discrete</td>
<td>Panel mount</td>
</tr>
<tr>
<td>10 ... 50 V DC switching level</td>
<td>IP65/Type 4X/NEMA 4X</td>
</tr>
<tr>
<td>Logical 0 =&lt; 0.5 V DC</td>
<td>IP54/Type 3/NEMA 3</td>
</tr>
<tr>
<td>Logical 1 = 10 ... 50 V DC</td>
<td></td>
</tr>
<tr>
<td>Max. 3 mA</td>
<td></td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>Electrical connection</td>
</tr>
<tr>
<td>• Echomax® transducer</td>
<td>Transducer and mA output signal</td>
</tr>
<tr>
<td>44 kHz</td>
<td>2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden® 8760 or equivalent is acceptable</td>
</tr>
<tr>
<td>• Ultrasonic transducer</td>
<td></td>
</tr>
<tr>
<td>Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5</td>
<td></td>
</tr>
<tr>
<td>• Relays</td>
<td></td>
</tr>
<tr>
<td>Rating 5 A at 250 V AC, non-inductive</td>
<td>Max. separation between transducer and transceiver</td>
</tr>
<tr>
<td>- Version with 1 relay (MultiRanger 100 only)</td>
<td>365 m (1200 ft)</td>
</tr>
<tr>
<td>1 SPST Form A</td>
<td></td>
</tr>
<tr>
<td>- Version with 3 relays</td>
<td></td>
</tr>
<tr>
<td>2 SPST Form A/1 SPDT Form C</td>
<td></td>
</tr>
<tr>
<td>- Version with 6 relays</td>
<td></td>
</tr>
<tr>
<td>4 SPST Form A/2 SPDT Form C</td>
<td></td>
</tr>
<tr>
<td>• mA output</td>
<td></td>
</tr>
<tr>
<td>0 ... 20 mA or 4 ... 20 mA</td>
<td></td>
</tr>
<tr>
<td>- Max. load</td>
<td></td>
</tr>
<tr>
<td>750 Ω isolated</td>
<td></td>
</tr>
<tr>
<td>- Resolution</td>
<td></td>
</tr>
<tr>
<td>0.1% of range</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
</tr>
<tr>
<td>• Error in measurement</td>
<td></td>
</tr>
<tr>
<td>0.25% of range or 6 mm (0.24”), whichever is greater</td>
<td></td>
</tr>
<tr>
<td>• Resolution</td>
<td></td>
</tr>
<tr>
<td>0.1 % of measuring range (^1) or 2 mm (0.08”), whichever is greater</td>
<td></td>
</tr>
<tr>
<td>• Temperature compensation</td>
<td></td>
</tr>
<tr>
<td>-50 ... +150 °C (-58 ... +302 °F)</td>
<td></td>
</tr>
<tr>
<td>• Integral temperature sensor</td>
<td></td>
</tr>
<tr>
<td>• External TS-3 temperature sensor (optional)</td>
<td></td>
</tr>
<tr>
<td>• Programmable fixed temperature values</td>
<td></td>
</tr>
<tr>
<td><strong>Rated operating conditions</strong></td>
<td><strong>Power supply</strong></td>
</tr>
<tr>
<td><strong>Installation conditions</strong></td>
<td>AC version</td>
</tr>
<tr>
<td>Indoor/outdoor</td>
<td>100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>DC version</td>
</tr>
<tr>
<td>II</td>
<td>12 ... 30 V DC (20 W)</td>
</tr>
<tr>
<td><strong>Installation category</strong></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td><strong>Pollution degree</strong></td>
<td>Certificates and approvals</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td><strong>CE, C-TICK(^2)</strong></td>
</tr>
<tr>
<td>Ambient temperature (housing)</td>
<td><strong>Lloyd’s Register of Shipping</strong></td>
</tr>
<tr>
<td>-20 ... +50 °C (-4 ... +122 °F)</td>
<td><strong>ABS Type Approval</strong></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td><strong>FM, CSA(_{US,CA}) - UL listed</strong></td>
</tr>
<tr>
<td>• Transducer and mA output signal</td>
<td><strong>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</strong></td>
</tr>
<tr>
<td>• Max. separation between transducer and transceiver</td>
<td><strong>Communication</strong></td>
</tr>
<tr>
<td>365 m (1200 ft)</td>
<td>• RS-232 with Modbus RTU or ASCII via RJ-11 connector</td>
</tr>
<tr>
<td><strong>Displays and controls</strong></td>
<td>• RS-485 with Modbus RTU or ASCII via terminal strips</td>
</tr>
<tr>
<td>100 x 40 mm (4 x 1.5”) multi-block LCD with backlighting</td>
<td>• Optional: SmartLinx® cards for - PROFIBUS DP</td>
</tr>
<tr>
<td>Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software</td>
<td>- DeviceNet™</td>
</tr>
<tr>
<td>• Programming</td>
<td>- Allen-Bradley® Remote I/O</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td><strong>Certificates and approvals</strong></td>
</tr>
<tr>
<td>• AC version</td>
<td><strong>CE, C-TICK(^2)</strong></td>
</tr>
<tr>
<td>100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)</td>
<td><strong>Lloyd’s Register of Shipping</strong></td>
</tr>
<tr>
<td>• DC version</td>
<td><strong>ABS Type Approval</strong></td>
</tr>
<tr>
<td>12 ... 30 V DC (20 W)</td>
<td><strong>FM, CSA(_{US,CA}) - UL listed</strong></td>
</tr>
<tr>
<td><strong>Rated operating conditions</strong></td>
<td><strong>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</strong></td>
</tr>
<tr>
<td><strong>Installation conditions</strong></td>
<td><strong>Communication</strong></td>
</tr>
<tr>
<td>Indoor/outdoor</td>
<td>• RS-232 with Modbus RTU or ASCII via RJ-11 connector</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>• RS-485 with Modbus RTU or ASCII via terminal strips</td>
</tr>
<tr>
<td>II</td>
<td>• Optional: SmartLinx® cards for - PROFIBUS DP</td>
</tr>
<tr>
<td><strong>Installation category</strong></td>
<td>- DeviceNet™</td>
</tr>
<tr>
<td>II</td>
<td>- Allen-Bradley® Remote I/O</td>
</tr>
<tr>
<td><strong>Pollution degree</strong></td>
<td><strong>Certificates and approvals</strong></td>
</tr>
<tr>
<td>4</td>
<td><strong>CE, C-TICK(^2)</strong></td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td><strong>Lloyd’s Register of Shipping</strong></td>
</tr>
<tr>
<td>Ambient temperature (housing)</td>
<td><strong>ABS Type Approval</strong></td>
</tr>
<tr>
<td>-20 ... +50 °C (-4 ... +122 °F)</td>
<td><strong>FM, CSA(_{US,CA}) - UL listed</strong></td>
</tr>
</tbody>
</table>

\(^1\) Program range is defined as the empty distance to the face of the transducer plus any range extension

\(^2\) EMC performance available on request
## MultiRanger 100/200

### Selection and Ordering data

<table>
<thead>
<tr>
<th>MultiRanger 100/200</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries</td>
<td>L M 5 0 3 3</td>
</tr>
</tbody>
</table>

### Versions

- MultiRanger 100, level measurement only
- MultiRanger 200, level, volume, flow and differential measurements

### Mounting, enclosure design

- Wall mount, standard enclosure
- Wall mount, 4 entries, 4 M20 cable glands included
- Panel mount (CE, CSA, FM, UL)

### Power supply

- 100 ... 230 V AC
- 12 ... 30 V DC

### Number of measurement points

- Single point version
- Dual point version

### Communication (SmartLinx)

- Without module
- SmartLinx® Allen-Bradley® Remote I/O module
- SmartLinx PROFIBUS DP module
- SmartLinx DeviceNet™ module

### 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)

### Approvals

- General Purpose CE, FM, CSA, UL listed, C-Tick
- CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III (1)
- ATEX II 3D (2)

### Further designs

- Please add "-Z" to Order No. and specify Order code(s).

### Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:

- Measuring-point number/identification (max. 16 characters) specify in plain text:
  - 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)

### Instruction manual

- English C)
- French C)
- Spanish C)
- German C)

- Quick Start guide, multi-language
- Note: The instruction manual should be ordered as a separate line on the order.

### Other instruction manuals

- SmartLinx Allen-Bradley Remote I/O, English C)
- SmartLinx PROFIBUS DP, English C)
- SmartLinx PROFIBUS DP, German C)
- SmartLinx PROFIBUS DP, French C)
- SmartLinx DeviceNet, English C)

- Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.

### Accessories

- Handheld programmer
- Tag, stainless steel, 12 x 45 mm (0.47 x 1.77")
- one text line, suitable for enclosure

- TS-3 Temperature Sensor - see TS-3 on page 5/186
- SITRANS RD100 Remote display - see RD100 on page 5/304
- SITRANS RD200 Remote display - see RD200 on page 5/306

### Spare parts

- Power Supply Board (100 ... 230 V AC) C)
- Power Supply Board (12 ... 30 V DC) C)
- Display Board C)

- See SmartLinx product page 5/301 for more information.

### Approvals

1) For wall mount applications only
2) For standard enclosure wall mount, option A only

C) Subject to export regulations AL: N, ECCN: EAR99
L) Subject to export regulations AL: N, ECCN: 3A991X

© Siemens AG 2010

© Modbus is a registered trademark of Schneider Electric.

© Belden is a registered trademark of Belden Wire and Cable Company.

© Allen-Bradley is a registered trademark of Rockwell Automation.

™ DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
Level instruments
Continuous level measurement - Ultrasonic controllers

MultiRanger 100/200

Dimensional drawings

**Wall Mount Version**

- 160.3 mm (6.325”)
- 91 mm (3.58”)
- 6.6 mm (0.26”)
- 51 mm (2.01”)
- 41.5 mm (1.63”)
- 14.9 mm (0.58”)
- 15.2 mm (0.6”)
- 2 cm (0.79”)
- 4.3 mm (0.17”)
- 2 cm (0.79”)
- 2 cm (0.79”)

**Panel Mount Version**

- 199 mm (7.85”)
- 97 mm (3.82”)
- 36 mm (1.42”)
- 276 mm (10.84”)

**Schematics**

**MultiRanger connections**

Notes:
1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 ft.).
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the MultiRanger Shield Connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

© Siemens AG 2010
HydroRanger Plus is an ultrasonic level controller for control of wet wells and reservoir pump operations, differential control and open channel flow monitoring, using energy-saving algorithms.

**Benefits**
- Outputs for alarms, chart recorders, controllers and integration of existing systems
- Monitors wet wells, weirs and flumes
- Energy-saving function with built-in real-time clock
- Special control mode to reduce grease rings and other deposits
- Integral temperature compensation
- Pump performance monitoring
- System monitoring and network analysis

**Application**
The system is effective in wet wells, weirs, and flumes where foam and turbulence are typical operating conditions. It can be customized to meet your specific application needs – from measuring flow rate in a narrow flume to volume in a ferric chloride storage bank.

The system consists of the electronics housed in a wall-mounted enclosure and a hermetically sealed, corrosion-resistant Echomax® transducer. These components can be separated by up to 365 m (1200 ft).

Optional submergence shields ensure consistent operation in wet wells where the transducer may be submerged during flooding from rainfall or a power outage. Siemens patented detection software can differentiate between a submerged condition and a high level.

- Key Applications: wet wells, weirs, flumes

**Technical specifications**

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Measuring principle</th>
<th>Ultrasonic level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.3 ... 15 m (1 ... 50 ft)</td>
<td></td>
</tr>
<tr>
<td>Measuring points</td>
<td>1 or 2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ultrasonic transducer 44 kHz</td>
</tr>
<tr>
<td>• Relays 5 alarm/control relays, 1 SPDT Form C per relay, rated 5 A at 250 V AC, resistive load</td>
</tr>
<tr>
<td>• mA output 0/4 ... 20 mA, optically isolated</td>
</tr>
<tr>
<td>- Max. load 1 kΩ</td>
</tr>
<tr>
<td>- Resolution 0.1 % of 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Error in measurement 0.25% of range or 6 mm (0.24&quot;), whichever is greater</td>
</tr>
<tr>
<td>• Resolution 0.1% of measuring range or 2 mm (0.08&quot;), whichever is greater¹</td>
</tr>
<tr>
<td>• Temperature compensation -50 ... +150 °C (-58 ... +302 °F)</td>
</tr>
<tr>
<td>- Integral temperature sensor</td>
</tr>
<tr>
<td>- External TS-3 temperature sensor (optional)</td>
</tr>
<tr>
<td>- Programmable fixed temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature for enclosure -20 ... +50 °C (-4 ... +122 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rack mount DIN 3 HU/14 pitch, 4 rail plug-in unit suitable for standard 84 pitch (19&quot;) rack</td>
</tr>
<tr>
<td>• Panel mount Suitable for standard panel cutout DIN 43700, 72 x 144 mm, 100 mm center height</td>
</tr>
<tr>
<td>• Degree of protection (wall mount) IP65/NEMA 4X/Type 4X</td>
</tr>
<tr>
<td>• Weight (rack and panel mount) 0.87 kg (1.9 lbs)</td>
</tr>
<tr>
<td>• Weight (wall mount) 1.5 kg (3.3 lbs)</td>
</tr>
<tr>
<td>• Material (enclosure) Polyester/polycarbonate alloy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercially available copper conductor according to local requirements, rated 250 V/5 A</td>
</tr>
<tr>
<td>• Ultrasonic transducer cable extension RG 62-AU coaxial cable with low capacitance</td>
</tr>
<tr>
<td>• mA output signal 2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden® 8760 or equivalent is acceptable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>100/115/200/230 V AC, ± 15%, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W</td>
</tr>
<tr>
<td>• Ultrasonic transducer Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Displays and controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack and panel mount 75 x 20 mm (3 x 0.8&quot;) LCD (selectable backlighting)</td>
</tr>
<tr>
<td>Wall mount 100 x 40 mm (4 x 1.5&quot;) multfield LCD, backlit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removable programmer or optional Dolphin Plus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPROM (non-volatile), no backup battery required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certificates and approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE², FM, CSAUS/C, C-TICK</td>
</tr>
</tbody>
</table>

¹ The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension.
² EMC certificate available on request
Belden is a registered trademark of Belden Wire and Cable Company.
# Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>HydroRanger Plus, rack and panel mount</th>
<th>HydroRanger Plus, wall mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>L9ML1025-01</td>
<td>Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display</td>
<td>Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display</td>
</tr>
<tr>
<td>Input voltage</td>
<td>100 V AC, 9 ... 30 V DC</td>
<td>100 V AC, 9 ... 30 V DC</td>
</tr>
<tr>
<td></td>
<td>115 V AC, 9 ... 30 V DC</td>
<td>115 V AC, 9 ... 30 V DC</td>
</tr>
<tr>
<td></td>
<td>200 V AC, 9 ... 30 V DC</td>
<td>200 V AC, 9 ... 30 V DC</td>
</tr>
<tr>
<td></td>
<td>230 V AC, 9 ... 30 V DC</td>
<td>230 V AC, 9 ... 30 V DC</td>
</tr>
</tbody>
</table>

**Approvals**
- CE (EN 61326), CSA US/CA, FM, C-TICK
- CE, FM General Purpose; CSA Class I, Div. 2, C-TICK

## Mounting/device version

- Version for 19" rack (requires terminal block; see accessories)
- Version for panel

## Approvals

- CE (EN 61326), CSA US/CA, FM, C-TICK
- CE, FM General Purpose; CSA Class I, Div. 2, C-TICK

## Input voltage

- 100 V AC, 9 ... 30 V DC
- 115 V AC, 9 ... 30 V DC
- 200 V AC, 9 ... 30 V DC
- 230 V AC, 9 ... 30 V DC

## Mounting/enclosure version

- Standard enclosure (NEMA 4X)
- Standard enclosure prepared for five M20 cable glands

## Further designs

Please add "-Z" to Order No. and specify Order code(s).

## Stainless steel tag

- Measuring-point number/identification (max. 16 characters) specify in plain text

## Instruction manual

- Order No.: 7ML1998-1AC02 (English), 7ML1998-1AC12 (French), 7ML1998-1AC32 (German)

## Accessories

- Handheld programmer
- Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line suitable for enclosures
- Terminal block for rack mount
- TS-3 Temperature Sensor - see TS-3 on page 5/186
- SITRANS RD100 Remote display - see RD100 on page 5/304
- SITRANS RD200 Remote display - see RD200 on page 5/306

## Spare parts

- Card, Analog HydroRanger Plus Rack/Panel
- Card, daughter
- Card, display, backlit

---

© Siemens AG 2010
Level instruments
Continuous level measurement - Ultrasonic controllers

HydroRanger Plus

**Dimensional drawings**

**Rack Mount**
DIN 3U/14HP, 4 rail plug-in unit suitable for standard 64 HP (19") subrack.
(Terminal is customer supplied or available as optional accessory.)

**Panel Mount**
72 mm (2.9")
18 mm (0.7")
201 mm (7.9")

**Wall Mount**
13 mm (0.5")
20 mm (0.8")
102 mm (4.0")
180 mm (7.1")

Suitable location for conduit entrances. Use water-tight conduit hubs to maintain enclosure rating.

**Schematics**

![Schematics](image)

**Notes**
1. Required only if mounted adjacent to other Siemens Miltronics equipment. Interconnect all "SYNC" terminals with a single 18 AWG (0.5 mm²) wire.
2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 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. Relay de-energized when in alarm conditions and energized for pump control.
4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with earth (ground) wire disconnected.

Voltage Selection

Voltage Selection Switches

HydroRanger Plus dimensions

HydroRanger Plus connections, rack and panel mount
Level instruments
Continuous level measurement - Ultrasonic controllers

HydroRanger Plus connections, wall mount

Notes
1. Required only if mounted adjacent to other Siemens Miltronics equipment. Interconnect all "SYNC" terminals with a single 18 AWG (0.8 mm²) wire.

2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.

3. Each relay has 1 set of Form "C" (SPDT) contacts, relay rated at 5A 250 V AC, non-inductive, when equal or lower rating limiting fuses are installed. Relay de-energized when in alarm conditions and energized for pump control.

4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with the enclosure lid open, or with the ground (earth) wire disconnected.
Level instruments
Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

Overview

SITRANS LUC500 is a complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.

Benefits

- Monitoring and control in one device
- Integral telemetry interface (Modbus RTU/ASCII)
- Patented algorithm for calculation of pumped volume within 5% accuracy
- Logging of pump runtime and number of pump starts
- Expandable with I/Os, RAM for data logging, dual point, SmartLinx communications and RS-485 interface
- Simple system configuration and diagnostics with Siemens Dolphin Plus Windows®-based software
- AC or DC power supply
- SITRANS LUC500 is available for rack mount, panel mount or wall mount

Application

It combines non-contacting ultrasonic technology, patented echo-processing techniques and proven application software to provide accurate level monitoring in liquids up to 15 m (50 ft). It also effectively monitors flow in flumes, weirs and open channels. Five relays control any combination of pumps, gate valves and alarms. Further advantages include fault signalling and data logging for trend analysis. It can log the time, date and volume of up to 20 occurrences of combined sewer overflows (CSO).

The basic device has 8 digital inputs, 5 digital outputs, 1 analog input, 1 ultrasonic level point, differential/average capability and one RS-232 interface with Modbus® RTU/ASCII protocol. The device can be expanded by additional I/Os, more RAM, two channels, RS-485 or SmartLinx communications models as your needs grow.

It integrates seamlessly with SCADA or DCS systems or a PLC system to provide remote access to all system parameters (pumped volume, pump runtime, pump status). The integral telemetry interface (Modbus RTU/ASCII) allows remote control in real time.

- Key Applications: wet well/lift station control, weirs/flumes, open channels

Application of accessories

SITRANS LUC500 can be expanded to meet the requirements of a variety of applications.

Auxiliary I/O cards, RAM and data logging, dual-channel function and SmartLinx communications.

- Input/output cards
  A single auxiliary I/O card can be installed in the SITRANS LUC500. The following I/O cards are available:
  - 2 analog inputs/2 analog outputs
  - 4 analog inputs
  - 4 analog outputs
  - 8 digital inputs
  - 8 digital inputs/2 analog inputs/2 analog outputs (wall mount only)

- Expanded memory card
  The available RAM can be increased using this card. The data logging function is then available.

- Two-channel function
  A second measuring point is provided on the SITRANS LUC500 to permit dual-channel measurements. This function is made available by ordering a software access code. Please contact your Siemens representative for details.

- Communications
  The SITRANS LUC500 is offered with MODBUS RTU/ASCII as a standard feature. Further industrial communications protocols are available with the addition of an optional SmartLinx card. The following protocols are currently available:
  - PROFIBUS DP
  - Allen Bradley® Remote I/O
  - DeviceNet®

®Modbus is a registered trademark of Schneider Electric.
®Allen-Bradley is a registered trademark of Rockwell Automation.
TMDeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
Windows® is a registered trademark of Microsoft Corp.
### Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Measuring principle</th>
<th>Ultrasonic level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.3 ... 15 m (1 ... 50 ft)</td>
<td></td>
</tr>
<tr>
<td>Measuring points</td>
<td>1 or 2</td>
<td></td>
</tr>
</tbody>
</table>

**Output**

- **Ultrasonic transducer**: 44 kHz
- **Relays**: 5 relays, rated 5 A at 250 V AC, non-inductive
  - Wall Mount version: 4 SPST Form A relays, 1 SPDT Form C relay
  - Rack and Panel Mount version: 4 SPST Form A relays, 1 SPST Form B relay

**Accuracy**

- **Error in measurement**: 0.25% of range or 6 mm (0.24"), whichever is greater
- **Resolution**: 0.1% of measuring range or 2 mm (0.08"), 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**

- **Rack mount**: DIN 3 HU/21 pitch, 4-rail plug-in unit suitable for standard 3 HU/84 pitch (19") rack
- **Panel mount**: Suitable for standard panel cutout DIN 43700 72 x 144 mm, 110 mm (4.33") center height

**Weight**

- **(rack and panel mount)**: 1.5 kg (3.3 lbs)
- **(wall mount)**: 2.5 kg (5.5 lbs)

**Communications**

- **RS-232**: Siemens Dolphin protocol, MODBUS RTU and ASCII
- **Option**: SmartLinx compatible, RS-485

**Power supply**

- **100 ... 230 V AC ± 15%, 50/60 Hz, 36 VA (17 W) or 12 ... 30 V DC, 20 W**

**Ultrasonic transducer**

- Compatible transducers: ST-H and Echomax® series
  - XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5

**mA output signal**

- 2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden® 8760 or equivalent is acceptable

**Displays and controls**

- **(rack and panel mount)**: 75 x 20 mm (3 x 0.8") LCD (selectable backlighting)
- **(wall mount)**: 100 x 40 mm (4 x 1.5") multfield LCD, backlit

**Programming**

- Using removable handheld programmer (ordered separately) or Dolphin Plus software (option)

**Memory**

- 1 Mbyte RAM (static) with battery
  - 1 Mbyte flash EPROM

**Certificates and approvals**

- CE, FM, CSA

---

1) The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension (P801)
## Continuous level measurement - Ultrasonic controllers

### SITRANS LUC500

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5001-A</td>
<td>A complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.</td>
</tr>
</tbody>
</table>

#### Mounting

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Panel mount version</td>
</tr>
<tr>
<td>2</td>
<td>Rack mount version for 19” rack</td>
</tr>
<tr>
<td>3</td>
<td>Wall mount, standard enclosure</td>
</tr>
<tr>
<td>4</td>
<td>Wall, 4 entry, M20 (valid with approval option 3 only)</td>
</tr>
</tbody>
</table>

#### Input voltage

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 ... 230 V AC</td>
</tr>
<tr>
<td>B</td>
<td>12 ... 30 V DC</td>
</tr>
</tbody>
</table>

#### Number of measurement points

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Single point version</td>
</tr>
<tr>
<td>B</td>
<td>Dual point version</td>
</tr>
</tbody>
</table>

#### Data communications

- SmartLinx ready, no module
- SmartLinx PROFIBUS DP module
- SmartLinx Allen-Bradley Remote I/O module
- SmartLinx DeviceNet module

#### Protocol

- Modbus RTU/ASCII

#### Auxiliary memory

- None
- 1 Mbyte static RAM, including data logging module

#### Auxiliary I/O

- None
- 2 analog inputs and 2 analog outputs
- 4 analog inputs
- 4 analog outputs
- 8 digital inputs
- 8 digital inputs, 2 analog inputs and 2 analog outputs (only for wall mount)

#### Approvals

- CSA, CE, UL (not available with mounting option 5)
- CE

#### Further designs

- Please add “Z” to Order No. and specify Order code(s).

#### Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]

- Measuring-point number/identification (max. 16 characters) specify in plain text

#### Instruction manual

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>English</td>
</tr>
<tr>
<td>B</td>
<td>German</td>
</tr>
</tbody>
</table>

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

### Auxiliary Cards

#### Access code required

1) Values of parameters P345 and P346 must be obtained from the customer in order to generate the order for the access code.

2) For replacement of auxiliary card or spare auxiliary card. Access code not required. Must be used only as replacement cards.

#### Optional Equipment

- Handheld programmer
- ERS500 Configuration Tool software, CD, cable kit, and License
- ERS500 Configuration Tool software, License only
- ERS500 Configuration Tool software, demo CD only

See SmartLinx product page 5/301 for more information.

#### Auxiliary Cards

1) Values of parameters P345 and P346 must be obtained from the customer in order to generate the order for the access code.

2) For replacement of auxiliary card or spare auxiliary card. Access code not required. Must be used only as replacement cards.

#### Auxiliary Cards

- 1 MB static RAM extended memory
- 2 analog input / 2 analog output for rack and panel mount version
- 2 analog input / 2 analog output for wall mount version
- 8 digital input for rack and panel mount version
- 8 digital input for wall mount version
- 4 analog input for rack and panel mount version
- 4 analog input for wall mount version
- 4 analog output for rack and panel mount version
- 4 analog output for wall mount version
- 6 digital inputs, 2 analog inputs, 2 analog outputs, wall mount
- Access code, dual point capability

### Optional Equipment

- Handheld programmer
- ERS500 Configuration Tool software, CD, cable kit, and License
- ERS500 Configuration Tool software, License only
- ERS500 Configuration Tool software, demo CD only

See SmartLinx product page 5/301 for more information.

#### Accessories

- Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]
- Measuring-point number/identification (max. 16 characters) specify in plain text

#### Instruction manual

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>English</td>
</tr>
<tr>
<td>B</td>
<td>German</td>
</tr>
</tbody>
</table>

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

#### Other Instruction manual

- SmartLinx Allen-Bradley Remote I/O, English
- SmartLinx PROFIBUS DP, English
- SmartLinx PROFIBUS DP, German
- SmartLinx DeviceNet, English

Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1998-5GL01</td>
<td>A complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.</td>
</tr>
</tbody>
</table>

#### Optional Equipment

- Handheld programmer
- ERS500 Configuration Tool software, CD, cable kit, and License
- ERS500 Configuration Tool software, License only
- ERS500 Configuration Tool software, demo CD only

See SmartLinx product page 5/301 for more information.

#### Auxiliary Cards

1) Values of parameters P345 and P346 must be obtained from the customer in order to generate the order for the access code.

2) For replacement of auxiliary card or spare auxiliary card. Access code not required. Must be used only as replacement cards.

#### Auxiliary Cards

- 1 MB static RAM extended memory
- 2 analog input / 2 analog output for rack and panel mount version
- 2 analog input / 2 analog output for wall mount version
- 8 digital input for rack and panel mount version
- 8 digital input for wall mount version
- 4 analog input for rack and panel mount version
- 4 analog input for wall mount version
- 4 analog output for rack and panel mount version
- 4 analog output for wall mount version
- 6 digital inputs, 2 analog inputs, 2 analog outputs, wall mount
- Access code, dual point capability

#### Optional Equipment

- Handheld programmer
- ERS500 Configuration Tool software, CD, cable kit, and License
- ERS500 Configuration Tool software, License only
- ERS500 Configuration Tool software, demo CD only

See SmartLinx product page 5/301 for more information.

#### Accessories

- Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]
- Measuring-point number/identification (max. 16 characters) specify in plain text

#### Instruction manual

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>English</td>
</tr>
<tr>
<td>B</td>
<td>German</td>
</tr>
</tbody>
</table>

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

#### Other Instruction manual

- SmartLinx Allen-Bradley Remote I/O, English
- SmartLinx PROFIBUS DP, English
- SmartLinx PROFIBUS DP, German
- SmartLinx DeviceNet, English

Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.
Level instruments
Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

Dimensional drawings

Rack Mount Unit

Panel Mount Unit

Wall Mount Unit

SITRANS LUC500 dimensions
SITRANS LUC500

**Level instruments**  
Continuous level measurement - Ultrasonic controllers

**Schematics**

SITRANS LUC500 connections

**Notes**
1. Transducer uses 2 wire twisted pair with shield only.
2. Terminals 49-64 are for use with optional expansion I/O cards.
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 and SmartLinx 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 (1200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features patented Sonic Intelligence® echo processing software for superior reliability.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

An on-board communications port automatically configures for RS-232, RS-485 or bi-polar current loop. The SITRANS LU01 will connect to a DCS or PLC using Siemens SmartLinx® interface modules, giving you remote 2-way communication and full parameter access. 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 and SmartLinx 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 patented Sonic Intelligence® echo processing software for superior reliability. Transducers can be mounted up to 365 m (1200 ft) from the monitor.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

It features an on-board communications port that automatically configures for RS-232, RS-485 or bi-polar current loop. It will connect to a DCS or PLC using Siemens SmartLinx® interface modules, giving you 2-way communication and full parameter access. 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, tripper car
## 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; 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**
  - **Max. load**: 750 Ω, isolated, 30 V
  - **Resolution**: 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"), whichever is greater
- **Resolution**: 0.1% of measuring range or 2 mm (0.08"), whichever is greater
- **Temperature compensation**
  - Temperature compensation:
    - -50 ... +150 ºC (-58 ... +302 ºF)
    - Integral temperature sensor
    - External TS-3 temperature sensor (optional)
    - Programmable fixed temperature

### Rated operating conditions
- **Ambient temperature for enclosure**: -20 ... +50 ºC (-4 ... +122 ºF)

### Design
- **Weight**: 2.7 kg (6 lbs)
- **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 mm² (22 ... 18 AWG), Belden® 8760 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") 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, CSAUS/C, FM, ATEX II 3D**

### Options
- **External temperature sensor**: TS-3
- **Communications**: Siemens Windows®-compatible interface and ComVerter link (infrared)
- **SmartLinx**: protocol-specific modules as interface for popular industrial fieldbus systems
- **Dolphin Plus**: Siemens Windows®-compatible interface and ComVerter link (infrared)
## Selection and Ordering data

### SITRANS LU01/LU02

<table>
<thead>
<tr>
<th>Number of measuring points</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU01 version, 1 point</td>
<td>C 7M 5 0 0 4 -</td>
</tr>
<tr>
<td>LU02 version, 2 points</td>
<td></td>
</tr>
</tbody>
</table>

### Input voltage

100/115/200/230 V AC, voltage selector switch 18 ... 30 V DC

### Feature software

- Standard

### Application software

- Standard

### Data communications

- No module (SmartLinx ready)
- SmartLinx Allen-Bradley® Remote I/O module
- SmartLinx PROFIBUS DP module
- SmartLinx Modbus® RTU module

### Enclosure

- Wall mount
- Wall mount, drilled, 6 x M20x1.5

### Approvals

- CE, CSAUS/C, FM¹
- CE²
- ATEX II 3D¹

### Further designs

Please add “Z” to Order No. and specify Order code(s).

### Accessories

- Handheld programmer
- Tag, stainless steel, 12 x 45 mm (0.47 x 1.77”), one text line, suitable for enclosures
- M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)
- TS-3 Temperature Sensor - see TS-3 on page 5/186

### Spare parts

- Card, LU01 mother main, comm ready
- Card, LU02 mother main, comm ready
- Card, LU02 daughter, comm ready
- Card, display

### Note

- The instruction manual should be ordered as a separate line item.
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Note

- The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.

### Note

- Available with enclosure option 1 only
- Available with enclosure option 3 only

### Note

- Subject to export regulations AL: N, ECCN: EAR99

---

¹ Modbus is a registered trademark of Schneider Electric.
² Allen-Bradley is a registered trademark of Rockwell Automation.
³ DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).
Level instruments
Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

Dimensional drawings

Suitable location for conduit entrances. Use water tight conduit hubs to maintain enclosure rating.

Mounting hole 4.3 mm (0.17") diameter access under lid (4 places)

Suitable location for conduit entrances. Use water tight conduit hubs to maintain enclosure rating.

Mounting hole 4.3 mm (0.17") diameter access under lid (4 places)

Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right)
Level instruments
Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

Schematics

**SITRANS LU01 connections**

**SITRANS LU02 connections**

Notes:
1. Optically isolated, 750 kV max. load
2. Use RG62-AU coaxial (or equivalent) for extensions up to 565 m (1860 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form "C" (SPDT) contacts, relay rated at 2A 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 16 AWG (0.5 mm²) wire.

© Siemens AG 2010
### 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 and SmartLinx® 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 (1200 ft) from the monitor. The SITRANS LU10 features patented Sonic Intelligence® echo processing software for superior reliability. Readings are displayed in user-selectable linear engineering units on the LCD.

SITRANS LU10 will connect to a DCS or PLC using Siemens SmartLinx® interface modules, giving you remote 2-way communication and full parameter access. 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 (sugar, flour bins, grains, cereals), plastic pellets, tank farms

### Technical specifications

#### Mode of operation

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Ultrasonic level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>Max. 0.3 ... 60 m (1 ... 200 ft)</td>
</tr>
<tr>
<td>Measuring points</td>
<td>Max. 10</td>
</tr>
</tbody>
</table>

#### Output

- Ultrasonic transducer
- • Echomax® series, ST-H transducers
- • SITRANS LU SAM module (option): 20 alarm/control relays
- • SPDT Form C relays, rated 5 A at 250 V AC, resistive load
- mA output
- • SITRANS LU A0 module (option): 0/4 ... 20 mA, optically isolated
  - Max. load 750 Ω, isolated
  - Resolution 0.1 % of range

#### Accuracy

- Error in measurement 0.25 % of range or 6 mm (0.24"), whichever is greater
- Resolution 0.1 % of measuring range or 2 mm (0.08"), whichever is greater
- Temperature compensation
  - -50 ... +150 °C (-58 ... +302 °F)
  - Integral temperature sensor
  - External TS-3 temperature sensor (expandable ... 10 inputs with optional TIB-9 card)
  - Programmable fixed temperature

#### Rated operating conditions

- Ambient conditions
  - Ambient temperature for enclosure -20 ... +50 °C (-4 ... +122 °F)

#### Design

- Weight 2.7 kg (6 lbs)
- Material (enclosure) Polycarbonate
- Degree of protection (wall mount) IP65/Type 4X/NEMA 4X

#### Electrical connection

- Ultrasonic transducer RG62-A/U coaxial cable with low capacitance
- Signal transmission 2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden® 8760 or equivalent is acceptable
- Electrical connection and relay connection Copper conductor according to local requirements, rated 250 V 5 A
- Synchronization Up to 16 LU10 units can be synchronized together

#### Power supply

- 100/115/200/230 V AC ± 15%, 50/60 Hz, 15 VA

#### Displays and controls

- 51 x 127 mm (2 x 5") 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, FM, CSA, ATEX II 3D
## Options

- **Expansion card**
  - TIB-9, increases the number of TS-3 inputs from 1 to 10

- **External temperature sensor**
  - TS-3

- **Communications**
  - SmartLinx: protocol-specific modules as interface for popular industrial fieldbus systems
  - Dolphin Plus: Siemens Windows®-compatible interface and ComVerter link (infrared)
  - Max. 3 I/O devices per
  - SITRANS LU AO analog output module (max. 1)
  - SITRANS LU SAM, satellite alarm module (max. 2)

- **I/O devices**

---

© Windows is a registered trademark of Microsoft Corporation.

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LU10</td>
<td>7ML 5007 -</td>
</tr>
<tr>
<td>Ten point ultrasonic long-range level monitoring system for liquids and solids level monitoring, and ranges up to 60 m (200 ft).</td>
<td></td>
</tr>
<tr>
<td>Input voltage</td>
<td>1</td>
</tr>
<tr>
<td>100/115, 200/230 V AC, selectable</td>
<td></td>
</tr>
<tr>
<td>Feature software</td>
<td>A</td>
</tr>
<tr>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Application software</td>
<td>A</td>
</tr>
<tr>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Data communications</td>
<td>0</td>
</tr>
<tr>
<td>No module (SmartLinx ready)</td>
<td></td>
</tr>
<tr>
<td>SmartLinx Allen-Bradley® Remote I/O module</td>
<td></td>
</tr>
<tr>
<td>SmartLinx PROFIBUS DP module</td>
<td></td>
</tr>
<tr>
<td>SmartLinx MODBUS® RTU module</td>
<td></td>
</tr>
<tr>
<td>TIB-9 temperature card</td>
<td>0</td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>With TIB-9 card</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>1</td>
</tr>
<tr>
<td>Wall mount</td>
<td></td>
</tr>
<tr>
<td>Wall mount, drilled, 12 x M20 x 1.5</td>
<td></td>
</tr>
<tr>
<td>Approvals</td>
<td>A</td>
</tr>
<tr>
<td>CE, CSA, FM1)</td>
<td></td>
</tr>
<tr>
<td>ATEX II 3D1)</td>
<td></td>
</tr>
<tr>
<td>CE2)</td>
<td></td>
</tr>
<tr>
<td>Further designs</td>
<td>Y15</td>
</tr>
<tr>
<td>Please add “-Z” to Order No. and specify Order code(s).</td>
<td></td>
</tr>
<tr>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]</td>
<td></td>
</tr>
<tr>
<td>Measuring-point number/identification (max. 16 characters) specify in plain text</td>
<td></td>
</tr>
<tr>
<td>Instruction manual</td>
<td>C)</td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-5AN02</td>
<td></td>
</tr>
<tr>
<td>French</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-5AN12</td>
<td></td>
</tr>
<tr>
<td>German</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-5AN32</td>
<td></td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered as a separate line item on the order.</td>
<td></td>
</tr>
<tr>
<td>This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.</td>
<td></td>
</tr>
<tr>
<td>Other Instruction manuals</td>
<td>C)</td>
</tr>
<tr>
<td>SmartLinx Allen-Bradley Remote I/O, English</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-1AP03</td>
<td></td>
</tr>
<tr>
<td>SmartLinx PROFIBUS DP, English</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-1AQ03</td>
<td></td>
</tr>
<tr>
<td>SmartLinx PROFIBUS DP, German</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-1AQ33</td>
<td></td>
</tr>
<tr>
<td>SmartLinx PROFIBUS DP, French</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-1AQ12</td>
<td></td>
</tr>
<tr>
<td>SmartLinx Modbus, English</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-1BF01</td>
<td></td>
</tr>
<tr>
<td>SmartLinx Modbus, German</td>
<td></td>
</tr>
<tr>
<td>C) 7ML1998-1BF31</td>
<td></td>
</tr>
<tr>
<td>Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.</td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td>C)</td>
</tr>
<tr>
<td>Handheld programmer</td>
<td></td>
</tr>
<tr>
<td>7ML1830-2AN</td>
<td></td>
</tr>
<tr>
<td>7ML1830-1AC</td>
<td></td>
</tr>
<tr>
<td>Tag, stainless steel, 12 x 45 mm (0.47 x 1.77”), one text line, suitable for enclosures</td>
<td></td>
</tr>
<tr>
<td>7ML1830-1CN</td>
<td></td>
</tr>
<tr>
<td>Temperature Card (TIB-9)</td>
<td></td>
</tr>
<tr>
<td>7ML1830-1GM</td>
<td></td>
</tr>
<tr>
<td>M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)</td>
<td></td>
</tr>
<tr>
<td>TS-3 Temperature Sensor - see TS-3 on page 5/186</td>
<td></td>
</tr>
<tr>
<td>Spare parts</td>
<td>C)</td>
</tr>
<tr>
<td>Card, mother main, comm ready</td>
<td></td>
</tr>
<tr>
<td>7ML1830-1ML</td>
<td></td>
</tr>
<tr>
<td>7ML1830-1LY</td>
<td></td>
</tr>
<tr>
<td>Card, daughter, comm ready</td>
<td></td>
</tr>
<tr>
<td>7ML1830-1LQ</td>
<td></td>
</tr>
<tr>
<td>Card, display</td>
<td></td>
</tr>
<tr>
<td>See SmartLinx product page 5/301 for more information.</td>
<td></td>
</tr>
<tr>
<td>1) Available with Enclosure option 1 only</td>
<td></td>
</tr>
<tr>
<td>2) Available with Enclosure option 2 only</td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010

© Siemens AG 2010

© Modbus is a registered trademark of Schneider Electric.

© Allen-Bradley is a registered trademark of Rockwell Automation.

TMDeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).

© Siemens AG 2010

© Siemens AG 2010
Level instruments
Continuous level measurement - Ultrasonic controllers

SITRANS LU10

Dimensional drawings

Suitable location for conduit entrances. Use water-tight conduit hubs to maintain enclosure rating.

Mounting hole 4.3 mm (0.17") diameter access under lid (4 places)

SITRANS LU10 dimensions

Schematics

To transducers (10 max.) RG62-AU coax, 365 m / transducer max.

Notes:
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 TB-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 Multitronics peripherals:
   - SITRANS LU SAM - relay satellite alarm module
   - SITRANS LU AO - analog output module

SITRANS LU10 connections
Overview

SITRANS LU SAM Satellite Alarm Module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.

Benefits

- The SITRANS LU SAM can be located up to 1500 m (5000 ft) from the SITRANS LU10
- Relay outputs can be assigned to any point on the SITRANS LU10

Application

The operation of the SITRANS LU SAM is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

Using a SITRANS LU SAM, you can have two relay outputs for all ten measurement points, all 20 for a single measurement point or any combination between the two.

All relays are Form C to allow NO or NC wiring.

Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Satellite alarm module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td>Data from SITRANS LU10</td>
</tr>
<tr>
<td>• Transmission rate</td>
<td>4800 bits/s</td>
</tr>
<tr>
<td>• Voltage</td>
<td>± 20 mA bipolar current loop</td>
</tr>
<tr>
<td>Output</td>
<td></td>
</tr>
<tr>
<td>• Relays</td>
<td>20 multi-purpose relays, programmable from SITRANS LU10</td>
</tr>
<tr>
<td>• ± 20 mA bipolar current loop</td>
<td>Input and transmission</td>
</tr>
<tr>
<td></td>
<td>1 receiving unit</td>
</tr>
<tr>
<td>Rated operation conditions</td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td>-20 … +50 °C (-5 … +122 °F)</td>
</tr>
<tr>
<td>• Location</td>
<td>Indoor/outdoor</td>
</tr>
<tr>
<td>• Installation category</td>
<td>II</td>
</tr>
<tr>
<td>• Pollution degree</td>
<td>4</td>
</tr>
</tbody>
</table>

Design

- Weight: 3 kg (6.6 lbs)
- Material (enclosure): Polycarbonate
- Degree of protection: Type 4X/NEMA 4X/IP65
- Cable connection: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 … 0.75 mm² (22 … 18 AWG)
- Electrical connection and relay connection: Copper conductor according to local requirements, rated 250 V 5 A
- Power supply: 100/115/200/230 V AC ± 15%, 50/60 Hz, 20 VA
- Displays and controls: 1 LED for display of voltage/communications state, 20 LEDs for display of relay states

Certificates and approvals

CE, FM, CSAUS/C, C-TICK

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LU SAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5811-1A</td>
<td>Satellite alarm module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor. Approvals: CSAUS/C, FM, CE, C-TICK</td>
</tr>
</tbody>
</table>

Instruction manual

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Instruction manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1998-5CF02</td>
<td>English</td>
</tr>
<tr>
<td>7ML1998-5CF32</td>
<td>German</td>
</tr>
</tbody>
</table>

Note: Instruction manuals should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

C) Subject to export regulations AL: N, ECCN: EAR99
SITRANS LU SAM dimensions

Dimensions:
- Lid screws (6 places): 16 mm (0.6")
- Lid: 209 mm (8.2")
- Lid: 172 mm (6.8")
- Lid: 91 mm (3.6")
- Lid: 287 mm (10.5")
- Lid: 285 mm (11.2")
- Mounting holes (accessed under lid): 16 mm (0.6") diameter, 4 places
- Lid enclosure: 225 mm (8.8")
- Mounting screw (by customer): 4.3 mm (0.17") diameter, 4 places

Notes:
1. SITRANS LU SAM receiver is polarized.
2. Refer to associated application device instruction manual for wiring detail. Check that the communication parameter P740 (SITRANS LU10) is 'ON'.
3. If SITRANS LU SAM is unpowered, transmitter ceases communication to all downstream peripherals.
4. Relay contact Form 'C' SPDT, 5A at 250 V AC non-inductive (typical of up to 20 per SITRANS LU SAM).
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 1500 m (5000 ft) from the SITRANS L 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

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Output module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td>Data from SITRANS LU10</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>4800 bits/s</td>
</tr>
<tr>
<td>Voltage</td>
<td>± 20 mA bipolar current loop</td>
</tr>
<tr>
<td>Polarization</td>
<td>Non-polarized</td>
</tr>
<tr>
<td>Max. load</td>
<td>1 receiving unit</td>
</tr>
<tr>
<td>Output</td>
<td></td>
</tr>
<tr>
<td>Analog outputs</td>
<td>10 analog outputs, programmable from SITRANS LU10</td>
</tr>
<tr>
<td>± 20 mA bipolar current loop</td>
<td>Input and transmission</td>
</tr>
<tr>
<td>- Max. load</td>
<td>750 Ω</td>
</tr>
<tr>
<td>- Resolution</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Rated operating conditions

| Ambient conditions | -20 … +50 °C (-5 ... +122 °F) |
| Location           | Indoor/outdoor |
| Installation category | II |
| Pollution degree   | 4 |

Design
Weight: 2 kg (4.4 lbs)
Material (enclosure): Polycarbonate
Degree of protection: Type 4X/NEMA 4X/IP65
Cable connection: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG)
Electrical connection and relay connection: Copper conductor according to local requirements, rated 250 V 5 A

Power supply: 100/115/230 V AC ± 15%, 50/60 Hz, 15 VA

Displays and controls: 1 LED for display of voltage/communications state

Certificates and approvals: CE, FM, CSAUS/C, C-TICK

Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LU AO</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides remote analog output for the measurement points of the SITRANS LU10 level monitor. Approvals: CSAus/C, FM, CE, C-TICK</td>
<td>C) 7ML5810-1A</td>
</tr>
</tbody>
</table>

Instruction manual

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>C) 7ML1998-5CE01</td>
</tr>
<tr>
<td>German</td>
<td>C) 7ML1998-5CE31</td>
</tr>
</tbody>
</table>

Note: Instruction manuals should be ordered as a separate line item on the order.
This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous level measurement - Ultrasonic controllers

SITRANS LU AO

## Dimensional drawings

![Dimensional Drawings](image)

### SITRANS LU AO dimensions
- 209 mm (8.2")
- 91 mm (3.6")
- 267 mm (10.5")
- 285 mm (11.2")
- 16 mm (0.6")
- 209 mm (8.2")
- 91 mm (3.6")
- 16 mm (0.6") lid screws (6 places)
- 91 mm (3.6")
- 267 mm (10.5")
- 285 mm (11.2")
- 16 mm (0.6")
- 209 mm (8.2")
- 91 mm (3.6")
- Suitable location for conduit entrances
- Mounting screw (by customer)
- Lid
- Enclosure
- Mounting holes (accessed under lid) 4.3 mm (0.17") diameter
- 4 places

## Schematics

![Schematics](image)

### SITRANS LU AO connections
- Switch is shown in OFF position. Select appropriate voltage.
- Switch is shown in OFF position. Select appropriate voltage.
- L2/N L1
- 100/115/200/230 V AC
- 50/60 Hz select voltage via switch.
Level instruments
Continuous level measurement - Ultrasonic transducers

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.

### 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

<table>
<thead>
<tr>
<th>Liquids</th>
<th>Liquids and Solids</th>
<th>Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>High Temperature</td>
<td>High Temperature</td>
</tr>
<tr>
<td>XRS-5</td>
<td>ST-H</td>
<td>XPS-10</td>
</tr>
<tr>
<td>Max. range</td>
<td>8 m (26 ft)</td>
<td>10 m (33 ft)</td>
</tr>
<tr>
<td>Min. range</td>
<td>0.3 m (1 ft)</td>
<td>0.3 m (1 ft)</td>
</tr>
<tr>
<td>Max. temperature</td>
<td>+65 °C (+149 °F)</td>
<td>+73 °C (+164 °F)</td>
</tr>
<tr>
<td>Min. temperature</td>
<td>-20 °C (-4 °F)</td>
<td>-40 °C (-40 °F)</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Wet wells and open channels</td>
<td>Chemical storage and liquid tanks</td>
</tr>
<tr>
<td>Frequency</td>
<td>44 kHz</td>
<td>44 kHz</td>
</tr>
<tr>
<td>Beam angle (-3dB)</td>
<td>10°</td>
<td>12°</td>
</tr>
<tr>
<td>Thread size</td>
<td>R 1” (BSPT), EN 10226</td>
<td>1” NPT</td>
</tr>
<tr>
<td>Enclosure</td>
<td>• PVDF Copolymer</td>
<td>• ETFE</td>
</tr>
<tr>
<td>Compatible with:</td>
<td>SITRANS LU</td>
<td>•</td>
</tr>
<tr>
<td>SITRANS LUC500</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>HydroRanger 200</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Multi-Ranger 100/200</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>OCM III</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

**Benefits**
- Can be mounted on a 2” (50.8 mm) 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 2” (50.8 mm) 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 (-4 ... +140 °F) (ATEX approved model)
  - Ambient temperature: -40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model)

**Design**
- Weight: 1.4 kg (3 lbs)
- Material (enclosure): Base and lid made of ETFE or PVDF (epoxy fitted joint)
- 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 mm² (20 AWG), PVC sheath
- Cable (max. length): 365 m (1200 ft) with RG 62 A/U coaxial cable

**Options**
- Flange adapter: 3” Universal (fits DN 65, PN 10 and 3” ASME)
- Submergence coupling: For maintaining high level readings while the transducer is submerged

**Certificates and approvals**
- CE, CSA Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Gr. C, D, E, F, G T4A, ATEX II 2G Ex m II C-T5, C-TICK, INMETRO: Br-Ex m II T5

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.
3) EMC certificate available on request
**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Echomax® ST-H ultrasonic transducer</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level measurement in chemical storage and liquid tanks</td>
<td>7ML11001</td>
</tr>
<tr>
<td>The narrow design of the ST-H allows the transducer to be mounted on a 2” standpipe.</td>
<td></td>
</tr>
<tr>
<td>Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft)</td>
<td></td>
</tr>
</tbody>
</table>

### Process connection

- ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1] (Option 0)
- ETFE, R 2" [(BSPT), EN 10226] (Option 1)
- ETFE, G 2" [(BSPP), EN ISO 228-1] (Option 2)
- PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1] (Option 3)
- PVDF copolymer, R 2" [(BSPT), EN 10226] (Option 4)
- PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] (Option 5)

### Cable length

- 5 m (16.40 ft) (Option A)
- 10 m (32.81 ft) (Option B)
- 30 m (98.43 ft) (Option C)
- 50 m (164.04 ft) (Option D)
- 100 m (328.08 ft) (Option E)

### Approvals

- FM Class I, II, Div. 1, C-TICK (Option 2)
- ATEX II 2G, CSA, C-TICK, INMETRO\(^1\) (Option 3)
- ATEX II 2G, C-TICK, INMETRO\(^2\) (Option 4)

### Instruction manual

- Quick Start Manual, multi-language (Option C) 7ML1998-5QK82
- Applications Guidelines, multi-language (Option C) 7ML1998-5HV61

**Note:** The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

- ST-H universal submergence shield 7ML1830-1CF
- 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, NPT with ¾” x 1” PVC coupling 7ML1830-1AQ
- Easy Aimer 2, aluminum with M20 adapter and 1” and 1½” BSPT aluminum couplings 7ML1830-1AX
- Easy Aimer 304, with stainless steel coupling 7ML1830-1AU
- Easy Aimer 304, with M20 adapter and 1” and 1½” BSPT 304 SS couplings 7ML1830-1GN

\(^1\) Available with Process connection options 0 to 2 only

\(^2\) Available with Process connection options 3 to 5 only

C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous level measurement - Ultrasonic transducers

ST-H

Dimensional drawings

ST-H ultrasonic transducer dimensions

Schematics

ST-H ultrasonic transducer connections

*For SITRANS LUC500, MultiRanger 100/200, HydroRanger 200
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 to 8 m (1 to 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**

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Ultrasound transducer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Ultrasonic transducer</td>
</tr>
<tr>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.3 ... 8 m (1 ... 26 ft), dependent on application</td>
</tr>
<tr>
<td>Output</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>44 kHz</td>
</tr>
<tr>
<td>Beam angle</td>
<td>10°</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
</tr>
<tr>
<td>Temperature error</td>
<td>Compensated by integral temperature sensor</td>
</tr>
</tbody>
</table>

**Rated operating conditions**

| Vessel pressure | Normal atmospheric pressure |
| Ambient conditions | |
| • Ambient temperature | -20 ... +65 °C (-4 ... +149° F) |

**Design**

| Weight (approximate shipping weight of sensor with standard cable length) | 1.2 kg (2.6 lbs) |
| Material (enclosure) | PVDF copolymer enclosure and CSM face |
| Process connection | 1” NPT ([Taper], ANSI/ASME B1.20.1) or R 1” (BSPT), EN 10226 |
| Degree of protection | IP65/IP68 |
| Cable connection | 2-core shielded/twisted, 0.5 mm² (20 AWG), PVC sheath |
| Cable (max. length) | • 365 m (1200 ft) with RG 62 A/U coaxial cable |
| Options | • 365 m (1200 ft) with 2-core twisted pair, foil shield, 0.5 mm² (20 AWG), PVC sheath, only for SITRANS LUC500, MultiRanger 100/200 |
| Flange version | Factory flange with PTFE face for ASME, EN or JIS configuration |
| Submergence shield | For applications with flooding possible |

**Certificates and approvals**

CE (EMC certificate available on request), CSA Class I Div. 2, FM Class I, ATEX II 2G, SAA Ex s Class I
## Echomax XRS-5

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>7ML1106</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Echomax® XRS-5 transducer</strong></td>
<td>C) 7ML1106</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Process connection</th>
<th>1&quot; NPT [(Taper), ANSI/ASME B1.20.1]</th>
<th>R 1&quot; [(BSPT), EN 10226]</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 m (16.40 ft)</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>10 m (32.81 ft)</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>30 m (98.43 ft)</td>
<td>C</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable length</th>
<th>5 m (16.40 ft)</th>
<th>10 m (32.81 ft)</th>
<th>30 m (98.43 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facing</td>
<td>Standard (CSM rubber)</td>
<td>PTFE (flange versions)</td>
<td></td>
</tr>
<tr>
<td>Approvals</td>
<td>CE, FM Class I, ATEX II 2G, CSA Class I Div. 2, SAA Class I</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mounting flange (flush mount)

<table>
<thead>
<tr>
<th>Mounting flange</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>3&quot; ASME, 150 lbs, flat faced</td>
<td>4&quot; ASME, 150 lbs, flat faced</td>
<td>6&quot; ASME, 150 lbs, flat faced</td>
<td>DN 80, PN 10/16, Type A, flat faced</td>
<td>DN 100, PN 10/16, Type A, flat faced</td>
</tr>
<tr>
<td>JIS10K 3B style</td>
<td>JIS10K 4B style</td>
<td>JIS10K 6B style</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.

### Instruction manual

<table>
<thead>
<tr>
<th>C) 7ML1998-5QT81</th>
<th>C) 7ML1998-5HV61</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Start Manual, multi-language</td>
<td>Applications Guidelines, multi-language</td>
</tr>
</tbody>
</table>

Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Further designs

Please add "-Z" to Order No. and specify Order code(s).

| Y17 |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 16 characters) specify in plain text |

### Accessories

<table>
<thead>
<tr>
<th>7ML1830-1BH</th>
<th>7ML1830-1AQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submergence shield kit</td>
<td>Easy Aimer 2, NPT with ¼&quot; x 1&quot; PVC coupling</td>
</tr>
<tr>
<td>7ML1830-1AX</td>
<td>7ML1830-1AU</td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum with M20 adapter and 1&quot; and 1½&quot; BSPT (adapter not included)</td>
<td>Easy Aimer 304, with stainless steel coupling</td>
</tr>
<tr>
<td>7ML1830-1GN</td>
<td>7ML1830-1JQ</td>
</tr>
<tr>
<td>Easy Aimer 304, with M20 adapter and 1&quot; and 1½&quot; BSPT 304 SS couplings</td>
<td>FMS-200 universal box bracket, mounting kit</td>
</tr>
<tr>
<td>7ML1830-1BK</td>
<td>7ML1830-1BL</td>
</tr>
<tr>
<td>FMS-210 channel bracket, wall mount</td>
<td>FMS-220 extended channel bracket, wall mount</td>
</tr>
<tr>
<td>7ML1830-1BM</td>
<td>7ML1830-1BN</td>
</tr>
<tr>
<td>FMS-310 channel bracket, floor mount</td>
<td>FMS-320 extended channel bracket, floor mount</td>
</tr>
<tr>
<td>7ML1830-1BP</td>
<td>7ML1830-1BQ</td>
</tr>
<tr>
<td>FMS-350 bridge channel bracket, floor mount</td>
<td>(see Mounting Brackets on page 5/185 for more information)</td>
</tr>
<tr>
<td>7ML1830-1DS</td>
<td>7ML1830-1DR</td>
</tr>
<tr>
<td>1&quot; NPT locknut, plastic</td>
<td>1½&quot; BSPT locknut, plastic</td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99
**Level instruments**

Continuous level measurement - Ultrasonic transducers

**Echomax XRS-5**

### Dimensional drawings

**Standard**

- 25 mm (0.98")
- 127 mm (5.0")
- 89 mm (3.5")

**Submergence Shield (optional)**

- 124 mm (4.9")
- 155 mm (6.1")

**Flange (optional)**

- 127 mm (5.0")

**Mounting: Suspended Conduit**

- Rigid metal conduit
- Steel channel
- Non-metallic coupling

**Bracket**

- Flexible conduit transducer should not be subjected to wind, vibration or jarring.

**Plywood**

- Non-metallic coupling

**Submersible**

- Rigid metal conduit
- Non-metallic coupling

**Flexible conduit**

- 127 mm (5.0")

**Coaxial Extension**

*Extend cable using RG-82 AU coax.*

**3 Terminal Direct**

**3 Terminal Extension**

*For SITRANS LUC500, MultiRanger 100/200, HydroRanger 200*

**XRS-5 ultrasonic transducer connections**

Plywood mounting provides excellent isolation (must be rigid).

Transducer with submergence shield, used in applications where flooding is possible.
Level instruments
Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Overview

Echomax® XPS/XCT 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

The 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 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F).

The XCT series can be used in applications at higher temperatures to measure level up to a distance of 12 m (40 ft) and at a max. temperature of +145 °C (+293 °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.
## Technical specifications

<table>
<thead>
<tr>
<th>Input</th>
<th>XPS-10 (standard and F models)</th>
<th>XPS-15 (standard and F models)</th>
<th>XPS-30</th>
<th>XPS-40</th>
<th>XCT-8 (standard and sanitary models)</th>
<th>XCT-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.3 ... 10 m (1 ... 33 ft)</td>
<td>Standard: 0.3 ... 15 m (1 ... 50 ft)</td>
<td>0.6 ... 30 m (2 ... 100 ft)</td>
<td>0.9 ... 40 m (3 ... 130 ft)</td>
<td>0.6 ... 8 m (2 ... 26 ft)</td>
<td>0.6 ... 12 m (2 ... 40 ft)</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td>Flanged: 0.45 ... 15 m (1.5 ... 50 ft)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Frequency
- 44 kHz
- 44 kHz
- 30 kHz
- 22 kHz
- 44 kHz
- 44 kHz

### Beam angle
- 12°
- 6°
- 6°
- 6°
- 12°
- 6°

### Environmental
- Location: Indoors/outdoors

#### Ambient temperature
- Standard: -20 ... +95 °C (-4 ... +203 °F)
- Flanged: -40 ... +145 °C (-40 ... +293 °F)
- Sanitary: -40 ... +125 °C (-40 ... +260 °F)

#### Pollution degree
- 4

#### Pressure
- 8 bar g (120 psi g)
- 0.5 bar g (7.25 psi g)
- 8 bar g (120 psi g)
- 0.5 bar g (7.25 psi g)
- 0.5 bar g (7.25 psi g)
- Standard: 4 bar g (60 psi g):
  - -40 ... +145 °C (-40 ... +293 °F)
  - -40 ... +280 °F
- Standard: 8 bar g (120 psi g):
  - -40 ... +95 °C (-40 ... +203 °F)
  - -40 ... +260 °F
- Flanged: 0.5 bar g (7.25 psi g)
- Sanitary: XCT-8: 0.5 bar g (7.25 psi g)

### Design
- Weight
  - 0.8 kg (1.8 lbs)
  - 1.3 kg (2.8 lbs)
  - Flanged: 2 kg (4.4 lbs)
  - 4.3 kg (9.5 lbs)
  - 8 kg (18 lbs)
  - 0.8 kg (1.7 lbs)
  - 1.3 kg (2.8 lbs)

### Power supply
- 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 universal PVDF flange

### Color
- Standard: blue
- F: gray
- blue
- blue
- white

### Process connection
- Standard: 1" NPT or 1" BSPT
- Flanged: 1" NPT
- F: 1" BSPT
- 1.5" universal thread (NPT or BSPT)
- 1" NPT or R 1" (BSPT), EN 10226

### Degree of protection
- IP65/IP67
- IP65/IP67
- IP65/IP67
- IP65/IP67
- IP65/IP67
- 2 wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) PVC jacket

### Cable
- 2 wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) silicone jacket

### Separation
- Max. 365 m (1200 ft)

### Certificates and approvals
- Standard: CE, CSA, FM, ATEX II 2GD
- CE, CSA, FM, ATEX II 2GD
- CE, CSA, FM, ATEX II 2G 1D
- CE, CSA, FM, ATEX II 2G 1D
- CE, CSA, FM, ATEX II 2G
- Standard: CE, CSA, FM, ATEX II 2G
- Sanitary: CSA, 3A
- DERAKANE is a registered trademark of Ashland Inc.

1) EMC certificate available on request.
## Level instruments
### Continuous level measurement - Ultrasonic transducers

#### Echomax XPS and XCT

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Echomax® XPS-10 ultrasonic transducer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7 ML 1115 - 0</td>
<td></td>
<td>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</td>
</tr>
</tbody>
</table>

**Mounting thread and facing**

<table>
<thead>
<tr>
<th>C</th>
<th>1&quot; NPT [(Taper), ANSI/ASME B1.20.1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1&quot; NPT [(Taper), ANSI/ASME B1.20.1] with foam facing¹</td>
</tr>
<tr>
<td>1</td>
<td>1&quot; NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing²</td>
</tr>
<tr>
<td>2</td>
<td>R 1&quot; [(BSPT), EN 10226] with foam facing¹</td>
</tr>
<tr>
<td>3</td>
<td>R 1&quot; [(BSPT), EN 10226] with PTFE facing²</td>
</tr>
<tr>
<td>4</td>
<td>R 1&quot; [(BSPT), EN 10226]</td>
</tr>
</tbody>
</table>

**Cable length**

<table>
<thead>
<tr>
<th>C</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 m (16.40 ft)</td>
<td>10 m (32.81 ft)</td>
<td>30 m (98.43 ft)</td>
<td>50 m (164.04 ft)</td>
<td>100 m (328.08 ft)</td>
<td></td>
</tr>
</tbody>
</table>

**Mounting flange**

<table>
<thead>
<tr>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>L</th>
<th>M</th>
<th>P</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>3&quot; ASME, 150 lb, flat faced</td>
<td>4&quot; ASME, 150 lb, flat faced</td>
<td>6&quot; ASME, 150 lb, flat faced</td>
<td>8&quot; ASME, 150 lb, flat faced</td>
<td>DN 80, PN 10/16, Type A, flat faced</td>
<td>DN 100, PN 10/16, Type A, flat faced</td>
<td>DN 150, PN 10/16, Type A, flat faced</td>
<td>JIS10K3B Style</td>
<td>JIS10K4B Style</td>
<td>JIS10K6B Style</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Approvals**

<table>
<thead>
<tr>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>L</th>
<th>M</th>
<th>P</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX II 2 GD, FM Class I Div. 2, SAA Class I</td>
<td>CSA Class I Div. 1³</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Further designs**

<table>
<thead>
<tr>
<th>Y15</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel tag [69 x 50 mm [2.71 x 1.97”]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
<td></td>
</tr>
</tbody>
</table>

---

¹ Not available with flanged versions
² Available with flanged versions only
³ Valid with mounting thread and facing options 0 to 2 only

---

© Siemens AG 2010
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Echomax® XPS-10F ultrasonic transducer</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
<td>C) 7ML1170 0</td>
</tr>
</tbody>
</table>

### Mounting thread and facing
- 1" NPT ([Taper], ANSI/ASME B1.20.1)

### 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)

### Mounting flange, flush mount
- 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
  (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)

### Approvals
- FM Class I Div. 1

### Further designs
- Please add "Z" to Order No. and specify Order code(s).
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text
- Order code: Y15

### Instruction manual
- English
- Note: The Instruction manual should be ordered as a separate line item on the order.
- Applications Guidelines, multi-language
  (Note: The Applications Guidelines should be ordered as a separate line item on the order.
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.
- Order No. C) 7ML1998-1DU01

### Accessories
- Tag, stainless steel with hole, 12 x 45 mm
  (0.47 x 1.77"), one text line for fastening on sensors
- Submergence shield kit
- Easy Aimer 2, with ¾" x 1" NPT PVC coupling
- Easy Aimer 304, with stainless steel coupling
- Universal box bracket, mounting kit
- Channel bracket, wall mount
- Extended channel bracket, wall mount
- Channel bracket, floor mount
- Extended channel bracket, floor mount
- Bridge channel bracket, floor mount
  (see Mounting Brackets on page 5/185 for more information)
- 1" NPT locknut, plastic
  - Order No.: 7ML1930-1BJ
  - 7ML1830-1BH
  - 7ML1830-1AQ
  - 7ML1830-1AU
  - 7ML1830-1BK
  - 7ML1830-1BL
  - 7ML1830-1BM
  - 7ML1830-1BN
  - 7ML1830-1BP
  - 7ML1830-1BQ
  - 7ML1830-1DS

C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echomax® XPS-15 ultrasonic transducer</td>
<td>C) 7ML1118 - 0</td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>Mounting thread and facing</td>
<td></td>
</tr>
<tr>
<td>1&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>1</td>
</tr>
<tr>
<td>½&quot; NPT [(Taper), ANSI/ASME B1.20.1] with foam facing 1)</td>
<td>2</td>
</tr>
<tr>
<td>1&quot; NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing 2)</td>
<td>3</td>
</tr>
<tr>
<td>R 1&quot; [(BSPT), EN 10226]</td>
<td>4</td>
</tr>
<tr>
<td>R 1&quot; [(BSPT), EN 10226] with foam facing 3)</td>
<td>5</td>
</tr>
<tr>
<td>R 1&quot; [(BSPT), EN 10226] with PTFE facing 4)</td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td></td>
</tr>
<tr>
<td>5 m (16.40 ft)</td>
<td>B</td>
</tr>
<tr>
<td>10 m (32.81 ft)</td>
<td>C</td>
</tr>
<tr>
<td>30 m (98.43 ft)</td>
<td>D</td>
</tr>
<tr>
<td>50 m (164.04 ft)</td>
<td>E</td>
</tr>
<tr>
<td>100 m (328.08 ft)</td>
<td>F</td>
</tr>
<tr>
<td>Mounting flange</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>A</td>
</tr>
<tr>
<td>6&quot; ASME, 150 lb, flat faced</td>
<td>D</td>
</tr>
<tr>
<td>8&quot; ASME, 150 lb, flat faced</td>
<td>E</td>
</tr>
<tr>
<td>DN 150, PN 10/16, Type A, flat faced</td>
<td>J</td>
</tr>
<tr>
<td>DN 200, PN 10/16, Type A, flat faced</td>
<td>K</td>
</tr>
<tr>
<td>JIS10K 6B</td>
<td>N</td>
</tr>
<tr>
<td>JIS10K 8B</td>
<td>P</td>
</tr>
<tr>
<td>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-2, or JIS B 2220 standard.)</td>
<td></td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
</tr>
<tr>
<td>ATEX II 2GD, FM Class I Div. 2, SAA Class I</td>
<td>C) 3</td>
</tr>
<tr>
<td>CSA Class I Div. 13)</td>
<td></td>
</tr>
<tr>
<td>Further designs</td>
<td>Order code</td>
</tr>
<tr>
<td>Please add &quot;Z&quot; to Order No. and specify Order code(s).</td>
<td></td>
</tr>
<tr>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters); specify in plain text</td>
<td>Y15</td>
</tr>
</tbody>
</table>

Selection and Ordering data

<table>
<thead>
<tr>
<th>Instruction manual</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Start Manual, multi-language</td>
<td>C) 7ML1998-5QM82</td>
</tr>
<tr>
<td>Applications Guidelines, multi-language</td>
<td>C) 7ML1998-5HV61</td>
</tr>
</tbody>
</table>

Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the ATEX Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors
Submergence shield kit
Universal box bracket, mounting kit
Channel bracket, wall mount
Extended channel bracket, wall mount
Channel bracket, floor mount
Extended channel bracket, floor mount
Bridge channel bracket, floor mount
(see Mounting Brackets on page 5/185 for more information)
1" NPT locknut, plastic
1" BSPT locknut, plastic
Easy Aimer 2, with ¾" x 1" NPT PVC coupling
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings
Easy Aimer 304 with stainless steel coupling
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

1) Not available with flanged versions
2) Available with flanged versions only
3) Available with mounting options 0 to 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

© Siemens AG 2010
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Echomax® XPS-15F ultrasonic transducer</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.</td>
<td>7ML1171</td>
</tr>
</tbody>
</table>

**Measuring range**: min. 0.3 m, max. 15 m

**Mounting thread and facing**
- 1” NPT ([Taper], ANSI/ASME B1.20.1)

<table>
<thead>
<tr>
<th>Cable length</th>
<th>5 m (16.40 ft)</th>
<th>10 m (32.81 ft)</th>
<th>30 m (98.43 ft)</th>
<th>50 m (164.04 ft)</th>
<th>100 m (328.08 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>

- **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.

**Appraisals**
- FM Class I Div. 1

**Further designs**
- Please add "Z" to Order No. and specify Order code(s).
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text

**Instruction manual**
- Order No.
- 7ML1998-1DU01
- 7ML1998-5HV61

**Accessories**
- Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77”), one text line for fastening on sensors
- Submersible shield kit
- Universal box bracket, mounting kit
- Channel bracket, wall mount
- Extended channel bracket, wall mount
- Channel bracket, floor mount
- Extended channel bracket, floor mount
- Bridge channel bracket, floor mount (see Mounting Brackets on page 5/185 for more information)
- 1” NPT locknut, plastic
- Easy Aimer 2, with ¾” x 1” NPT PVC coupling
- Easy Aimer 304 with stainless steel coupling

---

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Echomax® XPS-30 ultrasonic transducer</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.</td>
<td>7ML1123</td>
</tr>
</tbody>
</table>

**Measuring range**: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)

**Mounting thread and facing**
- 1 ½” universal thread
- 1 ½” universal thread, foam facing

**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
- 6” ASME, 150 lb, flat faced
- 8” ASME, 150 lb, flat faced

**Approvals**
- ATEX II 2G 1D, FM Class I Div 2, SAA

**Further designs**
- Please add "Z" to Order No. and specify Order code(s).
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text

**Instruction manual**
- Order No.
- 7ML1998-5QM82
- 7ML1998-5HV61

**Accessories**
- Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77”), one text line for fastening on sensors
- 1 ½” universal thread, PTFE facing
- 1 ½” universal thread, foam facing

---

1) Not available with flanged versions
2) Available with flanged versions only

C) Subject to export regulations AL: N, ECCN: EAR99
# Level instruments

## Continuous level measurement - Ultrasonic transducers

### Echomax XPS and XCT

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Echomax® XPS-40 ultrasonic transducer</strong></td>
<td>C) 7 ML 1 1 2 7 - 0</td>
</tr>
<tr>
<td>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½&quot; universal thread compatible with ½&quot; NPT and R ½&quot; [(BSPT), EN 10226]</td>
<td></td>
</tr>
<tr>
<td>Measuring range: min. 0.9 m (2.95 ft), max. 40 m (131.23 ft)</td>
<td></td>
</tr>
</tbody>
</table>

### Mounting thread and facing

<table>
<thead>
<tr>
<th>1½&quot; universal thread</th>
<th>1½&quot; universal thread, foam facing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

### Cable length

<table>
<thead>
<tr>
<th>5 m (16.40 ft)</th>
<th>10 m (32.81 ft)</th>
<th>30 m (98.43 ft)</th>
<th>50 m (164.04 ft)</th>
<th>100 m (328.08 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>E</td>
<td>F</td>
<td>K</td>
</tr>
</tbody>
</table>

### Mounting flange

<table>
<thead>
<tr>
<th>None</th>
<th>A</th>
</tr>
</thead>
</table>

### Approvals

<table>
<thead>
<tr>
<th>ATEX II 2G 1D, FM Class I Div 2, SAA</th>
<th>5</th>
</tr>
</thead>
</table>

### Further designs

Please add "-Z" to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</th>
<th>Y15</th>
</tr>
</thead>
</table>

### Instruction manual

<table>
<thead>
<tr>
<th>Quick Start Manual, multi-language, multi-language</th>
<th>C) 7ML1998-5QM82</th>
</tr>
</thead>
</table>

Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

<table>
<thead>
<tr>
<th>Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77&quot;), one text line for fastening on sensors 1½&quot; BSPT locknut, plastic</th>
<th>7ML1930-1BJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy Aimer 2, ½&quot; NPT galvanized coupling</td>
<td>7ML1830-1DP</td>
</tr>
<tr>
<td>Easy Aimer 2, ½&quot; NPT with stainless steel coupling</td>
<td>7ML1830-1AN</td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum with M20 adapter and 1&quot; and 1½&quot; BSPT aluminum couplings</td>
<td>7ML1830-1AT</td>
</tr>
<tr>
<td>Easy Aimer 304, with M20 adapter and 1&quot; and 1½&quot; BSPT 304 SS couplings</td>
<td>7ML1830-1AX</td>
</tr>
</tbody>
</table>

Subject to export regulations AL: N, ECCN: EAR99
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Echomax® XCT-8 ultrasonic transducer</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Ambient temperatures up to +145 °C (+293 °F) Measuring range: min. 0.6 m (2 ft), max. 8 m (26 ft)</td>
<td>C) 7ML 1132 - 0</td>
</tr>
</tbody>
</table>

### Mounting thread and facing

- 1” NPT ([Taper], ANSI/ASME B1.20.1) 0
- 1” NPT ([Taper], ANSI/ASME B1.20.1), PTFE facing 1) 1
- R 1” [BSPT], EN 10226 2
- R 1” [BSPT], EN 10226, PTFE facing 1) 3

### Cable length

- 1 m (3.28 ft) A
- 5 m (16.40 ft) B
- 10 m (32.81 ft) C
- 30 m (98.43 ft) D
- 50 m (164.04 ft) E
- 100 m (328.08 ft) F

### Mounting flange

- None A
- 3” ASME, 150 lb, flat faced C
- 4” ASME, 150 lb, flat faced D
- 6” ASME, 150 lb, flat faced E
- DN 80, PN 10/16, Type A, flat faced G
- DN 100, PN 10/16, Type A, flat faced H
- DN 150, PN 10/16, Type A, flat faced J
- JIS10K 3B L
- JIS10K 4B M
- JIS10K 6B N

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-2 or JIS B 2220 standard.)

### Approvals

- ATEX II 2G, FM Class I, Div. 2, SAA C
- CSA Class I Div. 1, available with mounting thread and facing option 0 G
- 3A Sanitary (only with 4” sanitary flange, option V) H

### Further designs

Please add "-Z" to Order No. and specify Order code(s).

- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Y15
## Continuous Level Measurement - Ultrasonic Transducers

**Echomax XPS and XCT**

### Selection and Ordering Data

<table>
<thead>
<tr>
<th>Echomax® XCT-12 Ultrasonic Transducer</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Ambient temperatures up to +145 °C (+293 °F). Measuring range: min. 0.6 m (2 ft), max. 12 m (40 ft).</td>
<td>C) 7ML 11 36 - 0</td>
</tr>
</tbody>
</table>

### Mounting Thread and Facing

- 1" NPT ([Taper], ANSI/ASME B1.20.1]
- 1" NPT ([Taper], ANSI/ASME B1.20.1], PTFE facing, available for flange options U only)
- R 1" (BSPT), EN 10226
- R 1" (BSPT), EN 10226, PTFE facing, available for flange options U only

### Cable Length

- 1 m (3.28 ft)
- 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
- 6" ASME, 150 lb, flat faced
- 8" ASME, 150 lb, flat faced
- DN 150, PN 10/16, Type A, flat faced
- DN 200, PN 10/16, Type A, flat faced
- 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.)

### 6" Universal for 6" ASME, DN 150 or JIS 10K6B Style

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>6&quot; ASME, 150 lb, flat faced</td>
<td>8&quot; ASME, 150 lb, flat faced</td>
<td>DN 150, PN 10/16, Type A, flat faced</td>
<td>DN 200, PN 10/16, Type A, flat faced</td>
<td>JIS10K 6B</td>
<td>JIS10K 8B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Approvals

- ATEX II 2G, FM Class I, Div. 2, SAA
- CSA Class I, Div. 1, available with mounting thread and facing option 0 only

### Further Designs

- Please add "Z" to Order No. and specify Order code(s).

### Accessories

- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
- Order No. 7ML1930-1G

### Instruction Manual

- Quick Start Manual, multi-language
- Applications Guidelines, multi-language
  Note: The Applications Guidelines should be ordered as a separate line item on the order.
- This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Order Information

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1998-SQM82</td>
<td>Quick Start Manual, multi-language</td>
</tr>
<tr>
<td>7ML1998-SHV61</td>
<td>Applications Guidelines, multi-language</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
Level instruments
Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Dimensional drawings

<table>
<thead>
<tr>
<th>Version</th>
<th>Dimension</th>
<th>XPS-10</th>
<th>XPS-15</th>
<th>XPS-30</th>
<th>XPS-40</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>88 mm (3.464&quot;)</td>
<td>121 mm (4.764&quot;)</td>
<td>175 mm (6.890&quot;)</td>
<td>206 mm (8.110&quot;)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>122 mm (4.803&quot;)</td>
<td>132 mm (5.197&quot;)</td>
<td>198 mm (7.795&quot;)</td>
<td>229 mm (9.016&quot;)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>According to ASME, DIN and JIS</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>124 mm (4.882&quot;)</td>
<td>158 mm (6.220&quot;)</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>152 mm (5.984&quot;)</td>
<td>198 mm (7.795&quot;)</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>28 mm (1.1&quot;)</td>
<td>28 mm (1.1&quot;)</td>
<td>28 mm (1.1&quot;)</td>
<td>28 mm (1.1&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Schematics

<table>
<thead>
<tr>
<th>Version</th>
<th>Dimension</th>
<th>XCT-8</th>
<th>XCT-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>88 mm (3.464&quot;)</td>
<td>121 mm (4.764&quot;)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>122 mm (4.803&quot;)</td>
<td>132 mm (5.197&quot;)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>According to ASME, DIN and JIS</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Sanitary version: 119 mm (4.68&quot;)</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Sanitary version: 122 mm (4.8&quot;)</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>28 mm (1.1&quot;)</td>
<td>28 mm (1.1&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

XPS and XCT ultrasonic transducer dimensions

XPS and XCT ultrasonic transducer connections

Mounting
Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of 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 the transducer.

Interconnection
Do not route cable openly or near high voltage or current runs, contactors and SCR control devices. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.
Continuous level measurement - Ultrasonic transducers

**Overview**

Echomax® XLT transducers use ultrasonic technology to measure level in a wide range of bulk solids.

**Benefits**

- Sealed aluminum face
- Integral temperature sensor
- Self-cleaning and low maintenance
- Connect using only two wires
- Easy to install

**Application**

XLT transducers operate with Siemens SITRANS LU transceivers in measuring ranges from 0.9 to 60 m (3.0 ... 200 ft) and temperatures up to +150 °C (+300 °F). A beam angle of just 5° provides accurate readings in deep, narrow tanks.

With increased signal sensitivity, the XLT transducers from Siemens can operate in difficult applications such as limestone, cement clinker and hot stone. All models have a sealed aluminum face to withstand very harsh environments.

During operation, Echomax transducers emit acoustic pulses in a narrow beam. 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. Temperature variations are automatically compensated by the integral temperature sensor.

- Key Applications: bulk solids including limestone, cement clinker, hot stone and coal bunkers

**Technical specifications**

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Ultrasonic transducer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Ultrasonic transducer</td>
</tr>
</tbody>
</table>

**Input**

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>XLT-30</th>
<th>XLT-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9 ... 30 m (3.0 ... 100 ft)</td>
<td>0.9 ... 30 m (3.0 ... 100 ft)</td>
<td>0.9 ... 30 m (3.0 ... 100 ft)</td>
</tr>
<tr>
<td>1.8 ... 60 m (6.0 ... 200 ft)</td>
<td>1.8 ... 60 m (6.0 ... 200 ft)</td>
<td>1.8 ... 60 m (6.0 ... 200 ft)</td>
</tr>
</tbody>
</table>

**Output**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>XLT-30</th>
<th>XLT-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 kHz</td>
<td>22 kHz</td>
<td>22 kHz</td>
</tr>
<tr>
<td>13 kHz</td>
<td>13 kHz</td>
<td>13 kHz</td>
</tr>
<tr>
<td>5°</td>
<td>5°</td>
<td>5°</td>
</tr>
</tbody>
</table>

**Accuracy**

Temperature error

- Compensated by transducers internal temperature sensor

**Rated operating conditions**

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th>Ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>- XLT-30 and XLT-60</td>
<td>-40 ... +150 °C (-40 ... +300 °F)</td>
</tr>
</tbody>
</table>

**Design**

<table>
<thead>
<tr>
<th>Weight</th>
<th>XLT-30</th>
<th>XLT-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 kg (9.5 lbs)</td>
<td>4.3 kg (9.5 lbs)</td>
<td>4.3 kg (9.5 lbs)</td>
</tr>
<tr>
<td>6.6 kg (14.5 lbs)</td>
<td>6.6 kg (14.5 lbs)</td>
<td>6.6 kg (14.5 lbs)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material (enclosure)</th>
<th>Aluminium, 304 stainless steel, polyester and silicone</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Degree of protection</th>
<th>IP68</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Color</th>
<th>XLT-30 and XLT-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Red</td>
</tr>
</tbody>
</table>

**Mounting**

1" NPT (Taper), ANSI/ASME B1.20.1

<table>
<thead>
<tr>
<th>Cable connection</th>
<th>2-core shielded/twisted, 0.5 mm² (20 AWG), silicone sheath</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cable (max. length)</th>
<th>365 m (1200 ft) with RG 62 AU coaxial cable</th>
</tr>
</thead>
</table>

| Certificates and approvals | CE (EMC certificate available on request), CSAUS/C, FM, ATEX II 2G 1D T5 |

---

1) Definition of beam width: twice the angle at which the off-axis transmission is 3 dB less than the acoustic pressure level of the transmission axis (as measured equidistant from the sensor face).
Level instruments  
Continuous level measurement - Ultrasonic transducers

Echomax XLT

Selection and Ordering data

Echomax® XLT-30, XLT-60, 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. 0.9 m, max. 30 m
Process connection: 1" NPT [Taper], ANSI/ASME B1.20.1

<table>
<thead>
<tr>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>XLT-30</td>
<td>7M1141</td>
</tr>
<tr>
<td>XLT-60</td>
<td>7M1145</td>
</tr>
</tbody>
</table>

Facing
XL T-30
XL T-60
XL T-30, nylon
XL T-60, nylon

Cable length
1 m (3.28 ft)
5 m (16.40 ft)
10 m (32.81 ft)
20 m (65.62 ft)
30 m (98.43 ft)
50 m (164.04 ft)
70 m (229.66 ft)
80 m (262.47 ft)
90 m (295.28 ft)
100 m (328.08 ft)

Approvals
ATEX II 2G I Div. 1, FM Class I Div. 2, CE

Further designs
Please add "Z" to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y15</td>
</tr>
</tbody>
</table>

Instruction manual
Quick Start manual, multi-language
Applications Guidelines, multi-language
Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

Order No.
7ML1998-5QS81
7ML1998-5HV61

Accessories
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77") one text line for fastening on sensors
Easy Aimer 2, 1" NPT galvanized
Easy Aimer 304 with stainless steel coupling
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

<table>
<thead>
<tr>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>XLT-30</td>
<td>7ML1930-1BJ</td>
</tr>
<tr>
<td>XLT-60</td>
<td>7ML1930-1AP</td>
</tr>
<tr>
<td></td>
<td>7ML1830-1AU</td>
</tr>
<tr>
<td></td>
<td>7ML1830-1AX</td>
</tr>
<tr>
<td></td>
<td>7ML1830-1GN</td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous level measurement - Ultrasonic transducers

Echomax XLT

Schematics

Direct Connection
Siemens Milltronics transceiver
black
white

2 Wire Extension
black
white
Note 1

Coaxial Extension
black
white
Note 2

Notes
1. Extend cable using 18 AWG shield / twisted pair up to 100 m (333 ft).
2. Extend cable using RG-62 A/U coax for optimum signal to noise ratio up to 365 m (1200 ft).

XLT 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.

**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 304 aiming device dimensions**

- 170 mm (6.7’’)
- 135 mm (5.3’’)
- 127 mm (5’’)
- 10 mm (0.39’’)
- max. 27°
- 178 mm (7’’)

**EA 2 aiming device dimensions**

- 3/4’’ NPT or BSP conduit x 300 mm (12’’) long
- 76 mm (3’’)
- 16 mm (0.63’’)
- 127 mm (5’’)
- 178 mm (7’’)
- 178 mm (7.0’’)
- 76 mm (3’’)

© Siemens AG 2010
# Level instruments

Continuous level measurement - Accessories for ultrasonic

## EA aiming devices

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Easy aimer</strong></td>
<td></td>
</tr>
<tr>
<td>Used on solids applications to aim transducers for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.</td>
<td></td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum with M20 adapter and 1” and 1½” BSPT aluminum couplings</td>
<td>7ML1830-1AX</td>
</tr>
<tr>
<td>Easy Aimer 304, with M20 adapter and 1” and 1½” BSPT 304 SS couplings</td>
<td>7ML1830-1GN</td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum, BSPT conduit</td>
<td>7ML1830-1AL</td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum, NPT with 1½” galvanized coupling&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>7ML1830-1AN</td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum, NPT with 1” galvanized coupling</td>
<td>7ML1830-1AP</td>
</tr>
<tr>
<td>Easy Aimer 2, aluminum, NPT with ¾” x 1” PVC coupling</td>
<td>7ML1830-1AQ</td>
</tr>
<tr>
<td>Easy Aimer 304, BSPT conduit</td>
<td>7ML1830-1AS</td>
</tr>
<tr>
<td>Easy Aimer 304, NPT with 1½” coupling&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>7ML1830-1AT</td>
</tr>
<tr>
<td>Easy Aimer 304, NPT with 1” coupling</td>
<td>7ML1830-1AU</td>
</tr>
</tbody>
</table>

### Instruction manual

Easy Aimer 2 and 304 Instruction manual, Multi-language

Note: The instruction manual should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

<sup>1)</sup> For use with XPS-30 or XPS-40 transducers only
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” or 2” threaded connection.
Distance from sensor to wall or beam: 20 to 31 cm (8 to 12”).
The unique box design also acts as a sun shield for transducers with 1” threaded connections.

FMS-210
wall mounting set
Mounting of transducers with 1” threaded connection.
Distance from transducer to wall or beam: 12 to 48 cm (5 to 19”).

FMS-220
extended wall mounting set
Mounting of transducers with 1” threaded connection.
Distance from transducer to wall or beam: 32 to 98 cm (13 to 39”).

FMS-310
floor mounting set
Mounting of transducers with 1” threaded connection.
Distance from transducer to floor: 20 to 48 cm (8 to 19”).
Distance from mounting support: 5 to 57 cm (2 to 22”).

FMS-320
extended floor mounting set
Mounting of transducers with 1” threaded connection.
Distance from transducer to floor: 20 to 48 cm (8 to 19”).
Distance from mounting support: 41 to 108 cm (16 to 43”).

FMS-350
floor mounting set, bridge
Mounting of transducers with 1” threaded connection.
Distance from transducer to floor: 20 to 48 cm (8 to 19”), anywhere along the complete width of the bridge [166 cm (65”)].
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.

Selection and Ordering data

<table>
<thead>
<tr>
<th>Mounting brackets for XPS-10/XCT-8 sensors</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMS-200 universal box bracket set</td>
<td>7ML1830-BK</td>
</tr>
<tr>
<td>FMS-210 wall mounting set</td>
<td>7ML1830-BL</td>
</tr>
<tr>
<td>FMS-220 extended wall mounting set</td>
<td>7ML1830-BM</td>
</tr>
<tr>
<td>FMS-310 floor mounting set</td>
<td>7ML1830-BN</td>
</tr>
<tr>
<td>FMS-320 extended floor mounting set</td>
<td>7ML1830-BP</td>
</tr>
<tr>
<td>FMS-350 floor mounting set, bridge</td>
<td>7ML1830-BQ</td>
</tr>
<tr>
<td>Additional instruction manual</td>
<td>C)</td>
</tr>
<tr>
<td>FMS-200</td>
<td>7ML1998-BBK</td>
</tr>
<tr>
<td>FMS-210</td>
<td>7ML1998-BBL</td>
</tr>
<tr>
<td>FMS-220</td>
<td>7ML1998-BBM</td>
</tr>
<tr>
<td>FMS-310</td>
<td>7ML1998-BBN</td>
</tr>
<tr>
<td>FMS-320</td>
<td>7ML1998-BBP</td>
</tr>
<tr>
<td>FMS-350</td>
<td>7ML1998-BBQ</td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered as a separate line item on the order.</td>
<td></td>
</tr>
</tbody>
</table>

C) Unterliegt den Exportbestimmungen AL: N, ECCN: EAR99

Integration
Level instruments
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

- Clearance
- Tapped

Note: Clearance Hole / Locknut Installation method is not suitable for pressure applications.
Technical specifications

Mode of operation
Measuring principle: Temperature sensor

Input
Measuring range: -40 ... +150 °C (-40 ... + 302 °F)

Output
Response time:
- Forced circulation (temperature variation: 63 %): 55 seconds
- Flange, forced circulation: 90 seconds
- Natural convection: 150 seconds

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
Cable connection:
- 2-core, 0.5 mm² (20 AWG), shielded, silicone sheath

Process connection:
- ¾" NPT (Taper), ANSI/ASME B1.20.1
- R ¾" (BSPT), EN 10226, totally encapsulated

Certificates and approvals
SAA, FM, CSA, ATEX

Selection and Ordering data

Order No.
TS-3 temperature sensor
TS-3 provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.
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
¾" NPT (Taper), ANSI/ASME B1.20.1
R ¾" (BSPT), EN 10226

Approvals
CSA, FM
ATEX, SAA

Instruction manual
English
7ML1998-5EM01
German
7ML1998-1EM31

Note: The instruction manual should be ordered as a separate line item on the order.
This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.

Optional equipment
¾" NPT locknut, aluminum
7ML1930-1BE
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77") for fastening on sensors
7ML1930-1BJ

Dimensional drawings

TS-3 temperature sensor dimensions
Level instruments
Continuous level measurement - Radar transmitters

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 (vapour, 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 storage and process vessels including high temperature and pressure, to a range of 20 m (66 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, 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).

SITRANS LR400 is a 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft). It is ideal for low dielectric media.

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.

Auto False-Echo Suppression
SITRANS LR instruments offer the unique advantage of patented 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 LR400, SITRANS LR460).

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
## Level instruments

Continuous level measurement - Radar transmitters

### Radar Selection Guide

#### Technical specifications

<table>
<thead>
<tr>
<th>Criteria</th>
<th>SITRANS Probe LR</th>
<th>SITRANS LR200</th>
<th>SITRANS LR250</th>
<th>SITRANS LR260</th>
<th>SITRANS LR400</th>
<th>SITRANS LR460</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical industries</strong></td>
<td>Chemicals</td>
<td>Chemicals,</td>
<td>Chemicals,</td>
<td>Cement,</td>
<td>Chemicals,</td>
<td>Cement,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>petrochemicals</td>
<td>petrochemicals</td>
<td>power generation, food processing, mineral processing, mining</td>
<td>petrochemicals</td>
<td>power generation, food processing, mineral processing, mining</td>
</tr>
<tr>
<td><strong>Typical applications</strong></td>
<td>Liquids, storage vessels</td>
<td>Liquids, storage and process vessels</td>
<td>Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media</td>
<td>Cement, plastics, grain, flour, coal</td>
<td>Liquids storage vessels, liquid petroleum gas (LPG)</td>
<td>Cement, flyash, grain, coal, flour, plastics</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>0.3 ... 20 m</td>
<td>0.3 ... 20 m</td>
<td>50 m (2')</td>
<td>30 m (98.4 ft)</td>
<td>0.35 ... 50 m</td>
<td>100 m (328 ft)</td>
</tr>
<tr>
<td></td>
<td>(1 ... 65 ft)</td>
<td>(1 ... 65 ft)</td>
<td>end of horn to 20 m (65 ft), horn dependent</td>
<td>(1.14 ... 164 ft)</td>
<td>(1.14 ... 164 ft)</td>
<td>(1.14 ... 164 ft)</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>5.8 GHz</td>
<td>5.8 GHz</td>
<td>K-band</td>
<td>K-band</td>
<td>24 ... 25 GHz</td>
<td>24 ... 25 GHz</td>
</tr>
<tr>
<td></td>
<td>(North America 6.3 GHz)</td>
<td>(North America 6.3 GHz)</td>
<td>(25.0 GHz)</td>
<td>(25.0 GHz)</td>
<td>FMCW</td>
<td>FMCW</td>
</tr>
<tr>
<td><strong>Performance accuracy</strong></td>
<td>0.1% of range or 10 mm (0.4’)</td>
<td>0.1% of range or 10 mm (0.4’)</td>
<td>5 mm (0.02’)</td>
<td>25 mm (1’) from minimum detectable distance to 300 mm (11.8”)</td>
<td>≤ 5 mm (0.2’) from 2 to 10 m (6.6 to 32.8 ft) ≤ 15 mm (0.6”) from 10 to 50 m (32.8 to 164 ft)</td>
<td>0.25 %</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F)</td>
<td>Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F)</td>
<td>Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F)</td>
<td>Ambient: -40 ... +65 °C (-40 ... +149 °F) Process: -40 ... +250 °C (-40 ... +482 °F)</td>
<td>Ambient: max. +65 °C (+149 °F) Process: max. +200 °C (+392 °F)</td>
<td></td>
</tr>
<tr>
<td><strong>Output/ Communications</strong></td>
<td>4 ... 20 mA/HART™, SIMATIC PDM for remote configuration and diagnostics</td>
<td>4 ... 20 mA/HART™, PROFIBUS PA, SIMATIC PDM for remote configuration and diagnostics, AMS</td>
<td>4 ... 20 mA/HART™, PROFIBUS PA, SIMATIC PDM for remote configuration and diagnostics, AMS</td>
<td>4 ... 20 mA/HART™, PROFIBUS PA, SIMATIC PDM for remote configuration and diagnostics, AMS</td>
<td>4 ... 20 mA/HART™, PROFIBUS PA, SIMATIC PDM for remote configuration and diagnostics, AMS</td>
<td>4 ... 20 mA/HART™, PROFIBUS PA, SIMATIC PDM for remote configuration and diagnostics, AMS</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>4 ... 20 mA, 24 V DC nominal, 30 V DC max.</td>
<td>4 ... 20 mA loop, 24 V DC nominal, 30 V DC max.</td>
<td>4 ... 20 mA loop, 24 V DC nominal, 30 V DC max.</td>
<td>4 ... 20 mA loop, 24 V DC nominal, 30 V DC max.</td>
<td>100 ... 230 V AC, ±15%, 50/60 Hz</td>
<td>24 V DC, ±25/-20%, 6 W (optional)</td>
</tr>
<tr>
<td></td>
<td>Minimum voltage depends on total loop resistance</td>
<td>Minimum voltage depends on total loop resistance</td>
<td>Minimum voltage depends on total loop resistance</td>
<td>Minimum voltage depends on total loop resistance</td>
<td>120 ... 230 V AC, ±15%, 50/60 Hz, 6 W</td>
<td>24 V DC, ±25/-20%, 6 W</td>
</tr>
</tbody>
</table>
Level instruments
Continuous level measurement - Radar transmitters

Radar Application Questionnaire

Customer information
Contact: ____________________________ Prepared By: ____________________________
Company: __________________________ Country: __________________________
Address: __________________________ Phone: ( ) __________________________
City: __________________________ Zip/Postal Code: __________________________
E-mail: __________________________ Fax: ( ) __________________________

Vessel Information (supply sketch where possible)

☐ Storage Solids  ☐ Storage Liquids  ☐ Process  ☐ Reactor

Area safety classification: (specify code required)

Height: __________ m/ft  Diameter: __________ m/ft  Filling method: __________

Top:
☐ Flat  ☐ Foam  ☐ Steam
☐ Parabolic  ☐ Dust  ☐ Deposit (build-up)
☐ Conical  ☐ Vapor

Atmosphere: (indicate all that apply)  Pressure:
Normal: __________
Maximum (relief): __________

Mounting connection (specify type): __________

Distance to sidewall: __________ cm/ft

Mounting connection maximum temperature: __________ °C/°F

Max. temperature at electronics: __________ °C/°F

Stilling well or Stilling Pipe mounting: ☐ Yes  ☐ No  Stilling well diameter: __________ cm/ft

Material

Material being measured: __________  ☐ Liquid  ☐ Solid  ☐ Liquified gas

Material temperature: Norm: __________ °C/°F  Max: __________ °C/°F

Material surface: ☐ Flat  ☐ Turbulent  ☐ Agitated  ☐ Vortex  Dielectric constant: ☐ εr < 3  ☐ εr > 3

Installation

Power available: __________

Communications:
☐ HART®/4 to 20 mA  ☐ PROFIBUS PA  ☐ None

Products recommended:

© Siemens Milltronics Process Instruments Inc.  www.siemens.com/processautomation

Form# 2-783R6
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 startup
• Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART® handheld communicator
• Communication using HART®
• Patented 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 vapours, temperature gradients, vacuum or pressure, such as tank farms, chemical storage, digesters and long-range applications. 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: tank farms, chemical storage, wastewater wet well

Configuration

Installation

min. 300 mm (1 ft) for every 3 m (10 ft) of vessel wall.

Mounting on a nozzle

SITRANS Probe LR

shield length

100 mm (4") or 250 mm (10")

standard lengths

min. 10 mm (0.4")

Mounting on a manhole cover

minimum 100 mm (4")

Mounting unit on vessel

Conical

Flat

Parabolic
## Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Pulse radar level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Pulse radar level measurement</td>
</tr>
<tr>
<td>Frequency</td>
<td>5.8 GHz (North America 6.3 GHz)</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.3 ... 20 m (1.0 ... 65 ft)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>4 ... 20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± 0.02 mA</td>
</tr>
<tr>
<td>Span</td>
<td>Proportional or inversely proportional</td>
</tr>
<tr>
<td>Communications</td>
<td>HART®</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance (reference conditions)</th>
<th>± the greater of 0.1% of range or 10 mm (0.4&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± the greater of 0.1% of range or 10 mm (0.4&quot;)</td>
</tr>
<tr>
<td>Influence of ambient temperature</td>
<td>0.003%/K</td>
</tr>
<tr>
<td>Repeatability</td>
<td>± 5 mm (2&quot;)</td>
</tr>
<tr>
<td>Fail-safe</td>
<td>mA signal programmable as high, low or hold (LOE)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating conditions</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Installation conditions</td>
<td>Indoor/outdoor</td>
</tr>
<tr>
<td>• Ambient conditions (enclosure)</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td>- Ambient temperature</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td>- Installation category</td>
<td>I</td>
</tr>
<tr>
<td>- Pollution degree</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medium conditions</th>
<th>ε_r &gt; 1.6 (for ε_r &lt; 3, use stillpipe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric constant ε_r</td>
<td>ε_r &gt; 1.6 (for ε_r &lt; 3, use stillpipe)</td>
</tr>
<tr>
<td>Vessel temperature</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td>Vessel pressure</td>
<td>3 bar g (43.5 psi g)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>PBT (Polybutylene Terephthalate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Body construction</td>
<td>PBT (Polybutylene Terephthalate)</td>
</tr>
<tr>
<td>- Lid construction</td>
<td>PEI (Polyether Imide)</td>
</tr>
<tr>
<td>- Cable inlet</td>
<td>2 x M20x1.5 or 2 x ½&quot; NPT with adapter</td>
</tr>
<tr>
<td>• Degree of protection</td>
<td>Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68</td>
</tr>
<tr>
<td>• Weight</td>
<td>1.97 kg (4.35 lb)</td>
</tr>
<tr>
<td>• Antenna</td>
<td>Polypropylene rod, hermetically sealed construction</td>
</tr>
<tr>
<td>- Material</td>
<td>Polypropylene rod, hermetically sealed construction</td>
</tr>
<tr>
<td>- Dimensions</td>
<td>Standard 100 mm (4&quot;) shield for maximum 100 mm (4&quot;) nozzle or optional 250 mm (10&quot;) long shield</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
<th>• Nominal 24 V DC with max. 550 Ω, maximum 30 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Nominal 24 V DC with max. 550 Ω, maximum 30 V DC</td>
<td>• 4 ... 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certificates and approvals</th>
<th>CSA US/C- CE, FM, C-TICK</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>CSA US/C- CE, FM, C-TICK</td>
</tr>
<tr>
<td>Marine</td>
<td>Lloyd’s Register of Shipping</td>
</tr>
<tr>
<td>• ABS Type Approval</td>
<td>Radio</td>
</tr>
<tr>
<td>FCC, Industry Canada and European (R&amp;TTE), C-TICK</td>
<td>FCC, Industry Canada and European (R&amp;TTE), C-TICK</td>
</tr>
</tbody>
</table>

HART® is a registered trademark of the Hart Communications Foundation.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS Probe LR</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>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). Max. 3 bar g (43.5 psi g) pressure and +80 °C (+176 °F)</td>
<td>7ML5430-0</td>
</tr>
</tbody>
</table>

### Enclosure
- Plastic, (PBT), 2 x ½" NPT
- Plastic, (PBT), 2 x M20x1.5

### Antenna type/Material - (max. 3 bar and +80 °C)
- Polypropylene Antenna
  - 1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 100 mm shield
  - R 1½" [(BSPT), EN 10226], c/w integral 100 mm shield
  - G 1½" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield
- 1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield
- R 1½" [(BSPT), EN 10226], c/w integral 250 mm shield
- G 1½" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield

### Approvals
- General Purpose, CE ¹
- General Purpose, FM, CSA ²
- CSA Class I, Div 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, Intrinsically Safe with suitable barrier ²
- FM, Class I, II and III, Div 1, Groups A, B, C, D, E, F, G, Intrinsically Safe with suitable barrier ¹
- ATEX II 1G Ex ia IIC T4, Intrinsically Safe with suitable barrier ²

### Communication/Output
- 4 ... 20 mA, HART ⁵

### Further designs
- Please add "Z" to Order No. and specify Order code(s).
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Y15
- Measuring-point number/identification (max. 16 characters) specify in plain text: C11
- Test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 90000

### Instruction manual
- English: 7ML1998-SHR02
- French: 7ML1998-SHR11
- Spanish: 7ML1998-SHR21
- German: 7ML1998-SHR32

### Note
- The instruction manual should be ordered as a separate item on the order.

### This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Additional quick start manual
- Multi-language Quick Start manual: 7ML1998-SQP81
Dimensional drawings

SITRANS Probe LR dimensions

Schematics

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Hand Programmer

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 instrument wiring practices or electrical codes.

SITRANS Probe LR connections
SITRANS LR200 is a 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).

**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 patented Process Intelligence signal-processing technology for superior reliability.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, asphalt, digesters

**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 rod antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected

**Mounting unit on vessel**

- Conical
- Flat
- Parabolic

**Mounting unit on stilling well**

Orient front or back of device toward stillpipe slots.

**Mounting on a nozzle**

Minimum 10 mm (0.4"")
### Level instruments

**Continuous level measurement - Radar transmitters**

#### SITRANS LR200

### Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Radar level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Radar level measurement</td>
</tr>
<tr>
<td>Frequency</td>
<td>5.8 GHz (North America 6.3 GHz)</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.3 ... 20 m (1.0 ... 65 ft)</td>
</tr>
</tbody>
</table>

### Output

- **Analog output**: 4 ... 20 mA
- **Accuracy**: ± 0.02 mA
- **Span**: Proportional or inversely proportional
- **Communications**: HART®
- **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")
- Remainder of range: 10 mm (0.4") or 0.1% of span (whichever is greater)

### Rated operating conditions

<table>
<thead>
<tr>
<th>Installation conditions</th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Indoor/outdoor</td>
</tr>
<tr>
<td>Ambient conditions (enclosure)</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td>Installation category</td>
<td>I</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>4</td>
</tr>
</tbody>
</table>

### Medium conditions

- **Dielectric constant ε_r**: ε_r > 1.6 (for ε_r < 3, use waveguide antenna or stillpipe)
- **Vessel temperature and pressure**: Varies with connection type; see Pressure/temperature curves for more information

### Design

- **Enclosure**
  - **Material**: Aluminium, polyester powder coated
  - **Cable inlet**: 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 kg (4.4 lbs) (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") shield for maximum 100 mm (4") nozzle, or optional 250 mm (10") long shield
  - **Optional rods, horn and waveguides**: Refer to SITRANS LR200/LR300 Antennas for optional rods, horns and waveguides

### Process connections

- **Process connection**: 1½" NPT [(Taper), ANSI/ASME B1.20.1]
- **Flange connection**: Refer to SITRANS LR200/LR300 Antennas for more connections

### Power supply

- **4 ... 20 mA/HART**
  - General Purpose, Non-incendive, Intrinsically Safe
  - Flame proof, Increased safety, Explosion proof
  - **HART®**: Optional: PROFIBUS PA (Profile 3.0, Class B)
  - **Fail-safe**: Programmable as high, low or hold (Loss of Echo)
- **PROFIBUS PA**
  - 10.5 mA per IEC 61158-2

### Certificates and approvals

- **General**: CSA US/CS, CE, FM, C-TICK
- **Marine**: Lloyd’s Register of Shipping, ABS Type Approval
- **Radio**: FCC, Industry Canada and European (R&TTE), C-TICK
- **Hazardous**
  - Flame proof (Europe)
  - Increased safety (Europe)
  - Explosion proof (USA/Canada)
  - Non-incendive (USA)
  - Intrinsically Safe (Europe)
  - Intrinsically Safe (USA/Canada)
  - Intrinsically Safe (Australia)
  - Intrinsically Safe (International)
  - Brazil - INMETRO
- **Brazil - INMETRO**: Brazilian Approvals for handheld programmer

### Programming

- **Intrinsically Safe Siemens handheld programmer**: Infrared receiver
- **Approvals for handheld programmer**: IS model:
  - ATEX I1G Ex ia IIC T4
  - ATEX II 1G Ex ia IIC T4
- **Handheld communicator**: HART communicator 375
- **PC**: SIMATIC PDM
- **AMS**: Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

HART® is a registered trademark of the Hart Communications Foundation.
Selection and Ordering data

**Order No.**

SITRANS LR200, Uni-Construction polypropylene rod antenna version

- 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).
- Max. 3 bar g (43.5 psi g) pressure and +80 °C (+176 °F)

**Enclosure/Cable inlet**

- 2 x ½” NPT, Siemens LUI interface
- 2 x M20x1.5, Siemens LUI interface

**Polypropylene antenna type - (Max. 3 Bar pressure and +80 °C)**

- 1½” NPT ([Taper], ANSI/ASME B1.20.1), c/w integral 100 mm shield
- R 1½” ([BSP], EN 10226), c/w integral 100 mm shield
- G 1½” ([BSPP], EN ISO 228-1), c/w integral 100 mm shield

**Approvals**

- General Purpose, CE1)
- General Purpose, CSAUS/C, FM, for North America only2)
- CSA Class I and II, Div. I, Groups A, B, C, D, G, 6.3 GHz, for North America only, Intrinsically Safe with suitable barrier 4)
- FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier 5)
- ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier 1)
- FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required) 3)
- ATEX II 1/2 G EEx emia IIC T4, no barrier required 4)
- ATEX II 1/2 G EEx dnia IIC T4, no barrier required 5)
- CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required) 3,4,5)

**Communication/Output**

- 4 ... 20 mA, HART®
- PROFIBUS PA

**Further designs**

Please add "-Z" to Order No. and specify Order code(s).

**Instruction manual for HART/mA device**

- English C) 7ML1998-5JP02
- German C) 7ML1998-5JP32
- Note: The instruction manual should be ordered as a separate line item on the order.

**Multi-language Quick Start manual**

- 7ML1998-5XC82

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Instruction manual for PROFIBUS PA device**

- English C) 7ML1998-5JR01
- German C) 7ML1998-5JR31
- Note: The instruction manual should be ordered as a separate line item on the order.

**Multi-language Quick Start manual**

- 7ML1998-5XD81

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Accessories**

- Handheld programmer, Intrinsically safe, EEx ia
- HART modem/RS-232 (for use with a PC and SIMATIC PDM)
- HART modem/USB (for use with a PC and SIMATIC PDM)
- One metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-4 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)
- One metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-4 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)
- One General Purpose polymeric cable gland M20x1.5, rating for -20 °C ... +80 °C (-4 °C ... +176 °F)
- SITRANS RD100 Remote display - see RD100 on page 5/304
- SITRANS RD200 Remote display - see RD200 on page 5/306

1) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK
2) Includes Radio approval FCC, 6.3 GHz
3) Available with enclosure option 2 only
4) Available with enclosure option 3 only
5) Available with communication option 1 only

C) Subject to export regulations AL: N, ECCN: EAR99
D) Subject to export regulations AL: N, ECCN: EAR99H
## SITRANS LR200

### Continuous level measurement - Radar transmitters

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LR200, Flange Adapter, Sanitary Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5424</td>
<td>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).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antenna material (uses antenna adapter)</th>
<th>PTFE, one piece rod antenna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process connection</td>
<td>Sanitary fitting clamp</td>
</tr>
<tr>
<td>Configuration/Connection size</td>
<td>2&quot; connection, rod antenna only</td>
</tr>
<tr>
<td>Antenna extension</td>
<td>No extension</td>
</tr>
<tr>
<td>Mounting Clamp</td>
<td>No mounting clamp</td>
</tr>
<tr>
<td>Enclosure/Cable inlet</td>
<td>Aluminum, Epoxy painted</td>
</tr>
<tr>
<td>Communication/Output</td>
<td>4 ... 20 mA, HART³</td>
</tr>
</tbody>
</table>

| Approvals                              | General Purpose, CE¹            |
|                                       | General Purpose, CSA² - FM, for North America only |
|                                       | CSA Class I and II, Div. I, Groups A, B, C, D, G, for C Northeam only, Intrinsically Safe with suitable barrier² |
|                                       | FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier² |
|                                       | ATEX II 1G EX ia IIC T4, Intrinsically Safe with suitable barrier¹ |
|                                       | FM, Class I, Div. 2, Groups A, B, C, D, FCC ³ |
|                                       | ATEX II 1/2 G EX ia IIC T4 (no barrier required)³ |
|                                       | ATEX II 1/2 G EX ia IIC T4 (no barrier required)³ |
|                                       | CSA/FM Class I, II and III, Div. I, Groups A, B, C, D, E, F, G (no barrier required)³ |
| Pressure rating                        | Rating per Pressure/Temperature curves in Manual |
|                                       | 0.5 bar g (7.25 psi g) maximum |

#### Further designs

- Please add "Z" to Order No. and specify Order code(s):
  - Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000
  - Inspection Certificate Type 3.1 per EN 10204 Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text
  - Namur NE43 compliant, device preset to failsafe <3.6 mA⁵

## Order No.

<table>
<thead>
<tr>
<th>SITRANS LR200, Flange Adapter, Sanitary Version</th>
<th>7ML5424</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction manual for HART/mA device</td>
<td>English</td>
</tr>
<tr>
<td></td>
<td>German</td>
</tr>
<tr>
<td></td>
<td>Note: The instruction manual should be ordered as a separate line item on the order.</td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td></td>
</tr>
</tbody>
</table>

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LR200, Flange Adapter, Sanitary Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5424</td>
<td>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).</td>
</tr>
</tbody>
</table>

| Instruction manual for PROFIBUS PA device     | English |
|                                               | German |
|                                               | Note: The instruction manual 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 CD containing the complete ATEX Quick Start and instruction manual library.

### Accessories

- Handheld programmer, Intrinsically safe, Ex ia ia IIC T4
- HART modem/RS-232 (for use with a PC and SIMATIC PDM)
- HART modem/USB (for use with a PC and SIMATIC PDM)
- One metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-40 °F ... +176 °F) with integrated shield connection (available for PROFIBUS PA)
- An General Purpose polymeric cable gland M20x1.5, rated -20 ... +80 °C (-4 ... +176 °F) for General Purpose or ATEX EEx e installations (available for PROFIBUS PA)

### Sanitary fitting clamps

- 2", 304 stainless steel
- 3", 304 stainless steel
- 4", 304 stainless steel

### Communication/Output

- 2 x M20x1.5, Siemens LUI interface C)
- 2 x ½" NPT, Siemens LUI interface C)
- Aluminum, Epoxy painted
- One General Purpose polymeric cable gland M20x1.5, rating for -20 ... +80 °C (-4 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)

### Mounting Clamp

- No extension
- Mounting clamp included, not available with Pressure rating option 0

### Pressure rating

- 0.5 bar g (7.25 psi g) maximum

### Further designs

- Please add "Z" to Order No. and specify Order code(s):
  - Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000
  - Inspection Certificate Type 3.1 per EN 10204 Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text
  - Namur NE43 compliant, device preset to failsafe <3.6 mA⁵

### Notes

- Subject to export regulations AL: N, ECCN: EAR99
- Subject to export regulations AL: N, ECCN: EAR99
Continuous level measurement - Radar transmitters

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version</td>
<td>C JML 5 4 23</td>
</tr>
<tr>
<td>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).</td>
<td></td>
</tr>
<tr>
<td><strong>Antenna material (uses antenna adapter)</strong></td>
<td></td>
</tr>
<tr>
<td>PTFE, uses antenna adapter and additional process connection below</td>
<td>1</td>
</tr>
<tr>
<td><strong>Process connection (refer to Pressure/Temperature curves in Instruction manual)</strong></td>
<td></td>
</tr>
<tr>
<td>Flanges (316L stainless steel)</td>
<td></td>
</tr>
<tr>
<td>DN 50 PN 16, Type A, flat faced</td>
<td>AA</td>
</tr>
<tr>
<td>DN 60 PN 16, Type A, flat faced</td>
<td>BA</td>
</tr>
<tr>
<td>DN 100 PN 16, Type A, flat faced</td>
<td>CA</td>
</tr>
<tr>
<td>DN 150 PN 16, Type A, flat faced</td>
<td>DA</td>
</tr>
<tr>
<td>2&quot; ASME 150 lb, flat faced</td>
<td>FB</td>
</tr>
<tr>
<td>3&quot; ASME 150 lb, flat faced</td>
<td>GB</td>
</tr>
<tr>
<td>4&quot; ASME 150 lb, flat faced</td>
<td>HB</td>
</tr>
<tr>
<td>6&quot; ASME 150 lb, flat faced</td>
<td>JB</td>
</tr>
<tr>
<td>DN 50 PN 40, flat faced</td>
<td>AC</td>
</tr>
<tr>
<td>DN 60 PN 40, flat faced</td>
<td>BC</td>
</tr>
<tr>
<td>DN 100 PN 40, flat faced</td>
<td>CC</td>
</tr>
<tr>
<td>DN 150 PN 40, flat faced</td>
<td>DC</td>
</tr>
<tr>
<td>2&quot; ASME 300 lb, flat faced, available with Pressure rating option 1 only</td>
<td>FD</td>
</tr>
<tr>
<td>3&quot; ASME 300 lb, flat faced</td>
<td>GD</td>
</tr>
<tr>
<td>4&quot; ASME 300 lb, flat faced</td>
<td>HD</td>
</tr>
<tr>
<td>6&quot; ASME 300 lb, flat faced</td>
<td>JD</td>
</tr>
<tr>
<td>JIS DN 50 10K</td>
<td>AE</td>
</tr>
<tr>
<td>JIS DN 80 10K</td>
<td>BE</td>
</tr>
<tr>
<td>JIS DN 100 10K</td>
<td>CE</td>
</tr>
<tr>
<td>JIS DN 150 10K</td>
<td>DE</td>
</tr>
<tr>
<td><strong>Antenna extensions or Inactive shield length</strong></td>
<td></td>
</tr>
<tr>
<td>No antenna extension</td>
<td>0</td>
</tr>
<tr>
<td>50 mm (2&quot;) extension, PTFE</td>
<td>1</td>
</tr>
<tr>
<td>100 mm (4&quot;) extension, PTFE</td>
<td>2</td>
</tr>
<tr>
<td>100 mm (4&quot;) extension, 316L stainless steel shield(1)</td>
<td>3</td>
</tr>
<tr>
<td>150 mm (6&quot;) extension, 316L stainless steel shield(1)</td>
<td>4</td>
</tr>
<tr>
<td>200 mm (8&quot;) extension, 316L stainless steel shield(1)</td>
<td>5</td>
</tr>
<tr>
<td>250 mm (10&quot;) extension, 316L stainless steel shield(1)</td>
<td>6</td>
</tr>
<tr>
<td>Custom inactive shield length 101 mm ... 1000 mm (in 1 mm increments)</td>
<td>7</td>
</tr>
<tr>
<td>Add order code Y01 and plain text: “Inactive shield length...mm”</td>
<td></td>
</tr>
<tr>
<td><strong>Process seal/gasket</strong></td>
<td></td>
</tr>
<tr>
<td>Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 to 6</td>
<td>0</td>
</tr>
<tr>
<td>FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Enclosure/Cable inlet</strong></td>
<td></td>
</tr>
<tr>
<td>Aluminum, Epoxy painted</td>
<td>2</td>
</tr>
<tr>
<td>2 x 3/4&quot; NPT, Siemens LUI interface</td>
<td>2</td>
</tr>
<tr>
<td>2 x M20x1.5, Siemens LUI interface</td>
<td>3</td>
</tr>
<tr>
<td><strong>Communication/Output</strong></td>
<td></td>
</tr>
<tr>
<td>4 ... 20 mA, HART® PROFIBUS PA</td>
<td>A</td>
</tr>
</tbody>
</table>

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version</td>
<td>C JML 5 4 23</td>
</tr>
<tr>
<td>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).</td>
<td></td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>A</td>
</tr>
<tr>
<td>General Purpose, CE(2)</td>
<td>B</td>
</tr>
<tr>
<td>General Purpose, CSAicc. FM, for North America only(2)</td>
<td>C</td>
</tr>
<tr>
<td>CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only.</td>
<td>D</td>
</tr>
<tr>
<td>Intrinsically Safe with suitable barrier(2)</td>
<td>E</td>
</tr>
<tr>
<td>FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only.</td>
<td>F</td>
</tr>
<tr>
<td>Intrinsically Safe with suitable barrier(2)</td>
<td>G</td>
</tr>
<tr>
<td>ATEX II 1G EEx ia IIC T4, (no barrier required)(2)</td>
<td>H</td>
</tr>
<tr>
<td>ATEX II 1/2 G EEx em ia IIC T4, (no barrier required)(2, 5, 6)</td>
<td>I</td>
</tr>
<tr>
<td>ATEX II 1/2 G EEx dm ia IIC T4, (no barrier required)(2, 5, 6)</td>
<td>J</td>
</tr>
<tr>
<td><strong>Pressure rating</strong></td>
<td>K</td>
</tr>
<tr>
<td>Rating per Pressure/Temperature curves in Manual</td>
<td>0</td>
</tr>
<tr>
<td>0.5 bar g (7.25 psi g) maximum</td>
<td>1</td>
</tr>
</tbody>
</table>

**Further designs**

Please add “Z” to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Description</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000</td>
<td>C11</td>
</tr>
<tr>
<td>Inspection Certificate Type 3.1 per EN 10204</td>
<td>C12</td>
</tr>
<tr>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters); specify in plain text inactive custom shield lengths: Enter the total length of the inactive shield in plain text description (in 1 mm increments).</td>
<td>Y15</td>
</tr>
<tr>
<td>Namur NE43 compliant, device preset to failsafe ≤3.6 mA(6)</td>
<td>Y01</td>
</tr>
<tr>
<td></td>
<td>N07</td>
</tr>
</tbody>
</table>

**Instruction manual for HART/mA device**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-SJP02</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-SJP32</td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered as a separate line item on the order.</td>
<td></td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td>7ML1998-SXC81</td>
</tr>
</tbody>
</table>

**Instruction manual for PROFIBUS PA device**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-SJR02</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-SJR32</td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered as a separate line item on the order.</td>
<td></td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td>7ML1998-SXD81</td>
</tr>
</tbody>
</table>
# Level instruments

## Continuous level measurement - Radar transmitters

### SITRANS LR200

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1930-1BK</td>
<td>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).</td>
</tr>
<tr>
<td>7ML1930-1DA</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1DB</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1AP</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1AM</td>
<td></td>
</tr>
</tbody>
</table>

**Accessories**

- Handheld programmer, Intrinsically safe, EEx ia C)
- HART modem/RS-232 (for use with a PC and SIMATIC PDM)
- HART modem/USB (for use with a PC and SIMATIC PDM)

- One metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-40 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)
- Antenna, rod, PTFE
- Antenna extension, 50 mm (2") PTFE
- One metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)
- One General Purpose polymeric cable gland M20x1.5, rating for -20 ... +80 °C (-4 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)

**Antenna Material (uses antenna adapter)**

- 316L stainless steel with PTFE cone emitter
- 316L stainless steel with PTFE cone emitter and purge connection with 1/8" NPT inlet
- Sliding waveguide system with 1000 mm (40") waveguide
- Process connection (refer to Pressure/Temperature curves on specification sheets)

**Flanges (316L stainless steel)**

- DN 50 PN 16, Type A, flat faced (BA)
- DN 80 PN 16, Type A, flat faced (CA)
- DN 100 PN 16, Type A, flat faced (DA)
- DN 200 PN 16, Type A, flat faced (EA)
- DN 80 PN 10/16 DIN EN1092-1 form B1 (BF)
- DN 100 PN 10/16 DIN EN1092-1 form B1 (CF)
- DN 150 PN 10/16 DIN EN1092-1 form B1 (DF)
- DN 200 PN 16 DIN EN1092-1 form B1 (EF)

**Process connection**

- 2" ASME 150 lb, flat faced (FB)
- 3" ASME 150 lb, flat faced (GB)
- 4" ASME 150 lb, flat faced (HB)
- 6" ASME 150 lb, flat faced (J)
- 8" ASME 150 lb, flat faced (KB)

**Process seal/gasket**

- FKM (-40 ... +200 °C)
- Nitrile (-40 ... +100 °C), sliding waveguide systems only
- FFKM (-35 ... +200 °C)

**Communication/Output**

- 4 ... 20 mA, HART
- PROFIBUS PA

**Process seal/gasket**

- FKM (-40 ... +200 °C)
- Nitrile (-40 ... +100 °C), sliding waveguide systems only
- FFKM (-35 ... +200 °C)

**Enclosure/Cable inlet**

- Aluminum, Epoxy painted
- 2 x 1/2" NPT, Siemens LUI interface
- 2 x M20x1.5, Siemens LUI interface

**Horn size/Waveguide options**

- 80 mm (3") horn
- 100 mm (4") horn
- 150 mm (6") horn
- 200 (8") mm horn
- 100 mm (4") horn with 100 mm (4") waveguide extension
- 100 mm (4") horn with 150 mm (6") waveguide extension
- 100 mm (4") horn with 200 mm (8") waveguide extension
- 100 mm (4") horn with 250 mm (10") waveguide extension

---

© Siemens AG 2010
### Selection and Ordering data

#### SITRANS LR200, Flange Adapter/Horn Antenna

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML 5 4 25 -</td>
<td>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).</td>
</tr>
</tbody>
</table>

#### Accessories

- Handheld programmer, Intrinsically safe, EEx ia C)
- HART modem/RS-232 (for use with a PC and SIMATIC PDM)
- HART modem/USB (for use with a PC and SIMATIC PDM)

#### Approval

- General Purpose, CE³)
- General Purpose, CSA ⁿaac FM, for North America only⁴)
- CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only, Intrinsically Safe with suitable barrier⁵)
- FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier⁶)
- ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier⁷)
- FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required)⁸)
- ATEX II 1/2 G EEx em ia IIC T4 (no barrier required)⁹)
- ATEX II 1/2 G EEx em ia IIC T4 (no barrier required)⁹)
- CSA/FM Class I, II and III, Div. 1, Groups A B C D E F G (no barrier required)¹⁰)

#### Pressure rating

- Rating per Pressure/temperature curves in Manual
  - 0.5 bar g (7.25 psi g) maximum

#### Further designs

- Please add "-Z" to Order No. and specify Order code(s).
- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000
- Inspection Certificate Type 3.1 per EN 10204
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
- Waveguide custom lengths: Enter the total length of the waveguide in plain text description (1 mm increments)
- Namur NE-43 compliant, device preset to failsafe <3.6 mA⁷)

---

### Selection and Ordering data

#### SITRANS RD200 Remote display

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML 5 4 25 -</td>
<td>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).</td>
</tr>
</tbody>
</table>

#### Instruction manual for HART/mA device

- English C)
- German C)

Note: The instruction manual should be ordered as a separate line item on the order.

#### Instruction manual for PROFIBUS PA device

- English C)
- German C)

Note: The instruction manual should be ordered as a separate line item on the order.

---

### Accessories

- Handheld programmer, Intrinsically safe, EEx ia C)
- HART modem/RS-232 (for use with a PC and SIMATIC PDM)
- HART modem/USB (for use with a PC and SIMATIC PDM)³)

One metallic cable gland M20x1.5, rating -40 °C ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)

One General Purpose polymeric cable gland M20x1.5, rating for -20 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)

SITRANS RD100 Remote display - see RD100 on page 5/304

SITRANS RD200 Remote display - see RD200 on page 5/306

---

### Approvals

- General Purpose, CE³)
- General Purpose, CSA ⁿaac FM, for North America only⁴)
- CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only, Intrinsically Safe with suitable barrier⁵)
- FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier⁶)
- ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier⁷)
- FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required)⁸)
- ATEX II 1/2 G EEx em ia IIC T4 (no barrier required)⁹)
- ATEX II 1/2 G EEx em ia IIC T4 (no barrier required)⁹)
- CSA/FM Class I, II and III, Div. 1, Groups A B C D E, F, G (no barrier required)¹⁰)

### Pressure rating

- Rating per Pressure/temperature curves in Manual
  - 0.5 bar g (7.25 psi g) maximum

---

### Further designs

- Please add "-Z" to Order No. and specify Order code(s).
- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000
- Inspection Certificate Type 3.1 per EN 10204
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text
- Waveguide custom lengths: Enter the total length of the waveguide in plain text description (1 mm increments)
- Namur NE-43 compliant, device preset to failsafe <3.6 mA⁷)
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR200

Characteristic curves

Maximum Flange and Process Temperatures versus Allowable Ambient

SITRANS LR200 Ambient/Process Flange Surface Temperature Curve
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR200

Dimensional drawings

SITRANS LR200 with Polypropylene Shielded Rod Antenna

PTFE Rod Antenna, Threaded

Threaded Connection PTFE Rod, external shield

Horn Antenna with Flat Faced Flange

Waveguide Antenna with Flat Faced Flange

Sliding Waveguide

Sanitary Rod Antenna

SITRANS LR200 dimensions
Schematics

Notes:
1. DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Hand Programmer

Part number:
7ML1930-1BK
## Integration

---

### Waveguide antenna for low dielectric products
- Custom lengths available.

### Sliding waveguide antenna
- Typically for digester applications that include an isolation valve between the instrument and the vessel.

---

## Technical specifications

<table>
<thead>
<tr>
<th>Antenna Types</th>
<th>Flat Faced Flange with Rod</th>
<th>Shielded Rod</th>
<th>Sanitary Rod (1 piece construction)</th>
<th>Horn (4&quot;, 6&quot;, 8&quot; sizes available)</th>
<th>Waveguide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection type</td>
<td>Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6&quot;)</td>
<td>Threaded 2&quot; NPT, R 2&quot; (BSPT), G 2&quot; (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4&quot;)</td>
<td>Sanitary fitting clamp 50, 80, 100 mm (2, 3, 4&quot;) sizes</td>
<td>Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6&quot;)</td>
<td>Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6&quot;)</td>
</tr>
</tbody>
</table>

### Wetted parts
- PTFE, 316L stainless steel, FKM o-ring
- UHMW-PE or PTFE, 316L stainless steel, PTFE, FKM o-ring

### Extensions
- 50 or 100 mm (2 or 4") PTFE or UHMW-PE
- 100, 150, 200 or 250 mm (4, 6, 8 or 10") standard shield length
- N/A
- Use waveguide for extensions to 6 m (20 ft) long
- Two sections (max.) can be connected together
- Max. overall length: 3 m (9.8 ft)

### Dielectric constant
- > 3
- > 3
- > 3
- > 3
- > 3

### Insertion length (max.)
- 41 cm (16.3")
- Variable
- 41 cm (16.3")
- Variable with extension

### Purging option (liquid or gas)
- No
- No
- No
- Yes
- Yes

### Sliding waveguide option for digesters
- Yes
- No
- No
- Yes
- N/A

### Weight
- 6.5 kg (14.3 lbs)
- 5.0 kg (11 lbs)
- 5.0 kg (11 lbs)
- 7.5 kg (16.5 lbs)
- 8.0 kg (17.6 lbs)

---

1) Maximum pressure 0.5 bar g at +60 °C (7.25 psi g at +140 °F)
2) Not including extensions, includes SITRANS LR200 and smallest process connection
Level instruments
Continuous level measurement - Radar transmitters

**SITRANS LR200 and LR300 Specials**

### Selection and ordering Data

#### SITRANS LR200 and SITRANS LR300 Specials

<table>
<thead>
<tr>
<th>SITRANS LR300 Aluminum Enclosure Kit with Electronics and Covers (7ML5411, 7ML5412, 7ML5413), calibrated for use with standard rod antenna</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LR200 aluminum enclosure with board stack, M20 cable inlet, approval option A, with HART® communication, no process connection. See note 7.</td>
<td>PBD-51035860</td>
</tr>
<tr>
<td>SITRANS LR300 aluminum enclosure with board stack, M20 cable inlet, approval option E, with HART communication, no process connection. See note 7.</td>
<td>PBD-51035377</td>
</tr>
<tr>
<td>SITRANS LR300 aluminum enclosure with board stack, M20 cable inlet, approval option G, with HART communication, no process connection. See note 7.</td>
<td>PBD-51035336</td>
</tr>
<tr>
<td>SITRANS LR300 aluminum enclosure with board stack, M20 cable inlet, approval option J, with HART communication, no process connection. See note 7.</td>
<td>PBD-51035566</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SITRANS LR200 Aluminum Enclosure Kit with Electronics and Covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option A, with HART communication, no process connection. See note 7.</td>
<td>A5E01483323</td>
</tr>
<tr>
<td>SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART communication, no process connection. See note 7.</td>
<td>A5E01483368</td>
</tr>
<tr>
<td>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. See note 7.</td>
<td>A5E01483389</td>
</tr>
<tr>
<td>SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection. See note 7.</td>
<td>A5E01483420</td>
</tr>
<tr>
<td>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. See note 7.</td>
<td>A5E01483440</td>
</tr>
<tr>
<td>SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection. See note 7.</td>
<td>A5E01483456</td>
</tr>
<tr>
<td>SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART communication, no process connection. See note 7.</td>
<td>A5E01483468</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SITRANS LR300 Flanged Rod Antenna Kit with 316L SS flat faced flanges</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flanged PTFE rod antenna kit, 2&quot; ASME, 150 lb. See drawing 51003 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a>. See notes 1 and 6.</td>
<td>PBD-51003K020AAAA</td>
</tr>
<tr>
<td>Flanged PTFE rod antenna kit, DN 50 PN16. See drawing 51003 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a>. See notes 1 and 6.</td>
<td>PBD-51003K050AAA</td>
</tr>
<tr>
<td>Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a>. See notes 1 and 6.</td>
<td>PBD-51003K050A0AA</td>
</tr>
</tbody>
</table>

---

See notes 1 and 6.
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR200 and LR300 Specials

**SITRANS LR200/LR300 PTFE Rod Antenna Kit with 316L SS 1½" pipe thread process connection**

PTFE rod antenna kit, 1½" NPT 316L SS Process Connection, FKM O-ring.
See note 6.

PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring.
See note 6.

PTFE rod antenna kit, 1½" G 316L SS Process Connection, FKM O-ring.
See note 6.

**SITRANS LR200/LR300 PTFE Rod Antenna Kit with 316L SS 2" pipe thread process connection**

PTFE rod antenna kit, 2" NPT 316L SS Process Connection, FKM O-ring.
See note 6.

PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring.
See note 6.

PTFE rod antenna kit, 2" G 316L SS Process Connection, FKM O-ring.
See note 6.

**SITRANS LR200/LR300 PTFE Rod Antenna Kit (100 mm shield) with 316L SS 2" pipe thread process connection**

PTFE rod antenna shielded kit, 2" NPT 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield.
See notes 3 and 6.

PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield.
See notes 3 and 6.

PTFE rod antenna shielded kit, 2" G 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield.
See notes 3 and 6.

**Horn antenna kit, 2" ASME 316L SS flange 3" horn, PTFE emitter**
See notes 1 and 6.

**Horn antenna kit, 2" ASME 316L SS flange 4" horn, PTFE emitter**
See notes 1 and 2.

**Horn antenna kit, 2" ASME 316L SS flange 6" horn, PTFE emitter**
See notes 1 and 2.

**Horn antenna kit, DN 50 PN 16 316L SS flange 80 mm horn, PTFE emitter**
See notes 1 and 2.

**Horn antenna kit, DN 50 PN 16 316L SS flange 100 mm horn, PTFE emitter**
See notes 1 and 2.

**Horn antenna kit, DN 50 PN 16 316L SS flange 200 mm horn, PTFE emitter**
See notes 1 and 2.

**SITRANS LR200/LR300 Sanitary Rod Antenna with Sanitary Fitting Clamp Flange mounting and bushing**

PTFE sanitary rod antenna kit, 2" mounting connection. See note 6.

PTFE sanitary rod antenna kit, 3" mounting connection. See note 6.

PTFE sanitary rod antenna kit, 4" mounting connection. See note 6.

UHMW-PE sanitary rod antenna kit, 2" mounting connection. See note 6.

UHMW-PE sanitary rod antenna kit, 3" mounting connection. See note 6.

UHMW-PE sanitary rod antenna kit, 4" mounting connection (Sanitary Fitting Clamps not included). See note 6.

**SITRANS LR200/LR300 PTFE Flanged Rod Antenna Kit with 316L SS shield and 316L SS flat faced flange**

PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 100 mm 316L SS shield. See notes 1 and 6.

PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 150 mm 316L SS shield. See notes 1 and 6.

PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 150 mm 316L SS shield. See notes 1 and 6.

PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 200 mm 316L SS shield. See notes 1 and 6.
# Level instruments

Continuous level measurement - Radar transmitters

## SITRANS LR200 and LR300 Specials

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBD-51014K0200AAA</td>
<td>PTFE shielded rod antenna kit, flanged, 3” ASME 150 lb 316L SS flange, 200 mm 316L SS shield. See notes 1 and 6.</td>
</tr>
<tr>
<td>PBD-51014K0200EJA</td>
<td>PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 200 mm 316L SS shield. See notes 1 and 6.</td>
</tr>
<tr>
<td>PBD-51014K0250AAA</td>
<td>PTFE shielded rod antenna kit, flanged, 3” ASME 150 lb 316L SS flange, 250 mm 316L SS shield. See notes 1 and 6.</td>
</tr>
<tr>
<td>PBD-51014K0250EJA</td>
<td>PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 250 mm 316L SS shield. See notes 1 and 6.</td>
</tr>
</tbody>
</table>

### PTFE paste

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBD-51036065</td>
<td>Kit, PTFE paste, Tube, 250 mL. See note 7.</td>
</tr>
</tbody>
</table>

### 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) 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

C) Subject to export regulations AL: N, ECCN: EAR99

Please contact nacc.smpl@siemens.com for special requests.

Note 1: Available in flange sizes including ASME, DIN and JIS; please contact nacc.smpl@siemens.com.

Note 2: Available with no pressure rating

Note 3: Available in other shield lengths; please contact nacc.smpl@siemens.com.

Note 4: Available with no pressure rating and with General Purpose Approvals only

Note 5: Please contact nacc.smpl@siemens.com for pricing and part number. Submit completed Application Questionnaire found on page 5/190.

Note 6: Available with Pressure rating; serial number of original unit required with completed Application Questionnaire found on page 5/190.

Note 7: Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR200 and SITRANS LR300 Antennas

Characteristic curves

SITRANS LR200/LR300 Process Pressure/Temperature derating curves
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR250

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 horn 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") from the end of the horn
- 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 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 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 on low dielectric media, and in small vessels, as well as tall and narrow vessels.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, low dielectric media

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.
## Technical specifications

### Mode of operation

**Measure principle**
- Radar level measurement

**Frequency**
- K-band (25.0 GHz)

**Minimum measuring range**
- 50 mm (2") from end of horn

**Maximum measuring range**
- 20 m (65 ft), horn dependent

### Output

- **Analog output**: 4 ... 20 mA
- **Accuracy**: ± 0.02 mA
- **Communications**: HART®
  - Optional: PROFIBUS PA (Profile 3.0, Class B)
- **Fail-safe**: Programmable as high, low or hold (Loss of Echo)
- **NE 43 programmable**

### Performance (according to reference conditions IEC60770-1)

- Maximum measured error: 5 mm (0.2")
- Influence of ambient temperature: <0.003 %/K

### Rated operating conditions

#### Installation conditions
- **Location**: Indoor/outdoor
- **Ambient conditions (enclosure)**
- **Ambient temperature**: -40 ... +80 °C (-40 ... +176 °F)
- **Installation category**: I
- **Pollution degree**: 4

#### Medium conditions
- **Dielectric constant $e_r$**: $e_r > 1.6$, horn and application dependent
- **Process temperature**
  - -40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM o-ring)
  - -20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM o-ring)
- **Process pressure**: Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information

### Design

- **Enclosure**
  - **Material**: Aluminium, polyester powder-coated
  - **Cable inlet**: 2 x M20x1.5 or 2 x ½" NPT
- **Degree of protection**: Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
- **Weight**: < 3 kg (6.6 lbs) 3.75 mm (1½") threaded connection with 1½" horn antenna
- **Display (local)**
  - Graphic local user interface including quick start wizard and echo profile display
- **Antenna**
  - **Material**: 316L stainless steel [optional alloy N06022/2.4602 (Hastelloy® C-22® or equivalent)]
  - **Dimensions (nominal horn sizes)**
    - Standard 1.5" (40 mm), 2" (48 mm), 3" (75 mm), 4" (95 mm) horn and optional 100 mm (4") horn extension

### Process connections

- **Process connection**
- **Flange connection**: 2", 3", 4" (ANSI 150, 300 lbs), 50, 80, 100 mm (PN 16, 40, JIS 10K)

### Power supply

- **Output**: 4 ... 20 mA/HART
- **Nominal 24 V DC (max. 30 V DC)** with max. 550 Ω
- **PROFIBUS PA**
  - 10.5 mA per IEC 61158-2

### Certificates and approvals

- **General**: CSA, CE, FM, NE 21, C-TICK
- **Radio**
  - FCC, Industry Canada and Europe ETSI EN 302-372, C-TICK
- **Hazardous**
  - **Intrinsically Safe (Europe)**
    - ATEX II 1G Ex ia IIC T4
    - ATEX II 1D Ex d A20 IP67 T90 °C
  - **Intrinsically Safe (USA/Canada)**
    - CSA/FM (barrier required) Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
  - **Intrinsically Safe (International)**
    - IECEx SIR 05.0031X, Ex ia IIC T4, EX ID A20 IP67 T90 °C
  - **Non-incendive (USA/Canada)**
    - CSA/FM Class I, Div. 2, Groups A, B, C, D T5
  - **Flameproof (Europe/International)**
    - ATEX II 1/2 GD, 1D, 2D, IECEx SIR 08.107X Ex dmbia IIC T4 Ga/GB Ex id A20 IP67 T90 °C
    - ATEX II 1/2 GD, 1D, 2D, IECEx SIR 08.107X Ex dmbia IIC T4 Ga/GB Ex id A20 IP67 T90 °C
  - **Increased Safety (Europe/International)**
    - CSA/FM: (barrier not required)
      - Class I, Div. 1, Groups A, B, C, D T4
      - Class II, Div. 1, Groups E, F, G Class III T4
- **Explosion proof (USA/Canada)**
- **Programming**
  - **Intrinsically Safe Siemens handheld programmer**
  - **Approvals for handheld programmer**
    - IS model:
      - ATEX II 1 GD Ex ia IIC T4 Ga
      - Ex ia D 20 T155°C Ta = -20 ... +50 °C
      - CSA/FM Class I, II, and III, Div. 1., Gr. A-G, T6 Ta=+50 °C
      - IECEx SIR 09.0073
  - **Handheld communicator**
    - HART communicator 375
  - **PC**
    - SIMATIC PDM
  - **AMS**
  - **Display (local)**
    - Graphic local user interface including quick start wizard and echo profile displays

© Siemens AG 2010

HART is a registered trademark of the Hart Communications Foundation.
Hastelloy and ®C-22 are registered trademarks of Haynes International Inc.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LR250</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>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). Ideal for small vessels and low dielectric media.</td>
</tr>
</tbody>
</table>

### Process Connection and Antenna Material

| 0 | 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 |
| 2 | Hastelloy C-22/2.4602, PTFE emitter, FKM seal |
| 3 | Hastelloy C-22/2.4602, PTFE emitter, FFKM seal |

### Process Connection Type

| 0 | 1½” NPT (Taper), ANSI/ASME B1.20.1 |
| 1 | R 1½” (BSP), EN 10226 |
| 2 | G 1½” (BSP), EN ISO 228-1 (parallel thread) |

### Antenna

| 0 | 1½” horn |
| 1 | 2” horn (fits 2” ASME or DN 50 nozzles) |
| 2 | 3” horn (fits 3” ASME or DN 80 nozzles) |
| 3 | 4” horn (fits 4” ASME or DN 100 nozzles) |
| 4 | 1½” horn with 100 mm extension |
| 5 | 2” horn with 100 mm extension |
| 6 | 3” horn with 100 mm extension |
| 7 | 4” horn with 100 mm extension |

(Note: Please use largest horn size possible.)

### Pressure Rating

Rating per Pressure/Temperature curves in Manual: 0.5 bar g (7.25 psi g) maximum

### Further designs

- Please add “-Z” to Order No. and specify Order code(s).
- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000
- Inspection Certificate Type 3.1 per EN 10204
- Namur NE43 compliant, device preset to failsafe <3.6mA
- Stainless steel tag (69 x 50 mm (2.71 x 1.97”)): Measuring-point number/identification (max. 27 characters) specify in plain text
- Instruction manual for HART/mA device
- English
- German

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS LR250</strong></td>
<td>C) 7ML 5431 -</td>
</tr>
<tr>
<td>2-wire, 25 GHz pulse radar level transmitter for con-</td>
<td></td>
</tr>
<tr>
<td>tinuous monitoring of liquids and slurries in storage</td>
<td></td>
</tr>
<tr>
<td>and process vessels including high temperature</td>
<td></td>
</tr>
<tr>
<td>and pressure, to a range of 20 m (66 ft). Ideal for</td>
<td></td>
</tr>
<tr>
<td>small vessels and low dielectric media.</td>
<td></td>
</tr>
<tr>
<td><strong>Instruction manual for PROFIBUS PA device</strong></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>C) 7ML1998-SJF02</td>
</tr>
<tr>
<td>German</td>
<td>C) 7ML1998-SJF32</td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered</td>
<td></td>
</tr>
<tr>
<td>as a separate line item on the order.</td>
<td></td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td>C) 7ML1998-SXE81</td>
</tr>
<tr>
<td>This device is shipped with the Siemens Milltronics</td>
<td></td>
</tr>
<tr>
<td>manual CD containing the complete ATEX Quick</td>
<td></td>
</tr>
<tr>
<td>Start and instruction manual library.</td>
<td></td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
</tr>
<tr>
<td>Handheld programmer, Intrinsically Safe, EEx ia</td>
<td>C) 7ML1930-1BK</td>
</tr>
<tr>
<td>(LUI enabled)</td>
<td></td>
</tr>
<tr>
<td>HART modem/RS-232 (for use with a PC and SIMATIC PDM)</td>
<td>D) 7MF4997-1DA</td>
</tr>
<tr>
<td>One metallic cable gland M20x1.5, rated -40 ... +80 °C</td>
<td>7ML1930-1AP</td>
</tr>
<tr>
<td>One metallic cable gland M20x1.5, rated -40 ... +80 °C</td>
<td>7ML1930-1AQ</td>
</tr>
<tr>
<td>°C (40 ... +176 °F), PROFIBUS PA</td>
<td></td>
</tr>
<tr>
<td>SITRANS RD100 Remote display - see RD100 on page 5/304</td>
<td></td>
</tr>
<tr>
<td>SITRANS RD200 Remote display - see RD200 on page 5/306</td>
<td></td>
</tr>
</tbody>
</table>

1) Not available with process connection options AA to AF
2) For 1½" horn antennas only, max. range 10 m (32.8 ft), dk > 3
3) For 1½" threaded connection only, max. range 10 m (32.8 ft), dk > 3
4) Includes equivalent IECEx approval
5) No barrier required
6) Applicable to HART version only

C) Subject to export regulations AL: N, ECCN: EAR99
D) Subject to export regulations AL: N, ECCN: EAR99H
## Level instruments
### Continuous level measurement - Radar transmitters

### SITRANS LR250

#### Selection and ordering Data

**SITRANS LR250 Spare parts**

<table>
<thead>
<tr>
<th>SITRANS LR250 Enclosures</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication, no process connection</td>
<td>C) A5E01156819</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication, no process connection</td>
<td>C) A5E01156820</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication, no process connection</td>
<td>C) A5E01156823</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option B, with HART communication, no process connection</td>
<td>C) A5E01156824</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option C, with HART communication, no process connection</td>
<td>C) A5E01156827</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication, no process connection</td>
<td>C) A5E01156832</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication, no process connection</td>
<td>C) A5E01156834</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option D, with HART communication, no process connection</td>
<td>C) A5E01156835</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156836</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156838</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156839</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156841</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156843</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156844</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection</td>
<td>C) A5E01156846</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option F, with Hart communication, no process connection</td>
<td>C) A5E02448270</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option G, with Hart communication, no process connection</td>
<td>C) A5E02448274</td>
</tr>
<tr>
<td>SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option H, with Hart communication, no process connection</td>
<td>C) A5E02448278</td>
</tr>
</tbody>
</table>

**SITRANS LR250 horn antenna and extension kits**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 mm (1.5&quot;) horn antenna kit, 1.5&quot; Process Connections only</td>
</tr>
<tr>
<td>100 mm (4&quot;) horn antenna extension kit, 1.5&quot; Process Connections only</td>
</tr>
<tr>
<td>50 mm (2&quot;) stainless steel horn antenna kit</td>
</tr>
<tr>
<td>75 mm (3&quot;) stainless steel horn antenna kit</td>
</tr>
<tr>
<td>100 mm (4&quot;) stainless steel horn antenna kit</td>
</tr>
<tr>
<td>100 mm (4&quot;) horn antenna extension kit, 50 mm (2&quot;), 75 mm (3&quot;) and 100 mm (4&quot;) process connection</td>
</tr>
<tr>
<td>50 mm (2&quot;) horn antenna kit, Hastelloy C-22</td>
</tr>
<tr>
<td>75 mm (3&quot;) horn antenna kit, Hastelloy C-22</td>
</tr>
<tr>
<td>100 mm (4&quot;) horn antenna kit, Hastelloy C-22</td>
</tr>
<tr>
<td>5 Dupont 1Gr Polyback, PTFE grease kit</td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99
J) Subject to export regulations AL: 9I999, ECCN: EAR99
Please contact nacc.smpl@siemens.com for special requests.
Characteristic curves

Maximum Flange and Process Temperatures versus Allowable Ambient

SITRANS LR250 Ambient/Process Flange Surface Temperature Curve
**SITRANS LR250**

**Dimensional drawings**

### SITRANS LR250 dimensions

<table>
<thead>
<tr>
<th>Nominal Horn Size</th>
<th>Horn O.D.</th>
<th>Horn Height</th>
<th>Beam Angle</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mm (1.5&quot;)</td>
<td>39.8 mm (1.57&quot;)</td>
<td>A 135 mm (5.3&quot;)</td>
<td>19 degrees</td>
<td>10 m (32.8 ft)</td>
</tr>
<tr>
<td>50 mm (2&quot;)</td>
<td>47.8 mm (1.88&quot;)</td>
<td>B 166 mm (6.55&quot;)</td>
<td>15 degrees</td>
<td>20 m (65.6 ft)</td>
</tr>
<tr>
<td>80 mm (3&quot;)</td>
<td>74.8 mm (2.94&quot;)</td>
<td>C 199 mm (7.85&quot;)</td>
<td>10 degrees</td>
<td>20 m (65.6 ft)</td>
</tr>
<tr>
<td>100 mm (4&quot;)</td>
<td>94.8 mm (3.75&quot;)</td>
<td>D 254 mm (10&quot;)</td>
<td>8 degrees</td>
<td>20 m (65.6 ft)</td>
</tr>
</tbody>
</table>
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 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Hand Programmer

SITRANS LR250
HART

Part number:
7ML1930-1BK

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

SITRANS LR250 connections
SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids 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 bulk storage vessels, and other applications.
## Technical specifications

### Mode of operation
- Measuring principle: Pulse radar level measurement
- Frequency: K-band (25.0 GHz)
- Minimum detectable distance: 0.05 m (2") from end of horn
- Maximum measuring range: 1) 2" horn: 10 m (32.8 ft), 3" horn: 20 m (65.6 ft), 4" horn: 30 m (98.4 ft)

### Output - HART®
- Power: 4 ... 20 mA (±0.02 mA accuracy)
- Fail signal: 3.6 mA ... 23 mA or last value
- Load: 230 ... 600 Ω, 230 ... 500 Ω when connecting a coupling module
- Max. line length: Multi-wire: ≤ 1500 m (4921 ft) Protocol HART, Version 5.1

### Output - PROFIBUS PA
- Per IEC 61158-2
- Profile version 3.01, Class B

### Performance (according to reference conditions IEC60770-1)
- Maximum measured error (including hysteresis and non-repeatability): 25 mm (1") from minimum detectable distance to 300 mm (11.8")
- Remainder of range = 10 mm (0.39") or 0.1% of span (whichever is greater)

### Rated operating conditions
- Installation conditions
  - Location: Indoor/outdoor
  - Ambient conditions (enclosure)
  - Ambient temperature: -40 ... +80 °C (-40 ... +176 °F)
  - Pollution degree: 4
- Medium conditions
  - Dielectric constant $\varepsilon_r$: $\varepsilon_r > 1.6$, antenna and application dependent
  - Process temperature: -40 ... +200 °C (-40 ... +392 °F)
  - Process pressure: 0.5 bar g (7.25 psi g) maximum
  - 3 bar g (43.5 psi g) optional with $+80 °C (+176 °F)$ temperature max.

### Design
- Enclosure: Aluminium, polyester powder-coated
  - Construction
  - Conduit entry: 2 x M20x1.5 or 2 x $\frac{3}{4}"$ 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
  - Material: 304 stainless steel
  - Dimensions (nominal horn sizes):
    - 2" horn: 1.93" (49.0 mm) diameter
    - 3" horn: 2.93" (74.5 mm) diameter
    - 4" horn: 3.84" (97.5 mm) diameter
- Process connections
  - Universal flanges²)
    - 2/50 mm, 3/80 mm, 4/100 mm, 6/150 mm

### Certificates and approvals
- General: CSAUS/C, CE, FM
- Radio: Europe (R&TTE), FCC, Industry Canada, C-TICK
- Hazardous: CSA/FM Class II, Div. 1, Groups E, F, G, Class III
- ATEX II 1D, 1/2D, 2D Ex tD A20 IP67, IP68 T100 ºC

### Programming
- Intrinsically Safe Siemens handheld programmer
- Approvals for handheld programmer
- Handheld communicator
  - HART communicator 375
- PC: SIMATIC PDM
- Display (local)
  - Graphic local user interface including quick start wizard and echo profile displays

---

¹) From sensor reference point
²) Universal flange mates with EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern

®HART is a registered trademark of the Hart Communications Foundation.
## Level instruments

### Continuous level measurement - Radar transmitters

#### SITRANS LR260

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITRANS LR260</strong></td>
<td>7ML 5427 0</td>
</tr>
<tr>
<td>2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids to a range of 30 m (98.4 ft).</td>
<td></td>
</tr>
<tr>
<td>Order handheld programmer separately!</td>
<td></td>
</tr>
</tbody>
</table>

**Process connection**
- Universal flat faced flange fits ANSI/DIN/JIS flanges, Easy Aimer with integral (Easy Aimer ball)
  - 2" / 50 mm
  - 3" / 80 mm
  - 4" / 100 mm
  - 6" / 150 mm

**Antenna**
- 2" Horn antenna, fits 50 mm or 2" nozzle
- 2" Horn antenna with 100 mm extension
- 2" Horn antenna with 200 mm extension
- 2" Horn antenna with 500 mm extension
- 2" Horn antenna with 1000 mm extension
- 3" Horn antenna, fits 80 mm or 3" nozzle
- 3" Horn antenna with 100 mm extension
- 3" Horn antenna with 200 mm extension
- 3" Horn antenna with 500 mm extension
- 3" Horn antenna with 1000 mm extension
- 4" Horn antenna, fits 100 mm or 4" nozzle
- 4" Horn antenna with 100 mm extension
- 4" Horn antenna with 200 mm extension
- 4" Horn antenna with 500 mm extension
- 4" Horn antenna with 1000 mm extension

**Purge (Self Cleaning) Connection**
- No purge connection
- Purge connection

**Output / Communication**
- 4 ... 20 mA, HART
- PROFIBUS PA

**Cable inlet**
- 2 x M20x1.5
- 2 x ½" NPT

**Approvals**
- General purpose, CSAUS/C, FM, Industry Canada, FCC, CE, R&TTE, C-TICK
- CSA/FM Class II, Div. I, Groups E, F, G, Class III
- Industry Canada, FCC, C-TICK
- ATEX II 1D, 1/2D, 2D T100 °C, CE, R&TTE, C-TICK

**Pressure rating**
- 3 bar g (43.5 psi g) pressure maximum and +80 °C (+176 °F)
- 0.5 bar g (7.25 psi g) maximum

**Further designs**
- Please add "-Z" to Order No. and specify Order code(s).  
  - Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000
  - Inspection Certificate Type 3.1 per EN 10204
  - Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 27 characters) specify in plain text

**Instruction manual for PROFIBUS PA device**
- English (C) 7ML1998-SKF01
- German (C) 7ML1998-SKF31
  
Note: The instruction manual should be ordered as a separate line item on the order.

**Multi-language Quick Start manual**
- 7ML1998-SXJ81

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

**Accessories**
- Metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-40 to +176 °F), HART (C) 7ML1930-1AP
- Metallic cable gland M20x1.5, rated -40 °C ... +80 °C (-40 to +176 °F), integrated shield for PROFIBUS PA (D) 7MF4997-1AQ
- Handheld programmer, Infrared, Intrinsically Safe (C) 7ML1930-1BK
- Dust cap, PTFE, for 2"/50 mm horn (C) 7ML1930-1DE
- Dust cap, PTFE, for 3"/75 mm horn (C) 7ML1930-1BL
- Dust cap, PTFE, for 4"/100 mm horn (D) 7ML1930-1BM
- HART modem/RS-232 (for use with a PC and SIMATIC PDM) (C) 7MF4997-1DA
- HART modem/USB (for use with a PC and SIMATIC PDM) (D) 7MF4997-1DB
- SITRANS RD100 Remote display - see RD100 on page 5/304
- SITRANS RD200 Remote display - see RD200 on page 5/306

**Note 1:** Available with no pressure rating, 0.5 bar g maximum.  
Please contact nacc.smpi@siemens.com for special requests.
Characteristics curves

Maximum Flange and Process Temperatures versus Allowable Ambient

Dimensional drawings

SITRANS LR260 dimensions
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR260

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 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Hand Programmer
Part number: 7ML1930-1BK

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

© Siemens AG 2010
**Overview**

The SITRANS LR400 is a 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft), ideal for low dielectric media.

**Benefits**

- Easy installation and commissioning, low maintenance
- Self-calibration with internal reference
- Built-in diagnostics
- Auto False-Echo Suppression and advanced echo processing
- 24 GHz and high signal-to-noise ratio
- Communication using HART® or PROFIBUS PA
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

**Application**

It provides excellent results on low dielectric media.

SITRANS LR400 is available for standard applications and for applications that require explosion proof protection.

SITRANS LR400 features robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming.

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 liquid or slurry applications, high temperature or high pressure, low dielectric media, such as LPG (liquid, petroleum, gas)

**Configuration**

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 liquid or slurry applications, high temperature or high pressure, low dielectric media, such as LPG (liquid, petroleum, gas)
## Technical specifications

### Mode of operation
- **Measuring principle**: FMCW radar level measurement
- **Frequency**: 24 ... 25 GHz FMCW
- **Measuring range**: 0.35 ... 50 m (1.15 ... 164 ft)

### Output
- **Analog output (HART®)**: Optically isolated 4 ... 20 mA
- **Load**: Max. 600 Ω (330 Ω for [ia] versions, Area classification options G, L, P, S)
- **Relay**: NC or NO function, max. DC 50 V, max. 200 mA, rating 5 W

### Communication
- **HART**, optional **PROFIBUS PA**
  - **PROFIBUS PA protocol**: Layer 1 and 2, Class A, Profile 3.0

### Performance (Reference conditions)
- **Dead band**: 0 ... 350 mm from bottom edge of flange
- **Error in measurement at +25 °C (+77 °F)**:
  - ≤ 5 mm from 2 ... 10 m
  - ≤ 15 mm from 10 ... 50 m
- **Repeatability**: ≤ 1 mm
- **Fail-safe**: mA signal programmable as high, low or hold (LOE)

### 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**: ε_r >1.4
- **Process temperature range**:
  - Standard: -40 ... +200 °C (-40 ... +392 °F) for SITRANS LR400 with ATEX rating
  - With optional temperature extension: -40 ... +250 °C (-40 ... +482 °F)
- **Vessel Pressure**: Up to 40 bar g (process connection dependent)

### Design
- **Weight**: Approx. 12.2 kg (26.8 lbs) with 3" 150 psi flange

### Materials
- **Enclosure**: Die-cast aluminum, painted
- **Degree of protection**: IP67/Type 4X/NEMA 4X, Type 6/NEMA 6
- **Cable inlet**: 2x M20x1.5 or ½" NPT
- **Process connections**:
  - Flat faced flanges: 316L stainless steel, 80, 100, 150 mm, bolt holes matching EN 1092-1 and JIS B 2220

### Programming
- **Intrinsically Safe Siemens handheld programmer** (ordered separately)
- **Infrared receiver**: IS model with ATEX EEx ia II 2 G EEx dem IIC T6

### Handheld communicator
- **PC Communicator**: 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
- **Safety**: CSAUS/C, CE, FM, C-TICK
- **Shipping**: Lloyd’s Register of Shipping
- **Radio**: Europe (R&TTE, CETECOM), Industry Canada, FCC, C-TICK
- **Hazardous areas**: ATEX II 1/2 G EEx dem [ia] IIIC T6

### Optional equipment
- **Purging (self-cleaning) system**
- **PTFE dust cover**

---

© Siemens AG 2010
Continuous level measurement - Radar transmitters

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>SITRANS LR400</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L) Subject to export regulations AL: N, ECCN: 3A991X</td>
<td></td>
</tr>
<tr>
<td>C) Subject to export regulations AL: N, ECCN: EAR99H</td>
<td></td>
</tr>
<tr>
<td>2) Available with process temperature range option 0 only</td>
<td></td>
</tr>
<tr>
<td>3) Germany and Belgium end customers only</td>
<td></td>
</tr>
<tr>
<td>4) Available only with power supply option E or F</td>
<td></td>
</tr>
</tbody>
</table>

**Antenna**
- Horn antenna, long 93 mm (3.66"") diam.
- Horn antenna, short 74 mm (2.91"") diam.

**Process seal/gasket**
- PTFE for -40 °C ... +250 °C (-40 ... +482 °F) flange temperatures
- FKM for -30 °C ... +200 °C (-40 ... +392 °F) flange temperatures

**Output/communication**
- 4 ... 20 mA, HART PROFIBUS PA

**Area classification**
- General Purpose, CE, CETECOM
- General Purpose, CSAusC, Industry Canada, FCC, CE and R&TTE
- ATEX II 2G Ex d IIC T6; CE, R&TTE
- ATEX II 2G Ex dem IIC T6; CE, R&TTE
- ATEX II 2G Ex dem [ia] IIC T6; CE, R&TTE
- ATEX II 1/2 GD Ex d IIC T6; CE, R&TTE
- ATEX II 1/2 GD Ex dem IIC T6; CE, R&TTE

**Order handheld programmer separately!**

**Order No.**
- 7ML5421

**Further designs**
- Handheld programmer Intrinsically Safe, EEx ia
- Handheld programmer ATEX EEx ei

**Instruction manual**
- English
- German
- French
- Spanish
- Multi-language Quick start manual

**Accessories**
- Handheld programmer Intrinsically Safe, EEx ia
- Handheld programmer ATEX EEx ei

**Level instruments**

**SITRANS LR400**

- 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media.

Order handheld programmer separately!
## Level instruments

Continuous level measurement - Radar transmitters

### SITRANS LR400

#### Selection and ordering Data

**SITRANS LR400 Spare parts**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4’/100 mm Universal Flange, without horn or hub. See note 1.</td>
<td>PBD-51035814, PBD-51035815, PBD-51035816</td>
</tr>
<tr>
<td>6’/150 mm Universal Flange, without horn or hub. See note 1.</td>
<td></td>
</tr>
<tr>
<td>8’/200 mm Universal Flange, without horn or hub. See note 1.</td>
<td></td>
</tr>
<tr>
<td>Purging kit with Easy Aimer ball, no flange, no horn. See note 1.</td>
<td>PBD-51036110, PBD-51035810, PBD-51035811, PBD-51035812</td>
</tr>
<tr>
<td>Long horn antenna, no emitter supplied</td>
<td></td>
</tr>
<tr>
<td>Short horn antenna, purged, no emitter supplied</td>
<td></td>
</tr>
<tr>
<td>Long horn antenna, purged, no emitter supplied</td>
<td></td>
</tr>
<tr>
<td>Replacement display module, SITRANS LR400 Liquids and Solids versions</td>
<td></td>
</tr>
<tr>
<td>4’ Horn antenna extension kit with General Purpose approvals</td>
<td>PBD-51035474, PBD-51035473, PBD-51036180</td>
</tr>
<tr>
<td>8’ Horn antenna extension kit with General Purpose approvals</td>
<td></td>
</tr>
<tr>
<td>8’ Horn antenna extension kit for hazardous units</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td>C) PBD-51036479</td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td>C) PBD-51036480</td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td>C) PBD-51035867</td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td>C) PBD-51035871</td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&amp;TTE approvals. See note 2.</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:** Available with no pressure rating and with General Purpose approvals only

**Note 2:** Subject to export regulations AL: N, ECCN: 3A991X

Please contact nacc.smpi@siemens.com for special requests.

C) Subject to export regulations AL: N, ECCN: 3A991X
Characteristic curves

SITRANS LR400 Process Pressure/Temperature derating curves
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR400

Dimensional drawings

SITRANS LR400 (7ML 5421)

SITRANS LR400 (with temperature extension)

SITRANS LR400

Dimensions:
- Connection: 204 mm (8.0’’)
- Electronics cover: 257 mm (10.1’’)
- Intermediate flange: 191 mm (7.5’’)
- Threaded ring: 238 mm (9.4’’)
- Process flange: 74 mm (2.9’’)
- Horn antenna: 93 mm (3.7’’)
- Earth terminal: 386 mm (15.1’’)

Maximum Flange and Process Temperature Versus Allowable Ambient Temperature:

<table>
<thead>
<tr>
<th>Ambient (°C)</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Temp (°C)</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
Schematics

AC version

HART

PROFIBUS PA

cable clamp

earth terminal

DC version

HART

PROFIBUS PA

cable clamp

earth terminal

Notes
- recommended torque on terminal clamping screws, 0.5 to 0.6 Nm
- 4-20 mA, Profibus PA, DC input circuits, 14-20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- all field wiring must have insulation suitable for at least 250 V
- the equipment must be protected by a 15 A fuse or circuit breaker in the building installation

Hand Programmer

Part number:
7ML880-2AJ

SITRANS LR400 connections
Level instruments
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 quick 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

Note: For best signal, always use largest horn size possible.
# Technical specifications

## Mode of operation

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>FMCW radar level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>24.2 ... 25.2 GHz FMCW</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.35 ... 100 m (1.15 ... 328.08 ft)</td>
</tr>
</tbody>
</table>

## Output

<table>
<thead>
<tr>
<th>Analog output (HART®)</th>
<th>Optically isolated 4 ... 20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>Max. 600 Ω</td>
</tr>
<tr>
<td>Fail-safe</td>
<td>mA signal programmable as high, low or hold (LOE)</td>
</tr>
</tbody>
</table>

## Communication

<table>
<thead>
<tr>
<th>HART, optional PROFIBUS PA</th>
</tr>
</thead>
</table>

## Digital output

<table>
<thead>
<tr>
<th>Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W</th>
</tr>
</thead>
</table>

## PROFIBUS PA protocol

<table>
<thead>
<tr>
<th>Layer 1 and 2, Class A, Profile 3.01</th>
</tr>
</thead>
</table>

## Performance (Reference conditions according to IEC 60770-1)

<table>
<thead>
<tr>
<th>Non-linearity</th>
<th>Greater of 25 mm (1&quot;) or 0.25% of span (including hysteresis and non-repeatability), over the full ambient temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-repeatability</td>
<td>≤ 10 mm (0.4&quot;)</td>
</tr>
</tbody>
</table>

## Rated operating conditions

<table>
<thead>
<tr>
<th>Amb. temperature for enclosure</th>
<th>-40 ... +65 °C (-40 ... +149 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Indoor/outdoor</td>
</tr>
<tr>
<td>Installation category</td>
<td>II</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>4</td>
</tr>
</tbody>
</table>

## Medium conditions

<table>
<thead>
<tr>
<th>Dielectric constant</th>
<th>ε_r &gt; 1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process temperature range</td>
<td>-40 ... +200 °C (-40 ... +392 °F)</td>
</tr>
<tr>
<td>Vessel Pressure</td>
<td>0.5 bar g (7.25 psi g) maximum</td>
</tr>
</tbody>
</table>

## Design

<table>
<thead>
<tr>
<th>Weight</th>
<th>Approx. 6.1 kg (13.4 lbs) with 3&quot; universal flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Die-cast aluminum, painted</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP67/Type 4X/NEMA 4X/Type 6/NEMA 6</td>
</tr>
<tr>
<td>Cable inlet</td>
<td>2x M20x1.5 or ½&quot; NPT</td>
</tr>
<tr>
<td>Process connections</td>
<td>3&quot;80 mm, 4&quot;/100 mm, 6&quot;/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</td>
</tr>
</tbody>
</table>

## Programming

<table>
<thead>
<tr>
<th>Intrinsically Safe Siemens handheld programmer (ordered separately)</th>
<th>Infrared receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Approvals for handheld programmer</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Handheld communicator</th>
<th>HART Communicator 375</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>SIMATIC PDM</td>
</tr>
<tr>
<td>Display (local)</td>
<td>Alphanumeric LCD for readout and entry</td>
</tr>
</tbody>
</table>

## 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

<table>
<thead>
<tr>
<th>General</th>
<th>CSAUS/C, CE, FM, C-TICK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>European Radio (R&amp;TTE), Industry Canada, FCC, C-TICK</td>
</tr>
<tr>
<td>Hazardous Areas</td>
<td>CSA/FM Class II, Div. 1, Groups E, F and G, Class III</td>
</tr>
<tr>
<td></td>
<td>ATEX II 1D, 1/2 D, 2D T85 °C</td>
</tr>
</tbody>
</table>

## Optional equipment

<table>
<thead>
<tr>
<th>Dust cap</th>
<th>PTFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air purge connection</td>
<td>1/8” NPT</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
### Level instruments

#### Continuous level measurement - Radar transmitters

**SITRANS LR460**

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LR460</td>
<td>7 ML 5 4 2 6 - 0 0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

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.

Order handheld programmer separately!

#### Process connection

- Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball
- 3” (80 mm)
- 4” (100 mm)
- 6” (150 mm)

#### Antenna

- 3” horn antenna, fits 80 mm (3”) nozzles
- 3” horn antenna, fits 80 mm (3”) nozzles with 100 mm extension
- 3” horn antenna, fits 80 mm (3”) nozzles with 200 mm extension
- 3” horn antenna, fits 80 mm (3”) nozzles with 500 mm extension
- 3” horn antenna, fits 80 mm (3”) nozzles with 1000 mm extension
- 4” horn antenna, fits 100 mm (4”) nozzles
- 4” horn antenna, fits 100 mm (4”) nozzles with 100 mm extension
- 4” horn antenna, fits 100 mm (4”) nozzles with 200 mm extension
- 4” horn antenna, fits 100 mm (4”) nozzles with 500 mm extension
- 4” horn antenna, fits 100 mm (4”) nozzles with 1000 mm extension

#### Purge (self-cleaning) connection

- No purge connection
- Purge connection

#### Output/Communication

- 4... 20 mA, HART®
- PROFIBUS PA

#### Power supply/cable inlet

- 100 ... 230 V AC
  - 2 x M20x1.5
  - 2 x ½” NPT
- 24 V DC
  - 2 x M20x1.5
  - 2 x ½” NPT

#### Approvals

- General Purpose, CSAUS, Industry Canada, FM, FCC, CE and R&TTE, C-TICK
- CSA/FM Class II, Div. 1, Groups E, F, and G, Class III
- ATEX II 1/2 D T6, CE, R&TTE

#### Further designs

Please add “-Z” to Order No. and specify Order code(s).

- Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000
- Stainless steel tag [69 x 50 mm (2.71 x 1.97”); Measuring-point number/identification (max. 16 characters); specify in plain text

Order handheld programmer separately!

#### Instruction manual

- English: 7ML1998-5JM02
- French: 7ML1998-5JM11
- German: 7ML1998-5JM32
- Multi-language Quick Start manual: 7ML1998-5SQ82

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

#### Accessories

- Handheld programmer, Infra-red, Intrinsically Safe, EEx ia: 7ML5830-2AJ
- Dust cap, PTFE, for 3”/80 mm horn: 7ML1930-1BL
- Dust cap, PTFE, for 4”/100 mm horn: 7ML1930-1BM
- HART modem/RS-232 (for use with a PC and SIMATIC PDM): 7MF4997-1DA
- 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) (available for HART only - two cable glands required): 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
- SITRANS RD100 Remote display - see RD100 on page 5/304
- SITRANS RD200 Remote display - see RD200 on page 5/306

1) Available with Purge option 0 only

C) Subject to export regulations AL: N, ECCN: EAR99
D) Subject to export regulations AL: N, ECCN: EAR99H
L) Subject to export regulations AL: N, ECCN: 3A991X

Note 1: available with no pressure rating, 0.5 bar g maximum. Please contact nacc.smpi@siemens.com for special requests.
Dimensional drawings

SITRANS LR460 dimensions
Level instruments
Continuous level measurement - Radar transmitters

SITRANS LR460

Schematics

AC version

DC version

Notes
- recommended torque on terminal clamping screws, 0.5 to 0.6 Nm
- 4-20 mA, PROFIBUS PA, DC input circuits, 14-20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- all field wiring must have insulation suitable for at least 250 V
- the equipment must be protected by a 15 A fuse or circuit breaker in the building installation

Hand Programmer

Part number:
7ML880-2AJ

SITRANS LR460 connections
### Selection and Ordering data

**SITRANS LR260 and SITRANS LR460 Specials**

<table>
<thead>
<tr>
<th>Process connection part kits - non-pressure-rated</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR260/LR460, 100 mm horn extension, no purge, see Note 1</td>
<td>A5E01087872</td>
</tr>
<tr>
<td>LR260/LR460, 200 mm horn extension, no purge, see Note 1</td>
<td>A5E01091262</td>
</tr>
<tr>
<td>LR260/LR460, 100 mm extension with purge, see Note 1</td>
<td>A5E01261979</td>
</tr>
<tr>
<td>LR260/LR460, 200 mm extension with purge, see Note 1</td>
<td>A5E01261981</td>
</tr>
<tr>
<td>LR260/LR460, horn 2&quot;, no purge, no emitter, see Note 1</td>
<td>A5E02083905</td>
</tr>
<tr>
<td>LR260/LR460, horn 3&quot;, no purge, no emitter, see Note 1</td>
<td>A5E01623511</td>
</tr>
<tr>
<td>LR260/LR460, horn 4&quot;, no purge, no emitter, see Note 1</td>
<td>A5E01623512</td>
</tr>
<tr>
<td>LR260/LR460, horn 2&quot;, with purge, no emitter, see Note 1</td>
<td>A5E02083906</td>
</tr>
<tr>
<td>LR260/LR460, horn 3&quot;, with purge, no emitter, see Note 1</td>
<td>A5E01623513</td>
</tr>
<tr>
<td>LR260/LR460, horn 4&quot;, with purge, no emitter, see Note 1</td>
<td>A5E01623514</td>
</tr>
<tr>
<td>LR260/LR460, 4&quot; universal flat faced flange, see Note 1</td>
<td>A5E01259467</td>
</tr>
<tr>
<td>LR260/LR460, 6&quot; universal flat faced flange, see Note 1</td>
<td>A5E01261834</td>
</tr>
<tr>
<td>LR260/LR460 O-Rings for Easy Aimer, see Note 1</td>
<td>A5E01261836</td>
</tr>
</tbody>
</table>

| Purge conversion kit - non-pressure-rated (no flange or extension included) | Order No. |
| L) LR260/LR460 purge conversion, 2" horn, see Note 1 | A5E02083914 |
| L) LR260/LR460 purge conversion, 3" horn, see Note 1 | A5E02083915 |
| L) LR260/LR460 purge conversion, 4" horn, see Note 1 | A5E02083916 |

**Enclosure with electronics**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR260 enclosure with board stack, PROFI-BUS PA communication, M20 cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR260 enclosure with board stack, PROFI-BUS PA communication, NPT cable inlet, approval option A, no process connection</td>
</tr>
</tbody>
</table>

**Enclosure with electronics (SITRANS 460)**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, PROFI-BUS PA communication, AC power, M20 cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, PROFI-BUS PA communication, AC power, NPT cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, PROFI-BUS PA communication, DC power, M20 cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection</td>
</tr>
<tr>
<td>LR460 enclosure with board stack, PROFI-BUS PA communication, DC power, NPT cable inlet, approval option A, no process connection</td>
</tr>
</tbody>
</table>

Note 1: available with no pressure rating, 0.5 bar g maximum. Please contact nacc.smpl@siemens.com for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99
F) Subject to export regulations AL: 91999, ECCN: N
L) Subject to export regulations AL: N, ECCN: 3A991X
Overview

Introduction

Guided Wave Radar transmitters combine TDR (time domain reflectometry), ETS (equivalent time sampling) and modern low power circuitry.

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.

In the SITRANS LG200 transmitter, a waveguide with a characteristic impedance in air 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.

Equivalent Time Sampling (ETS)

ETS (Equivalent Time Sampling) is used to measure the high speed, low power EM energy. ETS is critical in the application of TDR to vessel level measurement technology. The high speed EM energy (1000 ft/μs) is difficult to measure over short distances and at the resolution required in the process industry. ETS captures the EM signals in real time (nanoseconds) and reconstructs them in equivalent time (milliseconds), which is much easier to measure with today's technology.

ETS is accomplished by scanning the waveguide to collect thousands of samples. Approximately 8 scans are taken per second; each scan gathers more than 30,000 samples.

Interface Detection

The SITRANS LG200, when used with the Model 7ML1301-6 coaxial probe, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.4 and 5 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 (Level) Application Questionnaire

### Customer information

<table>
<thead>
<tr>
<th>Contact:</th>
<th>Prepared By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company:</td>
<td>Date:</td>
</tr>
<tr>
<td>Address:</td>
<td>Notes on the Application:</td>
</tr>
<tr>
<td>City:</td>
<td>Country:</td>
</tr>
<tr>
<td>Zip/Postal Code:</td>
<td>Phone:</td>
</tr>
<tr>
<td>E-mail:</td>
<td>Fax:</td>
</tr>
</tbody>
</table>

### Tank/Vessel Information

<table>
<thead>
<tr>
<th>□ Solids</th>
<th>□ Liquids</th>
</tr>
</thead>
</table>

### Tank top:

- □ Open
- □ Flat
- □ Conical
- □ Parabolic

### Tank bottom:

- □ Sloped
- □ Flat
- □ Conical
- □ Parabolic

### Mounting location:

- □ Top mount
- □ Thread mount
- □ Flange mount
- □ Bypass/Spidepipe mount
- □ Pipe mount
- □ Displacer replacement

### Tank dimensions:

<table>
<thead>
<tr>
<th>Height:</th>
<th>m/ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter:</td>
<td>m/ft</td>
</tr>
<tr>
<td>Nozzle Length:</td>
<td>cm/in</td>
</tr>
<tr>
<td>Nozzle Diameter:</td>
<td>cm/in</td>
</tr>
</tbody>
</table>

### Process connection type:

- □ |

### Process connection size:

- |

### Pressure:

<table>
<thead>
<tr>
<th>Normal:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum (relief):</td>
</tr>
</tbody>
</table>

### Material

<table>
<thead>
<tr>
<th>Material being measured:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material temperature:</td>
</tr>
<tr>
<td>Norm: °C/°F</td>
</tr>
<tr>
<td>Max: °C/°F</td>
</tr>
</tbody>
</table>

### Measurement type:

- □ Continuous level
- □ Interface level

### Dielectric constant value:

- |

### Coating buildup:

- □ Yes
- □ No

### Turbulence:

- □ Yes
- □ No

### Maximum viscosity:

- |

### Density:

- |

### Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m³)

### Foam type:

- □ None
- □ Wet
- □ Dry
- □ Wet/dense

### Liquid □ Solid □ Slurry

### Particle size:

- □ Fine dust/powder, <0.5 cm (0.2")
- □ Grains (rice, corn), <2 cm (0.8")
- □ Small stones/gravel, <2 cm (0.8")
- □ Small rocks/chunks, >2 cm (0.8")
- □ Large particles, <9 cm (3.5")

### Installation

| □ Power available: |

### Communications:

| □ HART® /4 to 20 mA |

### Outputs required:

| □ 4 to 20 mA |
| □ Other (please specify) |

### Products recommended:

© Siemens Miltronics Process Instruments Inc.

www.siemens.com/processautomation

Form# 2-937R0
Guided Wave Radar (Interface) Application Questionnaire

Customer information

Contact: ____________________________ Prepared By: ____________________________
Company: __________________________ Date: ____________________________
Address: __________________________ Notes on the Application: __________________________
City: __________________ Country: __________________
Zip/Postal Code: __________________ Phone: (____) __________________
E-mail: __________________ Fax: (____) __________________

Sketch attached

Tank/Vessel Information (supply sketch where possible)

Tank top: Tank bottom: Mounting location:
[ ] Open [ ] Flat [ ] Conical [ ] Parabolic [ ] Sloped [ ] Flat [ ] Conical [ ] Parabolic [ ] Top mount [ ] Thread mount [ ] Flange mount [ ] Bypass/Sidepipe Mount [ ] Pipe mount [ ] Displacer replacement

Height: __________ m/ft
Diameter: __________ m/ft
Nozzle Length: __________ cm/in
Nozzle Diameter: __________ cm/in
Process connection type: __________________
Process connection size: __________________
Distance to sidewall: __________ cm/in

Interface Data

Upper material: __________ Lower material: __________ Emulsion layer: [ ] Yes
Upper material thickness: __________ cm/in Lower material thickness: __________ cm/in
[ ] No (preferred)
Upper material dielectric: __________ Lower material dielectric: __________ Emulsion thickness: __________ cm/in

Material

Material being measured: __________________
Material temperature: Norm: __________ °C/°F Max: __________ °C/°F

Coating buildup: [ ] Yes [ ] No Turbulence: [ ] Yes [ ] No

Maximum Viscosity: __________ Density: __________ kg/m³
Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m³)
[ ] 1 to 5 cSt (like water) [ ] 50 to 100 cSt (like honey)
[ ] 5 to 20 cSt (like machine oil) [ ] 100 to 500 cSt (like syrup/molasses)
[ ] 20 to 50 cSt (like cooking oil) [ ] >500 cSt (like tar)

Installation

Power available: __________ Outputs required: [ ] 4 to 20 mA
Communications: [ ] HART®/4 to 20 mA [ ] Other (please specify) __________

Products recommended:

© Siemens Milltronics Process Instruments Inc. www.siemens.com/processautomation Form# 2-938R0

© Siemens AG 2010
Overview

SITRANS LG200 is a guided wave radar transmitter for short and medium range level, level/interface, and volume measurement of liquids and solids. It is unaffected by changes in process conditions, high temperatures and pressures, and steam.

Benefits

- Coaxial, rigid, and flexible single or twin rods for many applications
- Measures accurately on materials with dielectric (dK) as low as 1.4
- Guided wave radar measurement for up to 2.5 mm (0.12") accuracy
- Measures level and interface on challenging applications including foam
- 3 button programming for quick setup
- Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F).

Application

SITRANS LG200 provides accurate measurement in level, volume, and interface applications. For short and extended applications, LG200 offers coaxial, single or twin rod probes, and single or twin cable probes up to 22.5 m (75 ft).

SITRANS LG200 measures accurately in liquid or slurry applications of corrosive vapors, foam, saturated steam, high viscosity, quick fill/empty rates, low levels and varying dielectrics and product densities.

Ideal for retrofitting torque tube applications, SITRANS LG200 chamber replacement probe can be mounted in existing chambers or cages for optimal measurement.

- Key applications: hydrocarbon processing, interface/level measurement, low dielectric liquids, high temperature/pressure applications, powdered solids with high angle of repose.
**Mounting on a nozzle**

**Optimal 1:1 ratio**

- **Do not use reducers**

---

**Installation in non-metallic silos**

For installation in vessels of a non-metallic construction or possibly open vessels, a suitable launch plate is required to optimize the impedance of the transmitted signal as it travels along the probe. Optimal performance cannot be guaranteed if a suitable transition is not available at the process connection. When using single rod versions (flexible or solid) and a threaded process connection, a metal sheet or flange will greatly improve conditions as this provides a suitable launch plate.

A flanged process connection is generally accepted to be provision of this launch plate.

---

**Displacer/Torque Tube Replacement**

1. With Coaxial Probe 7ML1301-4 there is no top transition zone allowing measurement to the process connection.
2. Minimum pipe size: coaxial probes 2"/DN50, twin rod 3"/DN80, single rod 2"/DN50
3. 22 mm (0.875") Coaxial probes should be used where limited build up is expected.

---

**Bypass pipe**

1. Minimum pipe diameter 50 mm (2")
2. Minimum 25 mm (1") from bottom of the bypass pipe
3. Take note of bottom transition zone for chosen probe, see probe type table
4. For pipe diameters less than 50 mm (2") consult factory

---

**Single Rod mounting:**

1. Do not mount in nozzles <50 mm (2") in diameter.
2. Mount in applications where ratio of diameter to length is 1:1 or greater. Any ratio less than 1:1 (e.g. 2"x6" nozzle = 1:3) may require a blanking distance and/or dielectric adjustment.
3. Do not use pipe reducers.
4. Keep conductive objects away from probe to ensure proper performance.

---

**Twin Rod mounting 7ML1302-x:**

1. Active rod must be mounted at least 25 mm (1") away from any obstructions.
2. Minimum stillwell or nozzle diameter for probe is 76 mm (3”), inactive art needs to be flush with inside tank wall.

---

**Coaxial 7ML1301-x/Coaxial-Interface 7ML1301-6**

1. Minimum 25 mm (1") from tank bottom
2. Minimum 2” process connection for enlarged coaxial probe
3. Distance to obstructions not important due to enclosed design.
Level instruments
Continuous level measurement - Guided wave radar transmitters

Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Guided wave radar measurement</td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.15 ... 22.5 m (0.5 ... 75 ft)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mA analog output with HART digital signal</td>
<td>Optically isolated 4 ... 20 mA, 620 Ω max.</td>
<td></td>
</tr>
<tr>
<td>Output range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog</td>
<td>3.8 ... 20.5 mA usable</td>
<td></td>
</tr>
<tr>
<td>Start-up current</td>
<td>4.0 mA</td>
<td></td>
</tr>
<tr>
<td>Diagnostic alarm</td>
<td>Adjustable 3.6 mA, 22 mA, HOLD HART® Version 5.x and multiprotocol compatible</td>
<td></td>
</tr>
<tr>
<td>Digital communication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-linearity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Coaxial/twin rod probes</td>
<td>&lt; 0.1% of probe length or 2.5 mm (0.1”), whichever is greater</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(top 60 cm (24”) of twin rod probes 30 mm (1.2”))</td>
<td></td>
</tr>
<tr>
<td>• Single rod probes</td>
<td>&lt; 0.3% or 0.3” (8 mm), whichever is greater</td>
<td></td>
</tr>
<tr>
<td>• Interface models</td>
<td>Upper layer: ± 25.4 mm (1”) Interface layer: ± 25.4 mm (1”) (distinct interface surface required)</td>
<td></td>
</tr>
<tr>
<td>Resolution and repeatability</td>
<td>≤ 2.5 mm (0.1”)</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Coaxial/twin rod probes</td>
<td>&lt; 0.1 % of probe length or 0.1” (2.5 mm), whichever is greater Top 60 cm (24”) of twin rod probes 30 mm (1.2”)</td>
<td></td>
</tr>
<tr>
<td>• Single rod probes</td>
<td>± 0.5 % of probe length or 0.5” (13 mm), whichever is greater</td>
<td></td>
</tr>
<tr>
<td>• Interface models</td>
<td>± 1” (25 mm) (distinct Interface required)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electromagnetic compatibility</th>
<th>Meets CE requirements (EN 61326-1:2006) (Single and Twin Rod probes must be used in metallic vessel or stilling well to maintain CE compliance.)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Response time</td>
<td>&lt; 1 second</td>
<td></td>
</tr>
<tr>
<td>Warm up time</td>
<td>&lt; 5 seconds</td>
<td></td>
</tr>
<tr>
<td>Rated operating conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature for enclosure</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
<td></td>
</tr>
<tr>
<td>• LCD readable temperature range</td>
<td>-20 ... +70 °C (-5 ... +160 °F)</td>
<td></td>
</tr>
<tr>
<td>• Location</td>
<td>Indoor/outdoor</td>
<td></td>
</tr>
<tr>
<td>• Installation category</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>• Pollution degree</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Medium conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dielectric constant</td>
<td>dK ≥ 1.4</td>
<td></td>
</tr>
<tr>
<td>Process temperature range</td>
<td>-196 ... +427 °C (-321 ... +800 °F)</td>
<td></td>
</tr>
<tr>
<td>Vessel pressure</td>
<td>Full vacuum to 431 bar g (6250 psi g), probe dependent</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of transmitter with solid lid</td>
<td>1.28 kg (2.83 lbs)</td>
<td></td>
</tr>
<tr>
<td>Weight of transmitter with glass window lid</td>
<td>1.60 kg (3.52 lbs)</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>Aluminum, epoxy-coated</td>
<td></td>
</tr>
<tr>
<td>• Enclosure</td>
<td>Type 4/NEMA 4, IP65</td>
<td></td>
</tr>
<tr>
<td>• Degree of protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cable inlet</td>
<td>2x M20x1.5 or 2 x ½” NPT</td>
<td></td>
</tr>
<tr>
<td>Process connections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Threaded</td>
<td>G ¾” [(BSPP), EN ISO 228-1], 1”, 1½”, 2” NPT [(Taper), ANSI/ASME B1.20.1] and G 2” [(BSPP), EN ISO 228-1]</td>
<td></td>
</tr>
<tr>
<td>• Flanged</td>
<td>3/4” ... 4”, ASME, DIN flanges</td>
<td></td>
</tr>
<tr>
<td>• Hygienic</td>
<td>3/4” ... 4”, Triclover</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certificates and approvals</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• General Purpose</td>
<td>CSA/FM, CE, C-TICK</td>
<td></td>
</tr>
<tr>
<td>• Intrinsically Safe</td>
<td>FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65</td>
<td></td>
</tr>
<tr>
<td>• Explosion Proof/Flame Proof</td>
<td>FM Class I, Div. 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSA Class I, Div. 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATEX II 1G Ex ia IIC T4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATEX II 1/2 G Ex ia IIC T6</td>
<td></td>
</tr>
<tr>
<td>• Non-Incendive</td>
<td>FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G T4, Class III, Type 4, IP65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G T4, Class III, Type 4, IP65</td>
<td></td>
</tr>
<tr>
<td>• Non-Sparking</td>
<td>ATEX II 3G Ex nA IIC T4 to T6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATEX II 3G Ex nA II T4 to T6</td>
<td></td>
</tr>
<tr>
<td>• Others</td>
<td>Functional Safety to SIL-1 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 85.5% (Third party FMEDA Analysis - hardware only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Functional Safety to SIL-2 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 91% (Third party FMEDA Analysis - hardware only)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11 ... 36 V DC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010
## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

<table>
<thead>
<tr>
<th>Model reference number</th>
<th>Coaxial Probe (7ML1301-1)</th>
<th>Coaxial HT/HP Probe (7ML1301-2)</th>
<th>Coaxial HP Probe (7ML1301-3)</th>
<th>Coaxial Overfill/Flooded Cage Probe (7ML1301-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended applications</td>
<td>General purpose: clean, low viscosity liquids &lt; +150 °C (+300 °F)</td>
<td>Clean, high temperature/high pressure liquids &gt; +200 °C (+400 °F), ammonia, chlorine</td>
<td>Clean, high pressure liquids &lt; +200 °C (+400 °F), ammonia, chlorine</td>
<td>General applications, over-fill, temperatures to +200 °C (+400 °F), clean, low viscosity liquids, displacer/torque-tube replacement</td>
</tr>
<tr>
<td>Materials/wetted parts</td>
<td>316 L SS, TFE spacers, O-ring</td>
<td>316 L SS, Alumina spacers (option PEEK or TFE), Borosilicate</td>
<td>316 L SS, TFE spacers, Borosilicate</td>
<td>316 L SS, TFE spacers, O-ring</td>
</tr>
<tr>
<td>Rod/tube diameter</td>
<td>ø 8 mm (0.3125&quot;) rod ø 22 mm (0.875&quot;) tube</td>
<td>ø 8 mm (0.3125&quot;) rod ø 22 mm (0.875&quot;) tube</td>
<td>ø 8 mm (0.3125&quot;) rod ø 22 mm (0.875&quot;) tube</td>
<td>ø 8 mm (0.3125&quot;) rod ø 22 mm (0.875&quot;) tube</td>
</tr>
<tr>
<td>Process connection thread</td>
<td>% NPT [(Taper), ANSI/ASME B1.20.1], G 1&quot; [(BSPP), EN ISO 228-1]</td>
<td>% NPT [(Taper), ANSI/ASME B1.20.1], G 1&quot; [(BSPP), EN ISO 228-1]</td>
<td>% NPT [(Taper), ANSI/ASME B1.20.1], G 1&quot; [(BSPP), EN ISO 228-1]</td>
<td>% NPT [(Taper), ANSI/ASME B1.20.1], G 1&quot; [(BSPP), EN ISO 228-1]</td>
</tr>
<tr>
<td>Flange ASME (EN/DIN)</td>
<td>Standard 1 ... 4&quot; (DN 25 ... 100)</td>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>Process pressure</td>
<td>Process pressure maximum 70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
<td>431 bar g @ +20 °C (6250 psi g @ +70 °F)</td>
<td>431 bar g @ +20 °C (6250 psi g @ +70 °F)</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
</tr>
<tr>
<td>Pressure</td>
<td>Pressure minimum/vacuum service Yes, not hermetic</td>
<td>Yes, hermetic (≤10⁻⁶ cc/sec @ 1 atmosphere)</td>
<td>Yes, hermetic (≤10⁻⁶ cc/sec @ 1 atmosphere)</td>
<td>Yes, not hermetic</td>
</tr>
<tr>
<td>Maximum viscosity (cP)</td>
<td>Standard 500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Enlarged 1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Coating/buildup</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Foam</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Corrosives</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sanitary</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Overfill</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

1) See O-Ring Selection Guide for guidance
3) Transition zone is dielectric dependent: dk = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone
© Siemens AG 2010
® Viton is a registered trademark of DuPont Dow Elastomers
® Hastelloy is a registered trademark of Haynes International
® Kalrez is a registered trademark of DuPont Dow Elastomers
® Monel is a registered trademark of Special Metals Corporation
## SITRANS LG200

### Continuous level measurement - Guided wave radar transmitters

<table>
<thead>
<tr>
<th>Model reference number</th>
<th>Coaxial Steam Probe (7ML1301-5)</th>
<th>Coaxial Interface Probe (7ML1301-6)</th>
<th>Single Rigid Rod Probe (7ML1303-1)</th>
<th>Single Rigid Rod Probe HT/HP Probe (7ML1303-2)</th>
<th>Single Rigid Rod Probe, PFA rod insulation (7ML1303-1J)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended applications</strong></td>
<td>Hot water (steam) &gt;+200 °C (+400 °F) (external chamber is required for use in boilers)</td>
<td>Liquid/liquid-interface, temperatures to +200 °C (+400 °F), clean, low-viscosity liquids</td>
<td>Coating and buildup, foam</td>
<td>Coating and buildup, foam</td>
<td>Excessive coating and buildup, foam</td>
</tr>
<tr>
<td><strong>Not recommended for</strong></td>
<td>General purpose, coating and buildup, foam</td>
<td>Coating and buildup, foam</td>
<td>Low dielectric media (dK &lt; 10)¹</td>
<td>Low dielectric media (dK &lt; 10)¹</td>
<td>Low dielectric media (dK &lt; 10)¹</td>
</tr>
<tr>
<td><strong>Materials/wetted parts</strong></td>
<td>316L SS, PEEK spacers, Aegis PF128 O-ring²</td>
<td>316L SS, TFE spacers, O-ring²</td>
<td>316L SS, TFE, O-ring²</td>
<td>316L SS, TFE, O-ring²</td>
<td>316L SS, PFA, TFE, O-ring²</td>
</tr>
<tr>
<td><strong>Process seal</strong></td>
<td>Aegis PF128 O-ring³, PEEK only</td>
<td>O-ring²</td>
<td>Aegis PF128 O-ring²</td>
<td>O-ring²</td>
<td></td>
</tr>
<tr>
<td><strong>Rod/Tube diameter</strong></td>
<td>ø 8 mm (0.3125”) rod ø 22 mm (0.875”) tube</td>
<td>ø 8 mm (0.3125”) rod ø 22 mm (0.875”) tube</td>
<td>ø 12 mm (0.5”) rod</td>
<td>ø 12 mm (0.5”) rod</td>
<td>ø 12 mm (0.5”) rod ø 16 mm (0.625”) insulation</td>
</tr>
<tr>
<td><strong>Process connection thread</strong></td>
<td>N/A</td>
<td>ø 15 mm (0.63”) rod ø 45 mm (1.75”) tube</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Flange ASME (EN/DIN)</strong></td>
<td>¾” NPT [(Taper), ANSI/ASME B1.20.1], G 1” [BSPP], EN ISO 228-1</td>
<td>¾” NPT [(Taper), ANSI/ASME B1.20.1], G 1” [BSPP], EN ISO 228-1</td>
<td>¾” NPT [(Taper), ANSI/ASME B1.20.1], G 1” [BSPP], EN ISO 228-1</td>
<td>¾” NPT [(Taper), ANSI/ASME B1.20.1], G 1” [BSPP], EN ISO 228-1</td>
<td>2” NPT [(Taper), ANSI/ASME B1.20.1], G 2” [BSPP], EN ISO 228-1</td>
</tr>
<tr>
<td><strong>Enlarged</strong></td>
<td>N/A</td>
<td>2” NPT [(Taper), ANSI/ASME B1.20.1]</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>60 ... 455 cm (24 ... 180”)</td>
<td>60 ... 610 cm (24 ... 240”)</td>
<td>60 ... 610 cm (24 ... 240”)</td>
<td>60 ... 610 cm (24 ... 240”)</td>
<td>60 ... 610 cm (24 ... 240”)</td>
</tr>
<tr>
<td><strong>Transition Zone³</strong></td>
<td>25 mm (1”) @ dk ≥ 10</td>
<td>none</td>
<td>Blocking distance: 12 ... 91 cm (4.8 ... 36”), probe length dependent</td>
<td>Blocking distance: 12 ... 91 cm (4.8 ... 36”), probe length dependent</td>
<td>Blocking distance: 12 ... 91 cm (4.8 ... 36”), probe length dependent</td>
</tr>
<tr>
<td><strong>Top</strong></td>
<td>25 mm (1”) @ dk ≥ 10</td>
<td>150 mm (6”) @ dk = 1,4</td>
<td>25 mm (1”) @ dk &gt; 10</td>
<td>25 mm (1”) @ dk &gt; 10</td>
<td>25 mm (1”) @ dk &gt; 10</td>
</tr>
<tr>
<td><strong>Process temperature maximum</strong></td>
<td>+343 °C @ 165 bar g (+650 °F @ 2400 psi g) (saturated steam)</td>
<td>+200 °C @ 18 bar g (+400 °F @ 300 psi g)</td>
<td>+150 °C @ 27 bar g (+300 °F @ 400 psi g)</td>
<td>+316 °C @ 165 bar g (+605 °F @ 2400 psi g)</td>
<td>+150 °C @ 27 bar g (+300 °F @ 400 psi g)</td>
</tr>
<tr>
<td><strong>Process temperature minimum</strong></td>
<td>-40 °C @ 207 bar g (-40 °F @ 3000 psi g)</td>
<td>-40 °C @ 70 bar g (-40 °F @ 1000 psi g)</td>
<td>-40 °C @ 70 bar g (-40 °F @ 1000 psi g)</td>
<td>-40 °C @ 70 bar g (-40 °F @ 1000 psi g)</td>
<td>-40 °C @ 70 bar g (-40 °F @ 1000 psi g)</td>
</tr>
<tr>
<td><strong>Process pressure maximum</strong></td>
<td>165 bar g @ +343 °C (2400 psi g @ +650 °F)</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
<td>207 bar g @ +20 °C (3000 psi g @ +70 °F)</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
</tr>
<tr>
<td><strong>Process pressure min. vacuum service</strong></td>
<td>Yes, not hermetic</td>
<td>Not suitable</td>
<td>Not suitable</td>
<td>Not suitable</td>
<td>Not suitable</td>
</tr>
<tr>
<td><strong>Dielectric range</strong></td>
<td>10 ... 100 Upper liquid layer 1.4 ... 5 Interface liquid layer 15 ... 100</td>
<td>1.9 ... 100¹</td>
<td>1.9 ... 100¹</td>
<td>1.9 ... 100¹</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum viscosity</strong></td>
<td>500 cP</td>
<td>500 cP</td>
<td>10000 cP (consult factory if severe agitation/turbulence)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Coating/buildup</strong></td>
<td>No</td>
<td>No</td>
<td>Yes, maximum error 10% of coated length; % error related to dielectric media, thickness of coating and coated probe length above media</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Foam</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Corrosives</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Sanitary</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Overfill</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

¹ With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 to 6”) of metal tank wall or in chamber/bridle
² See O-ring Selection Guide for guidance
³ Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone
## Level instruments

### Continuous level measurement - Guided wave radar transmitters

**SITRANS LG200**

<table>
<thead>
<tr>
<th>Model reference number</th>
<th>Single Rigid Rod Probe, Sanitary (7ML1303-1D)</th>
<th>Single Rigid Rod Probe, PFA faced flange (7ML1303-1E)</th>
<th>Single Flexible Rod Probe (7ML1304-1)</th>
<th>Single Flexible Rod Probe for Bulk Solids (7ML1304-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended applications:</strong></td>
<td>Applications demanding sanitary specifications</td>
<td>Extreme corrosives, coating/buildup, foam</td>
<td>Coating and buildup, foam; lengths &gt; 6 m (20 ft) head-room</td>
<td>Granular bulk solids applications (powders, gran, dust) 3000 lb pull down force</td>
</tr>
<tr>
<td><strong>Not recommended for</strong></td>
<td>Low dielectric media (dK &lt; 10)(^1)</td>
<td>Low dielectric media (dK &lt; 10)(^1)</td>
<td>Low dielectric media (dK &lt; 4)</td>
<td>Solids with dK &lt; 4</td>
</tr>
<tr>
<td><strong>Materials/wetted parts</strong></td>
<td>316L SS, TFE, 15 µ-inch (&lt;0.4 µm) (R_g)</td>
<td>All PFA - wetted surfaces</td>
<td>316L SS, TFE, O-ring(^2)</td>
<td>316L SS, TFE, O-ring(^2)</td>
</tr>
<tr>
<td><strong>Optional</strong></td>
<td>AL6XN SS</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Process seal</strong></td>
<td>PFA, no O-ring</td>
<td>O-ring(^2)</td>
<td>O-ring(^2)</td>
<td>Sealant</td>
</tr>
<tr>
<td><strong>Rod/tube diameter</strong></td>
<td>ø 12 mm (0.5”) rod</td>
<td>ø 12 mm (0.5”) rod</td>
<td>ø 12 mm (0.5”) rod</td>
<td>ø 6 mm (0.25”) cable</td>
</tr>
<tr>
<td><strong>Flange ASME (DIN)</strong></td>
<td>19 ... 100 mm (% ¼” 4”) Tricllover-style 16 amp fitting</td>
<td>2 ... 4” (DN 50 ... 100)</td>
<td>2 ... 4” (DN 50 ... 100)</td>
<td>2 ... 4” (DN 50 ... 100)</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>60 ... 610 cm (24 … 240”)</td>
<td>60 ... 610 cm (24 … 240”)</td>
<td>1 ... 22.5 meters (3 … 75 ft)</td>
<td>1 ... 22.5 meters (3 … 75 ft)</td>
</tr>
<tr>
<td><strong>Transition Zone</strong>(^3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Top</strong></td>
<td>Blocking distance: 0 ... 91 cm (0 ... 36”), probe length dependent</td>
<td>Blocking distance: 12 ... 91 cm (4.8 ... 36”), probe length dependent</td>
<td>Blocking distance: 12 ... 91 cm (4.8 ... 36”), probe length dependent</td>
<td>Blocking distance: 12 ... 91 cm (4.8 ... 36”), probe length dependent</td>
</tr>
<tr>
<td><strong>Bottom</strong></td>
<td>25 mm (1”) @ dK &gt;10</td>
<td>25 mm (1”) @ dK &gt;10</td>
<td>305 mm (12”)</td>
<td>305 mm (12”)</td>
</tr>
<tr>
<td><strong>Process temperature maximum</strong></td>
<td>+150 °C @ 5.1 bar g (+300 °F @ 75 psi g)</td>
<td>+150 °C @ 27 bar g (+300 °F @ 400 psi g)</td>
<td>+150 °C @ 27 bar g (+300 °F @ 400 psi g)</td>
<td>+66 °C @ 3.4 bar g (+150 °F @ 50 psi g)</td>
</tr>
<tr>
<td><strong>Process temperature minimum</strong></td>
<td>0 °C at 5.1 bar g (+32 °F at 75 psi g)</td>
<td>-40 °C @ 13.7 bar g (-40 °F @ 200 psi g)</td>
<td>-40 °C @ 70 bar g (-40 °F @ 1000 psi g)</td>
<td>-40 °C @ 3.4 bar g (-40 °F @ 50 psi g)</td>
</tr>
<tr>
<td><strong>Process pressure maximum</strong></td>
<td>5.1 bar g @ +150 °C (75 psi g @ +300 °F)</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
<td>3.4 bar g @ +66 °C (50 psi g @ +150 °F)</td>
</tr>
<tr>
<td><strong>Process pressure minimum/vacuum service</strong></td>
<td>Not suitable for vacuum applications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dielectric range</strong></td>
<td>1.9 ... 100(^1)</td>
<td>1.9 ... 100(^1)</td>
<td>4 ... 100(^1)</td>
<td>4 ... 100</td>
</tr>
<tr>
<td><strong>Maximum viscosity (cP)</strong></td>
<td>10000 (consult factory if severe agitation/turbulence)</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Coating/buildup</strong></td>
<td>Yes, maximum error 10% of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Foam</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Corrosives</strong></td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Sanitary</strong></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Overfill</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

\(^1\) With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 to 6”) of metal tank wall or in chamber/bridele

\(^2\) See O-ring Selection Guide for guidance

\(^3\) Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone
## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

<table>
<thead>
<tr>
<th>Model reference number</th>
<th>Twin Rod Probe (7ML1302-1)</th>
<th>Flexible Twin Rod Probe (7ML1302-3)</th>
<th>Flexible Twin Rod Bulk Solids Probe (7ML1302-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model reference number</td>
<td>Twin Rod Probe (7ML1302-1)</td>
<td>Flexible Twin Rod Probe (7ML1302-B)</td>
<td>Flexible Twin Rod Bulk Solids Probe (7ML1302-2)</td>
</tr>
<tr>
<td>Recommended applications:</td>
<td>General purpose, foam, minor film coating</td>
<td>Low dielectric media (1.9 ... 10) with lengths &gt; 6 m (20 ft)</td>
<td>Granular light bulk solids applications (powders, grains, dust), 5000 lbs pull-down force</td>
</tr>
<tr>
<td>Not recommended for:</td>
<td>Media bridging between rods or building up on spacers</td>
<td>Dielectric &gt; 10: media bridging on flexible elements</td>
<td>Media bridging flexible elements</td>
</tr>
<tr>
<td>Materials/wetted parts</td>
<td>316L SS, TFE spacers, O-ring</td>
<td>316L SS, FEP webbing, O-ring</td>
<td>316L SS, FEP webbing, O-ring</td>
</tr>
<tr>
<td>Process seal</td>
<td>O-ring</td>
<td>O-ring</td>
<td>Sealant</td>
</tr>
<tr>
<td>Rod/tube diameter</td>
<td>Two, ø 12 mm (0.5&quot;) rod; 22 mm (0.875&quot;) C_L to C_L</td>
<td>Two, ø 6 mm (0.25&quot;) cables; 22 mm (0.875&quot;) C_L to C_L</td>
<td>Two, ø 6 mm (0.25&quot;) cables; 22 mm (0.875&quot;) C_L to C_L</td>
</tr>
<tr>
<td>Flange ASME (EN/DIN)</td>
<td>2 ... 4&quot; (DN 50 ... 100)</td>
<td>2 ... 4&quot; (DN 50 ... 100)</td>
<td>2 ... 4&quot; (DN 50 ... 100)</td>
</tr>
<tr>
<td>Length</td>
<td>60 ... 610 cm (24 ... 240&quot;)</td>
<td>1 ... 22.5 m (3 ... 75 ft)</td>
<td>1 ... 22.5 m (3 ... 75 ft)</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>Top 150 mm (6&quot;) @ dK &gt; 1.9 Blocking distance: none</td>
<td>150 mm (6&quot;) @ dK &gt; 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20&quot;)</td>
<td>150 mm (6&quot;) @ dK &gt; 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20&quot;)</td>
</tr>
<tr>
<td>Bottom 150 mm (6&quot;) @ dK &gt; 1.9</td>
<td>305 mm (12&quot;)</td>
<td>305 mm (12&quot;)</td>
<td></td>
</tr>
<tr>
<td>Process temperature max</td>
<td>+200 °C @ 19 bar g (+400 °F @ 275 psi g)</td>
<td>+66 °C @ 3.4 bar g (+150 °F @ 50 psi g)</td>
<td>3.4 bar g @ +66 °C (50 psi g @ +150 °F)</td>
</tr>
<tr>
<td>Process temperature min</td>
<td>-40 °C @ 70 bar g (-40 °F @ 1000 psi g)</td>
<td>-40 °C @ 3.4 bar g (-40 °F @ 50 psi g)</td>
<td></td>
</tr>
<tr>
<td>Process pressure max</td>
<td>70 bar g @ +20 °C (1000 psi g @ +70 °F)</td>
<td>3.4 bar g @ +66 °C (50 psi g @ +150 °F)</td>
<td></td>
</tr>
<tr>
<td>Process pressure min/vacuum service</td>
<td>Yes, not hermetic</td>
<td>Not suitable</td>
<td></td>
</tr>
<tr>
<td>Dielectric range</td>
<td>1.9 ... 100</td>
<td>1.9 ... 100</td>
<td>1.9 ... 100</td>
</tr>
<tr>
<td>Maximum viscosity (cP)</td>
<td>1500</td>
<td>1500</td>
<td>Not suitable</td>
</tr>
<tr>
<td>Coating/buildup</td>
<td>Yes, maximum error 3% of coated length with conductive media</td>
<td>Bridging not recommended</td>
<td></td>
</tr>
</tbody>
</table>

### O-ring and Seal Selection Guide

<table>
<thead>
<tr>
<th>Material</th>
<th>Recommended for Use in:</th>
<th>Not Recommended for Use In:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viton GFLT</td>
<td>General purpose, steam, ethylene</td>
<td>Ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric or chlorosulfuric acids, sour HCs</td>
</tr>
<tr>
<td>EPDM</td>
<td>Acetone, MEK, skydrol fluids</td>
<td>Petroleum oils, di-ester base lubricants, propane, steam, anhydrous ammonia</td>
</tr>
<tr>
<td>Kalrez (4079)</td>
<td>Inorganic and organic acids (including HF and nitric) aldehydes, ethylenes, glycols, organic oils, silicone oils, vinegar, sour HCs</td>
<td>Black liquor, hot water/steam, hot alkaline amines, ethylene oxide, propylene oxide, molten sodium, molten potassium, anhydrous ammonia</td>
</tr>
<tr>
<td>Aegis PF128</td>
<td>Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs, steam, amines, ethylene oxide, propylene oxide</td>
<td>Black liquor, Freon 43, Freon 75, Galden, KEL-F liquid, molten sodium, molten potassium, anhydrous ammonia</td>
</tr>
<tr>
<td>Borosilicate (HT/HP probes only)</td>
<td>General high temperature/high pressure applications, hydrocarbons, full vacuum (hermetic), anhydrous ammonia</td>
<td>Hot alkaline solutions, HF acid, media with pH&gt;12</td>
</tr>
</tbody>
</table>

---

1) See O-ring Selection Guide for guidance

2) Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

3) Refer to Ambient Temperature vs Process Temperature graphs or instruction manual

4) Bridging is defined as continuous accumulation of material between the probe elements

---

© Siemens AG 2010
## Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LG200 Transmitter</th>
<th>C) Order No. 7ML 1 3 0 0 - 0 1 - A 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A guided wave radar transmitter for short and medium range level, level/interface, and volume measurement of liquids and solids, including high temperature and pressure applications, and steam.</td>
<td></td>
</tr>
</tbody>
</table>

### Note:

In addition to the transmitter, please select a probe configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

<table>
<thead>
<tr>
<th>Power</th>
<th>24 V DC, 2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Output</td>
<td>4 ... 20 mA HART</td>
</tr>
<tr>
<td>Options</td>
<td>SIL-1 Approved (FMEDA analysis) SFF = 85.5 %</td>
</tr>
<tr>
<td>Enclosure/ Lid</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Cable Inlet</td>
<td>2 x 1/2&quot; NPT, IP65 2 x M20x1.5, IP65</td>
</tr>
</tbody>
</table>

### Approvals (Please select for your region)

#### North America


Explosion Proof (ATEX II 1G Ex ee II T4) Non-sparking [ATEX II 3G Ex ee II Ex ee ie (i)] IIC T4 to T6

### Further designs

Please add “Z” to Order No. and specify Order code(s).

For tagging information see probe configurations (additional option Y15).

### Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 [Available only when ordered in conjunction with a probe (7ML130xx-x). Testing requires transmitter with probe.]

### Instruction manual

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-SKA01</td>
</tr>
<tr>
<td>French</td>
<td>7ML1998-SKA11</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-SKA31</td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td>7ML1998-SXG81</td>
</tr>
</tbody>
</table>

### Accessories

SITRANS RD100 Remote display - see RD100 on page 5/304

SITRANS RD200 Remote display - see RD200 on page 5/306

C) Subject to export regulations AL: N, ECCN: EAR99

---

## Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LG200 Coaxial Probes</th>
<th>C) Order No. 7ML 1 3 0 1 - 0 0 - B 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (DK 1.4 to 100).</td>
<td></td>
</tr>
</tbody>
</table>

### Note:

For orders of 10 or more, please consult factory.

<table>
<thead>
<tr>
<th>Model</th>
<th>Coaxial (1) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coaxial, High Temperature/High Pressure (2) (3)</td>
</tr>
<tr>
<td></td>
<td>Coaxial, High Pressure (2) (3)</td>
</tr>
<tr>
<td></td>
<td>Coaxial, Overfill/Flooded Cage (1) (2)</td>
</tr>
<tr>
<td></td>
<td>Coaxial Steam (4) (5)</td>
</tr>
<tr>
<td></td>
<td>Coaxial, Interface (1) (2)</td>
</tr>
</tbody>
</table>

### Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection

316/316L (1.4401/1.4404) SS probe ASME B31.1 specifications (6)

Enlarged Coaxial, 316/316L (1.4401/1.4404) stainless steel probe and process connection (7)

316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK HT spacers (8)

316/316L (1.4401/1.4404) stainless steel probe and process connection with Teflon® spacers (9)

### Probe Insertion Length

Add order code Y01 and plain text:

<table>
<thead>
<tr>
<th>Insertion length</th>
<th>cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>option A</td>
<td>101 ... 200 cm (39.8 ... 78.7)</td>
</tr>
<tr>
<td>option B</td>
<td>60 ... 100 cm (23.6 ... 39.4)</td>
</tr>
<tr>
<td>option C</td>
<td>301 ... 400 cm (118.5 ... 157.5)</td>
</tr>
<tr>
<td>option D</td>
<td>201 ... 300 cm (79.1 ... 118.1)</td>
</tr>
<tr>
<td>option E</td>
<td>501 ... 610 cm (197.2 ... 240.2)</td>
</tr>
</tbody>
</table>

### Further designs

Please add “Z” to Order No. and specify Order code(s).

For tagging information see probe configurations (additional option Y15).

### Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 [Available only when ordered in conjunction with a probe (7ML130xx-x). Testing requires transmitter with probe.]

### Instruction manual

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-SKA01</td>
</tr>
<tr>
<td>French</td>
<td>7ML1998-SKA11</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-SKA31</td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td>7ML1998-SXG81</td>
</tr>
</tbody>
</table>

### Accessories

SITRANS RD100 Remote display - see RD100 on page 5/304

SITRANS RD200 Remote display - see RD200 on page 5/306

C) Subject to export regulations AL: N, ECCN: EAR99

---

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200 Coaxial Probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (DK 1.4 to 100). For orders of 10 or more, please consult factory.

- **Model**
  - Coaxial (1) (2)
  - Coaxial, High Temperature/High Pressure (2) (3)
  - Coaxial, High Pressure (2) (3)
  - Coaxial, Overfill/Flooded Cage (1) (2)
  - Coaxial Steam (4) (5)
  - Coaxial, Interface (1) (2)

- **Material of Construction**
  - 316/316L (1.4401/1.4404) stainless steel probe and process connection
  - 316/316L (1.4401/1.4404) SS probe ASME B31.1 specifications (6)
  - Enlarged Coaxial, 316/316L (1.4401/1.4404) stainless steel probe and process connection (7)

- **Probe Insertion Length**

- **Further designs**

- **Instruction manual**

- **Accessories**
## Selection and Ordering data

### Level instruments

---

### SITRANS LG200 Coaxial Probes

SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 to 100).

**Note:**
For orders of 10 or more, please consult factory.

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Insertion length (cm)</th>
<th>Material of Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 1</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>E 2</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>E 3</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>E 4</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>E 5</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>E 6</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>F 1</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>F 2</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>F 3</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>F 4</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
<tr>
<td>F 5</td>
<td>100 cm (39.4&quot;)</td>
<td>A, E, H, J</td>
</tr>
</tbody>
</table>

### O-Rings

- Viton
- EPDM (Ethylene Propylene Rubber)
- Kalrez 4079
- HSN (Nitrile)
- Buna-N
- Neoprene
- Chemraz
- Polyurethane
- Aegis PF128
- Kalrez 2035

### Process Connection (Size/Type)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1½&quot; 300 lb ASME branch face flange</td>
<td>1½&quot; 300 lb ASME branch face flange</td>
<td>1½&quot; 300 lb ASME branch face flange</td>
<td>1½&quot; 300 lb ASME branch face flange</td>
</tr>
<tr>
<td>1½&quot; 600 lb ASME branch face flange</td>
<td>1½&quot; 600 lb ASME branch face flange</td>
<td>1½&quot; 600 lb ASME branch face flange</td>
<td>1½&quot; 600 lb ASME branch face flange</td>
</tr>
<tr>
<td>1½&quot; 900/1500 lb ASME branch face flange</td>
<td>1½&quot; 900/1500 lb ASME branch face flange</td>
<td>1½&quot; 900/1500 lb ASME branch face flange</td>
<td>1½&quot; 900/1500 lb ASME branch face flange</td>
</tr>
<tr>
<td>1½&quot; 2500 lb ASME branch face flange</td>
<td>1½&quot; 2500 lb ASME branch face flange</td>
<td>1½&quot; 2500 lb ASME branch face flange</td>
<td>1½&quot; 2500 lb ASME branch face flange</td>
</tr>
<tr>
<td>1½&quot; 300 lb ASME raised face flange</td>
<td>1½&quot; 300 lb ASME raised face flange</td>
<td>1½&quot; 300 lb ASME raised face flange</td>
<td>1½&quot; 300 lb ASME raised face flange</td>
</tr>
</tbody>
</table>
## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.

#### Further designs

- Please add "-Z" to Order No. and specify Order code(s).
- Enter the total insertion length in plain text description, max. 610 cm (240.2")
- Stainless steel tag, Measuring-point number/identification (max. 16 characters); specify in plain text
- Inspection Certificate Type 3.1 per EN 10204
- Manufacturer’s test report (Hydrostatic Test)
- NACE MR-0175 materials traceability

#### Instruction manual

- English
- French
- German
- Multi-language Quick Start manual

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

#### Accessories

- Coaxial probe shortening kit with TFE end spacer [for process temperatures < +200 °C (+400 °F)]
- Coaxial probe TFE end spacer [for process temperatures < +200 °C (+400 °F)]
- SITRANS RD200 Remote display - see RD100 on page 5/306
- SITRANS RD200 Remote display - see RD200 on page 5/306

### Notes:

1) Not available with O-ring option 21 (type Aegis PF128)
2) Consult factory for these options in Hastelloy C or Monel
3) Available with O-ring option 23 (none)
4) Coaxial steam probe must be used with O-ring option 21 only (type Aegis PF128)
5) Available with Material of Construction option A and D only [316/316L (1.4401/1.4404) stainless steel]
6) Available with Model option 5 only (coaxial steam probe)
7) 2" or DN 50 minimum Process Connection
8) Used with Model option 2 only (coaxial High Temperature/High Pressure probe)
9) Available with model options 2, 3, and 5 only (High Temperature/High Pressure, High Pressure, and Steam probes only)
10) Available with Material of Construction option E only (enlarged coaxial probe)

C) Subject to export regulations AL: N, ECCN: EAR99

---

**Level instruments**

**SITRANS LG200 Coaxial Probes**

SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 to 100).

**Further designs**

- Please add "-Z" to Order No. and specify Order code(s).
- Enter the total insertion length in plain text description, max. 610 cm (240.2")
- Stainless steel tag, Measuring-point number/identification (max. 16 characters); specify in plain text
- Inspection Certificate Type 3.1 per EN 10204
- Manufacturer’s test report (Hydrostatic Test)
- NACE MR-0175 materials traceability

**Instruction manual**

- English
- French
- German
- Multi-language Quick Start manual

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

**Accessories**

- Coaxial probe shortening kit with TFE end spacer [for process temperatures < +200 °C (+400 °F)]
- Coaxial probe TFE end spacer [for process temperatures < +200 °C (+400 °F)]
- SITRANS RD200 Remote display - see RD100 on page 5/306
- SITRANS RD200 Remote display - see RD200 on page 5/306

---

**Notes:**

1) Not available with O-ring option 21 (type Aegis PF128)
2) Consult factory for these options in Hastelloy C or Monel
3) Available with O-ring option 23 (none)
4) Coaxial steam probe must be used with O-ring option 21 only (type Aegis PF128)
5) Available with Material of Construction option A and D only [316/316L (1.4401/1.4404) stainless steel]
6) Available with Model option 5 only (coaxial steam probe)
7) 2" or DN 50 minimum Process Connection
8) Used with Model option 2 only (coaxial High Temperature/High Pressure probe)
9) Available with model options 2, 3, and 5 only (High Temperature/High Pressure, High Pressure, and Steam probes only)
10) Available with Material of Construction option E only (enlarged coaxial probe)

C) Subject to export regulations AL: N, ECCN: EAR99

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.

---

**Selection and Ordering data**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1301-0</td>
<td>SITRANS LG200 Coaxial Probes</td>
</tr>
</tbody>
</table>

**Note:**

For orders of 10 or more, please consult factory.
### Selection and Ordering data

**SITRANS LG200 Twin Rod Probes**

SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥1.9.

**Note:**

For orders of 10 or more, please consult factory.

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin rod</td>
<td>C 7 M L 1 3 0 2 - 01</td>
</tr>
<tr>
<td>Flexible twin rod bulk solids probe</td>
<td>02</td>
</tr>
<tr>
<td>Flexible twin rod probe</td>
<td>03</td>
</tr>
</tbody>
</table>

**Material of Construction**

316/316L (1.4401/1.4404) stainless steel probe and process connection.

**Process Connection (size/type)**

- 2" NPT [Taper], ANSI/ASME B1.20.1: A 1
- 2" 150 lb ASME raised face flange: A 2
- 2" 300 lb ASME raised face flange: A 3
- 3" 150 lb ASME raised face flange: B 1
- 3" 600 lb ASME raised face flange: B 2
- 3" 300 lb ASME raised face flange: B 3
- 4" 150 lb ASME raised face flange: C 1
- 4" 600 lb ASME raised face flange: C 2
- DN 50 PN 16 EN 1092-1 Type A flat faced flange: C 3
- DN 50 PN 25/40 EN 1092-1 Type A flat faced flange: D 1
- DN 50 PN 25/40 EN 1092-1 Type A flat faced flange: D 2
- DN 50 PN 25/40 EN 1092-1 Type A flat faced flange: D 3
- DN 80 PN 16 EN 1092-1 Type A flat faced flange: E 1
- DN 80 PN 25/40 EN 1092-1 Type A flat faced flange: E 2
- DN 100 PN 16 EN 1092-1 Type A flat faced flange: E 3
- DN 100 PN 25/40 EN 1092-1 Type A flat faced flange: E 4
- Fisher Torque Tube flange, 316SS (249C): E 5
- Masonell Torque Tube flange, 316SS: F 1
- Carbon Steel: G 1
- Fisher Torque Tube flange, Carbon Steel (249B): K 1
- Masonell Torque Tube flange, Carbon Steel: L 1

**O-Ring**

- Viton: 1
- EPDM (Ethylene Propylene Rubber): 1
- Kalrez 4079: 1
- HSN (Nitrile): 1
- Buna-N: 1
- Neoprene: 1
- Chemraz: 1
- Polyurethane: 1
- Aegis PF128: 1
- Kalrez 2035: 1

**Probe Insertion Length**

Add order code Y01 and plain text: 

- Insertion length ... cm

Model option 1 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")
Model option 1 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")
Model option 1 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")

**Selection and Ordering data**

**SITRANS LG200 Twin Rod Probes**

SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥1.9.

**Note:**

For orders of 10 or more, please consult factory.

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model option 1 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5&quot;)</td>
<td>A D</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9&quot;)</td>
<td>A E</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2&quot;)</td>
<td>A F</td>
</tr>
</tbody>
</table>

**Standard lengths**

- Model option 2,3 and Material of Construction option A: 1 meter (39.4")
- Model option 2,3 and Material of Construction option A: 2 meters (78.7")
- Model option 2,3 and Material of Construction option A: 3 meters (118.1")
- Model option 2,3 and Material of Construction option A: 4 meters (157.5")
- Model option 2,3 and Material of Construction option A: 5 meters (196.9")
- Model option 2,3 and Material of Construction option A: 6 meters (236.2")
- Model option 2,3 and Material of Construction option A: 7 meters (275.6")
- Model option 2,3 and Material of Construction option A: 8 meters (315.0")
- Model option 2,3 and Material of Construction option A: 9 meters (354.3")
- Model option 2,3 and Material of Construction option A: 10 meters (393.7")
- Model option 2,3 and Material of Construction option A: 11 meters (433.1")
- Model option 2,3 and Material of Construction option A: 12 meters (472.4")
- Model option 2,3 and Material of Construction option A: 13 meters (511.8")
- Model option 2,3 and Material of Construction option A: 14 meters (551.2")
- Model option 2,3 and Material of Construction option A: 15 meters (590.6")
- Model option 2,3 and Material of Construction option A: 16 meters (629.9")
- Model option 2,3 and Material of Construction option A: 17 meters (669.3")
- Model option 2,3 and Material of Construction option A: 18 meters (708.7")
- Model option 2,3 and Material of Construction option A: 19 meters (748.0")
- Model option 2,3 and Material of Construction option A: 20 meters (787.4")
- Model option 2,3 and Material of Construction option A: 21 meters (826.8")
- Model option 2,3 and Material of Construction option A: 22.5 meters (885.8")
- Model option 2,3 and Material of Construction option A: 24.5 meters (967.5")
- Model option 2,3 and Material of Construction option A: 26 meters (1039.4")
- Model option 2,3 and Material of Construction option A: 28 meters (1111.1")
- Model option 2,3 and Material of Construction option A: 30 meters (1182.8")
- Model option 2,3 and Material of Construction option A: 32 meters (1254.5")
- Model option 2,3 and Material of Construction option A: 34 meters (1326.2")
- Model option 2,3 and Material of Construction option A: 36 meters (1397.9")
- Model option 2,3 and Material of Construction option A: 38 meters (1469.6")
- Model option 2,3 and Material of Construction option A: 40 meters (1541.3")
- Model option 2,3 and Material of Construction option A: 42 meters (1613.0")
- Model option 2,3 and Material of Construction option A: 44 meters (1684.7")
- Model option 2,3 and Material of Construction option A: 46 meters (1756.4")
- Model option 2,3 and Material of Construction option A: 48 meters (1828.1")
- Model option 2,3 and Material of Construction option A: 50 meters (1899.8")
## Level instruments

Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>SITRANS LG200 Twin Rod Probes</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥ 1.9.</td>
<td>7ML1302-777777-777777-777777</td>
</tr>
</tbody>
</table>

**Note:**
For orders of 10 or more, please consult factory.

#### Further designs

Please add "-Z" to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Description</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter the total insertion length in plain text description, max. 610 cm (240.2&quot;) (Not needed for standard lengths, insertion length options EA to EX)</td>
<td>Y01</td>
</tr>
<tr>
<td>Stainless steel tag, Measuring-point number/identification (max. 16 characters); specify in plain text Inspection Certificate Type 3.1 per EN 10204</td>
<td>Y15</td>
</tr>
<tr>
<td>Manufacturer’s test report (Hydrostatic Test)</td>
<td>C12</td>
</tr>
<tr>
<td>NACE MR-0175 materials traceability</td>
<td>C18</td>
</tr>
</tbody>
</table>

#### Instruction manual

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1988-5KA01</td>
</tr>
<tr>
<td>French</td>
<td>7ML1988-5KA11</td>
</tr>
<tr>
<td>German</td>
<td>7ML1988-5KA31</td>
</tr>
<tr>
<td>Multi-language Quick Start manual</td>
<td>7ML1988-5XG81</td>
</tr>
</tbody>
</table>

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

#### Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS RD100 Remote display - see RD100 on page 5/304</td>
<td></td>
</tr>
<tr>
<td>SITRANS RD200 Remote display - see RD200 on page 5/306</td>
<td></td>
</tr>
</tbody>
</table>

1) Available with O-ring option 11 only
2) No Y01 needed in order code
3) Available with Model option 1 only

C) Subject to export regulations AL: N, ECCN: EAR99
### SITRANS LG200 Single Rod Rigid Probes

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥10, or d/k > 1.9 when installed within 2 to 6" of a metal tank wall or in cage or bridle.

#### Note:
For orders of 10 or more, please consult factory.

#### Model
- Single rod rigid probe
- High Temperature/High Pressure Single rod

#### Material of Construction
- 316/316L (1.4401/1.4404) stainless steel probe and process connection
- 316/316L (1.4401/1.4404) stainless steel sanitary probe and process connection
- PFA faced-flange and rod insulation
- All PFA wetted parts
- 316 AL6XN stainless steel sanitary probe and process connection
- PFA rod insulation

#### Process Connection (size/type)
- 1 or 1½" Tri-Clover 16 amp sanitary fitting
- 2" NPT [(Taper), ANSI/ASME B1.20.1]
- G 2" (BSPP), EN ISO 228-1
- 2" 150 lb ASME raised face flange
- 2" 300 lb ASME raised face flange
- 2" Tri-Clover 16 amp sanitary fitting
- ¾" Tri-Clover 16 amp sanitary fitting
- 2½" Tri-Clover 16 amp sanitary fitting
- 3" 150 lb ASME raised face flange
- 3" 300 lb ASME raised face flange
- 3" Tri-Clover 16 amp sanitary fitting
- 4" 150 lb ASME raised face flange
- 4" 300 lb ASME raised face flange
- 4" Tri-Clover 16 amp sanitary fitting

#### Selection and Ordering data

**Order No.**
- L 1
- L 2
- L 3
- L 4
- L 5
- L 6
- M 0
- M 1
- M 2
- N 0
- N 3
- N 4
- N 5
- P 0
- P 1
- P 2
- P 3
- P 4
- P 5
- Q 0
- Q 1
- Q 2
- R 0
- R 1
- R 2
- R 3
- R 4
- R 5
- S 0
- S 1
- S 2
- S 3
- S 4
- S 5
- T 0
- T 1
- T 2
- T 3
- U 0
- U 1
- U 2
- U 3
- V 0
- V 1
- V 2
- V 3

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Rod Rigid Probe</td>
<td>1</td>
</tr>
<tr>
<td>High Temperature/High Pressure Single Rod</td>
<td>2</td>
</tr>
</tbody>
</table>

### Selection and Ordering data

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥10, or d/k > 1.9 when installed within 2 to 6" of a metal tank wall or in cage or bridle.

#### Note:
For orders of 10 or more, please consult factory.

#### Material of Construction
- 316/316L (1.4401/1.4404) stainless steel probe and process connection
- 316/316L (1.4401/1.4404) stainless steel sanitary probe and process connection
- PFA faced-flange and rod insulation
- All PFA wetted parts
- 316 AL6XN stainless steel sanitary probe and process connection
- PFA rod insulation

#### Process Connection (size/type)
- 1 or 1½" Tri-Clover 16 amp sanitary fitting
- 2" NPT [(Taper), ANSI/ASME B1.20.1]
- G 2" (BSPP), EN ISO 228-1
- 2" 150 lb ASME raised face flange
- 2" 300 lb ASME raised face flange
- 2" Tri-Clover 16 amp sanitary fitting
- ¾" Tri-Clover 16 amp sanitary fitting
- 2½" Tri-Clover 16 amp sanitary fitting
- 3" 150 lb ASME raised face flange
- 3" 300 lb ASME raised face flange
- 3" Tri-Clover 16 amp sanitary fitting
- 4" 150 lb ASME raised face flange
- 4" 300 lb ASME raised face flange
- 4" Tri-Clover 16 amp sanitary fitting

#### Selection and Ordering data

**Order No.**
- L 1
- L 2
- L 3
- L 4
- L 5
- L 6
- M 0
- M 1
- M 2
- N 0
- N 3
- N 4
- N 5
- P 0
- P 1
- P 2
- P 3
- P 4
- P 5
- Q 0
- Q 1
- Q 2
- R 0
- R 1
- R 2
- R 3
- R 4
- R 5
- S 0
- S 1
- S 2
- S 3
- S 4
- S 5
- T 0
- T 1
- T 2
- T 3
- U 0
- U 1
- U 2
- U 3
- V 0
- V 1
- V 2
- V 3

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Rod Rigid Probe</td>
<td>1</td>
</tr>
<tr>
<td>High Temperature/High Pressure Single Rod</td>
<td>2</td>
</tr>
</tbody>
</table>
## Level instruments
### Continuous level measurement - Guided wave radar transmitters

**SITRANS LG200**

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LG200 Single Rod Rigid Probes</td>
<td>C) 7ML1303-0</td>
</tr>
</tbody>
</table>

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥10, or dk > 1.9 when installed within 2 to 6" of a metal tank wall or in cage or bridle.

**Note:**
For orders of 10 or more, please consult factory.

### Probe Insertion Length

<table>
<thead>
<tr>
<th>Add order code Y01 and plain text:</th>
<th>&quot;Insertion length ... cm&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model option 1 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4&quot;)</td>
<td>AA</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7&quot;)</td>
<td>AB</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1&quot;)</td>
<td>AC</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5&quot;)</td>
<td>AD</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9&quot;)</td>
<td>AE</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2&quot;)</td>
<td>AF</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option B: 60 ... 100 cm (23.6 ... 39.4&quot;)</td>
<td>BA</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option B: 101 ... 200 cm (39.8 ... 78.7&quot;)</td>
<td>BB</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option B: 201 ... 300 cm (79.1 ... 118.1&quot;)</td>
<td>BC</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option B: 301 ... 400 cm (118.5 ... 157.5&quot;)</td>
<td>BD</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option B: 401 ... 500 cm (157.9 ... 196.9&quot;)</td>
<td>BE</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option B: 501 ... 610 cm (197.2 ... 240.2&quot;)</td>
<td>BF</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option C: 60 ... 100 cm (23.6 ... 39.4&quot;)</td>
<td>CA</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option C: 101 ... 200 cm (39.8 ... 78.7&quot;)</td>
<td>CB</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option C: 201 ... 300 cm (79.1 ... 118.1&quot;)</td>
<td>CC</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option C: 301 ... 400 cm (118.5 ... 157.5&quot;)</td>
<td>CD</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option C: 401 ... 500 cm (157.9 ... 196.9&quot;)</td>
<td>CE</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option C: 501 ... 610 cm (197.2 ... 240.2&quot;)</td>
<td>CF</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option D: 60 ... 100 cm (23.6 ... 39.4&quot;)</td>
<td>DA</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option D: 101 ... 200 cm (39.8 ... 78.7&quot;)</td>
<td>DB</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option D: 201 ... 300 cm (79.1 ... 118.1&quot;)</td>
<td>DC</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option D: 301 ... 400 cm (118.5 ... 157.5&quot;)</td>
<td>DD</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option E: 60 ... 100 cm (23.6 ... 39.4&quot;)</td>
<td>DE</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7&quot;)</td>
<td>DF</td>
</tr>
</tbody>
</table>

Add order code Y01 and plain text:

<table>
<thead>
<tr>
<th>&quot;Insertion length ... cm&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model option 1 and Material of Construction option F: 60 ... 100 cm (23.6 ... 39.4&quot;)</td>
</tr>
<tr>
<td>Model option 1 and Material of Construction option F: 101 ... 200 cm (39.8 ... 78.7&quot;)</td>
</tr>
</tbody>
</table>

### Further designs

Please add "Z" to Order No. and specify Order code(s).

Enter the total insertion length in plain text description, max. 610 cm (240.2")

Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text

Inspection Certificate Type 3.1 per EN 10204

Manufacturer’s test report (Hydrostatic Test)

NACE MR-0175 materials traceability

**Instruction manual**

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7ML1998-5KA01</td>
</tr>
<tr>
<td>C) 7ML1998-5KA11</td>
</tr>
<tr>
<td>C) 7ML1998-5KA31</td>
</tr>
<tr>
<td>C) 7ML1998-5XG81</td>
</tr>
</tbody>
</table>

**Accessories**

TFE bottom spacer/endplate

see RD100 on page 5/304

SITRANS RD200 Remote display - see RD200 on page 5/306

| 7ML1930-1DJ |

1) Model option 1 and Material of Construction options D, E, F, available with O-ring option 23 only
2) Available with O-ring option 21 only
3) Available with Material of Construction option A only
4) Available with Process Connection options A1, A6, A7, B0, B3, C3 only
5) Available with Process Connection options H1, H2, J1, J2, K1, K2, L1, L2, L3, L4, L5, L6 only
6) Available with Process Connection options E0, E1, E2, E3, F1, G1 only
7) Available with Material of Construction option D only
8) Available with Material of Construction options A and J only
9) Available with Probe Insertion Length options FA and FB only
10) Available with Material of Construction option F only
11) Available with Material of Construction option E only
12) Available with Model option 2 only
13) Available with Process Connection options A7 and E0 only
14) Subject to export regulations AL: N, ECCN: EAR99

---

© Siemens AG 2010
Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LG200 Single Rod Flexible Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1304-0</td>
<td></td>
</tr>
</tbody>
</table>

SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant ≥10 or dk > 1.9 when installed within 2 to 6" of a metal tank wall or in cage or bridle. For solids version only, dk>4.

Note:
For orders of 10 or more, please consult factory.

Model

| Single rod flexible probe | 1 |
| Single rod bulk solids flexible probe | 2 |

Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection

Process Connection (size/type)

2" NPT (Taper), ANSI/ASME B1.20.1
2" 150 lb ASME raised face flange
2" 300 lb ASME raised face flange
3" 150 lb ASME raised face flange
3" 300 lb ASME raised face flange
4" 150 lb ASME raised face flange
4" 300 lb ASME raised face flange
DN 50 PN 16 EN 1092-1 Type A flat faced flange
DN 50 PN 25/40 EN 1092-1 Type A flat faced flange
DN 80 PN 16 EN 1092-1 Type A flat faced flange
DN 80 PN 25/40 EN 1092-1 Type A flat faced flange
DN 100 PN 16 EN 1092-1 Type A flat faced flange
DN 100 PN 25/40 EN 1092-1 Type A flat faced flange

O-Ring

| Viton | 1 |
| EPDM (Ethylene Propylene Rubber) | 2 |
| 316L | 3 |
| HSN (Nitrite) | 4 |
| Buna-N | 5 |
| Neoprene | 6 |
| Chemraz | 7 |
| Polyurethane | 8 |
| Aegis PF128 | 9 |
| Kalrez 2035 | 10 |

Flexible Rod Length (To be shortened by customer as required)

| 1 meter (39.4") | A |
| 2 meters (78.7") | B |
| 3 meters (118.1") | C |
| 4 meters (157.5") | D |
| 5 meters (196.9") | E |
| 6 meters (236.2") | F |
| 7 meters (275.6") | G |
| 8 meters (315.0") | H |
| 9 meters (354.3") | I |
| 10 meters (393.7") | J |
| 11 meters (433.1") | K |
| 12 meters (472.4") | L |
| 13 meters (511.8") | M |
| 14 meters (551.2") | N |
| 15 meters (590.6") | O |
| 16 meters (629.9") | P |
| 17 meters (669.3") | Q |
| 18 meters (708.7") | R |

Further designs

Please add "Z" to Order No. and specify Order code(s).

Stainless steel tag, Measuring-point number/identification (max. 16 characters); specify in plain text

Instruction manual

English
French
German
Multi-language Quick Start manual

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

Accessories

SITRANS RD100 Remote display - see RD100 on page 5/304
SITRANS RD200 Remote display - see RD200 on page 5/306

1) Available with O-ring option 1 1 only (others on request)

C) Subject to export regulations AL: N, ECCN: EAR99

© Siemens AG 2010
## Selection and Ordering data

**SITRANS LG200 Chamber Replacement Probe**

SITRANS LG200 Chamber Replacement Probe replaces existing aging torque tube transmitters. Proprietary flanges can be used with existing chambers and cages.

**Note:**
For this option, please consult factory

<table>
<thead>
<tr>
<th>Model</th>
<th>Chamber/Process Connection Material of Construction</th>
<th>Process Connection (size/type)</th>
<th>Temperature Range</th>
<th>Chamber Type</th>
<th>Further designs</th>
<th>Instruction manual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carbon Steel (106 Grade B)2)</td>
<td>1½&quot; NPT [(Taper), ANSI/ASME B1.20.1] thread</td>
<td>+316 °C (+600 °F) (Dielectric constant ≥ 10)</td>
<td>Fisher 249B</td>
<td>Order code</td>
<td>Order No.</td>
</tr>
<tr>
<td></td>
<td>Carbon Steel (B31.1 construction)</td>
<td>1½&quot;, 150 lb ASME raised face flange</td>
<td>+260 °C (+500 °F) (Dielectric constant ≥ 1.4)</td>
<td>Fisher 259B</td>
<td></td>
<td>7ML1998-5KA01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>C</td>
<td>C</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1½&quot; Socket weld</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 1</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1] thread</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2&quot;, 150 lb ASME raised face flange</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 1</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2&quot;, 300 lb ASME raised face flange</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 2</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2&quot;, 600 lb ASME raised face flange</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 3</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2&quot; Socket weld</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D 1</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D 2</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other flange sizes available. Please consult factory.</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

**Level Range**

14" (0.356 meters)

Other level ranges available. Please consult factory.

**Process Connection Configuration**

Top In, Bottom Out

Top In, Bottom Out, with Sight Glass Connections

Other configurations available. Please consult factory.

**Temperature Range**

+316 °C (+600 °F) (Dielectric constant ≥ 10)

+260 °C (+500 °F) (Dielectric constant ≥ 1.4)

**Chamber Type**

Fisher 249B

Fisher 259B

Fisher 249

**Further designs**

Please add "-Z" to Order No. and specify Order code(s).

| Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text | Order code |
| NACE MR-0175 materials traceability | D07 |

**Instruction manual**

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

**Order No.**

C) Subject to export regulations AL: N, ECCN: EAR99

### Accessories

SITRANS RD100 Remote display - see RD100 on page 5/304

SITRANS RD200 Remote display - see RD200 on page 5/306

1) Probe is always 316/316L (1.4401/1.4404) Stainless Steel construction regardless of chamber and process connection materials.

2) Available Process Connection Configuration option 1 only

© Siemens AG 2010
Characteristic curves

SITRANS LG200 Process Pressure/Temperature derating curves

SITRANS LG200 Process Pressure/Temperature derating curves
Level instruments
Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

SITRANS LG200 Process Pressure/Temperature derating curves

© Siemens AG 2010
Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Dimensional drawings

SITRANS LG200 Enclosure

7ML1300

2 cable entries
½” NPT or M20x1.5

lid with window

lid without window

M20: 135 mm (5.32”)

½” NPT: 150 mm (5.91”)

166 mm (6.54”)

153 mm (6.02”)

38mm (1 1/2”)

SITRANS LG200 Enclosure

7ML1301-1 (7xA-x) Probe, Threaded and Flanged Connection

129 mm (4.7”)

145 mm (5.7”)

59 mm (2.32”)

probe insertion length

22 or 45 mm (deppendant on option)

7ML1303-1D (7xF-E) Probe, Sanitary Connection

74 mm (2.91”)

22 or 45 mm (deppendant on option)

7ML1303-1 (7xF-x) Probe, Threaded and Flanged Connection

22 or 45 mm (deppendant on option)

lid with window

lid without window

166 mm (6.54”)

153 mm (6.02”)

38mm (1 1/2”)

Probe Connections and Insertion Lengths (Note BSP connections differ from NPT)

insertion length A

insertion length B

insertion length C

insertion length D

NPT

BSP

sanitary flange

ANSI or DIN welded flange

22 or 45 mm (deppendant on option)

22 or 45 mm (deppendant on option)

22 or 45 mm (deppendant on option)

22 or 45 mm (deppendant on option)

SITRANS LG200 dimensions (threaded process connection dimensions shown are NPT connections unless stated otherwise)
**Level instruments**

Continuous level measurement - Guided wave radar transmitters

**SITRANS LG200**

SITRANS LG200 dimensions (threaded process connection dimensions shown are NPT connections unless stated otherwise)
Continuous level measurement - Guided wave radar transmitters

**SITRANS LG200**

### SITRANS LG200 Dimensions

**7ML1302-2 (7x5-x) Twin Rod Bulk Solids Flexible Probe**

<table>
<thead>
<tr>
<th>Threaded or Flanged Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Probes</strong></td>
</tr>
<tr>
<td>7ML1302-3 (Coaxial Overfill/Flooded Cage Probe)</td>
</tr>
<tr>
<td>7ML1301-5 (Coaxial HT/HP Steam Probe)</td>
</tr>
</tbody>
</table>

**Twin Rod End View**

- Ø 13 (0.50") rods
- 6.3 mm (0.248")
- 22.2 mm (0.875")

- 7ML1301-2 (7xD-x), 7ML1301-3 (7xP-x), 7ML1301-4 (7xR-x), 7ML1301-6 (7xT-x), Threaded or Flanged Connection

- 120 mm (4.7")
- 145 mm (5.7")
- 14 mm (0.56")
- 2.25 kg (5 lbs) AISI 316 AISI 316

- FEP webbing
- TFE spacer

**Probes**

- 7ML1302-1 (7xB-x) Twin Rod Probe, Threaded and Flanged Connection

- 120 mm (4.7")
- 126 mm (5.00")
- 20.3 mm (0.80")

- 7ML1302-2 (7x5-x) Twin Rod Flexible Probe

- 120 mm (4.7")
- 126 mm (5.00")
- 20.3 mm (0.80")

© Siemens AG 2010

SITRANS LG200 dimensions (threaded process connection dimensions shown are NPT connections unless stated otherwise)
Level instruments
Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

SITRANS LG200 - Model 7ML1305-1 Chamber Replacement Probe
Intrinsically Safe wiring
When connecting SITRANS LG200 in Intrinsically Safe applications, install an approved IS barrier in the non-hazardous (safe) area.

Explosion Proof wiring
When connecting SITRANS LG200 in hazardous areas with explosion hazard, the wiring for the transmitter must be contained in Explosion Proof conduit extending into the safe area. An Explosion Proof conduit fitting is not required within 457 mm (18") of the transmitter. An Explosion Proof conduit filling is required between the hazardous and safe areas.
**Level instruments**
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 and mining, aggregate and cement industries.

### Benefits

- Patented 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 signalling according to NAMUR NE 43
- Push-button calibration and programming

### 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 two versions: rod and cable.

SITRANS LC300 has a stainless steel process connection with PFA-lined probe. Materials with low or high dielectric properties are accurately measured and patented Active-Shield technology helps in ignoring the effects of buildup near vessel nozzle.

- Key Applications: Conductive and non-conductive media including liquids and solids in standard industrial processes and bulk solids applications involving dust or chemical processes involving vapour

### Configuration

SITRANS LC300 installation
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC300

### Technical specifications

#### Input
- Measuring range: 1.66 ... 3300 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

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>Installation category</td>
<td>II</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>4</td>
</tr>
<tr>
<td>Ingress protection</td>
<td>Type 4/NEMA 4/IP65 (optional IP68)</td>
</tr>
</tbody>
</table>

#### Installation conditions
- Location: Indoor/outdoor
- Process pressure: -1 ... 35 bar g (-14.6 ... 511 psi g)
- Process temperature: -40 ... +200 ºC (-40 ... +392 ºF)
- Min. dielectric constant: $\varepsilon_r = 1.5$

#### Design
- Material:
  - Enclosure: Aluminum, epoxy-coated
  - Rod version: 19 mm (0.75") with PFA jacket
  - Cable version: 9 mm (0.35") with PFA jacket, 6 mm (0.24") without PFA jacket
  - Active shield length:
    - Rod version: 100 mm (3.94")
    - Cable version: 105 mm (4.13")
  - Process connection of probe:
    - Threaded rod mounting: ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1]
    - Threaded cable mounting: 1½" NPT [(Taper), ANSI/ASME B1.20.1]
    - Flange mounting: 1 ... 4" ASME, DIN DN 25 ... 100
- 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 signalling: According to NAMUR NE 43, signal 3.8 to 20.5 mA, fault ≤ 3.6 or ≥ 21 mA (22 mA)

#### Certificates and approvals
- General: CE, CSA, FM, C-TICK
- Dust Ignition Proof (Intrinsically Safe probe circuit):
  - CSA/FM Class II, III, Div 1, Groups E, F, G, T4
- Explosion Proof (Intrinsically Safe probe circuit):
  - CSA/FM Class I, Div 1, Groups A, B, C, D, T4
  - ATEX II 1/2 G EEx d [ia] IIC T6 to T1
- Marine: Bureau Veritas, American Bureau of Shipping (ABS)

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/268.
2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)

#### Design: Probe

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard version</th>
<th>Cable version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Min. 300 mm (12&quot;), max. 5000 mm (197&quot;)</td>
<td>Min. 1000 mm (40&quot;), max. 25000 mm (984&quot;)</td>
</tr>
<tr>
<td>Sensor wetted parts</td>
<td>PFA, 316L stainless steel</td>
<td>316 stainless steel, optional PFA</td>
</tr>
<tr>
<td>O-ring seal material</td>
<td>FKM</td>
<td>FKM</td>
</tr>
<tr>
<td>Thermal isolator</td>
<td>Optional</td>
<td>Optional</td>
</tr>
</tbody>
</table>

1) FFKM available as special option. Contact nacc.smpi@siemens.com for details.
## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

#### Selection and Ordering data

**Order No.**
SITRANS LC300, threaded 7 ML 5 62 5 •

**Selection and Ordering data**

**Order No.**
SITRANS LC300, threaded 7 ML 5 62 5 •

### An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.

#### Version

(/threaded lengths include process thread)

**Rod, 19 mm (0.75”) diameter, PFA insulated**

Add order code Y01 and plain text:

**Insertion length ... mm**

- 300 ... 1000 mm (11.81 ... 39.37”) 0 A
- 1001 ... 2000 mm (39.41 ... 78.74”) 1 A
- 2001 ... 3000 mm (78.78 ... 118.11”) 1) 2 A
- 3001 ... 4000 mm (118.15 ... 157.48”) 1) 2) 3 A
- 4001 ... 5000 mm (157.52 ... 196.85”) 1) 2) 4 A

**Rod, 19 mm (0.75”) diameter, PFA insulated with 35 mm (1.38”) diameter stilling well**

Add order code Y01 and plain text:

**Insertion length ... mm**

- 300 ... 1000 mm (11.81 ... 39.37”) 2) 0 B
- 1001 ... 2000 mm (39.41 ... 78.74”) 2) 1 B
- 2001 ... 3000 mm (78.78 ... 118.11”) 1) 2) 2 B
- 3001 ... 4000 mm (118.15 ... 157.48”) 1) 2) 3 B
- 4001 ... 5000 mm (157.52 ... 196.85”) 1) 2) 4 B

**Cable, 9 mm (0.35”) diameter, PFA insulated, weighted**

Add order code Y01 and plain text:

**Insertion length ... mm**

- 1000 ... 2000 mm (39.37 ... 78.74”) 2) 0 E
- 2001 ... 4000 mm (78.78 ... 157.48”) 2) 1 E
- 4001 ... 6000 mm (157.52 ... 236.22”) 2) 2 E
- 6001 ... 8000 mm (236.26 ... 314.96”) 2) 3 E
- 8001 ... 10000 mm (315 ... 393.70”) 2) 4 E

**Cable, 6 mm (0.24”) diameter, non-insulated, weighted (non-conductive media only)**

Add order code Y01 and plain text:

**Insertion length ... mm**

- 1000 ... 2000 mm (39.37 ... 78.74”) 2) 0 F
- 2001 ... 4000 mm (78.78 ... 157.48”) 2) 1 F
- 4001 ... 6000 mm (157.52 ... 236.22”) 2) 2 F
- 6001 ... 8000 mm (236.26 ... 314.96”) 2) 3 F
- 8001 ... 10000 mm (315 ... 393.70”) 2) 4 F

**Cable lengths up to 25000 mm (984.25”) are possible for non-conductive media. Cable lengths up to 15000 mm (590.55”) are possible for conductive media.**

Contact nacc.smpi@siemens.com for details.

#### Process connection

- ¾” NPT [“Taper], ANSI/ASME B1.20.1] 3) A 0
- 1” NPT [“Taper], ANSI/ASME B1.20.1] 3) B 0
- 1½” NPT [“Taper], ANSI/ASME B1.20.1] 3) C 0
- R ¾” [BSPT], EN 10226/PT (JIS-T), JIS B 0203] 3) 3) D 0
- R 1” [BSPT], EN 10226/PT (JIS-T), JIS B 0203] 3) 3) E 0
- R 1½” [BSPT], EN 10226/PT (JIS-T), JIS B 0203] 3) 3) F 0
- 1¼” NPT [“Taper], ANSI/ASME B1.20.1] 3) 3) G 0
- G ¾” [BSPP], EN ISO 228-1/FF (JIS-P), JIS B 0202] 3) 3) H 0
- G 1” [BSPP], EN ISO 228-1/FF (JIS-P), JIS B 0202] 3) 3) I 0
- G 1½” [BSPP], EN ISO 228-1/FF (JIS-P), JIS B 0202] 3) 3) J 0

#### Approvals

- General purpose: CE, CSA, FM, C-TICK 1
- CSA and FM Class II and III, Div. 1, Groups E, F, G T4, ATEX II 1/2 D T100 °C 2
- ATEX II 1/2 G Ex d [ia] IIC T6 to T1 3
- CSA/FM Class I, Div. 1, Groups A, B, C, D T4 4

#### Further designs

Please add -Z to Order No. and specify Order code(s).

**Insertion length, specify in plain text:**

Y01: ... mm

**Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]:**

Measuring-point number/identification (max. 16 characters) specify in plain text

**Acceptance test certificate:**

Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204

**Instruction manual**

English 7ML1998-SHE01

French 7ML1998-SHE11

German 7ML1998-SHE31

Spanish 7ML1998-SHE21

Note: The instruction manual should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

© Siemens AG 2010
### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5625A</td>
<td>SITRANS LC300, threaded</td>
</tr>
</tbody>
</table>

**An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.**

### Accessories

- **½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47") -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)**
  - 7ML1830-1JA

- **½" NPT cable gland, brass, ATEX II 2GD EEx d IIC and EEx e II, fits cable diameter 6.5 ... 14 mm (0.26 ... 0.55"), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)**
  - 7ML1830-1JB

- **M20x1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47"), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)**
  - 7ML1830-1JC

- **M20x1.5 cable gland, brass, ATEX II 2GD EEx d IIC and EEx e II, fits cable diameter 10.5 ... 15.9 mm (0.41 ... 0.63"), under armour cable diameter 6.1 ... 11.5 mm (0.24 ... 0.45"), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)**
  - 7ML1830-1JD

- **Electronic transmitter kit (includes transmitter and driver)**
  - 7ML1830-1KN

  1) Custom shipping methods required. Contact factory for more details
  2) For process connections 1½" and larger
  3) Available for rod versions only
  4) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).
  5) Available for PFA insulated cable versions 0E to 4E only
  C) Subject to export regulations AL: N, ECCN: EAR99

---

**SITRANS RD100 Remote display** - see RD100 on page 5/304

**SITRANS RD200 Remote display** - see RD200 on page 5/306

---

© Siemens AG 2010
## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LC300, welded flange</th>
</tr>
</thead>
</table>
| 7ML5626- | An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. | A

#### Version (lengths from flange face)

- **Rod, PFA insulated**
  - Add order code Y01 and plain text: 
  - *Insertion length ... mm*: 
    - 300 ... 1000 mm (11.81 ... 39.37"
    - 1001 ... 2000 mm (39.41 ... 78.74"
    - 2001 ... 3000 mm (78.78 ... 118.11"
    - 3001 ... 4000 mm (118.15 ... 157.48"
    - 4001 ... 5000 mm (157.52 ... 196.85"

- **Cable, PFA insulated, weighted**
  - Add order code Y01 and plain text: 
  - *Insertion length ... mm*: 
    - 1000 ... 2000 mm (39.37 ... 78.74"
    - 2001 ... 4000 mm (78.78 ... 157.48"
    - 4001 ... 6000 mm (157.52 ... 236.22"
    - 6001 ... 8000 mm (236.26 ... 314.96"
    - 8001 ... 10000 mm (315 ... 393.70"

- **Insertion length, specify in plain text:**

#### Further designs

- **Process connection**
  - **Welded flange, 316L stainless steel, raised face**
    - 1" ASME 150 lb
    - 1" ASME 300 lb
    - 1½" ASME 150 lb
    - 1½" ASME 300 lb
    - 2" ASME 150 lb
    - 2" ASME 300 lb
    - 3" ASME 150 lb
    - 3" ASME 300 lb
    - 4" ASME 150 lb
    - 4" ASME 300 lb

- **Welded flange, 316L stainless steel, Type A flat faced**
  - DN 25, PN 16
  - DN 25, PN 40
  - DN 40, PN 16
  - DN 40, PN 40
  - DN 50, PN 16
  - DN 50, PN 40
  - DN 60, PN 16
  - DN 60, PN 40
  - DN 100, PN 16

---

### Further information

- Contact nacc.smpi@siemens.com for details.
- Please add "-Z" to Order No. and specify Order code(s).

---

### Approvals

- **General purpose**: CE, CSA, FM, C-Tick
- **CSA/FM Class II and III**, Div. 1, Groups E, F, G T4;
- **ATEX II 1/2 D T100 °C**
- **ATEX II 1/2 G EEx d [ia] IIC T6 to T1**
- **CSA/FM Class I, Div. 1, Groups A, B, C, D T4**

### Enclosure

- **Aluminum, epoxy-coated**
  - **Thermal isolator**
    - With thermal isolator
    - With mounting eye
  - **Electronic transmitter**
    - 3300 pF range

### Instruction manual

- **English**
- **French**
- **German**
- **Spanish**

---

### Compliance

- **Measuring-point number/identification**
  - Stainless steel tag [69 x 50 mm (2.71 x 1.97”)]

### Inspection Certificate Type 3.1 per EN 10204

- **Certificate M to DIN 55350, Part 18 and ISO 9000**

### Approvals

- **Acceptance test certificate**: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204

---

### Version (lengths from flange face)

- **Rod, PFA insulated**
  - *Insertion length ... mm*
    - 300 ... 1000 mm (11.81 ... 39.37"
    - 1001 ... 2000 mm (39.41 ... 78.74"
    - 2001 ... 3000 mm (78.78 ... 118.11"
    - 3001 ... 4000 mm (118.15 ... 157.48"
    - 4001 ... 5000 mm (157.52 ... 196.85"

- **Cable, PFA insulated, weighted**
  - *Insertion length ... mm*
    - 1000 ... 2000 mm (39.37 ... 78.74"
    - 2001 ... 4000 mm (78.78 ... 157.48"
    - 4001 ... 6000 mm (157.52 ... 236.22"
    - 6001 ... 8000 mm (236.26 ... 314.96"
    - 8001 ... 10000 mm (315 ... 393.70"

- **Insertion length, specify in plain text:**

---

### Electronic transmitter

- 3300 pF range

---

### Instruction manual

- **Order No.:**
  - 7ML1998-SHE01
  - 7ML1998-SHE01
  - 7ML1998-SHE31
  - 7ML1998-SHE21
<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LC300, welded flange</td>
<td>7ML5626-</td>
</tr>
<tr>
<td>An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.</td>
<td>A</td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>½&quot; NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47&quot;) -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)</td>
<td>7ML1830-1JA</td>
</tr>
<tr>
<td>½&quot; NPT cable gland, brass, ATEX II 2GD EEx d IIC and EEx e II, fits cable diameter 6.5 ... 14 mm (0.26 ... 0.55&quot;), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)</td>
<td>7ML1830-1JB</td>
</tr>
<tr>
<td>M20x1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47&quot;), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)</td>
<td>7ML1830-1JC</td>
</tr>
<tr>
<td>M20x1.5 cable gland, brass, ATEX II 2GD EEx d IIC and EEx e II, fits cable diameter 10.5 ... 15.9 mm (0.41 ... 0.63&quot;), under armour cable diameter 6.1 ... 11.5 mm (0.24 ... 0.45&quot;), -60 ... +130 °C (-76 ... +266 °F), IP68 (Explosion Proof)</td>
<td>7ML1830-1JD</td>
</tr>
<tr>
<td>Electronic transmitter kit (includes transmitter and driver) SITRANS RD100 Remote display - see RD100 on page 5/304 SITRANS RD200 Remote display - see RD200 on page 5/306</td>
<td>7ML1830-1KN</td>
</tr>
</tbody>
</table>

1. Custom shipping methods required. Contact factory for more details
2. For process connections 1½" and larger
3. Only for use with Versions 0A to 4A
4. Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).
5. Available for PFA insulated cable versions 0E to 4E only

C) Subject to export regulations AL: N, ECCN: EAR99
F) Subject to export regulations AL: 99999, ECCN: N
Pressure/Temperature Curve
LC300 Standard, Extended Rod and Cable Probes
Threaded Process Connections (7ML5625)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

Example
Permitted operating pressure = 30 bar (435 psi) at 75 °C

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5625)
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC300

Pressure/Temperature Curve
LC300 Standard, Extended Rod and Cable Probes
ASME Flanged Process Connections (7ML5626)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)

Pressure/Temperature Curve
LC300 Standard, Extended Rod and Cable Probes
EN Flanged Process Connections (7ML5626)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC300

Dimensional drawings

Threaded (7ML5625)

- Lid clip
- Electronics/Enclosure
- PFA insulated probe
- ø 19 mm (0.75”)
- ø 35 mm (1.38”)
- ñ = 30 mm (1.18”) Inactive tip

Threaded (7ML5625)

- Lid without window
- Thermal isolator
- ø 34.5 mm (1.36”)
- ø 9 mm (0.35”)
- 2 cable entries

Cable version, non-insulated

Threaded (7ML5625)

- Stainless steel cable
- ø 6 mm (0.24”)
- ø 32.0 mm (1.26”)

Cable version, insulated

Threaded (7ML5625)

- Stainless steel weight
- ø 25 mm (0.98”)
- ø 9 mm (0.35”)
- ø 34.5 mm (1.36”)

Notes:
1) Rod version Y02: Shield length= 100 mm (3.9”) for threaded including process connection thread length, 100 mm (3.9”) for welded flange.
2) For non-conductive applications only. Non-insulated cable can be shortened on site. Weight is included in measuring length.
3) For liquids and solids applications. Insulated cable cannot be shortened. Weight is not included in measuring length.
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.

SITRANS LC300 dimensions - Threaded Process Connections
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC300

SITRANS LC300 dimensions - Flanged Process Connections
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC300

Schematics

<table>
<thead>
<tr>
<th>with safety barrier</th>
<th>without safety barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>white (A)</td>
<td>orange (S)</td>
</tr>
<tr>
<td>black (B)</td>
<td>black (C)</td>
</tr>
<tr>
<td>red (C)</td>
<td>red (F)</td>
</tr>
</tbody>
</table>

SITRANS LC300 connections
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 vapours.

Benefits

- Patented 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
- 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)
- SIL/IEC61508 compliant for use in safety integrated level applications [SIL-1 (overfill or underfill)]

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 CO2 and liquified natural gas (LNG), distillation/regeneration tanks with high temperatures

Configuration

SITRANS LC500 installation

Installation

Build up of material or condensation in active shield area does not affect switch operation.

Mounting on non-linear vessels in non-conductive fluids using flaring well

Technical specifications

<table>
<thead>
<tr>
<th>Input</th>
<th>Measuring range</th>
<th>1 to 3300 pF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Span</td>
<td>Min. 3.3 pF</td>
</tr>
<tr>
<td>Output</td>
<td>Solid-state switch</td>
<td>Galvanically isolated</td>
</tr>
<tr>
<td></td>
<td>• Output</td>
<td>Bipolar</td>
</tr>
<tr>
<td></td>
<td>• Protection</td>
<td>• Max. switching voltage</td>
</tr>
<tr>
<td></td>
<td>• Max. load current</td>
<td>30 V (DC)</td>
</tr>
<tr>
<td></td>
<td>• Voltage drop</td>
<td>30 V peak (AC)</td>
</tr>
<tr>
<td></td>
<td>• Time delay (pre or post switching)</td>
<td>82 mA</td>
</tr>
<tr>
<td></td>
<td>Loop current</td>
<td>&lt; 1 V, typical at 50 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 ... 60 s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.6 ... 22 mA/22 ... 3.6 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2-wire current loop)</td>
</tr>
<tr>
<td>Accuracy (transmitter)</td>
<td>Temperature stability</td>
<td>0.15 pF (0 pF) or &lt; 0.25% (typically &lt; 0.1%) of actual measured value, whichever is greater over the full temperature range</td>
</tr>
<tr>
<td></td>
<td>Non-linearity and repeatability</td>
<td>&lt; 0.1% of range and actual measured value respectively</td>
</tr>
<tr>
<td></td>
<td>Accuracy</td>
<td>Deviation &lt; 0.1% of measured value</td>
</tr>
</tbody>
</table>
## Level instruments

Continuous level measurement - Capacitance transmitters

### SITRANS LC500

#### Rated operating conditions

<table>
<thead>
<tr>
<th><strong>Installation conditions</strong></th>
<th>Indoor/outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature (transmitter)</td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
<tr>
<td>• Installation category</td>
<td>II</td>
</tr>
<tr>
<td>• Pollution degree</td>
<td>4</td>
</tr>
<tr>
<td><strong>Medium conditions</strong></td>
<td></td>
</tr>
<tr>
<td>• Relative dielectric constant ( \varepsilon_r )</td>
<td>Min. 1.5</td>
</tr>
<tr>
<td>• Process temperature</td>
<td></td>
</tr>
<tr>
<td>- Standard (PFA)</td>
<td>-50 ... +200 °C (-58 ... +392 °F)</td>
</tr>
<tr>
<td>- High temperature version with thermal isolator and enamel insulation</td>
<td>-60 ... +400 °C (-76 ... +752 °F)</td>
</tr>
<tr>
<td>- Cryogenic version</td>
<td>-200 ... +200 °C (-328 ... +392 °F)</td>
</tr>
<tr>
<td><strong>Process pressure</strong></td>
<td>Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/282.</td>
</tr>
<tr>
<td>Standard (PFA)</td>
<td>-1 ... 150 bar g (2175 psi g)</td>
</tr>
<tr>
<td>High temperature version (Enamel)</td>
<td>-1 ... 345 bar g (5004 psi g)</td>
</tr>
</tbody>
</table>

#### Design

| **Material** | 316L stainless steel |
| Probe insulation (rod) | PFA, enamel |
| **Cable** | 316 stainless steel/316 stainless steel PFA |
| **Probe diameter** | |
| Rod version | 16 mm (0.63") or 24 mm (0.95") |
| Cable version | 9 mm (0.35") with PFA jacket, 6 mm (0.24") without PFA jacket |
| **Active shield length** | 50 mm (1.97"), customer selectable (order number Y02) |
| **Probe length** | |
| Rod version | Max. 3.5 m (138") with 16 mm rod, PFA |
| | Max. 1.5 m (59") with 16 mm rod, enamel |
| | Max. 5.5 m (216") with 24 mm rod, PFA |
| Cable version | Max. 35 m (1378") |
| **Process connection of probe** | NPT [(Taper), ANSI/ASME B1.20.1], R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203], G [(BSPP), EN ISO 228-1/PT (JIS-P), JIS B 0202] |
| **Flange mounting** | ASME, EN 1092-1 |
| **Enclosure** | |
| **Material** | Aluminium, epoxy-coated |
| **Cable inlet** | 2 x ½" 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 to 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 signalling** | According to NAMUR NE 43, signal 3.8 to 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 to 9, A to F |
| **SMART communication** | Conforming to HART Communication Foundation (HCF) |

#### Certificates and approvals

| **General Purpose** | CE, CSA, FM, C-TICK |
| **Non-incendive/Non-sparking** | CSA/FM Class 1, Div. 2, Groups A, B, C, D T4 |
| | CSA/FM Class II and III, Div. 1, Groups E, F, G |
| **Dust Ignition Proof** | CSA/FM Class II and III, Div. 1, Groups E, F, G |
| **Explosion Proof** | FM Class 1, Div. 1, Groups A, B, C, D T4 |
| **Temperature Proof** | ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C |
| **Explosion Rating** | ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 |
| **Marine** | Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3 and ENV5, Bureau Veritas |
| **Other** | SIL/IEC61508 Declaration of Conformity [SIL-1 (overfill or underfill)] |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/282.
2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).
## Continuous Level Measurement - Capacitance Transmitters

### SITRANS LC500

<table>
<thead>
<tr>
<th>Process connection types</th>
<th>Standard</th>
<th>Extended Cable version with Rod Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>Available as standard</td>
<td>Available as standard</td>
</tr>
<tr>
<td>Flange</td>
<td>Available as standard</td>
<td>Available as standard</td>
</tr>
</tbody>
</table>

### Process connection materials

- Stainless steel 316L: Available as standard

### Probe insulation

- PFA: Available as standard
- Enamel: Available as standard

### Length and Process Parameters

<table>
<thead>
<tr>
<th>Description</th>
<th>Standard</th>
<th>Extended Cable version with Rod Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rod length for PFA 16 mm version</td>
<td>Min. 200 mm (7.87&quot;) Max. 3500 mm (137.80&quot;)</td>
<td>Min. 200 mm (7.87&quot;) Max. 3500 mm (137.80&quot;)</td>
</tr>
<tr>
<td>Rod length for PFA 24 mm version</td>
<td>Min. 200 mm (7.87&quot;) Max. 5500 mm (216.54&quot;)</td>
<td>Min. 200 mm (7.87&quot;) Max. 5500 mm (216.54&quot;)</td>
</tr>
<tr>
<td>Rod length for enamel 16 mm version</td>
<td>Min. 250 mm (9.84&quot;) Max. 1500 mm (59.06&quot;)</td>
<td>-</td>
</tr>
<tr>
<td>Cable length</td>
<td>Min. 1000 mm (39.37&quot;) Max. 35000 mm (1377.95&quot;)</td>
<td>Min. 5000 mm (196.85&quot;) Max. 35000 mm (1377.95&quot;)</td>
</tr>
</tbody>
</table>

### Maximum process pressure

- See Pressure/Temperature curves for specific probe type
- 5 bar g (73 psi g)

### Maximum process temperature

- See Pressure/Temperature curves for specific probe type
- +100 °C (+212 °F)

1) See Pressure/Temperature curves for specific probe type
2) Refers to total insertion length. See dimension drawing on page 5/292 for further explanation

- Not available as standard
**Level instruments**

**Continuous level measurement - Capacitance transmitters**

### SITRANS LC500

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7 ML 5 51 3 -</td>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

#### Version

- Cable, 9 mm (0.35") diameter, 316 stainless steel with PFA insulation, weighted
- **Add order code Y01 and plain text:**
  - Insertion length: mm
    - 1000 ... 2000 mm (39.37 ... 78.74")
    - 2000 ... 4000 mm (78.78 ... 157.48")
    - 4000 ... 6000 mm (157.52 ... 236.22")
    - 6000 ... 8000 mm (236.26 ... 314.96")
    - 8000 ... 10000 mm (314.99 ... 393.70")
- Longer lengths possible to a max. of 35000 mm (114.83 ft). Contact nacc.smpi@siemens.com for details.
- Cable, 6 mm (0.24") diameter, 316L stainless steel, non-insulated, weighted (non-conductive media only)
- **Add order code Y01 and plain text:**
  - Insertion length: mm
    - 1000 ... 2000 mm (39.37 ... 78.74")
    - 2000 ... 4000 mm (78.78 ... 157.48")
    - 4000 ... 6000 mm (157.52 ... 236.22")
    - 6000 ... 8000 mm (236.26 ... 314.96")
    - 8000 ... 10000 mm (314.99 ... 393.70")
- Cable lengths up to 25000 mm (86.42") are possible for non-conductive media. Cable lengths up to 15000 mm (59.05") are possible for conductive media. Contact nacc.smpi@siemens.com for details.

#### Process connection (316L Stainless steel)

- **Threaded connection**
  - 1 ½" NPT ([Taper], ANSI/ASME B1.20.1) C0 F0 L0
  - R 1 ½" [BSPT], EN 10226/PT (JIS-T), JIS B 0203 K0 L1
  - 1¼" NPT ([Taper], ANSI/ASME B1.20.1) G 1¼" [BSPP], EN ISO 228-1/PT (JIS-PT), JIS B 0203 L0

- **Welded flange, raised face**
  - 1 ½", ASME, 150 lb B1 B1 B1
  - 1 ½", ASME, 600 lb B3 B3 B3
  - 2", ASME, 150 lb C1 C1 C1
  - 2", ASME, 300 lb C2 C2 C2
  - 2", ASME, 600 lb C3 C3 C3
  - 3", ASME, 150 lb D1 D1 D1
  - 3", ASME, 300 lb D2 D2 D2
  - 3", ASME, 600 lb D3 D3 D3
  - 4", ASME, 150 lb E1 E1 E1
  - 4", ASME, 300 lb E2 E2 E2
  - 4", ASME, 600 lb E3 E3 E3
  - 6", ASME, 150 lb F1 F1 F1
  - 6", ASME, 300 lb F2 F2 F2
  - 6", ASME, 600 lb F3 F3 F3

- **Welded flange, Type A flat faced**
  - DN 40, PN 16 K4 K4 K4
  - DN 40, PN 40 K5 K5 K5
  - DN 50, PN 16 L4 L4 L4
  - DN 50, PN 40 L5 L5 L5
  - DN 80, PN 16 M4 M4 M4
  - DN 80, PN 40 M5 M5 M5
  - DN 100, PN 16 N4 N4 N4
  - DN 100, PN 40 N5 N5 N5
  - DN 125, PN 16 P4 P4 P4
  - DN 125, PN 40 P5 P5 P5

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7 ML 5 51 3 -</td>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

#### Approvals

- **General Purpose:** CE, CSA, FM, C-TICK
- **CSA/FM Class 1, Div. 2, Groups A, B, C, D T4:**
- **ATEX II 3G 2D Ex n A [ib] IIC T6 to T100 °C, CSA/FM Class II and III, Div. 1, Groups E, F, G:**
- **ATEX II 1/2 GD Ex d [ia] IIC T6 to T1**

- **FM Class I, Div.1, Groups A, B, C, D, T4**

- **Enclosure/Cable inlet**
  - Aluminum epoxy coated
  - 2 x ⅝” NPT, IP68
  - 2 x M20x1.5 (IP68, adapter)

#### Options

- No additional options
- With mounting eye

#### 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)

#### Electronic output

- No transmitter supplied
- 2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)

#### Further designs

- Please add "-Z" to Order No. and specify Order code(s).

**Insertion length, specify in plain text:**

- **Y01:** ... mm

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]

- Measuring-point number/identification (max. 16 characters) specify in plain text

- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000

- Compliance test cert: Manufacturer’s test certificate to DIN EN 13310, Part 18 and ISO 9000

- Inspection Certificate Type 3.1 per EN 10204

- SIL/IEC61508 Declaration of Conformity

- [SIL-1 (overfill)]

#### Instruction manual

See page 5/281

#### Accessories

See page 5/281

---

1) A minimum span of 3 pF must be maintained
2) Available with non-conductive media only
3) Custom shipping methods required. Contact factory for more details.
4) Available in PFA insulated version only
C) Subject to export regulations AL: N, ECCN: EAR99

(Notes: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)

---

© Siemens AG 2010
Continuous level measurement - Capacitance transmitters

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Selection and Ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ML 5 515</td>
<td>SITRANS LC500, Threaded or Welded Flange, with Rod Sensor</td>
</tr>
</tbody>
</table>

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**

Rod, 16 mm (0.63"), PFA insulated

Add order code Y01 and Y02 and plain text:

- **Insertion length, mm and active shield length, mm**
  - 200...1000 mm (7.87...39.37")
  - 1001...2000 mm (39.41...78.74")
  - 2001...3000 mm (78.78...118.11")
  - 3001...5000 mm (118.15...137.80")

Rod, 16 mm (0.63"), PFA insulated with 35 mm (1.38") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

- **Insertion length, mm and active shield length, mm**
  - 200...1000 mm (7.87...39.37")
  - 1001...2000 mm (39.41...78.74")
  - 2001...3000 mm (78.78...118.11")
  - 3001...5000 mm (118.15...137.80")

Rod, 24 mm (0.94"), PFA insulated

Add order code Y01 and Y02 and plain text:

- **Insertion length, mm and active shield length, mm**
  - 200...1000 mm (7.87...39.37")
  - 1001...2000 mm (39.41...78.74")
  - 2001...3000 mm (78.78...118.11")
  - 3001...5000 mm (118.15...137.80")

Rod, 24 mm (0.94"), Glasssteel Enamel insulated

Add order code Y01 and Y02 and plain text:

- **Insertion length, mm and active shield length, mm**
  - 200...1000 mm (7.87...39.37")
  - 1001...2000 mm (39.41...78.74")
  - 2001...3000 mm (78.78...118.11")
  - 3001...5000 mm (118.15...137.80")

Rod, 16 mm (0.63")

Add order code Y01 and Y02 and plain text:

- **Insertion length, mm and active shield length, mm**
  - 200...1000 mm (7.87...39.37")
  - 1001...2000 mm (39.41...78.74")
  - 2001...3000 mm (78.78...118.11")
  - 3001...5000 mm (118.15...137.80")

Rod, 16 mm (0.63")

Add order code Y01 and Y02 and plain text:

- **Insertion length, mm and active shield length, mm**
  - 200...1000 mm (7.87...39.37")
  - 1001...2000 mm (39.41...78.74")
  - 2001...3000 mm (78.78...118.11")
  - 3001...5000 mm (118.15...137.80")

Process connection (316L Stainless steel)

- **Threaded connection**
  - ¾" NPT [(Taper), ANSI/ASME B1.20.1]
  - 1" NPT [(Taper), ANSI/ASME B1.20.1]
  - 1½" NPT [(Taper), ANSI/ASME B1.20.1]
  - 2" NPT [(Taper), ANSI/ASME B1.20.1]

- **Flange connection**
  - ¾" [BSPT], EN 10226/PT (JIS-T), JIS B 2003
  - 1" [BSPT], EN 10226/PT (JIS-T), JIS B 2003
  - 1½" [BSPT], EN 10226/PT (JIS-T), JIS B 2003
  - 2" [BSPT], EN 10226/PT (JIS-T), JIS B 2003

- **Welded flange, Type A flat faced**
  - DN 40, PN 16
  - DN 50, PN 16
  - DN 60, PN 16
  - DN 80, PN 16
  - DN 100, PN 16
  - DN 125, PN 16

**Enclosure/Cable inlet**

- Aluminum epoxy coated
  - 2 x ½" NPT, IP68
  - 2 x M20x1.5 (IP68, adapter)

**Options**

- No additional options

Additional options:

- Skidded holes instead of standard vent holes in stilling well (refer to instruction manual for dimensions).

**Thermal isolator/remote version**

- Without thermal isolator or remote electronics
- **Thermal 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)

**Remote electronics with mounting bracket and cable**

- Length: 2 m (79")
- Length: 3 m (118")
- Length: 4 m (158")
- Length: 5 m (197")
### SITRANS LC500

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SITRANS LC500, Threaded or Welded Flange, with Rod Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>D) 7 M L 5 5 1 5 -</td>
<td>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.</td>
</tr>
</tbody>
</table>

#### Electronic output

<table>
<thead>
<tr>
<th>Order code</th>
<th>No transmitter supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2-wire loop current 4...20 mA</td>
</tr>
<tr>
<td>1</td>
<td>(transmitter MSP 2002-2, 3300 pF)</td>
</tr>
</tbody>
</table>

#### Further designs

- Please add "-Z" to Order No. and specify Order code(s).
- Insertion length, specify in plain text: Y01: ... mm [minimum 200 mm (7.87")]
- Active shield length, specify in plain text [min. length is 50 mm (2")]: Y02: ... mm
- Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Y15
- Acceptance test certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000 C11
- Inspection Certificate Type 3.1 per EN 10204 C12
- Manufacturing Test Report (Electrode Test) C18
- SIL/IEC61508 Declaration of Conformity [SIL-1 (overfill)] C20

**Instruction manual**

See page 5/281

**Accessories**

See page 5/281

1. A minimum span of 3 pF must be maintained
2. Custom shipping methods required. Contact factory for more details.
3. Available with process connection 1½" or larger
4. Available with process connection 1" or larger
5. Available with process connection 2" or larger
6. Available with version 0B to 3B, 0D to 5D and 0F only
7. Available with approval option 1 only

D) Subject to export regulations AL: N, ECCN: EAR99H
Continuous level measurement - Capacitance transmitters

Selection and Ordering data

SITRANS LC500, Single Piece Flanged with Rod C)

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**
Rod, 16 mm (0.63’’), PFA insulated
Add order code Y01 and Y02 and plain text: 
*Insertion length ... mm and active shield length ... mm*

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 ... 1000</td>
<td>0A</td>
</tr>
<tr>
<td>1001 ... 2000</td>
<td>1A</td>
</tr>
<tr>
<td>2001 ... 3000</td>
<td>2A</td>
</tr>
<tr>
<td>3001 ... 5000</td>
<td>3A</td>
</tr>
</tbody>
</table>

Rod, 16 mm (0.63’’), PFA insulated with 35 mm (1.34’’) stilling well in 316L stainless steel
Add order code Y01 and Y02 and plain text:
*Insertion length ... mm and active shield length ... mm*

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 ... 1000</td>
<td>0B</td>
</tr>
<tr>
<td>1001 ... 2000</td>
<td>1B</td>
</tr>
<tr>
<td>2001 ... 3000</td>
<td>2B</td>
</tr>
<tr>
<td>3001 ... 5000</td>
<td>3B</td>
</tr>
</tbody>
</table>

Rod, 24 mm (0.94’’), PFA insulated
Add order code Y01 and Y02 and plain text:
*Insertion length ... mm and active shield length ... mm*

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 ... 1000</td>
<td>0C</td>
</tr>
<tr>
<td>1001 ... 2000</td>
<td>1C</td>
</tr>
<tr>
<td>2001 ... 3000</td>
<td>2C</td>
</tr>
<tr>
<td>3001 ... 5000</td>
<td>3C</td>
</tr>
<tr>
<td>5001 ... 5500</td>
<td>5C</td>
</tr>
</tbody>
</table>

Rod, 24 mm (0.94’’), Glasssteel Enamel insulated
Add order code Y01 and Y02 and plain text: 
*Insertion length ... mm and active shield length ... mm*

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 ... 1000</td>
<td>0D</td>
</tr>
<tr>
<td>1001 ... 2000</td>
<td>1D</td>
</tr>
<tr>
<td>2001 ... 3000</td>
<td>2D</td>
</tr>
<tr>
<td>3001 ... 5000</td>
<td>3D</td>
</tr>
<tr>
<td>5001 ... 5500</td>
<td>5D</td>
</tr>
</tbody>
</table>

Rod, 16 mm (0.63’’), Glasssteel Enamel insulated
Add order code Y01 and Y02 and plain text:
*Insertion length ... mm and active shield length ... mm*

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 ... 1500</td>
<td>0E</td>
</tr>
</tbody>
</table>

Rod, 16 mm (0.63’’), Glasssteel Enamel insulated with 40 mm (1.61’’) stilling well in 316L stainless steel
Add order code Y01 and Y02 and plain text: 
*Insertion length ... mm and active shield length ... mm*

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 ... 1500</td>
<td>0F</td>
</tr>
</tbody>
</table>

**Process connection (316L Stainless steel)**
Single piece flange, raised face

<table>
<thead>
<tr>
<th>Size</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/2</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>5/3</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>1 1/2</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>2</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>2</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>2</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>3</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>3</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>3</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>4</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>4</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>4</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>6</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>6</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>6</td>
<td>ASME, 600 lb</td>
</tr>
</tbody>
</table>

Single piece flange, Type B1 raised face

<table>
<thead>
<tr>
<th>Size</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 40</td>
<td>FN 16</td>
</tr>
<tr>
<td>DN 40</td>
<td>FN 40</td>
</tr>
<tr>
<td>DN 50</td>
<td>FN 16</td>
</tr>
<tr>
<td>DN 50</td>
<td>FN 40</td>
</tr>
<tr>
<td>DN 80</td>
<td>FN 16</td>
</tr>
</tbody>
</table>

Selection and Ordering data

SITRANS LC500, Single Piece Flanged with Rod C)

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.

**DN 80, PN 40**

<table>
<thead>
<tr>
<th>Size</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 100</td>
<td>PN 16</td>
</tr>
<tr>
<td>DN 100</td>
<td>PN 40</td>
</tr>
<tr>
<td>DN 125</td>
<td>PN 16</td>
</tr>
<tr>
<td>DN 125</td>
<td>PN 40</td>
</tr>
</tbody>
</table>

Single piece flange with PTFE flange facing (aplicable with versions 0A to 3A and 0C to 5C)

<table>
<thead>
<tr>
<th>Size</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>1 1/2</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>1 1/2</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>2</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>2</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>2</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>3</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>3</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>3</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>4</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>4</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>4</td>
<td>ASME, 600 lb</td>
</tr>
<tr>
<td>6</td>
<td>ASME, 150 lb</td>
</tr>
<tr>
<td>6</td>
<td>ASME, 300 lb</td>
</tr>
<tr>
<td>6</td>
<td>ASME, 600 lb</td>
</tr>
</tbody>
</table>

Single piece flange with PTFE flange facing (aplicable with versions 0A to 3A, 0C to 5C)

<table>
<thead>
<tr>
<th>Size</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 40</td>
<td>FN 16</td>
</tr>
<tr>
<td>DN 40</td>
<td>FN 40</td>
</tr>
<tr>
<td>DN 50</td>
<td>FN 16</td>
</tr>
<tr>
<td>DN 50</td>
<td>FN 40</td>
</tr>
<tr>
<td>DN 80</td>
<td>FN 16</td>
</tr>
<tr>
<td>DN 80</td>
<td>FN 40</td>
</tr>
<tr>
<td>DN 100</td>
<td>PN 16</td>
</tr>
<tr>
<td>DN 100</td>
<td>PN 40</td>
</tr>
<tr>
<td>DN 125</td>
<td>PN 16</td>
</tr>
<tr>
<td>DN 125</td>
<td>PN 40</td>
</tr>
</tbody>
</table>

**Approvals**

General Purpose: CE, CSA, FM, C-TICK
CSA/FM Class I, Div. 2, Groups A, B, C, D T4;
ATEX II 3G 2D EEx n A [ib] IIC T6 to T4 +70 °C (<40 ... +158 °F)
CSA/FM Class II and III, Div. 1, Groups E, F, G
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1
General Purpose: CE, CSA, FM, C-TICK

**Enclosure/Cable inlet**

Aluminum epoxy coated 2 x 1/2” NPT, IP68 2 x M20x1.5 (IP68, adapter)

**Options**

None

Slotted holes instead of standard vent holes in stilling well (Refer to manual for dimensions)

**Thermal isolator/remote version**

Without thermal isolator
Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +85 °C (-40 ... +185 °F), explosion proof approval (-40 ... +158 °F)
Remote electronics with mounting bracket and cable

<table>
<thead>
<tr>
<th>Length</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>79’’</td>
</tr>
<tr>
<td>3 m</td>
<td>118’’</td>
</tr>
<tr>
<td>4 m</td>
<td>158’’</td>
</tr>
<tr>
<td>5 m</td>
<td>197’’</td>
</tr>
</tbody>
</table>
## SITRANS LC500

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LC500, Single Piece Flanged with Rod Sensor</td>
<td>7ML5517-7</td>
</tr>
</tbody>
</table>

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.

### Electronic output

- No transmitter supplied
- 2-wire loop current 4...20 mA (transmitter MSP 2002-2 _3300 pF)

### Further designs

Please add "-Z" to Order No. and specify Order code(s).

<table>
<thead>
<tr>
<th>Insertion length, specify in plain text:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y01: ... mm</td>
</tr>
<tr>
<td>Y02: ... mm</td>
</tr>
<tr>
<td>Y15: ... mm</td>
</tr>
</tbody>
</table>

### Acceptance test certificate

- Manufacturer’s test certificate M to DIN 55350, Part 18 and ISO 9000
- Inspection Certificate Type 3.1 per EN 10204
- Manufacturing Test Report (Electrode Test)
- SIL/IEC61508 Declaration of Conformity [SIL-1 (overfill)]

### Instruction manual

See page 5/281

### Accessories

See page 5/281

---

1) A minimum span of 3 pF must be maintained
2) Custom shipping methods required. Contact factory for more details.
3) Available with process connection 2" or larger, and only available with process connection options C1 to F3, L4 to P5
4) Not available with versions 0E and 0F
5) Available with version 0B to 3B, 0D to 5D and 0F only
6) Available with approval option 1 only
C) Subject to export regulations AL: N, ECCN: EAR99
Continuous level measurement - Capacitance transmitters

Selection and Ordering data

SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange

Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.

**Version**
- Rod, 16 mm (0.63’’), 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 (1)
    - 5000 ... 10000 mm (196.85 ... 393.70)”
    - 10000 ... 20000 mm (393.74 ... 787.40)”
    - 20000 ... 30000 mm (787.44 ... 984.25)”
    - 30000 ... 50000 mm (984.29 ... 1377.95)”

**Process connection (316L stainless steel)**
- Threaded connection
  - 2” NPT [(Taper), ANSI/ASME B1.20.1]
  - 2” ASME, 150 lb
  - 3” ASME, 150 lb
  - 4” ASME, 150 lb
  - 6” ASME, 150 lb

**Welded flange, raised face**
- 2”, ASME, 150 lb
- 3”, ASME, 150 lb
- 4”, ASME, 150 lb
- 6”, ASME, 300 lb

**Welded flange, Type A flat faced**
- DN 50, PN 16
- DN 50, PN 40
- DN 80, PN 16
- DN 80, PN 40
- DN 100, PN 40
- DN 125, PN 40

**Enclosure/Cable inlet**
- Aluminum epoxy coated
- 2’’ x 3/4” NPT, IP68
- 2 m X2001.5 (IP68, adapter)

**Options**
- No additional options
- With mounting eye

**Selection and Ordering data**

SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange

Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.

**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)

**Electronic output**
- No transmitter supplied
- 2-wire loop current 4 ... 20 mA

**Further designs**
- Please add "-Z" to Order No. and specify Order code(s).
- Total Insertion length, specify in plain text: Y01: ... mm
- [min. PFA rod length 200 mm (7.87”)]
- Active shield length, specify in plain text: Y02: ... mm
- [min. length 50 mm (2”)]

**Accessories**
- Instruction manual: See page 5/281
- Start and instruction manual library.

**Selection and Ordering data**

SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange

Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.

**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)

**Electronic output**
- No transmitter supplied
- 2-wire loop current 4 ... 20 mA

**Further designs**
- Please add "-Z" to Order No. and specify Order code(s).
- Total Insertion length, specify in plain text: Y01: ... mm
- [min. PFA rod length 200 mm (7.87”)]
- Active shield length, specify in plain text: Y02: ... mm
- [min. length 50 mm (2”)]

**Accessories**
- Instruction manual: See page 5/281
- Start and instruction manual library.
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC500

Characteristic curves

Pressure/Temperature Curve
LC500 Cable Probes
Threaded Process Connections (7ML5513)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

Example
Permitted operating pressure = 10 bar (145 psi) at 75 °C
Pressure/Temperature Curve
LC500 PFA Rod Probes
Threaded Process Connections (7ML5515)

P = Permitted Operating Pressures
T = Permitted Operating Temperature
Pressure/Temperature Curve
LC500 Cable Probes
ASME Flanged Process Connections (7ML5513)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)
Continuous level measurement - Capacitance transmitters

SITRANS LC500

Pressure/Temperature Curve
LC500 PFA Rod Probes
ASME Flanged Process Connections (7ML5515 and 7ML5517)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)
Pressure/Temperature Curve
LC500 Cable Probes
EN Flanged Process Connections (7ML5513)

\[ P = \text{Permitted Operating Pressures} \]
\[ T = \text{Permitted Operating Temperature} \]

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)
Pressure/Temperature Curve
LC500 PFA Rod Probes
EN Flanged Process Connections (7ML5515 and 7ML5517)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)
Pressure/Temperature Curve
LC500 Enamel Rod Probes
ASME Flanged Process Connections
(7ML5515 and 7ML5517)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)
Pressure/Temperature Curve
LC500 Enamel Rod Probes
EN Flanged Process Connections
(7ML5515 and 7ML5517)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC500

Pressure/Temperature Curve
LC500 Single Piece Flanged Rod Probes with PTFE facing
EN Flanged Process Connections (7ML5517)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)
Pressure/Temperature Curve

LC500 Single Piece Flanged Rod Probes with PTFE facing
ASME Flanged Process Connections (7ML5517)

P = Permitted Operating Pressures
T = Permitted Operating Temperature

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC500

Dimensional drawings

Cable version (non-insulated)
Threaded (7ML5513)

Cable version (insulated)
Threaded (7ML5513)

Extended cable version with rod sensor
Threaded (7ML5523)

Notes:
1) Applicable for non-conductive media only. Cable can be shortened on site. Weight is included in measuring length.
2) Applicable for both liquids and solids. Cable cannot be shortened. Weight is part of measuring length.
3) For Y02 lengths greater than 5000 mm (197"), cable is inactive and is not actively shielded.
4) Minimum length = 200 mm (7.87"
5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62"
6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59"

© Siemens AG 2010
Notes:
1) Applicable for non-conductive media only. Cable can be shortened on site. Weight is included in measuring length.
2) Applicable for both liquids and solids. Cable cannot be shortened. Weight is part of measuring length.
3) For Y02 lengths greater than 5000 mm (197”), cable is inactive and is not actively shielded.
4) Minimum length = 200 mm (7.87”)
5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62”)
6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59”)
**Level instruments**

Continuous level measurement - Capacitance transmitters

**SITRANS LC500**

---

**Rod version**

Threaded (7ML5515)

*Transmitter electronics*

- PFA insulated probe

**Dimensions**

- Ø 16 mm (0.63") or Ø 24 mm (0.94")

---

**Rod version with stilling well**

Threaded (7ML5515)

*Stainless steel stilling well*

- Stainless steel flexible tube

**Dimensions**

- Ø 16 mm (0.63") or Ø 24 mm (0.94")

---

**Remote electronics with mounting bracket option**

Threaded (7ML5515)

*General Purpose approval only.*

---

**Enamel rod version**

Threaded (7ML5515)

*Enamel probe*

**Dimensions**

- Ø 40 mm (1.57")

---

**Enamel rod version with stilling well**

Threaded (7ML5515)

*Stainless steel stilling well*

**Dimensions**

- Ø 16 mm (0.63")

---

**Standard configuration (all versions)**

**With thermal isolator option (all versions)**

**Notes:**

1) Minimum Y02 (active shield length) = 50 mm (1.96"), minimum measuring length = 200 mm (7.87")

2) Minimum Y02 (active shield length) = 100 mm (3.94"), minimum measuring length = 250 mm (9.84")

---

**SITRANS LC500 dimensions - Rod Versions**
Level instruments
Continuous level measurement - Capacitance transmitters

SITRANS LC500

Schematics

SITRANS LC500 connections
## Selection and ordering Data

**LC300 and LC500 Specials. See note 1.**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01163688</td>
<td>Kit, Stainless steel cable extension, 1 m, adjustable by customer</td>
</tr>
<tr>
<td>A5E01163689</td>
<td>Kit, Stainless steel cable extension, 3 m, adjustable by customer</td>
</tr>
<tr>
<td>A5E01163690</td>
<td>Kit, Stainless steel cable extension, 5 m, adjustable by customer</td>
</tr>
<tr>
<td>A5E01163691</td>
<td>Kit, Stainless steel cable extension, 10 m, adjustable by customer</td>
</tr>
<tr>
<td>A5E01163693</td>
<td>Kit, Stainless steel cable extension, 15 m, adjustable by customer</td>
</tr>
<tr>
<td>A5E01163695</td>
<td>Kit, Stainless steel cable extension, 20 m, adjustable by customer</td>
</tr>
<tr>
<td>A5E01163709</td>
<td>Kit, PFA cable extension, 1 m</td>
</tr>
<tr>
<td>A5E01163710</td>
<td>Kit, PFA cable extension, 3 m</td>
</tr>
<tr>
<td>A5E01163711</td>
<td>Kit, PFA cable extension, 5 m</td>
</tr>
<tr>
<td>A5E01163712</td>
<td>Kit, PFA cable extension, 10 m</td>
</tr>
<tr>
<td>A5E01163713</td>
<td>Kit, PFA cable extension, 15 m</td>
</tr>
<tr>
<td>A5E01163714</td>
<td>Kit, PFA cable extension, 20 m</td>
</tr>
<tr>
<td>A5E01163717</td>
<td>Spare mounting eye (LC300 PFA versions only)</td>
</tr>
<tr>
<td>A5E01163727</td>
<td>Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300</td>
</tr>
<tr>
<td>A5E01163728</td>
<td>LC500 Gasket (IP65), Silicone</td>
</tr>
<tr>
<td>A5E01163729</td>
<td>LC500 Blind Lid</td>
</tr>
<tr>
<td>A5E01163717</td>
<td>LC500 Mounting Eye</td>
</tr>
<tr>
<td>A5E01163717</td>
<td>LC500 Mounting Bracket</td>
</tr>
<tr>
<td>A5E01163730</td>
<td>LC500 Sanitary Versions</td>
</tr>
</tbody>
</table>

**Note 1:** Special flange sizes and facings are available. Please contact nacc.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 5/8.

**Note 2:** Please contact nacc.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 5/8.

Please contact nacc.smpi@siemens.com for special requests.

© Siemens AG 2010

(C) Subject to export regulations AL: N, ECCN: EAR99
Overview

The OCM III is a high accuracy ultrasonic flow monitor for open channels.

Benefits

- Influent and effluent monitor
- BS 3680 calculations provide exceptional accuracy in measuring flow
- 1 to 24 months data log, subject to logging rate
- RS-232 serial communication
- High accuracy on unique or non-standard weirs and flumes
- AC and DC operation. Automatically switches to battery operation for uninterrupted power
- Dual power input
- Low power remote monitoring
- Flow Reporter software available for remote monitoring, configuration and data retrieval

Application

In addition to monitoring flowrate in sewage works, OCM III can monitor industrial discharge, rainfall/storm water studies, inflow/infiltration studies and sewer system evaluations. As well as being compatible with many standard weirs and flumes, the programmable head versus flow curve (up to 16 points) accurately defines flow rate on unique or non-standard weirs and flumes.

The OCM III has data logging and is adjustable from once per minute to once a day. It records the average flow rate for that time period. Daily, it records minimum/maximum of temperature and flow rates, and the time they occurred, as well as the daily total. Advanced functions include variable rate logging. It can be pre-programmed to log at a higher rate when needed. Under steady conditions, the OCM III automatically logs less frequently to conserve data log space.

The OCM III has two-way communication via RS-232 with a modem or a bi-polar current loop with a current-to-voltage communication converter. Data logs can be downloaded to a file that can be manipulated into a spreadsheet or ASCII format.

Technical specifications

Mode of Operation

| Measuring range | 0.3 ... 1.2 m (1 ... 4 ft) or 0.6 ... 3 m (2 ... 10 ft) |

Output

| Transducer | Echomax® XRS-5, 44 kHz |
| Relays | 3 alarm/control relays, 1 SPDT Form C contact per relay, rated 5 A at 250 V AC non-inductive or 30 V DC |
| mA output | 0/4 ... 20 mA, isolated |
| Max. load | 1 KΩ max. load |
| Resolution | 5 μA |
| Isolation | 300 V AC continuous |
| DC output | +24 V DC, 20 mA average to 200 mA at 1/10 duty cycle max. 0 ... 20 |

Accuracy

| Error in measurement | ±1 mm/m, calculated error less than 0.02% |
| Resolution | 0.2 mm (0.007") |

Rated operating conditions

<table>
<thead>
<tr>
<th>Installation conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
</tr>
<tr>
<td>Installation category</td>
</tr>
<tr>
<td>Pollution degree</td>
</tr>
<tr>
<td>Ambient conditions</td>
</tr>
</tbody>
</table>

Design

| Weight | 2.3 kg (5.1 lbs) |
| Material (enclosure) | Polycarbonate |
| Degree of protection (enclosure) | IP65/Type 4X/NEMA 4X |
| Transducer and mA output signal | • Transducer: co-axial to be RG62-A/U low capacity |
| | • mA output signal to be 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 to 0.75 mm² (22 to 18 AWG) |
| | • Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating |
| Max. separation between transducer and transceiver | 183 m (600 ft) |

Displays and controls

| LCD 5 x 7 dot matrix display with 2 lines of 40 characters each |
| Programming | Via removable programmer and communication link |
| Memory | 3 V battery (NEDA 5003LC or equivalent), operating life 1 year, SuperCap capacitor for back-up during battery replacement |

Power supply

| AC version | 100/115/200/230 V AC ± 15%, 50/60 Hz, 20 VA max. |
| DC version | 9 ... 30 V DC, 8 W max. |
## Certificates and approvals
- CE, FM, CSAusC, MCERTS, C-Tick

## Communication
- RS-232 or ±20 mA bipolar current loop, 300, 600, 1200, 2400, 4800, 9600, 19200 baud

## Options
### Temperature sensor
- TS-2
- Flow Reporter, a Windows®-based configuration software and data extractor

### Remote monitoring
- Flow Reporter, a Windows®-based configuration software and data extractor

### Velocity sensor
- Consult with factory

1) Program range is defined as the empty distance to the face of the transducer plus any range extension

2) EMC performance available upon request

Windows® is a registered trademark of Microsoft Corporation

---

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Option</th>
<th>Order No.</th>
</tr>
</thead>
</table>
| **OCM III** High accuracy ultrasonic flow monitor for open channels. | 7ML1002-
| **Input voltage** AC, voltage selector switch | 0 |
| **Enclosure** Wall mount, standard enclosure | A |
| Wall mount, 6 entries, M20 holes 1) | B |
| **Approvals** CSAusC, FM (EN61326), C-Tick | 5 |
| CE 2) | 6 |

### Instruction manual
- English: 7ML1998-5AB01
- French: 7ML1998-1AB11
- Spanish: 7ML1998-1AB21
- German: 7ML1998-1AB31

Note: The instruction manual should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

### Required equipment
- **TS-2 Temperature Sensor**
  - TS-2, 1 m cable: 7ML1812-1AA1
  - TS-2, 5 m cable: 7ML1812-2AA1
  - TS-2, 10 m cable: 7ML1812-3AA1
  - TS-2, 30 m cable: 7ML1812-4AA1
  - TS-2, 50 m cable: 7ML1812-5AA1
  - TS-2, 70 m cable: 7ML1812-6AA1
  - TS-2, 90 m cable: 7ML1812-7AA1
  - TS-2 Instruction manual: 7ML1998-5EW01

Note: The TS-2 instruction manual should be ordered as a separate line item on the order.

### Accessories
- Handheld programmer: 7ML1830-2AA
- Flow Reporter software license: 7ML1930-1AK
- Flow Reporter Kit (includes disk, authorization code and cable): 7ML1930-1AL

### Spare parts
- Card, Mother, main: 7ML1830-1MG
- Card, daughter/display: 7ML1830-1LT
- Card, LCD: 7ML1830-1KY
- Eprom: 7ML1830-1KW
- Battery: 7ML1830-1JV
- OCM III Lid overlay: 7ML1830-1KV

1) Available with approval option 6 only
2) Available with enclosure option B only

B) Subject to export regulations AL: N, ECCN: EAR99S
C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments
Continuous measurement - Open channel flow - Ultrasonic controller

OCM III

Dimensional drawings

OCM III dimensions

Schematics

OCM III connections

Notes:
1. Use RG62-A/U Coaxial (or equivalent) for extensions up to 183 m (600 ft). Run in grounded metal conduit, separate from other wiring.
2. Each relay has 1 set of form ‘C’ (SPDT) contacts, relay rated at 5A, 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed. Relay de-energized when in alarm conditions and energized for pump control.
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, Allen-Bradley® Remote I/O and DeviceNet®, Modbus® RTU
- Modbus is a registered trademark of Schneider Electric
- Allen-Bradley is a registered trademark of Rockwell Automation
- DeviceNet is a trademark of Open DeviceNet Vendor Association

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.

Technical specifications

<table>
<thead>
<tr>
<th>Module type</th>
<th>Allen Bradley Remote I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>RIO</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>57.6, 115.2 or 230.4 Kbaud</td>
</tr>
<tr>
<td>Rack address</td>
<td>1 ... 73, 1/4 to full rack</td>
</tr>
<tr>
<td>Connection</td>
<td>RIO slave</td>
</tr>
<tr>
<td>SmartLinx module compatibility</td>
<td>SITRANS LU01, SITRANS LU02, SITRANS LU10, SITRANS LUC500, MultiRanger 100/200, HydroRanger 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module type</th>
<th>PROFIBUS DP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>RS-485 (PROFIBUS standard)</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>All valid PROFIBUS DP rates from 9600 Kbps to 12 Mbps</td>
</tr>
<tr>
<td>Rack address</td>
<td>0 ... 99</td>
</tr>
<tr>
<td>Connection</td>
<td>Slave</td>
</tr>
<tr>
<td>SmartLinx module compatibility</td>
<td>SITRANS LU01, SITRANS LU02, SITRANS LU10, SITRANS LUC500, MultiRanger 100/200, HydroRanger 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module type</th>
<th>MODBUS RTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>RS-232 or RS-485</td>
</tr>
<tr>
<td>Transmission rate in bps</td>
<td>1200, 2400, 4800, 9600, 19200, 38400</td>
</tr>
<tr>
<td>Rack address</td>
<td>1 ... 247</td>
</tr>
<tr>
<td>Connection</td>
<td>Slave</td>
</tr>
<tr>
<td>SmartLinx module compatibility</td>
<td>SITRANS LU01, SITRANS LU02, SITRANS LU10</td>
</tr>
<tr>
<td>Included with product:</td>
<td>SITRANS LUC500, MultiRanger 100/200, HydroRanger 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module type</th>
<th>DeviceNet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>DeviceNet physical layer</td>
</tr>
<tr>
<td>Transmission rate in kbps</td>
<td>125, 250, 500</td>
</tr>
<tr>
<td>Rack address</td>
<td>0 ... 63</td>
</tr>
<tr>
<td>Connection</td>
<td>Slave (group 2)</td>
</tr>
<tr>
<td>SmartLinx module compatibility</td>
<td>SITRANS LUC500, MultiRanger 100/200, HydroRanger 200</td>
</tr>
</tbody>
</table>
## SmartLinx module

### Selection and Ordering data

<table>
<thead>
<tr>
<th>SmartLinx® module for SITRANS LU01, LU02, LU10</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley Remote I/O module</td>
<td>7ML1830-1CP</td>
</tr>
<tr>
<td>PROFIBUS DP module</td>
<td>7ML1830-1CQ</td>
</tr>
<tr>
<td>Modbus RTU module</td>
<td>7ML1830-1CR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SmartLinx module for SITRANS LUC500 Rack and Panel Mount models</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley Remote I/O module</td>
<td>7ML1830-1HP</td>
</tr>
<tr>
<td>PROFIBUS DP module</td>
<td>7ML1830-1CS</td>
</tr>
<tr>
<td>DeviceNet module</td>
<td>7ML1830-1HQ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SmartLinx module for SITRANS LUC500 Wall Mount model, MultiRanger 100/200, HydroRanger 200</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley Remote I/O module</td>
<td>7ML1830-1HS</td>
</tr>
<tr>
<td>PROFIBUS DP module</td>
<td>7ML1830-1HR</td>
</tr>
<tr>
<td>DeviceNet module</td>
<td>7ML1830-1HT</td>
</tr>
</tbody>
</table>

### Instruction manuals

- Allen-Bradley Remote I/O communications module, English
  - English                                                                                   | 7ML1998-1AP03 |
  - French                                                                                   | 7ML1998-1AQ03 |
  - German                                                                                    | 7ML1998-1AQ12 |

- Modbus RTU communications module, English
  - French                                                                                    | 7ML1998-1BF01 |
  - German                                                                                    | 7ML1998-1BF11 |

- SmartLinx modem, English
  - English                                                                                   | 7ML1998-1BG01 |

- DeviceNet, English
  - This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and instruction manuals. | 7ML1998-1BH02 |

### Spare SmartLinx software

- Allen-Bradley data diskette                                                                | 7ML1830-1CK |
- PROFIBUS DP data diskette                                                                  | 7ML1830-1CL |
- DeviceNet data diskette                                                                    | 7ML1830-1CM |

C) Subject to export regulations AL: N, ECCN: EAR99
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

Note:
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 LUC500
- HydroRanger Plus
- 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

<table>
<thead>
<tr>
<th>Dolphin Plus</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>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. Dolphin Plus Software includes a software CD, and a nine pin adapter with a 2.1 m (82.7”) cable for connection to a PC serial port.</td>
<td>C) 7ML1841 - A0 -</td>
</tr>
</tbody>
</table>

RS-485 to RS-232 converter

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

ComVerter

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Instruction manual

- Connection manual, English: Included on Dolphin Plus CD and available at www.siemens.com/processautomation

This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and instruction manuals.

Spare parts

| Converter, RS 485 to RS 232 (D-Sub) | C) 7ML1830-1HA |
| Converter, RS 485 to RS 232 (D-Sub) | 7ML1830-1MC |
| Kit containing one 9-pin D-Sub to RJ11 Adapter and one 2.1 meter telephone cable with two male jacks | C) 7ML1830-1MM |

C) Subject to export regulations AL: N, ECCN: EAR99
Level instruments  
Communications and 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 °C (-40 to +185 °F), adding only 1 V to the loop.

The RD100 has a large 1" (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

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Analog to digital conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td>Measuring points</td>
<td>1 instrument only</td>
</tr>
</tbody>
</table>

Accuracy

±0.1 % of span ±1 count

Rated operating conditions

<table>
<thead>
<tr>
<th>Ambient conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
</tr>
</tbody>
</table>

-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

• 1.0" (2.54 cm) high LCD
• Numeric range from -1000 ... +1999

Certificates and approvals

Hazardous

• Intrinsically Safe
• CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4
• CSA/FM Class I, Zone 0, Group IIC
• CSA/FM Class I, Div. 2, Groups A, B, C, D
• CSA/FM Class II and III, Div. 2, Groups F and G

Non-incendive

• CSA/FM Class I, Div. 2, Groups A, B, C, D
• CSA/FM Class II and III, Div. 2, Groups F and G

Options

• Mounting

• 2" (5.08 cm) pipe mounting kit (zinc plated or stainless steel)
• Panel mounting kit

Selection and Ordering data

<table>
<thead>
<tr>
<th>Data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS RD100 A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.</td>
<td>7ML5741A00 -</td>
</tr>
<tr>
<td>Conduit hole location (1/2&quot;)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Bottom</td>
<td></td>
</tr>
<tr>
<td>Rear</td>
<td></td>
</tr>
<tr>
<td>Top</td>
<td></td>
</tr>
<tr>
<td>Instruction manual</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>C) 7ML1998-5JU01</td>
</tr>
<tr>
<td>French</td>
<td>C) 7ML1998-5JU11</td>
</tr>
<tr>
<td>German</td>
<td>C) 7ML1998-5JU31</td>
</tr>
<tr>
<td>Note: The instruction manual should be ordered as a separate line item.</td>
<td></td>
</tr>
<tr>
<td>This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and instruction manuals.</td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>Panel mount kit</td>
<td>C) 7ML1930-1BN</td>
</tr>
<tr>
<td>2&quot; (5.08 cm) pipe mounting kit (zinc plated seal)</td>
<td>C) 7ML1930-1BP</td>
</tr>
<tr>
<td>2&quot; (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)</td>
<td>C) 7ML1930-1BQ</td>
</tr>
</tbody>
</table>

C) Subject to export regulations AL: N, ECCN: EAR99

Available ex stock.
**Dimensional drawings**

**RD100 - Front View**

- A: 80 mm (3.15")
- B: 140 mm (5.51")
- C: 60 mm (2.36")
- D: 120 mm (4.72")
- E: 65 mm (2.56")
- F: 20 mm (0.79")

**RD100 - Side View**

- Wall mounting holes beneath cover screws

---

**Schematics**

**Calibrator Connected to Input Signal PCB**

- Display PCB component side (may be removed for bench calibration)
- Calibrated current source
- Input signal PCB (mounted to base of enclosure)

**Control Loop Connected to Input Signal PCB**

- Input signal PCB
- Loop jumper (remove when Display PCB is connected)
- Field wiring is made to the Input Signal PCB which is mounted to the base of the enclosure.

**Calibrator Connected to Display PCB**

- Display PCB component side
- Calibrated current source

The Display PCB may be removed from the enclosure for bench calibration. Loop jumper must be installed on Input Signal PCB to maintain loop. Refer to RD100 Instruction manual for more details.

---

**SITRANS RD100 dimensions**

**SITRANS RD100 connections**
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
- Serial communication using built in protocol or optional Modbus® RTU
- 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

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
- Measuring points
- Analog to digital conversion
- 1 instrument
- Remote monitoring of 100 instruments with PC and RD Software

Input

- Measuring range
- Current
- Voltage
- Thermocouple temperature
- RTD temperature

Output signal

- Output
- PDC output
- Modbus (optional)
- 4 ... 20 mA (optional)
- 2 SPDT Form C relays, rated 3 A @ 30 V DC or 3 A @ 250 V AC, non-inductive, auto-initializing (optional)
- Communications
- RS-232 with PDC or Modbus RTU
- RS-422/485 with PDC or Modbus RTU

Accuracy

- 4 ... 20 mA optional output
- Process input
- Thermocouple temperature input
- RTD temperature input

Rated operating conditions

- Ambient conditions
- Operating temperature range

Design

- Weight
- Material (enclosure)
- Degree of protection
### Electrical connection
- **mA output signal**: 2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm² (18 ... 12 AWG). Belden® 8760 or equivalent is acceptable.
- **Electrical connection and relay connection**: Copper conductor according to local requirements, rated 3A @ 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 ±10% @ 200 mA max.
- **Dual power supplies**: Two 24 V DC ±10% @ 200 mA and 40 mA max.
- **External loop power supply**: 35 V DC max.
- **Output loop resistance**: 24 V DC, 10 ... 700 Ω max.
- **35 V DC (external)**: 100 ... 1200 Ω max.

### Displays and controls
- **Display**: 14 mm (0.56") high LED
- **Numeric range from**: -1999 ... +9999
- **Four digits, automatic lead zero blanking**: Eight intensity levels
- **Memory**: Non-volatile
- **Stores settings for minimum of 10 years if power is lost**:
- **Programming**: Primary: front panel
  Secondary: Meter Copy or PC with SITRANS RD Software

### Certificates and approvals
- CE, UL, CUL

### Options
- **Enclosures**: Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
- **Communications**: Modbus RTU

---

© Siemens AG 2010

®Modbus is a registered trademark of Schneider Electric.
®Belden is a registered trademark of Belden Wire and Cable Company.
Selection and Ordering data

**SITRANS RD200**

A universal input, panel mount remote digital display for process instrumentation.

**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.

**Transmitter supply**
- None
- Single 24 V DC transmitter supply
- Dual 24 V DC transmitter supply

**Output**
- None
- 2 relays
- 4 ... 20 mA output

**Communication**
- Modbus disabled
- Modbus enabled

**Approvals**
- CE, UL, cUL

**Instruction manuals**
- English
- Spanish
- German

Note: The instruction manual should be ordered as a separate line item.

This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and instruction manuals.

**Other instruction manuals**
- SITRANS RD Enclosures, English
- SITRANS RD Enclosures, German
- SITRANS RD Serial Adapters, English
- SITRANS RD Serial Adapters, German
- SITRANS RD Software, English
- SITRANS RD Software, German

**Accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS RD200 copy cable 2.1 m (7 ft)</td>
<td>C) 7ML1930-1BR</td>
</tr>
<tr>
<td>SITRANS RD200 RS-232 serial adapter (copy cable included)</td>
<td>C) 7ML1930-1BS</td>
</tr>
<tr>
<td>SITRANS RD200 RS-422/485 serial adapter (copy cable included)</td>
<td>C) 7ML1930-1BT</td>
</tr>
<tr>
<td>RS-232 to RS-422/485 isolated converter</td>
<td>C) 7ML1930-1BU</td>
</tr>
<tr>
<td>RS-232 to RS-422/485 non-isolated converter</td>
<td>C) 7ML1930-1BV</td>
</tr>
<tr>
<td>SITRANS RD200 RS-232 and RS-485 isolated multi-input adapter board</td>
<td>C) 7ML1930-1BW</td>
</tr>
<tr>
<td>USB to RS-422/485 isolated converter</td>
<td>C) 7ML1930-1BX</td>
</tr>
<tr>
<td>USB to RS-422/485 non-isolated converter</td>
<td>C) 7ML1930-1BY</td>
</tr>
<tr>
<td>USB to RS-232 converter</td>
<td>C) 7ML1930-1DC</td>
</tr>
<tr>
<td>RD Software CD for 1 to 100 displays</td>
<td>C) 7ML1930-1CC</td>
</tr>
<tr>
<td>Modbus option enabled</td>
<td>C) 7ML1930-1CD</td>
</tr>
<tr>
<td>Low cost polycarbonate plastic enclosure for 1 display</td>
<td>C) 7ML1930-1CF</td>
</tr>
<tr>
<td>Thermoplastic enclosure</td>
<td>C) 7ML1930-1CG</td>
</tr>
<tr>
<td>For use with 1 display</td>
<td>C) 7ML1930-1CH</td>
</tr>
<tr>
<td>For use with 2 displays</td>
<td>C) 7ML1930-1CJ</td>
</tr>
<tr>
<td>For use with 3 displays</td>
<td>C) 7ML1930-1CK</td>
</tr>
<tr>
<td>For use with 4 displays</td>
<td>C) 7ML1930-1CL</td>
</tr>
<tr>
<td>For use with 5 displays</td>
<td>C) 7ML1930-1CM</td>
</tr>
<tr>
<td>Stainless steel enclosure (Type 304, EN 1.4301)</td>
<td>C) 7ML1930-1CN</td>
</tr>
<tr>
<td>For use with 1 display</td>
<td>C) 7ML1930-1CP</td>
</tr>
<tr>
<td>For use with 2 displays</td>
<td>C) 7ML1930-1CQ</td>
</tr>
<tr>
<td>For use with 3 displays</td>
<td>C) 7ML1930-1CR</td>
</tr>
<tr>
<td>For use with 4 displays</td>
<td>C) 7ML1930-1CS</td>
</tr>
<tr>
<td>For use with 5 displays</td>
<td>C) 7ML1930-1CT</td>
</tr>
<tr>
<td>Steel enclosure</td>
<td>C) 7ML1930-1CU</td>
</tr>
<tr>
<td>For use with 1 display</td>
<td>C) 7ML1930-1CV</td>
</tr>
<tr>
<td>For use with 2 displays</td>
<td>C) 7ML1930-1CW</td>
</tr>
<tr>
<td>For use with 3 displays</td>
<td>C) 7ML1930-1CX</td>
</tr>
<tr>
<td>For use with 4 displays</td>
<td>C) 7ML1930-1CY</td>
</tr>
<tr>
<td>For use with 5 displays</td>
<td>C) 7ML1930-1DA</td>
</tr>
</tbody>
</table>

1) Available with input voltage option 1 only
2) Available with output option C only

C) Subject to export regulations AL: N, ECCN: EAR99

Available ex stock when configured with the following options only:
- Input voltage: 1, Transmitter supply: B, Output: A, Communication: 0.
### Dimensional drawings

**SITRANS RD200 dimensions**

**Schematics**

**SITRANS RD200 connections**
Overview

The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling, and data capture for instrumentation.

Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web server provides worldwide access to instrument data log and RD500 configuration and setup
- 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 I/O
- 10 base-TI 100 Base-TX ethernet and support for GSM, GPRS, and PSTN provide flexible remote communications options
- Supports up to 128 devices with the flexible I/O modules and up to 247 Modbus serial devices
- 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.
- Log files formats are CSV (comma separated values) for data files and HTML for report files

Application

The RD500 is an easy-to-use remote data manager, 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 any Modbus RTU device.

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 collect data from up to 247 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 external modems, providing flexibility for applications in which GSM/GPRS 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

Technical specifications

| Mode of operation | Remote data manager
| Measuring principle | • up to 128 standard input/outputs
| Measuring points | • 247 Modbus serial devices
| Input | See table on page 5/4
| Output | See table on page 5/4
| Accuracy | See table on page 5/4
| 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, noncondensing, from 0 ... +50 °C (+32 ... +122 °F)
| Design | Material (enclosure) High impact plastic and stainless steel
| Pollution degree | 2
| 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
| • STS - Status LED indicates condition of master
| • TX/RX - Transmit/Receive LEDs show serial activity
| • Ethernet - Link and activity LEDs
| • CF - CompactFlash LED indicates card status and read/write activity
| Memory | On-board user memory
| 4 Mbytes of non-volatile Flash memory
| On-board SDRAM
| 2 Mbytes
| Memory card
| Compact Flash Type II slot for Type I and Type II cards; 2 Gbytes
| Certificates and approvals | • Safety
| • UL Listed to U.S. and Canadian safety standards UL508 and CSA C22.2 No. 14-M05 (File No. E302106)
| • IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
| 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
| • RS232/PG port | RS232 port via RJ12
| • Comms ports | RS422/485 port via RJ45 and RS232 port via RJ12
| • Ethernet port | 10 BASE-T/100 BASE-TX; RJ45 jack is wired as a NIC (Network Interface Card)

© Siemens AG 2010
## SITRANS RD500 Module Specifications

<table>
<thead>
<tr>
<th>Order number</th>
<th>Application</th>
<th>Accuracy</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1930-1ES</td>
<td>8 inputs, 6 outputs used to monitor contact or sensor inputs</td>
<td>Not applicable</td>
<td>Snaps onto standard DIN style top hat (T) profile mounting rails according to EN50022 -35 x 7.5 and -35 x 15</td>
</tr>
<tr>
<td>7ML1930-1ER</td>
<td>8 inputs, 6 outputs used to monitor contact or sensor inputs</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1EP</td>
<td>16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4-20 mA process signals</td>
<td>±0.1% of span</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1EQ</td>
<td>16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ±10 V process signals</td>
<td>±0.1% of span</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1ET</td>
<td>16 bit analog input module provides high density signal measurement for data monitoring applications and accepts various RTD inputs</td>
<td>± (0.2% of span, +1 °C) 0 to 50 °C (32 to 122 °F); ± (0.1% of span, +1 °C) 18 to 28 °C (64 to 82 °F), includes NIST conformity, A/D conversion errors, temperature coefficient and linearity conformity at 23 °C after 20 minute warm-up</td>
<td></td>
</tr>
<tr>
<td>7ML1930-1EU</td>
<td>16 bit thermocouple input module provides high density signal measurement for data acquisition applications and accepts wide range of thermocouple types</td>
<td>± (0.3% of span, +1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearity conformity at 23 °C after 20 minute warm-up</td>
<td></td>
</tr>
</tbody>
</table>

### Inputs
- **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
- **Ranges:**
  - 0-20 mA or 4-20 mA
  - Sample time: 50 msec-400 msec depending on number of enabled inputs

### Outputs
- **Solid state output, switched DC, contact rating 1 A DC max.**
  - Form A, NO
  - Pairs share common terminals: 1&2, 3&4, 5&6
  - Current rating by pair: 3 Amps@30 V DC/125 V AC resistive
  - 1/10 HP@125 V AC
- **Resolution:**
  - 8 single-ended
  - Sample time: 50 msec-400 msec depending on number of enabled inputs
  - 8 single-ended
  - Resolution: Full 16-bit
  - Sample time: 50 msec-400 msec depending on number of enabled inputs
  - 6 single-ended
  - Resolution: Full 16-bit
  - Sample time: 67 msec-400 msec depending on number of enabled inputs
  - 8 single-ended
  - Resolution: Full 16-bit
  - Sample time: 50 msec-400 msec depending on number of enabled inputs

### Notes
- Off voltage: <1.2 V
- On voltage: >3.8 V
SITRANS RD500

Selection and Ordering data

Order No.

SITRANS RD500

The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation.

Communications Connection

Ethernet

Digital Communications to Instruments

RS-485 Modbus® RTU

Input configuration modules

Note: one RD500 supports 16 input modules

<table>
<thead>
<tr>
<th>Component</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD500 8 channel 0(4)-20 mA input module</td>
<td>7ML1930-1EP</td>
</tr>
<tr>
<td>RD500 8 channel ±10 V input module</td>
<td>7ML1930-1EQ</td>
</tr>
<tr>
<td>RD500 8 digital inputs, 6 relay outputs module</td>
<td>7ML1930-1ER</td>
</tr>
<tr>
<td>RD500 8 digital inputs, 6 solid state outputs module</td>
<td>7ML1930-1ES</td>
</tr>
<tr>
<td>RD500 6 channel input, RTD module</td>
<td>7ML1930-1ET</td>
</tr>
<tr>
<td>RD500 8 channel thermocouple module</td>
<td>7ML1930-1EU</td>
</tr>
</tbody>
</table>

Instruction manuals

Application manual, English

<table>
<thead>
<tr>
<th>Manual</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD500 Remote Data Manager manual, English: web access, alarm event handling, and data capture</td>
<td>7ML1998-5MK01</td>
</tr>
<tr>
<td>RD500 Remote Data Manager manual, German: web access, alarm event handling, and data capture</td>
<td>7ML1998-5MK31</td>
</tr>
<tr>
<td>RD500 8 channel 0(4)-20 mA input module manual, English</td>
<td>7ML1998-5MB01</td>
</tr>
<tr>
<td>RD500 8 channel 0(4)-20 mA input module manual, German</td>
<td>7ML1998-5MB31</td>
</tr>
<tr>
<td>RD500 8 channel ±10 V input module manual, English</td>
<td>7ML1998-5MC01</td>
</tr>
<tr>
<td>RD500 8 channel ±10 V input module manual, German</td>
<td>7ML1998-5MC31</td>
</tr>
<tr>
<td>RD500 8 inputs, 6 relay outputs module manual, English</td>
<td>7ML1998-5MD01</td>
</tr>
<tr>
<td>RD500 8 inputs, 6 relay outputs module manual, German</td>
<td>7ML1998-5MD31</td>
</tr>
<tr>
<td>RD500 8 inputs, 6 solid state outputs module manual, English</td>
<td>7ML1998-5ME01</td>
</tr>
<tr>
<td>RD500 8 inputs, 6 solid state outputs module manual, German</td>
<td>7ML1998-5ME31</td>
</tr>
<tr>
<td>RD500 6 channel input, RTD module manual, English</td>
<td>7ML1998-5MF01</td>
</tr>
<tr>
<td>RD500 6 channel input, RTD module manual, German</td>
<td>7ML1998-5MF31</td>
</tr>
<tr>
<td>RD500 8 channel thermocouple module manual, English</td>
<td>7ML1998-5MJ01</td>
</tr>
<tr>
<td>RD500 8 channel thermocouple module manual, German</td>
<td>7ML1998-5MJ31</td>
</tr>
</tbody>
</table>

Optional equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial CompactFlash card, 2 Gigabytes</td>
<td>7ML1930-1FB</td>
</tr>
<tr>
<td>Industrial CompactFlash card, 1 Gigabyte</td>
<td>7ML1930-1FC</td>
</tr>
<tr>
<td>RJ11 serial to terminal block RS-232</td>
<td>7ML1930-1FD</td>
</tr>
<tr>
<td>RJ45 serial to terminal block RS-485</td>
<td>7ML1930-1FE</td>
</tr>
<tr>
<td>Multitech GPRS modem, external</td>
<td>7ML1930-1EX</td>
</tr>
<tr>
<td>GPRS Modem antenna</td>
<td>7ML1930-1FF</td>
</tr>
<tr>
<td>RD500 Spare Module base</td>
<td>7ML1930-1FG</td>
</tr>
<tr>
<td>RD500 Spare End terminator</td>
<td>7ML1930-1FH</td>
</tr>
<tr>
<td>5' Ethernet Cat 5e Red X/O cable for configuration</td>
<td>7ML1930-1FT</td>
</tr>
</tbody>
</table>

Configuration limited to 16 modules.

C) Subject to export regulations AL: N, ECCN: EAR99
Schematics

Power Connection

RS232/PG
factory use only

RS-485

RD500 Port Pin Outs

RS-232/485 4-wire Connections

RS-485 2-wire Connections

Communication Ports

Programming Ports

Ethernet (Crossover)

Ethernet Connection (Port 3)

standard ethernet cable

SITRANS RD500 connections
Level instruments
### Electropneumatic positioners
#### SIPART PS2

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/2</td>
<td>Product Overview</td>
</tr>
<tr>
<td>6/3</td>
<td>Technical description</td>
</tr>
<tr>
<td>6/4</td>
<td>Technical specifications</td>
</tr>
<tr>
<td>6/8</td>
<td>- all versions</td>
</tr>
<tr>
<td>6/9</td>
<td>- SIPART PS2</td>
</tr>
<tr>
<td>6/11</td>
<td>- SIPART PS2 PA</td>
</tr>
<tr>
<td>6/13</td>
<td>- SIPART PS2 FF</td>
</tr>
<tr>
<td>6/15</td>
<td>- Add-on modules</td>
</tr>
<tr>
<td>6/18</td>
<td>- Ordering data</td>
</tr>
<tr>
<td>6/20</td>
<td>- SIPART PS2, PS2 PA, PS2 FF</td>
</tr>
<tr>
<td>6/21</td>
<td>- Accessories</td>
</tr>
<tr>
<td>6/23</td>
<td>- Dimensional drawings</td>
</tr>
<tr>
<td>6/24</td>
<td>- Schematics</td>
</tr>
<tr>
<td>6/25</td>
<td>- Mounting kit</td>
</tr>
</tbody>
</table>

#### Software

- Sec. 9 SIMATIC PDM, for parametrize HART and PROFIBUS PA devices

You can download all instructions, catalogs and certificates for SIPART PS2 free of charge at the following Internet address:

[www.siemens.com/positioners](http://www.siemens.com/positioners)
## Electropneumatic positioners

### Product Overview

#### Overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Catalog page</th>
<th>Software for parameterization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electropneumatic positioners</td>
<td>Position control of pneumatic linear or part-turn actuators, also for intrinsically safe operation</td>
<td>SIPART PS2</td>
<td>6/3</td>
</tr>
<tr>
<td></td>
<td>Universal device for positionning pneumatic actuators</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Connection: 4 to 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• HART, PROFIBUS PA or FOUNDATION Fieldbus</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Local manual operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Binary inputs and outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Diagnostic function</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Blocking function</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Automatic startup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>As above, but in flameproof enclosure for explosion-proof application</td>
<td>SIPART PS2</td>
<td>6/3</td>
</tr>
<tr>
<td></td>
<td>As above, but in flameproof aluminum enclosure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Electropneumatic positioners
SIPART PS2

Technical description

Overview

SIPART PS2 electropneumatic positioner in Makrolon enclosure

SIPART PS2 Ex d electropneumatic positioner in flameproof aluminium enclosure (Ex d)

SIPART PS2 in stainless steel enclosure

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
  - Programming through SIMATIC PDM
- Very high-quality control thanks to an online adaptation procedure
- Negligible air consumption in stationary operation
- "Tight shut-off" function (ensures maximum positioning pressure on the valve seat)
- 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 position sensor as option for extreme ambient conditions
- "Intelligent solenoid valve": Partial Stroke Test and solenoid valve function in a single device
- Partial Stroke Test e.g. for safety valves
- Can also be operated with natural gas
- 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 aluminium enclosure, as well as flameproof aluminum enclosure (Ex d)
- For double-action actuators: In Makrolon enclosure, stainless steel enclosure and flameproof aluminium enclosure (Ex d)
- For non-hazardous applications
- For hazardous applications in the versions
  - as intrinsically safe device (Ex ia/ib) or
  - in flameproof aluminium enclosure (Ex d) or
  - in Ex n design (non sparking)

and in the versions:

- With 0/4 ... 20 mA control with/without communication through HART signal
- With PROFINET PA communication interface
- With Foundation Fieldbus (FF) communications interface.

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.
Explosion-proof versions
The basic version of the device is available in an intrinsically safe design with degree of protection Ex ia/ib and approval for zone 2/zone 20 (dust).
Operation in zone 1 is permissible for the SIPART PS2 Ex d version with flameproof enclosure (see ‘Technical Data’). It is then permissible to use all option modules (except external actuator travel detection systems, SIA/GWK modules and NCS).

In a flameproof 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 those of the basic versions.

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 or with electronics for communication in accordance with
  - PROFIBUS PA specification, IEC 61158-2; bus-supplied device,
  - 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:
  - \( I_y \) module:
    - Position feedback as a two-wire signal 4 to 20 mA
  - Alarm unit (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 unit).

Limit value signal via mechanical contacts (limit value contact module)
Two limits can be signaled redundantly by switching contacts. An alarm output is also integrated in the module (see alarm unit).
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.
Electropneumatic positioners
SIPART PS2

Technical description

The SIPART PS2 electropneumatic 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 piezoelectric 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 system deviation (deviation between setpoint w and control output x). 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 (high-speed zone); in areas of moderate system deviation (slow-speed zone) it outputs a se-quence of pulses. No positioning signals are output in the case of a small system deviation (adaptive or variable dead zone).

The linear or rotary motion of the actuator is detected by the mounting kit and transferred to a high-quality potentiometer made of plastic conductive material 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 communications program
The SIMATIC PDM program is available for communication through the HART interface and also for the PROFIBUS PA coupling.

The SIMATIC PDM communication software allows for convenient remote operation and remote observation using a PC. The positioner can also be configured using this program. Parameters which provide important information for maintenance and fault diagnosis of the complete unit can also be determined using process data and comparison data.

When operating the SIPART PS2 through the HART interface, the connection is made directly to the 2-wire cable to the SIPART PS2 positioner through a HART modem that can be connected to the RS 232 or USB interface. The signals needed for communication in conformity with the HART protocol are superimposed on the current signal in accordance with the Frequency Shift Keying (FSK) method.

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 dead zone, 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.

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.
Electropneumatic positioners

SIPART PS2

Technical description

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 dead zone
- 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

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 color 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 display of the device also displays the graded maintenance requirements, complete with identification of the source of the fault.

Functional safety acc. to SIL 2

The SIPART PS2 positioners are also suitable for the control of fittings, which meet the special requirements of the functional safety up to SIL 2 to IEC 61508 or IEC 61511-1.

This is a single-action, venting positioner with an input of 4 to 20 mA, PROFIBUS PA and FOUNDATION Fieldbus (FF) 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 requirements:

- Functional safety up to SIL 2 to IEC 61508 or IEC 61511-1, from firmware version C4 or higher for safe venting
- Explosion protection for the versions 6DR5...-.E...
- Electromagnetic compatibility to EN 61326/A1, Appendix A.1

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 S2 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 fouling

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 PS2 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.

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)
- Split-range operation; adjustable start-of-scale and full-scale values
- Response threshold (dead zone); 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 shut-off" (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.
SiPART PS2, electropneumatic positioner, function diagram

1. Motherboard with microcontroller and input circuit
2. Control panel with display and pushbuttons
3. Piezoelectric valve unit, always present
4. Valve unit, present as accessory in double-action positioner
5. I/ module for SiPART PS2 controller
6. Alarm module for 3 alarm outputs and one binary input
7. SIA module (slot initiator alarm module, fig.) or limit value contact module
8. Spring loaded pneumatic actuator (single-action)
9. Springless pneumatic actuator (double-action)

Note:
Alarm module (6) and SIA module (7) can only be inserted as alternatives.
## Technical specifications

### SIPART PS2 (all versions)

<table>
<thead>
<tr>
<th>General data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of stroke (linear actuators)</td>
</tr>
<tr>
<td>Angle of rotation (part-turn actuators)</td>
</tr>
<tr>
<td>Assembly</td>
</tr>
<tr>
<td>- On linear actuators</td>
</tr>
<tr>
<td>- On part-turn actuators</td>
</tr>
<tr>
<td>Controller unit</td>
</tr>
<tr>
<td>- Five-point switch</td>
</tr>
<tr>
<td>- Deadband</td>
</tr>
<tr>
<td>- dEbA = Auto</td>
</tr>
<tr>
<td>- dEbA = 0.1 ... 10 %</td>
</tr>
<tr>
<td>A/D converter</td>
</tr>
<tr>
<td>- Scan time</td>
</tr>
<tr>
<td>- Resolution</td>
</tr>
<tr>
<td>- Transmission error</td>
</tr>
<tr>
<td>- Temperature influence effect</td>
</tr>
<tr>
<td>Cycle time</td>
</tr>
<tr>
<td>- 20 mA/HART device</td>
</tr>
<tr>
<td>- PA device</td>
</tr>
<tr>
<td>- FF device</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Binary input BE1 (terminals 9/10; electrically conn. to basic device)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable only for floating contact; max. contact load &lt; 5 μA with 3 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61326/A1 Appendix A.1 and NAMUR NE21 August 98</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Enclosure</td>
</tr>
<tr>
<td>- 6DRS.0...-... (plastic)</td>
</tr>
<tr>
<td>- 6DRS.1...-... (aluminum)</td>
</tr>
<tr>
<td>- 6DRS.2...-... (stainless steel)</td>
</tr>
<tr>
<td>- 6DRS.5...-... (alum., press.-proof)</td>
</tr>
<tr>
<td>- Pressure gauge block</td>
</tr>
<tr>
<td>- Vibration resistance</td>
</tr>
<tr>
<td>- Harmonic oscillations (sine-wave)</td>
</tr>
<tr>
<td>- Bumping (half sine)</td>
</tr>
<tr>
<td>- Noise (digitally controlled)</td>
</tr>
<tr>
<td>- Valve leakage</td>
</tr>
<tr>
<td>- Valve leakage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight, basic device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. 0.9 kg (1.98 lb)</td>
</tr>
</tbody>
</table>

### Pneumatic data

#### Auxiliary power (air supply)

- Pressure: Compressed air, nitrogen or cleaned natural gas
- 1.4 ... 7 bar (20.3 ... 101.5 psi): Sufficiently greater than max. drive pressure (actuating pressure)

#### Air quality to ISO 8573-1

- Solid particulate size and density
- Pressure dew point
- Oil content
- Pressure leakage
- Throttle ratio

#### Unrestricted flow (DIN 1945)

- Inlet air valve (ventilator) | 4.1 Nm³/h (18.1 USgpm) |
- Outlet air valve (vent actuator) | 8.2 Nm³/h (36.1 USgpm) |
- Valve leakage | < 3.6 10⁻⁴ Nm³/h (0.0158 USgpm) |

#### Device versions

- In Makrolon enclosure | Single-acting and double-acting |
- In stainless steel enclosure | Single-acting and double-acting |
- In pressure-proof aluminum enclosure | Single-acting and double-acting |

#### CE marking

- Suitable for floating contact; max. contact load < 5 μA with 3 V

#### Certificates and approvals

For gases of fluid group 1, complies with requirements of article 3, par. 3 (sound engineering practice SEP)
### Technical specifications

<table>
<thead>
<tr>
<th>SIPART PS2</th>
<th>Basic device without Ex protection</th>
<th>Basic device with Ex d protection (flameproof enclosure)</th>
<th>Basic device with Ex ia/ib protection</th>
<th>Basic device with Ex n/dust protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explosion protection ATEX</strong></td>
<td>-</td>
<td>Ex d II 2 G Ex d II C T6</td>
<td>Ex ia/ib II 2 G Ex ia/ib II C T6</td>
<td>Ex n II 3 G Ex nA nL[nL] IIC T6</td>
</tr>
<tr>
<td><strong>Mounting location</strong></td>
<td>Zone 1</td>
<td>Zone 1</td>
<td>Zone 1</td>
<td>Zone 2/22</td>
</tr>
<tr>
<td><strong>Permissible ambient temperature for operation</strong></td>
<td>-30 ... +80 °C (-22 ... +176 °F)</td>
<td>T4: -30 ... +80 °C (-22 ... +176 °F)</td>
<td>T5: -30 ... +65 °C (-22 ... +149 °F)</td>
<td>T6: -30 ... +50 °C (-22 ... +122 °F)</td>
</tr>
</tbody>
</table>

### Electrical specifications

**Input**

- 2-wire connection (terminals 6/8)
- Rated signal range: 4 ... 20 mA
- Current to maintain the auxiliary power supply: \( \geq 3.6 \text{ mA} \)

#### Required load voltage \( U_{B} \) (corresponds to \( \Omega \) at 20 mA)

- **Without HART** (6DR50..)
  - Typical: \( 6.36 \text{ V} \) (corresponds to 318 \( \Omega \))
  - Max.: \( 6.48 \text{ V} \) (corresponds to 324 \( \Omega \))
- **Without HART** (6DR53..)
  - Typical: \( 7.9 \text{ V} \) (corresponds to 395 \( \Omega \))
  - Max.: \( 8.4 \text{ V} \) (corresponds to 420 \( \Omega \))
- **With HART** (6DR51..)
  - Typical: \( 6.6 \text{ V} \) (corresponds to 330 \( \Omega \))
  - Max.: \( 8.4 \text{ V} \) (corresponds to 420 \( \Omega \))
- **With HART** (6DR52..)
  - Typical: \( 8.4 \text{ V} \) (corresponds to 420 \( \Omega \))
  - Max.: \( 8.8 \text{ V} \) (corresponds to 440 \( \Omega \))

#### Internal capacitance \( C_{i} \)

- **Without HART**
  - Typical: 22 nF (at "nL")
- **With HART**
  - Typical: 7 nF (at "nL")

#### Internal inductance \( L_{i} \)

- **Without HART**
  - Typical: 0.12 mH (at "nL")
- **With HART**
  - Typical: 0.24 mH (at "nL")

#### Static destruction limit

- Typical: \( \pm 40 \text{ mA} \)

For connection to circuits with the following peak values

- \( U_{i} = 30 \text{ V DC} \)
- \( I_{i} = 100 \text{ mA} \)
- \( P_{i} = 1 \text{ W} \)
# Electropneumatic Positioners SIPART PS2

## Technical Specifications SIPART PS2

### 3-/4-wire Device (terminals 2/4 and 6/8) (6DR52.. and 6DR53..)

- **Power Supply** $U_H$
- **Current Consumption** $I_H$
- **Internal Capacitance** $C_i$
- **Internal Inductance** $L_i$
- **For Connection to Circuits with the Following Peak Values**

<table>
<thead>
<tr>
<th>Current Input $I_W$</th>
<th>Rated Signal Range</th>
<th>Load Voltage at 20 mA</th>
<th>Internal Capacitance $C_i$</th>
<th>Internal Inductance $L_i$</th>
<th>For Connection to Circuits with the Following Peak Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0/4 ... 20 mA$</td>
<td>$0/4 ... 20 mA$</td>
<td>$\leq 0.2 \text{ V (corresponds to } 10 \Omega)$</td>
<td>$22 \text{ nF}$</td>
<td>$0.12 \text{ mH}$</td>
<td>$U_i = 30 \text{ V DC}$, $I_i = 100 \text{ mA}$, $P_i = 1 \text{ W}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\leq 1 \text{ V (corresponds to } 50 \Omega)$</td>
<td>$22 \text{ nF (at } nL')$</td>
<td>$0.12 \text{ mH (at } nL')$</td>
<td>$U_i = 30 \text{ V DC}$, $I_i = 100 \text{ mA}$</td>
</tr>
</tbody>
</table>

### Electrical Isolation

<table>
<thead>
<tr>
<th>Test Voltage</th>
<th>Between $U_H$ and $I_W$ (2 Intrinsically Safe Circuits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>840 V DC, (1 s)</td>
<td>Between $U_H$ and $I_W$</td>
</tr>
</tbody>
</table>

### Connections

- **Electrical**
  - Screw terminals 2.5 AWG28-12
  - Cable gland M20x1.5 or ½-14 NPT
  - Ex d certified cable gland M20x1.5, ½-14 NPT or M25x1.5

- **Pneumatic**
  - Female thread G1/4 EN ISO 228-1 or ¼-18 NPT

### External Position Sensor (Potentiometer or NCS, as Option) with the Following Peak Values

- **$U_o$**
- **$I_o$ (Static)**
- **$I_s$ (Short-time)**
- **$P_o$**
- **Maximum Permissible External Capacitance $C_o$**
- **Maximum Permissible External Inductance $L_o$**
## Technical specifications

<table>
<thead>
<tr>
<th>SIPART PS2 PA</th>
<th>Basic device without Ex protection</th>
<th>Basic device with Ex d protection (flameproof enclosure)</th>
<th>Basic device with Ex ia/ib protection</th>
<th>Basic device with Ex n/ dust protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosion protection as per ATEX</td>
<td>Without</td>
<td>Ex d II 2 G Ex d II C T4/T5/T6</td>
<td>Ex ia/ib II 2 G Ex ia/ib II C T6</td>
<td>Ex n II 3 G Ex nA nL[nL] IIC T6 Dust II 3 D Ex d A22 IP66 T100°C Zone 2/2</td>
</tr>
<tr>
<td>Mounting location</td>
<td>Zone 1</td>
<td>Zone 1</td>
<td>Zone 1</td>
<td>Zone 2/2</td>
</tr>
<tr>
<td>Permissible ambient temperature for operation</td>
<td>-30 ... +80 °C (-22 ... +176 °F)</td>
<td>T4: -30 ... +80 °C (-22 ... +176 °F)</td>
<td>T4: -20 ... +75 °C (-4 ... +167 °F)</td>
<td>T4: -20 ... +75 °C (-4 ... +167 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T5: -30 ... +65 °C (-22 ... +149 °F)</td>
<td>T5: -20 ... +65 °C (-4 ... +149 °F)</td>
<td>T5: -20 ... +65 °C (-4 ... +149 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T6: -30 ... +50 °C (-22 ... +122 °F)</td>
<td>T6: -20 ... +50 °C (-4 ... +122 °F)</td>
<td>T6: -20 ... +50 °C (-4 ... +122 °F)</td>
</tr>
</tbody>
</table>

### Electrical specifications

#### Input

**Power supply (terminals 6/7)**

**Bus voltage**

- 9 ... 32 V
- 9 ... 24 V
- Bus-supplied

**Bus connection with supply unit**

- Intrinsically safe FISCO at "nA" and "tD":
  - Un = 32 V DC
  - at "nL":
    - FNICO

**Current consumption**

- 11.5 mA ± 10%
- 8 μH
- 8 μH (at "nL")

**Additional error signal**

- 0 mA
- Negligible

**Effective internal inductance L_i**

- Negligible
- Negligible

**Effective internal capacitance C_i**

- Negligible
- Negligible

**Safety shutdown can be activated with coding bridge (terminals 81/82; electrically isolated from the basic device)**

- Input resistance
  - > 20 kΩ
- Signal status "0" (shutdown active)
  - 0 ... 4.5 V or unused
- Signal status "1" (shutdown not active)
  - 13 ... 30 V

**Effective Internal capacitance C_i**

- For connection to power supply with
  - Max. supply voltage U_i
  - Max. short-circuit current I_i
  - Maximum power P_i

**Effective inductance L_i**

- Negligible
- Negligible

**Electrical isolation**

- Between basic device and the input for safety shutdown, as well as the outputs of the option modules:
  - Between basic device and the input for safety shutdown, as well as the outputs of the option modules:
    - At "nA", "nL", and "tD":
      - At "nA", "nL", and "tD":
        - 30 V
        - 100 mA
        - 1 W

**Test voltage**

- 840 V DC, 1 s
### Electropneumatic Positioners

**SIPART PS2**

#### Technical Specifications

**SIPART PS2 PA**

| Communication | Layers 1 and +2 according to PROFINET, transmission technology according to IEC 1158-2; slave function: layer 7 (protocol layer) according to PROFINET DP, EN 50170 standard with the extended PROFINET functions (all data acyclic, manipulated variable, feedbacks and status also cyclic) |
| C2 connections | Four connections to master class 2 are supported, automatic connection setup 60 s after break in communication |
| Device profile | PROFIBUS PA profile B, version 3.0, more than 150 objects |
| Response time to master message | Typically 10 ms |
| Device address | 126 (when delivered) |
| PC parameterizing software | SIMATIC PDM, supports all device objects. The software is not included in the scope of delivery |

#### Connections

| • Electrical | Screw terminals 2.5 AWG28-12 Cable gland M20x1.5 or ½-14 NPT | Screw terminals 2.5 AWG28-12 Ex d certified cable gland M20x1.5, ½-14 NPT or M25x1.5 | Screw terminals 2.5 AWG28-12 Cable gland M20x1.5 or ½-14 NPT | Female thread G¼ EN ISO 228-1 (¼ -18 NPT) |
| • Pneumatic | External position sensor (potentiometer or NCS, as option) with the following peak values |

| • $U_0$ | – | – | – | 5 V |
| • $I_o$ (static) | – | – | – | 75 mA |
| • $I_s$ (short-time) | – | – | 160 mA | – |
| • $P_o$ | – | – | – | 120 mW |
| • Maximum permissible external capacitance $C_o$ | – | – | – | 1 μF |
| • Maximum permissible external inductance $L_o$ | – | – | – | 1 mH |

**Basic device**

- without Ex protection
- with Ex d protection (flameproof enclosure)
- with Ex ia/ib protection
- with Ex n/dust protection

© Siemens AG 2010
## Technical specifications

<table>
<thead>
<tr>
<th>SIPART PS2 FF</th>
<th>Basic device without Ex protection</th>
<th>Basic device with Ex d protection (flameproof enclosure)</th>
<th>Basic device with Ex ia/ib protection</th>
<th>Basic device with Ex n/ dust protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosion protection as per ATEX</td>
<td>Without</td>
<td>Ex d II 2 G Ex d II C T4/T5/T6</td>
<td>Ex ia/ib II 2 G Ex ia/ib II C T6</td>
<td>Ex n II 3 G Ex nA n[L] II C T6 Dust</td>
</tr>
<tr>
<td>Mounting location</td>
<td>Zone 1</td>
<td>Zone 1</td>
<td>Zone 1</td>
<td>Zone 2/22</td>
</tr>
<tr>
<td>Permissible ambient temperature for operation</td>
<td>-30 ... +80 °C (-22 ... +176 °F)</td>
<td>T4: -30 ... +80 °C (-22 ... +149 °F)</td>
<td>T5: -30 ... +65 °C (-22 ... +149 °F)</td>
<td>T6: -30 ... +50 °C (-22 ... +122 °F)</td>
</tr>
</tbody>
</table>

### Electrical specifications

#### Input
- Power supply (terminals 6/7)
  - **Bus voltage**: 9 ... 32 V
  - Intrinsically safe FISCO: 9 ... 24 V
  - Intrinsically safe at "nA" and "tD": Un = 32 V DC
  - Intrinsically safe at "nL":
    - At "nA", "nL", and "tD": FNICO
    - At "nL": Un = 32 V DC

#### Additional error signal
- **Current consumption**: 10.5 mA ± 10 %
- **Effective internal inductance Li**: 8 μH
- **Effective internal capacitance Ci**: Negligible

#### Safety shutdown
- **Input resistance**: > 20 kΩ
- **Signal status "0" (shutdown active)**: 0 ... 4.5 V or unused
- **Signal status "1" (shutdown not active)**: 13 ... 30 V
- **Effective Internal capacitance Ci**: Negligible
- **Effective internal inductance Li**: Negligible

#### Electrical isolation
- **For connection to power supply with intrinsically safe**: At "nA", "nL", and "tD"
  - **Max. supply voltage Uj**: 30 V
  - **Max. short-circuit current Ij**: 100 mA
  - **Max. power Pj**: 1 W

### Test voltage
- **840 V DC, 1 s**
## Electropneumatic positioners

### SIPART PS2 FF

#### Technical specifications

**SIPART PS2 FF**

<table>
<thead>
<tr>
<th>Communication</th>
<th>Basic device without Ex protection</th>
<th>Basic device with Ex d protection (flameproof enclosure)</th>
<th>Basic device with Ex ia/ib protection</th>
<th>Basic device with Ex n/ dust protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communications group and class</strong></td>
<td>According to technical specification of the Fieldbus Foundation for H1 communication</td>
<td>Group 3, Class 31PS (publisher, subscriber)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Function blocks</strong></td>
<td>1 resource block (RB2)</td>
<td>1 analog output function block (AO)</td>
<td>1 PID function block (PID)</td>
<td>1 transducer block (standard advanced positioner valve)</td>
</tr>
<tr>
<td><strong>Execution times of the blocks</strong></td>
<td>AO: 60 ms</td>
<td></td>
<td>PID: 80 ms</td>
<td></td>
</tr>
<tr>
<td><strong>Physical layer profile</strong></td>
<td>123, 511</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FF registration</strong></td>
<td>Tested with ITK 5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Device address</strong></td>
<td>22 (when delivered)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Connections**

- **Electrical**
  - Screw terminals 2.5 AWG28-12
  - Cable gland M20x1.5 or ½-14 NPT
  - Ex d certified cable gland M20x1.5, ½-14 NPT or M25x1.5
- **Pneumatic**
  - Female thread G¼ EN ISO 228-1 (¼ -18 NPT)

**External position sensor**

- **U₀**
- **Iₜ (static)**
- **Iₜ (short-time)**
- **Pₒ**
- Maximum permissible external capacitance **Cₒ**
- Maximum permissible external inductance **Lₒ**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Technical specifications

#### Add-on modules

<table>
<thead>
<tr>
<th>Add-on modules</th>
<th>Without Ex protection/ with Ex d protection</th>
<th>With Ex ia/ib protection</th>
<th>With Ex n/dust protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex protection acc. to ATEX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible ambient temperature for operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(For devices with Ex protection: Only in conjunction with the basic device 6DR5... -E... Only T4 permissible when using Iy module.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Alarm unit

**Binary alarm outputs A1, A2 and alarm output**

- Signal status High (not responded)
  - Signal status Low* (responded)
  - Internal capacitance C_i
  - Internal inductance L_i
  - Power supply U_H
  - Connecting to circuits with the following peak values

**Binary input BE2**

- Electrically connected to the basic device
  - Signal status 0
  - Signal status 1
  - Contact load
- Electrically isolated from the basic device
  - Signal status 0
  - Signal status 1
  - Natural resistance
- Static destruction limit
- Internal inductance and capacitance
- Connecting to circuits with the following peak values

**Electrical isolation**

- Test voltage
  - 840 V DC, 1 s

---

1) Only in conjunction with the basic device 6DR5... -E... Only T4 permissible when using Iy module.
### Technical specifications

#### Add-on modules

<table>
<thead>
<tr>
<th>Add-on modules</th>
<th>Without Ex protection/with Ex d protection</th>
<th>With Ex ia/ib protection</th>
<th>With Ex n/dust protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIA module</strong>&lt;br&gt;Limit transmitter with slot-type initiators and alarm output</td>
<td>6DR4004-8G (not for Ex d version)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex protection</td>
<td>Without</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>2-wire system to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 slot-type initiators</td>
<td>Type SJ2-SN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>NC (normally closed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting to circuits with the following peak values</td>
<td>rated voltage 8 V</td>
<td>Intrinsic safety switching amplifier EN 60947-5-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 3 mA (limit value not responded)</td>
<td>at &quot;nA&quot; and &quot;tD&quot;:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 1 mA (limit value responded)</td>
<td>$U_I = 15.5$ V DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal capacitance $C_i$</td>
<td>$I_i = 25$ mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal inductance $L_i$</td>
<td>$P_i = 64$ mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply UH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$U_{ij} \leq 35$ V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i \leq 20$ mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting to circuits with the following peak values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit value contact module</td>
<td>6DR4004-8K (not for Ex d version)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit transmitter with mechanical ground contact and alarm output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit transmitter A1, A2</td>
<td>Without</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching current AC/DC</td>
<td>4 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching voltage AC/DC</td>
<td>250 V/24 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal capacitance $C_i$</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal inductance $L_i$</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply UH</td>
<td>$U_{ij} \leq 35$ V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i \leq 20$ mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting to circuits with the following peak values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical isolation</td>
<td>The 3 outputs are electrically isolated from the basic device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test voltage</td>
<td>840 V DC, 1 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm output</td>
<td>To switching amplifier according to EN 60947-5-6 (NAMUR), $U_{iH} = 8.2$ V, $R_i = 1$ kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$R = 1.1$ kΩ</td>
<td>≥ 2.1 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$R_i = 10$ kΩ</td>
<td>≤ 1.2 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal capacitance $C_i$</td>
<td>5.2 nF</td>
<td>5.2 nF (at &quot;nL&quot;)</td>
</tr>
<tr>
<td></td>
<td>Internal inductance $L_i$</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Power supply UH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$U_{ij} \leq 35$ V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i \leq 20$ mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting to circuits with the following peak values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit value contact module</td>
<td>6DR4004-8K (not for Ex d version)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit transmitter with mechanical ground contact and alarm output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit transmitter A1, A2</td>
<td>Without</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex protection</td>
<td>II 2 G Ex ia/ib IIC T6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching current AC/DC</td>
<td>4 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching voltage AC/DC</td>
<td>250 V/24 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal capacitance $C_i$</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal inductance $L_i$</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply UH</td>
<td>$U_{ij} \leq 35$ V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i \leq 20$ mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting to circuits with the following peak values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical isolation</td>
<td>The 3 outputs are electrically isolated from the basic device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test voltage</td>
<td>3150 V DC, 2 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm output</td>
<td>To switching amplifier according to EN 60947-5-6 (NAMUR), $U_{iH} = 8.2$ V, $R_i = 1$ kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$R = 1.1$ kΩ</td>
<td>≥ 2.1 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$R_i = 10$ kΩ</td>
<td>≤ 1.2 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal capacitance $C_i$</td>
<td>5.2 nF</td>
<td>5.2 nF (at &quot;nL&quot;)</td>
</tr>
<tr>
<td></td>
<td>Internal inductance $L_i$</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Power supply UH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$U_{ij} \leq 35$ V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i \leq 20$ mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting to circuits with the following peak values</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Add-on modules

<table>
<thead>
<tr>
<th>Add-on modules</th>
<th>Without Ex protection/ with Ex d protection</th>
<th>With Ex ia/ib protection</th>
<th>With Ex n protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Iy module</strong></td>
<td>6DR4004-8J</td>
<td>6DR4004-6J</td>
<td></td>
</tr>
<tr>
<td>DC output for position feedback</td>
<td>2-wire connection</td>
<td>4 ... 20 mA, short-circuit-proof</td>
<td></td>
</tr>
<tr>
<td>Rated signal range</td>
<td></td>
<td>3.6 ... 20.5 mA</td>
<td></td>
</tr>
<tr>
<td>Total operating range</td>
<td>+12 ... +35 V</td>
<td>+12 ... +30 V</td>
<td></td>
</tr>
<tr>
<td>Power supply $U_{II}$</td>
<td>$\leq (U_{II} [V] - 12 V) / i [mA]$</td>
<td>$\leq 0.3 %$</td>
<td></td>
</tr>
<tr>
<td>External loads $R_B [k\Omega]$</td>
<td>$\leq 0.1 %/10 K (\leq 0.1 %/18 ^{\circ}F)$</td>
<td>$\leq 0.1 %$</td>
<td></td>
</tr>
<tr>
<td>Temperature influence effect</td>
<td>$\leq 1 %$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual ripple</td>
<td>-</td>
<td>11 nF</td>
<td>11 nF (at &quot;nL&quot;)</td>
</tr>
<tr>
<td>Internal capacitance $C_i$</td>
<td>-</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Internal inductance $L_i$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>For connection to circuits with the following peak values</td>
<td>Intrinsically safe: $U_i = 30 V$ DC</td>
<td>at &quot;nA&quot; and &quot;ID&quot;: $U_i = 30 V$ DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i = 100 mA$</td>
<td>$I_i = 100 mA$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$P_i = 1 W$ (only T4)</td>
<td>$P_i = 1 W$ (only T4)</td>
<td></td>
</tr>
<tr>
<td>Electrical isolation</td>
<td>Electrically isolated from the basic device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test voltage</td>
<td>840 V DC, 1 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NCS sensor</strong></td>
<td>(not for Ex d version)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position range</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>• Linear actuator</td>
<td>3 ... 130 mm (0.12 ... 5.12 inch), to 200 mm (7.87 inch) on request</td>
<td>3 ... 130 mm (0.12 ... 5.12 inch), to 200 mm (7.87 inch) on request</td>
<td>-</td>
</tr>
<tr>
<td>• Part-turn actuator</td>
<td>30° ... 100° (not for Ex d version)</td>
<td>30° ... 100°</td>
<td>-</td>
</tr>
<tr>
<td>Linearity (after correction by SIPART PS2)</td>
<td>± 1%</td>
<td>± 1%</td>
<td>-</td>
</tr>
<tr>
<td>• Linear actuator</td>
<td>± 1%</td>
<td>± 1%</td>
<td>-</td>
</tr>
<tr>
<td>• Part-turn actuator</td>
<td>± 0.2%</td>
<td>± 0.2%</td>
<td>-</td>
</tr>
<tr>
<td>Hysteresis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous working temperature</td>
<td>-40 °C ... +85 °C (-40 °F ... +185 °F), extended temperature range on request</td>
<td>-40 °C ... +85 °C (-40 °F ... +185 °F), extended temperature range on request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 mm (0.28 inch), 5 ... 54 Hz</td>
<td>500 m/s² (1640 ft/s²), 80 ... 200 Hz</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance Harmonic oscillations (sine-wave) according to EN 60062-2-6/05.96</td>
<td>Intrinsically safe</td>
<td>at &quot;nL&quot;: $U_i = 5 V$ DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_i = 5 V$ DC</td>
<td>$I_i = 5 V$ DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal capacitance $C_i$</td>
<td>10 nF</td>
<td>10 nF (at &quot;nL&quot;)</td>
</tr>
<tr>
<td></td>
<td>Internal inductance $L_i$</td>
<td>240 μH</td>
<td>240 μH (at &quot;nL&quot;)</td>
</tr>
<tr>
<td>Degree of protection of enclosure</td>
<td>IP68/NEMA 4X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© Siemens AG 2010
**Electropneumatic positioners**

**SIPART PS2**

### Ordering data

**SIPART PS2, PS2 PA, PS2 FF**

<table>
<thead>
<tr>
<th>Selection and ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIPART PS2 electropneumatic positioner, without Ex protection, Ex ia/ib and Ex n</td>
<td>6 DR 5 0 0 A</td>
</tr>
</tbody>
</table>

#### Version

- 2-wire (4 to 20 mA)
  - Without HART
  - With HART, not explosion-protected
  - With HART, explosion-protected
  - Without HART, not explosion-protected

#### Enclosure

- Makrolon
- Aluminum; only single-action
- Stainless steel (without window)

#### Explosion protection

- Without
- With explosion protection Ex ia/ib (CENELEC/FM/CSA)
- With explosion protection Ex n (CENELEC/ATEX)

#### Connection thread

- **electrical/pneumatic**
  - M20 x 1.5 / G¼
  - ½-14 NPT / ¼-18 NPT

- **with plug**
  - M12 / G¼
  - M12 / ¼-18 NPT

#### Limit monitor

- Installed, incl. 2nd cable gland
- Without

#### Option modules

- Installed, incl. 2nd cable gland
- Alarm module; electronic (6DR4004-)
- SIA module; slot-type initiators (6DR4004-)
- Limit value contact module (mechanical switching contacts (6DR4004-)

#### Further designs

Add “-Z” to Order No. and specify Order Code.

<table>
<thead>
<tr>
<th>Gauge made of steel</th>
<th>Gauge made of steel</th>
<th>Gauge made of steel</th>
<th>Gauge made of steel</th>
<th>Gauge made of stainless steel 316, stainless steel block 316, single-action G¼, scaled in MPa, bar and psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1A</td>
<td>R2A</td>
<td>R1B</td>
<td>R2B</td>
<td></td>
</tr>
</tbody>
</table>

1) Maximum impact energy on the enclosure: 1 Joule
2) For device versions in Makrolon enclosure: it is essential to prevent electrostatic charging.
3) Connection thread, electrical using NPT adapter on Makrolon and aluminum enclosure.
4) Available in April 2010
### Selection and ordering data

<table>
<thead>
<tr>
<th>Measuring point number (TAG No.)</th>
<th>Measuring point description</th>
<th>Measuring point text</th>
<th>TAG plate made of stainless steel, 3-line</th>
<th>Preset bus address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 8 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: <strong>Y17:</strong> ........</td>
<td>Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: <strong>Y15:</strong> ........</td>
<td>Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: <strong>Y16:</strong> ........</td>
<td>Text line 1: Plain text from Y17, Text line 2: Plain text from Y15, Text line 3: Plain text from Y16</td>
<td>Specify in plain text: <strong>Y25:</strong> ........ (only for 6DR55.. and 6DR56..)</td>
</tr>
</tbody>
</table>

---

5) Only for Makrolon enclosure, for other enclosures on request.
## Electropneumatic positioners

### SIPART PS2

### Ordering data

**SIPART PS2 Ex d, PS2 Ex d PA, PS2 Ex d FF**

<table>
<thead>
<tr>
<th>Selection and ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIPART PS2 electropneumatic positioner, Ex d explosion protection, aluminum enclosure, without cable gland</td>
<td>6DR550E-0A</td>
</tr>
<tr>
<td><strong>Version</strong></td>
<td></td>
</tr>
<tr>
<td>2-wire (4 to 20 mA)</td>
<td>0</td>
</tr>
<tr>
<td>• Without HART</td>
<td>1</td>
</tr>
<tr>
<td>• With HART</td>
<td>2</td>
</tr>
<tr>
<td>2-, 3-, 4-wire (0/4 to 20 mA)</td>
<td>3</td>
</tr>
<tr>
<td>• Without HART</td>
<td>4</td>
</tr>
<tr>
<td>PROFIBUS PA connection</td>
<td>5</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus connection</td>
<td>6</td>
</tr>
<tr>
<td><strong>For actuator</strong></td>
<td></td>
</tr>
<tr>
<td>Single-action</td>
<td>1</td>
</tr>
<tr>
<td>Double-action</td>
<td>2</td>
</tr>
<tr>
<td><strong>Connection thread electrical/pneumatic</strong></td>
<td></td>
</tr>
<tr>
<td>M20 x 1.5 / G ¼</td>
<td>G</td>
</tr>
<tr>
<td>¼-14 NPT / ¼-18 NPT</td>
<td>N</td>
</tr>
<tr>
<td>M20 x 1.5 / ¼-18 NPT</td>
<td>M</td>
</tr>
<tr>
<td>¼-14 NPT / G ¼</td>
<td>P</td>
</tr>
<tr>
<td>M25x1.5 / G ¼</td>
<td>Q</td>
</tr>
<tr>
<td><strong>Limit monitor</strong></td>
<td></td>
</tr>
<tr>
<td>Integrated</td>
<td>0</td>
</tr>
<tr>
<td>Without</td>
<td>1</td>
</tr>
<tr>
<td>Alarm module; electronic (6DR4004-8A)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Option modules</strong></td>
<td></td>
</tr>
<tr>
<td>Integrated</td>
<td>3</td>
</tr>
<tr>
<td>Without</td>
<td>4</td>
</tr>
<tr>
<td>Iy module for position feedback signal (4 ... 20 mA) (6DR4004-8J)</td>
<td>5</td>
</tr>
<tr>
<td><strong>Customer-specific design</strong></td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>6</td>
</tr>
<tr>
<td><strong>Brief instructions</strong></td>
<td></td>
</tr>
<tr>
<td>German/English</td>
<td>A</td>
</tr>
<tr>
<td>French/Spanish/Italian</td>
<td>B</td>
</tr>
<tr>
<td><strong>Mounted pressure gauge block</strong></td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>7</td>
</tr>
<tr>
<td>Single-action G ¼, scaled in MPa and bar</td>
<td>8</td>
</tr>
<tr>
<td>Double-action G ¼, scaled in MPa and bar</td>
<td>9</td>
</tr>
<tr>
<td>Single-action ¼-18 NPT, scaled in MPa and psi</td>
<td>10</td>
</tr>
<tr>
<td>Double-action ¼-18 NPT, scaled in MPa and psi</td>
<td>11</td>
</tr>
<tr>
<td>Gauge version with order code R. (see Further designs)</td>
<td>12</td>
</tr>
<tr>
<td><strong>Further designs</strong></td>
<td></td>
</tr>
<tr>
<td>Add “-Z” to Order No. and specify Order Code.</td>
<td></td>
</tr>
<tr>
<td>Gauge made of steel, aluminium block, single-action G ¼, scaled in MPa, bar and psi</td>
<td>R1A</td>
</tr>
<tr>
<td>Gauge made of steel, aluminium block, double-action G ¼, scaled in MPa, bar and psi</td>
<td>R2A</td>
</tr>
<tr>
<td>Gauge made of steel, aluminium block, single-action ¼-18 NPT, scaled in MPa, bar and psi</td>
<td>R1B</td>
</tr>
<tr>
<td>Gauge made of steel, aluminium block, double-action ¼-18 NPT, scaled in MPa, bar and psi</td>
<td>R2B</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block 316, single-action G ¼, scaled in MPa, bar and psi</td>
<td>R1C</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block 316, double-action G ¼, Skalierung MPa, bar, psi</td>
<td>R2C</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block 316, single-action ¼-18 NPT, scaled in MPa, bar and psi</td>
<td>R1D</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block 316, double-action ¼-18 NPT, scaled in MPa, bar and psi</td>
<td>R2D</td>
</tr>
<tr>
<td><strong>Measuring point number (TAG No.)</strong></td>
<td></td>
</tr>
<tr>
<td>Max. 8 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y17: .........</td>
<td>Y17</td>
</tr>
<tr>
<td><strong>Measuring point description</strong></td>
<td></td>
</tr>
<tr>
<td>Max. 16 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y15: .........</td>
<td>Y15</td>
</tr>
<tr>
<td><strong>Measuring point text</strong></td>
<td></td>
</tr>
<tr>
<td>Max. 24 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y16: .........</td>
<td>Y16</td>
</tr>
<tr>
<td><strong>TAG plate made of stainless steel, 3-line</strong></td>
<td></td>
</tr>
<tr>
<td>Text line 1: Plain text from Y17</td>
<td>A</td>
</tr>
<tr>
<td>Text line 2: Plain text from Y15</td>
<td>B</td>
</tr>
<tr>
<td>Text line 3: Plain text from Y16</td>
<td>C</td>
</tr>
<tr>
<td><strong>Preset bus address</strong></td>
<td></td>
</tr>
<tr>
<td>Specify in plain text: Y25: .........</td>
<td>Y25</td>
</tr>
</tbody>
</table>

1) Available in April 2010
2) On request

---

© Siemens AG 2010
### Selection and ordering data

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCS sensor</td>
<td>6DR4004-NN</td>
</tr>
<tr>
<td>for non-contacting detection of position (not for Ex d version), cable length 6 m (19.68 ft)</td>
<td></td>
</tr>
<tr>
<td>Non explosion-proof</td>
<td>8</td>
</tr>
<tr>
<td>Explosion-protected, Ex ia/ib</td>
<td>6</td>
</tr>
<tr>
<td>For part-turn actuators, without mounting console</td>
<td>1</td>
</tr>
<tr>
<td>For linear actuators up to 14 mm (0.55 inch), without mounting bracket</td>
<td>2</td>
</tr>
<tr>
<td>For linear actuators &gt;14 mm (0.55 inch), up to 130 mm (5.12 inch), mounting kit same as for SIPART PS2 (sep. ordering item). The EMC filter module is additionally required for the controller unit (sep. order item, see below)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Selection and ordering Data

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm unit for 3 alarm outputs and 1 binary input (functionality: 2 limit monitors, 1 fault alarm, 1 binary input)</td>
<td>6DR4004-8A</td>
</tr>
<tr>
<td>• Not explosion-proof</td>
<td></td>
</tr>
<tr>
<td>• With explosion protection CENELEC/ATEX</td>
<td>6DR4004-6A</td>
</tr>
<tr>
<td>• With explosion protection FM/CSA ¹)</td>
<td>6DR4004-7A</td>
</tr>
<tr>
<td>SIA module (slot-type initiator alarm unit, not for Ex d version)</td>
<td>6DR4004-8G</td>
</tr>
<tr>
<td>• Not explosion-proof</td>
<td></td>
</tr>
<tr>
<td>• With CENELEC/ATEX and FM/CSA explosion protection ¹)</td>
<td>6DR4004-6G</td>
</tr>
<tr>
<td>Limit value contact module (with mechanical ground contacts, not for Ex d version)</td>
<td>6DR4004-8K</td>
</tr>
<tr>
<td>• Not explosion-proof</td>
<td></td>
</tr>
<tr>
<td>• With explosion protection</td>
<td>6DR4004-6K</td>
</tr>
<tr>
<td>HART modem for connecting to PC or laptop</td>
<td>6DR4004-8J</td>
</tr>
<tr>
<td>• Not explosion-proof</td>
<td></td>
</tr>
<tr>
<td>• With explosion protection CENELEC/ATEX</td>
<td>6DR4004-6J</td>
</tr>
<tr>
<td>• With explosion protection FM/CSA ¹)</td>
<td>6DR4004-7J</td>
</tr>
<tr>
<td>EMC filter module for connection of external position sensor (10 kΩ) or NCS sensor (not for Ex d version)</td>
<td>C73451-A430-D23</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block, single-action G¼, scaled in MPa, bar and psi</td>
<td>6DR4004-2Q²)</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block, double-action G¼, ¼-18 NPT, scaled in MPa, bar and psi</td>
<td>6DR4004-1Q²)</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block, double-action ¼-18 NPT, in MPa, bar and psi</td>
<td>6DR4004-2QN²)</td>
</tr>
<tr>
<td>Two terminal blocks made of stainless steel 316. For replacement of the aluminum terminal blocks in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators.</td>
<td>6DR4004-8N²)</td>
</tr>
<tr>
<td>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.</td>
<td>6DR4004-9N²)</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block, single-action G¼, scaled in MPa, bar and psi</td>
<td>6DR4004-1RN</td>
</tr>
<tr>
<td>Gauge made of stainless steel 316, stainless steel block, double-action ¼-18 NPT, in MPa, bar and psi</td>
<td>6DR4004-2RN</td>
</tr>
<tr>
<td>Coupler for NAMUR part-turn actuators</td>
<td>TGX:16152-105</td>
</tr>
<tr>
<td>(VDI/VDE 3845, with plastic coupling wheel, without mounting console)</td>
<td></td>
</tr>
<tr>
<td>(VDI/VDE 3845, with stainless steel coupling, without mounting console)</td>
<td></td>
</tr>
<tr>
<td>The following mounting consoles can be used with the NAMUR part-turn actuator mounting kit 6DR4004-8D. Size W x L x H (H = height of shaft butt)</td>
<td></td>
</tr>
<tr>
<td>• 30 x 80 x 20 mm</td>
<td></td>
</tr>
<tr>
<td>• 30 x 80 x 30 mm</td>
<td></td>
</tr>
<tr>
<td>• 30 x 130 x 30 mm</td>
<td></td>
</tr>
<tr>
<td>• 30 x 130 x 50 mm</td>
<td></td>
</tr>
<tr>
<td>Mounting kit for other part-turn actuators</td>
<td>TGX:16152-328</td>
</tr>
<tr>
<td>The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.</td>
<td></td>
</tr>
<tr>
<td>• SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A</td>
<td></td>
</tr>
<tr>
<td>• Masoneilan Camflex II</td>
<td></td>
</tr>
<tr>
<td>• Fisher 1051/1052, size 33</td>
<td></td>
</tr>
<tr>
<td>• Fisher 1051/1052/1061, sizes 30, 40, 60 to 70</td>
<td></td>
</tr>
<tr>
<td>• Fisher 1051/1052, size 33</td>
<td></td>
</tr>
<tr>
<td>Mounting kit for NAMUR linear actuators</td>
<td>TGX:16152-350</td>
</tr>
<tr>
<td>NAMUR linear actuator mounting kit with short lever arm (2 to 35 mm)</td>
<td></td>
</tr>
<tr>
<td>• Lever arm for travels from 35 mm to 130 mm (1.38 inch to 5.12 inch)</td>
<td></td>
</tr>
<tr>
<td>• Reduced mounting kit for linear actuator (like 6DR4004-8V but without fixing angle and U-bolt), with short lever with up to 35 mm (1.38 inch) travel</td>
<td></td>
</tr>
<tr>
<td>• Reduced mounting kit for linear actuator (like 6DR4004-8V but without fixing angle and U-bolt), with short lever with up to 35 mm (1.38 inch) travel</td>
<td></td>
</tr>
</tbody>
</table>

¹) For NAMUR part-turn actuators.
²) For NAMUR linear actuators.
## Electropneumatic positioners

### SIPART PS2

#### Ordering data

<table>
<thead>
<tr>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting kit for other linear actuators</td>
</tr>
<tr>
<td>• Retrofitting kit for Moore series 72 and 750 valve positioners (C)</td>
</tr>
<tr>
<td>• Fisher type 657/657, size 30 to 80 (C)</td>
</tr>
<tr>
<td>• Samson actuator type 3277 (yoke dimension H5 = 101 mm) (integrated connection without tube), not for Ex d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pipe mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bracket for pipe mounting of the SIPART PS2 positioner (e.g. when using the NCS sensor)</td>
</tr>
<tr>
<td>Additional actuator components can be found at the following Internet address: <a href="http://www.siemens.de/sipartps2">www.siemens.de/sipartps2</a></td>
</tr>
<tr>
<td>Customer-specific mounting kits avail. on request.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manomoter made from plastic, including pressure gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>For single-action SIPART PS2 positioner (2 manometers, scaled in MPa and bar)</td>
</tr>
<tr>
<td>For double-action SIPART PS2 positioner (3 manometers, scaled in MPa and bar)</td>
</tr>
<tr>
<td>For single-action SIPART PS2 positioner with NPT thread (2 manometers, scaled in MPa and psi)</td>
</tr>
<tr>
<td>For double-action SIPART PS2 positioner with NPT thread (3 manometers, scaled in MPa and psi)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection block, for safety solenoid valve with extended mounting flange to NAMUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>• For mounting to IEC 534-6</td>
</tr>
<tr>
<td>• For SAMSON actuator (integrated mounting) see above</td>
</tr>
</tbody>
</table>

| External position detection system (with explosion protection to CENELEC/ATEX, Ex ia, ib) for separate mounting of position sensor and controller (not for Ex d version), comprising SIPART PS2 Makrolon casing with integral potentiometer and sliding clutch (without electronics and valve block). The EMC filter module is additionally required for the controller unit. (separate ordering item, see below). |

<table>
<thead>
<tr>
<th>Documentation (see notes below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction Manual for SIPART PS2</td>
</tr>
<tr>
<td>• German/English</td>
</tr>
<tr>
<td>• French/Italian/Spanish</td>
</tr>
<tr>
<td>Instruction Manual for SIPART PS2 PROFIBUS PA</td>
</tr>
<tr>
<td>• German/English</td>
</tr>
<tr>
<td>• French/Italian/Spanish</td>
</tr>
<tr>
<td>Instruction Manual for NCS Sensor</td>
</tr>
<tr>
<td>• German/English/French/Spanish/Italian</td>
</tr>
<tr>
<td>SIPART PS2 device documentation</td>
</tr>
<tr>
<td>• CD-ROM with complete documentation for all device versions</td>
</tr>
<tr>
<td>Device manual for SIPART PS2 (not PA and FF)</td>
</tr>
<tr>
<td>• German</td>
</tr>
<tr>
<td>• English</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SITRANS I200 output isolator HART</th>
</tr>
</thead>
<tbody>
<tr>
<td>(see &quot;SITRANS I supply units and isolation amplifiers&quot;) with</td>
</tr>
<tr>
<td>• 24 V DC power supply</td>
</tr>
</tbody>
</table>

## More Information

### Special versions

- 6DR4004-8S
- 6DR4004-1M
- 6DR4004-1MN
- 6DR4004-2M
- 6DR4004-2MN
- 6DR4004-1B
- 6DR4004-1C

### Scope of delivery for positioner

- 1 SIPART PS2 positioner as ordered
- 1 CD-ROM with the complete documentation for all versions and accessories
- Manual "SIPART PS2 - Configuration At a Glance"

### Note:

All the above mentioned manuals are included on CD-ROM and can be downloaded from www.siemens.de/sipartps2.

Following manuals are available in addition as downloads from the Internet or are included on CD-ROM:

- Instruction Manual Compact SIPART PS2 FF, Electropneumatic Positioner (6DR56..) with Foundation Fieldbus - German/English: A5E00214570
- Instruction Manual SIPART PS2 FF, Electropneumatic Positioner (6DR56..) with FOUNDATION Fieldbus - German: A5E00214568 - English: A5E00214569

### Scope of delivery for positioner

- 1 SIPART PS2 positioner as ordered
- 1 CD-ROM with the complete documentation for all versions and accessories
- Manual "SIPART PS2 - Configuration At a Glance"
**Dimensional drawings**

Makrolon and stainless steel enclosure (top), aluminum enclosure (center), Makrolon and aluminum enclosure (bottom), dimensions in mm (inch)

Flameproof enclosure left, dimensions in mm (inch)
Schematics

Mounting onto part-turn actuators; mounting consoles (scope of delivery of actuator manufacturer), extract from VDI/VDE 3845, dimensions in mm (inch)

Electric connection of 2-wire devices (6DR50.. and 6DR51..)

Devices of types 6DR50.. and 6DR51.. are operated in a 2-wire system.

Electric connection of PROFIBUS PA device (6DR55..) and Foundation Fieldbus device (6DR56..)

SIPART PS2 electropneumatic positioner, input circuits for 6DR52.. and 6DR53..

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.

1) Only required with current sources not conforming to HART

SIPART PS2 electropneumatic positioner, example of connection for communication through HART for 6DR52..

1) Jumper between 5 and 7 only for three-wire system

SIPART PS2 electropneumatic positioner, input circuits for 6DR52.. and 6DR53.
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 Ex d 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 Ex d on part-turn actuators
<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/2</td>
<td>Product overview</td>
</tr>
</tbody>
</table>
| 7/3  | Isolating power supplies with HART  
      | SITRANS I100 |
| 7/6  | Output isolators with HART  
      | SITRANS I200 |

You can download all instructions, catalogs and certificates for SITRANS I free of charge at the following Internet address: [www.siemens.com/sitransi](http://www.siemens.com/sitransi)
### Overview

<table>
<thead>
<tr>
<th>Area of application</th>
<th>Description</th>
<th>Catalog page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS I100 isolating power supply</td>
<td>Isolating power supply for supplying 2- and 3-wire transmitters and for connecting mA sources in the hazardous area</td>
<td>SITRANS I100 Isolating power supply with HART for rail mounting, with intrinsically-safe input. 7/3</td>
</tr>
<tr>
<td>SITRANS I200 output isolator</td>
<td>Output isolator for controlling valve positioners, I/P converters or indicators in the hazardous area</td>
<td>SITRANS I200 Output isolator with HART for rail mounting, with intrinsically-safe output 7/6</td>
</tr>
</tbody>
</table>
Overview

Analog input 0/4 ... 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 ... 20 mA

• Suitable for 2-, 3-wire transmitters, 2-wire HART transmitters and mA sources

• Intrinsically safe input [Ex ia] IIIC

• 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)

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.

Technical specifications

<table>
<thead>
<tr>
<th>SITRANS I100 Isolating Power Supplies with HART</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ex i input</strong></td>
</tr>
<tr>
<td>Input signal</td>
</tr>
<tr>
<td>Functional range</td>
</tr>
<tr>
<td>Max. input current for mA sources</td>
</tr>
<tr>
<td>Transmitter supply voltage</td>
</tr>
<tr>
<td>Supply voltage residual ripple</td>
</tr>
<tr>
<td>No-load voltage</td>
</tr>
<tr>
<td>Short-circuit current</td>
</tr>
<tr>
<td>Input resistance (AC impedance HART)</td>
</tr>
<tr>
<td>Input resistance for mA sources</td>
</tr>
<tr>
<td>Communication signal (on 2-wire transmitters)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Output</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
</tr>
<tr>
<td>Load resistance $R_L$</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Residual ripple</td>
</tr>
<tr>
<td>No-load voltage</td>
</tr>
<tr>
<td>Communication signal</td>
</tr>
<tr>
<td>Response time (10 % ... 90 %)</td>
</tr>
</tbody>
</table>

**Transfer behavior**

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 $U_N$, 23 °C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linearity error</td>
<td>≤ 0.1 %</td>
</tr>
<tr>
<td>Offset error</td>
<td>≤ 0.1 %</td>
</tr>
<tr>
<td>Temperature influence</td>
<td>≤ 0.1 %/10 K</td>
</tr>
<tr>
<td>Power supply effect within voltage range</td>
<td>≤ 0.01 %</td>
</tr>
<tr>
<td>Load resistance effect</td>
<td>≤ 0.02 %</td>
</tr>
</tbody>
</table>
Isolating power supplies and output isolators

Isolating power supplies with HART

**SITRANS I100**

**Rated conditions**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection of enclosure</td>
<td>IP30</td>
</tr>
<tr>
<td>Degree of protection of terminals</td>
<td>IP20</td>
</tr>
<tr>
<td>Ambient conditions</td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td>-20 ... +60 °C / +70 °C (-4 ... +140 °F / +158 °F) (see operating instructions)</td>
</tr>
<tr>
<td>• Storage temperature</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td>• Relative humidity</td>
<td>≤ 95 %</td>
</tr>
</tbody>
</table>

**Degree of protection of terminals**

- No condensation

**Electromagnetic compatibility**

Tested under the following standards and regulations:

- EN 61326-1 Use in the industrial environment

**Mechanical specifications**

**Screw terminals**

- One-wire connection
  - Rigid: 0.2 ... 2.5 mm² (0.00031 ... 0.0039 in²)
  - Flexible: 0.2 ... 2.5 mm² (0.00031 ... 0.0039 in²)
  - Flexible with end ferrules (without/without plastic ferrule): 0.25 ... 2.5 mm² (0.00039 ... 0.0039 in²)
- Two-wire connection
  - Rigid: 0.2 ... 1 mm² (0.00031 ... 0.00155 in²)
  - Flexible: 0.2 ... 1.5 mm² (0.00031 ... 0.0023 in²)
  - Flexible with end ferrules: 0.25 ... 1 mm² (0.00039 ... 0.00155 in²)

**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)**

- V0

**Auxiliary power**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage U_N</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Voltage range</td>
<td>18 ... 31.2 V</td>
</tr>
<tr>
<td>Residual ripple within voltage range</td>
<td>≤ 3.6 V_SS</td>
</tr>
<tr>
<td>Rated current (U_N, 20 mA)</td>
<td>70 mA</td>
</tr>
<tr>
<td>Power consumption (U_N, 20 mA)</td>
<td>1.7 W</td>
</tr>
<tr>
<td>Power loss (at U_N, R_L = 250 Ω)</td>
<td>1.3 W</td>
</tr>
<tr>
<td>Operation indicator</td>
<td>Green &quot;PWR&quot; LED</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>Yes</td>
</tr>
<tr>
<td>Undervoltage monitoring</td>
<td>Yes (no faulty module/output states)</td>
</tr>
</tbody>
</table>

**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
  - Error contact to auxiliary power and output: 350 V AC

**Error detection Ex i input**

- Open circuit: < 2 mA
- Short-circuit: > 22 mA
- Output behavior
  - Output current at I_i = 0
  - Power consumption (U_N, 20 mA)
  - Power loss (at U_N, R_L = 250 Ω)
- Error detection output
  - Open circuit: < 2 mA

**Error messaging Ex i input/output**

- Settings (LF switch)
- Error indication
- Error messaging and power supply failure
  - Contact (30 V/100 mA), closed to ground in case of error
  - pac-Bus, floating contact (30 V/100 mA)

**Certificates and approvals**

**Explosion protection ATEX**

- EC type-examination certificate: DMT 03 ATEX E 010 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) (available soon)
- Kanada (CSA) (available soon)
- Shipping (DNV)

**Safety specifications (CENELEC)**

- Max. voltage U_o: 27 V
- Max. current I_o: 88 mA
- Max. power P_o: 576 mW
- Max. connectable capacitance C_o for IIC/IIB: 90 nF/705 nF
- Max. connectable inductance L_o for IIC/IIB: 2.3 mH/14 mH
- Internal capacitance C_i and inductance L_i: Negligible
- Insulation voltage U_m: 253 V
- When connecting mA sources:
  - Max. output voltage U_o: 4.1 V
  - Max. connectable voltage U_i: 30 V
  - Max. connectable current I_i: 100 mA
  - Internal capacitance C_i and inductance L_i: Negligible
- For more information and value combinations see certification.
Isolating power supplies and output isolators

Isolating power supplies with HART

SITRANS I100

Selection and Ordering data

Order No.

SITRANS I100 Isolating Power Supply with HART
For rail mounting, for supplying 2-/3-wire transmitters and for mA sources, output 0/4 ... 20 mA, with intrinsically safe input

Accessories

pac-Bus basic set
With 5 single elements and 1 terminal set (beginning and end)

pac-Bus extension set
With 5 single elements

Available ex stock.

Dimensional drawings

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
Analog output 0/4 ... 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 ... 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)

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.

Technical specifications

<table>
<thead>
<tr>
<th>SITRANS I200 output isolator with HART</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
</tr>
<tr>
<td>Input signal</td>
</tr>
<tr>
<td>Functional range</td>
</tr>
<tr>
<td>Max. input current</td>
</tr>
<tr>
<td>Input resistance (changeable switch LI)</td>
</tr>
<tr>
<td>Communication signal</td>
</tr>
<tr>
<td><strong>Ex i output</strong></td>
</tr>
<tr>
<td>Output signal</td>
</tr>
<tr>
<td>Connectable load resistance</td>
</tr>
<tr>
<td>Min. load resistance for short-circuit monitoring</td>
</tr>
<tr>
<td>Residual ripple</td>
</tr>
<tr>
<td>No-load voltage</td>
</tr>
<tr>
<td>Response time (10 % ... 90 %)</td>
</tr>
<tr>
<td>Transfer behavior</td>
</tr>
<tr>
<td>Input/Output</td>
</tr>
</tbody>
</table>

Measuring accuracy

- 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 °C ... +70 °C (-4 °F ... +158 °F) (see operating instructions)
  - Storage temperature -40 °C ... +80 °C (-40 °F ... +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

Output isolators with HART

SITRANS I200

### Mechanical specification

**Screw terminals**

- **One-wire connection**
  - Rigid: $0.2 \ldots 2.5 \text{ mm}^2$ (0.00031 \ldots 0.0039 in²)
  - Flexible: $0.2 \ldots 2.5 \text{ mm}^2$ (0.00031 \ldots 0.0039 in²)
  - Flexible with end ferrules (without with plastic ferrule): $0.25 \ldots 2.5 \text{ mm}^2$ (0.00039 \ldots 0.0039 in²)

- **Two-wire connection**
  - Rigid: $0.2 \ldots 1 \text{ mm}^2$ (0.00031 \ldots 0.00155 in²)
  - Flexible: $0.2 \ldots 1.5 \text{ mm}^2$ (0.00031 \ldots 0.0023 in²)
  - Flexible with end ferrules: $0.25 \ldots 1 \text{ mm}^2$ (0.00039 \ldots 0.00155 in²)

**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)**

V0

### Auxiliary power

**Rated voltage $U_N$**

24 V DC

**Voltage range**

18 \ldots 31.2 V

**Residual ripple within voltage range**

$\leq 3.6 \text{ V}_{SS}$

**Rated current ($U_N$, 20 mA)**

80 mA

**Power consumption ($U_N$, 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

- **Test voltage according to EN 50178**
  - Input to auxiliary power: 350 V AC
  - Error contact to auxiliary power and input: 350 V AC

**Error detection Ex i output**

- **Open circuit**
  - $> 10 \text{ k}\Omega$

- **Short-circuit**
  - $< 15 \Omega$

- **Input behavior**
  - $> 6 \text{ k}\Omega$

- **Open-circuit detection only for input current**
  - $\geq 3.6 \text{ mA}$

- **Settings (LF switch)**
  - Activated/deactivated

- **Error indication**
  - LED red "LF"

- **Error messaging and power supply failure**
  - Contact (30 V/100 mA), closed to ground in case of error
  - pac-Bus, floating contact (30 V/100 mA)

### 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) (available soon)

Canada (CSA) (available soon)

Shipping (DNV)

### Safety specifications (CENELEC)

- **Max. voltage $U_m$**
  - 25.6 V

- **Max. current $I_m$**
  - 96 mA

- **Max. power $P_m$**
  - 605 mW

- **Max. connectable capacitance $C_m$**
  - 103 nF/800 nF

- **Max. connectable inductance $L_m$**
  - 1.9 mH/11 mH

- **Internal capacitance $C_i$ and inductance $L_i$**
  - Negligible

- **Insulation voltage $U_m$**
  - 253 V

- **Max. voltage $U_o$**
  - 25.6 V

- **Max. current $I_o$**
  - 96 mA

- **Max. power $P_o$**
  - 605 mW

- **Max. connectable capacitance $C_o$**
  - 103 nF/800 nF

- **Max. connectable inductance $L_o$**
  - 1.9 mH/11 mH

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7NG4131-0AA00</td>
<td>SITRANS I200 output isolator with HART</td>
</tr>
<tr>
<td>7NG4998-1AA</td>
<td>pac-Bus basic set</td>
</tr>
<tr>
<td>7NG4998-1AB</td>
<td>pac-Bus extension set</td>
</tr>
</tbody>
</table>

- **Accessories**

  - **pac-Bus basic set**
    - With 5 single elements and 1 terminal set (beginning and end)
  
  - **pac-Bus extension set**
    - With 5 single elements

- **Available ex stock.**
Isolating power supplies and output isolators

Output isolators with HART

SITRANS I200

Dimensional drawings

SITRANS I200 output isolator with HART, dimensions in mm (inch)

Schematics

SITRANS I200 output isolator with HART, connection diagram
# Process protection

## 8/2 Product overview

## 8/3 Acoustic and Motion Sensing

<table>
<thead>
<tr>
<th>Acoustic sensor for pump monitoring</th>
<th>8/5</th>
<th>SITRANS DA400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic sensors for material flow monitoring</td>
<td>8/10</td>
<td>SITRANS AS100</td>
</tr>
<tr>
<td></td>
<td>8/14</td>
<td>SITRANS CU02</td>
</tr>
<tr>
<td>Motion sensors</td>
<td>8/17</td>
<td>Milltronics MFA 4p</td>
</tr>
<tr>
<td></td>
<td>8/21</td>
<td>Milltronics Millpulse 600</td>
</tr>
<tr>
<td></td>
<td>8/23</td>
<td>Milltronics ZSS</td>
</tr>
</tbody>
</table>

You can download all instructions, catalogs and certificates for Process Protection free of charge at: [www.siemens.com/processprotection](http://www.siemens.com/processprotection)
# Overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Device description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acoustic sensor for pump monitoring</strong></td>
<td>SITRANS DA400</td>
<td>8/5</td>
</tr>
</tbody>
</table>
| 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. | • 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 |      |
| **Acoustic sensors for material flow monitoring**                           | SITRANS AS100                                                                      | 8/10 |
| Acoustic sensor for solids flow detection                                    | • Non-invasive  
• Screw in, bolt on, weld, or bond in place  
• Analog output  
• High and low sensitivity range of operation |      |
| 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 to 20 mA output  
• Two programmable relays  
• Adjustable independent time delay for each relay  
• DIN rail mounting provides easy installation | 8/14 |
| **Motion sensors**                                                           | Milltronics MFA 4p                                                                 | 8/17 |
| Highly sensitive single set point motion sensor alarm unit, used with MSP and XPP probes | • Probe/target separation up to 100 mm (4")  
• Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm) |      |
| Heavy-duty 2-wire motion sensor providing solid state switch output to PLCs between 18 to 135 V AC or DC | Milltronics Millpulse 600  
• Provide pulse output to PLC input when monitoring speed of rotating, reciprocating or conveying equipment | 8/21 |
| Heavy-duty zero speed alarm switch                                           | Milltronics ZSS                                                                     | 8/23 |
|                                                                              | • Detects the absence or presence of motion of rotating or reciprocating or conveying equipment |      |
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. All of the MFA 4p motion sensing probes as well as the Millpulse 600 can be mounted up to 100 mm (4") 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.

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 SI-TRANS 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.

Motion sensing on drive shaft of rotary feeder
### Technical specifications

#### Process Protection Selection Guide

<table>
<thead>
<tr>
<th>Criteria</th>
<th>SITRANS DA400</th>
<th>SITRANS AS100</th>
<th>Milltronics MFA 4p</th>
<th>Milltronics Millpulse 600</th>
<th>Milltronics ZSS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical industries</strong></td>
<td>Mining, water/wastewater, chemicals/petrochemicals and oil &amp; gas industry</td>
<td>Aggregates, grain, cement, food processing, power generation, steel processing</td>
<td>Aggregates, cement, mining, wastewater, grain</td>
<td>Aggregates, cement, mining</td>
<td>Aggregates, cement, mining</td>
</tr>
<tr>
<td><strong>Typical Applications</strong></td>
<td>Oscillating displacement pumps such as diaphragm piston pumps, piston pumps</td>
<td>Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection</td>
<td>Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators</td>
<td>Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators</td>
<td>Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td>Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency</td>
<td>Acoustic sensing</td>
<td>Motion sensing</td>
<td>Motion sensing</td>
<td>Motion sensing</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>Electronics housing, Makrolon IP65, sensor, stainless steel material number W.-Nr. 1.4571 (161T SST)</td>
<td>Compact 304 or 303 stainless steel, IP68</td>
<td>Type 4X/NEMA 4X/IP65 polycarbonate</td>
<td>Type 4X/NEMA 4X/IP67 aluminum</td>
<td>Type 4X/NEMA 4X/IP67 aluminum</td>
</tr>
<tr>
<td><strong>Sensor mounting</strong></td>
<td>Screw to outside of pump housing. For material flow monitoring on the outside of pipes, channels, chutes or raceways</td>
<td>Sensor non-invasive: glue or weld-on disc, bolt or weld-on tab, drill and tap</td>
<td>Non-contacting probes secured with supplied flange</td>
<td>Non-contacting, secured with supplied flange</td>
<td>Non-contacting, secured with supplied flange</td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>Electronics -20 °C to +60 °C (-4 °F to +140 °F) Sensor -20 °C to +110 °C (-4 °F to +230 °F)</td>
<td>-20 to +80 °C (-4 to +176 °F)1)</td>
<td>-20 to +50 °C (-4 to +122 °F)2)</td>
<td>-40 to +60 °C (-40 to +140 °F)</td>
<td>-40 to +60 °C (-40 to +140 °F)</td>
</tr>
<tr>
<td><strong>Power requirements</strong></td>
<td>19 V to 36 V DC, &lt; 100 mA</td>
<td>20 to 30 V DC, 18 mA</td>
<td>100/115/200/230 V AC ± 10 % 50/60Hz, 15 VA</td>
<td>Switch 18 to 48 V AC/DC or 60 to 135 V AC/DC</td>
<td>115 or 230 V AC ± 10 % 50/60Hz, 7 VA</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>CE, PROFIBUS DP and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D</td>
<td>CE, CSA/FM Class II, Div. 1, Group E, F, G optional, ATEX II 3D optional</td>
<td>CSAUS/C, CE</td>
<td>CSAUS/C, CE</td>
<td>CSAUS/C, CE</td>
</tr>
</tbody>
</table>

1) Extended temperature model -40 to +125 °C (-40 to +257 °F) available (CE version)
2) Probes available for -40 to +260 °C (-40 to +500 °F)
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 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 a 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 options:
• Operation of the sensors over the safety barriers or
• Operation of the sensors over the SITRANS DA400 with explosion protection.

Function

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 parametrize:

• 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.

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
Acoustic sensors for pump monitoring

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

<table>
<thead>
<tr>
<th>SITRANS DA400</th>
<th>Without Ex protection</th>
<th>With Ex protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acoustic channels</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Cycle time</td>
<td>10 ms</td>
<td></td>
</tr>
<tr>
<td>Only for connection to intrinsically-safe sensors with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. voltage U₀</td>
<td>≤ 5.5 V</td>
<td></td>
</tr>
<tr>
<td>Max. current I₀</td>
<td>≤ 70 mA</td>
<td></td>
</tr>
<tr>
<td>Max. power P₀</td>
<td>≤ 100 mW</td>
<td></td>
</tr>
<tr>
<td>Internal capacitance Cᵢ</td>
<td>≤ 1.2 μF</td>
<td></td>
</tr>
<tr>
<td>Internal inductance Lᵢ</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Universal inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle time</td>
<td>80 ms</td>
<td></td>
</tr>
<tr>
<td>Low pass filter time</td>
<td>1 s</td>
<td></td>
</tr>
</tbody>
</table>

SITRANS DA400

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: 0.5 %
- Static destruction limit: 40 mA, 4 V

For connection with approved intrinsically-safe circuits with:

- Max. supply voltage Uᵢ: ≤ 30 V
- Max. short-circuit current Iᵢ: ≤ 100 mA
- Max. power Pᵢ: ≤ 1 W
- Internal capacitance Cᵢ: ≤ 11 nF
- Internal inductance Lᵢ: ≤ 70 μH

Universal input 24 V digital signal

- Input resistance: > 19 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:

- Max. supply voltage Uᵢ: ≤ 30 V
- Max. short-circuit current Iᵢ: ≤ 100 mA
- Max. power Pᵢ: ≤ 1 W
- Internal capacitance Cᵢ: ≤ 11 nF
- Internal inductance Lᵢ: ≤ 70 μH

Universal input 24 V digital signal

- Open circuit voltage: 8.2 V ± 0.3 V, short-circuit proof
- Input resistance: < 950 Ω
- Static destruction limit for incorrect wiring: +20 V/-10 V

Output

Digital outputs

- 6
- 6 (applicable for NAMUR switch hardener)

- Semiconductor relay
- Individually isolated, short circuit-proof
- Switching voltage: 24 V AC/36 V DC, any polarity
- 35 V AC, 50 V DC
- Destruction limit: 100 mA
- Max. switching current: ≤ 1.2 mA (source to DIN 19234)
- Signal status Low (no response)
- ≥ 2.1 mA (source to DIN 19234)
- Signal status High (response)
**Process protection**

Acoustic sensors for pump monitoring

### SITRANS DA400

<table>
<thead>
<tr>
<th>Conditions of use</th>
<th>Without Ex protection</th>
<th>With Ex protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation conditions</td>
<td>Vertical wall mounting, cables fed in from below</td>
<td></td>
</tr>
<tr>
<td><strong>Climatic class</strong></td>
<td>Class 4K4 according to EN 60721-3-4</td>
<td>Zone 1 or zone 2</td>
</tr>
<tr>
<td><strong>Mounting location</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Permissible ambient temperature</strong></td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
<td>-20 ... +60 °C (-4 ... +140 °F)</td>
</tr>
<tr>
<td><strong>Temperature class T5</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature class T6</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical load</strong></td>
<td>Class 4M3 according to EN 60721-3-4</td>
<td>IP65</td>
</tr>
<tr>
<td><strong>Degree of protection to EN 60529</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Electromagnetic Compatibility</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Usage limits for water</strong></td>
<td>≥ 10 bar a</td>
<td></td>
</tr>
<tr>
<td><strong>Delivery side</strong></td>
<td>min. 4 min⁻¹, max. 10 ... 500 min⁻¹</td>
<td></td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight (without options)</strong></td>
<td>approx. 2.5 kg</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions (W x H x D in mm (inch))</strong></td>
<td>172 x 320 x 80 (6.8 x 12.6 x 3.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Enclosure material</strong></td>
<td>Macrolon (polycarbonate + 20 % glass fiber)</td>
<td>Makrolon (Polycarbonate + 20 % glass fibers), surface attenuated with CrNi layer and painted</td>
</tr>
<tr>
<td><strong>Electrical connection via screw terminals</strong></td>
<td>• Rigid 2.5 mm (0.094 inch)</td>
<td></td>
</tr>
<tr>
<td><strong>Cable inlet via plastic cable joints</strong></td>
<td>• Flexible 1.5 mm (0.59 inch)</td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Rated voltage</strong></td>
<td>24 V DC</td>
<td>16 V DC</td>
</tr>
<tr>
<td><strong>Operating range</strong></td>
<td>19 to 36 V DC</td>
<td>15 to 17 V DC</td>
</tr>
<tr>
<td><strong>Current consumption</strong></td>
<td>&lt; 100 mA</td>
<td>&lt; 40 mA</td>
</tr>
</tbody>
</table>

### Certificate and Approvals

**SITRANS DA400**

Without Ex protection

- Explosion protection to EN 50014, EN 50020 and EN 50021
  - Intrinsic safety "i" -
  - Marking -

With Ex protection

- TÜV (German Technical Inspectorate) 06 ATEX 2952
  - II 2(1) G Ex e [ia]

### Communication

**PROFIBUS DP**

RS485, switchable 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 ± 10 %
- Yes

**Bus connection with FISCO supply unit, ia/ib group IIC or IIB**

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 Profi! V3.0 Rev. 1, Class B
- Device address - 1 ... 126 (126 factory-set)

**PC parameterization software**

SIMATIC PDM (not included in the scope of delivery)

### 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 60721-3-4

**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)
Process protection
Acoustic sensors for pump monitoring

SITRANS DA400

Sensor for SITRANS DA400

Power supply
Power fed from device

Certificates and approvals

Explosion protection
Intrinsic safety ‘i’
Marking
TÜV 2005 ATEX 2876 X
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 Ex zone.

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’
• Marking
TÜV 05 ATEX 2917 X
II (2) G [EEx ib] IIC

Selection and Ordering data

Acoustic diagnostics unit SITRANS DA400 with local programming and display
Order-No.
7 M 2 4 0 0 - 1 A 0

Communication
• PROFIBUS DP
• PROFIBUS PA

Explosion protection
• without
• with EEx ia/ib to ATEX

Application software
for continuous condition monitoring of positive displacement pumps
for material flow monitoring in pipes, raceways and conveyors

Acoustic sensors for diagnostics unit SITRANS DA400
Order-No.
7 M 2 0 0 0 - 1 0 0

Explosion protection
• without
• with EEx ia to ATEX

Cable
(incl. pin and allen screw M6)
20 m
40 m
100 m

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

1) Not in combination with trigger sensor

Dimensional drawings

Sensor for SITRANS DA400, dimensions in mm (inch)
Process protection
Acoustic sensors for pump monitoring

SITRANS DA400

Safety barrier for SITRANS DA400, terminal assignment

SITRANS DA400, dimensions in mm (inch)

Safety barrier for SITRANS DA400, dimensions in mm (inch)

SITRANS DA400, terminal assignment

© Siemens AG 2010
Process protection
Acoustic sensors for material flow monitoring

SITRANS AS100

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
## Technical specifications

### Mode of Operation

**Operating principle**  
Acoustic sensing of high frequency emissions caused by impact or friction

**Typical application**  
- Detects burst filter bags in dust collection systems
- Detects material being conveyed in pneumatic conveyor lines
- Route confirmation in chute work

### 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 kΩ minimum load impedance

### Rated operating conditions

**Amb. temperature for enclosure**

<table>
<thead>
<tr>
<th>Type</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>-20 ... +80 °C (-4 ... +176 °F)</td>
</tr>
<tr>
<td>Extended</td>
<td>-40 ... +125 °C (-40 ... +257 °F) (CE only)</td>
</tr>
<tr>
<td></td>
<td>-30 ... +120 °C (-22 ... +248 °F) option</td>
</tr>
</tbody>
</table>

### Design

**Weight**  
0.4 kg (1 lb)

**Enclosure**  
304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version]

**Ingress protection**  
IP68 (waterproof)

**Cable**

- **Standard**  
  4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm²), 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
- CSA/FM Class II Div.1, Group E, F and G (includes ½" NPT female fitting)
- CE, CSA Class II, Div. 1, Group E, F and G (includes ½" NPT female fitting)
- CE, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female fitting)

### Selection and Ordering data

**Order No.**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>7MH7560</td>
</tr>
</tbody>
</table>

**Sensor**

- **Standard temperature range**  
  [-20 ... +80 °C (-4 ... +176 °F)]

- **Extended temperature range**  
  [-40 ... +125 °C (-40 ... +257 °F)]

- **Extended temperature range**  
  [-30 ... +120 °C (-22 ... +248 °F)]

**Cable Length**  
4 meters (13.12 ft)

**Sensor Mounting**

- None
- Mounting disk
- Mounting tab

**Approvals**

- CE
- CSA/FM Class II Div.1, Group E, F and G (includes ½" NPT female fitting)
- CE, CSA Class II, Div. 1, Group E, F and G (includes ½" NPT female fitting)
- CE, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female fitting)

**Further designs**

Please add "-Z" to Order No. and specify Order code(s).

- Manufacturer’s test certificate M to DIN 55 350, Part 18 and to ISO 9000
- Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]

**Instruction manual**

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>7ML1998-5DM02</td>
</tr>
<tr>
<td>German</td>
<td>7ML1998-5DM32</td>
</tr>
<tr>
<td>French</td>
<td>7ML1998-5DM12</td>
</tr>
<tr>
<td>Spanish</td>
<td>7ML1998-5DM21</td>
</tr>
</tbody>
</table>

**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  
  7MH7723-1BX

**Note:** Adapter kits are not CSA Class II approved

1) Available with approval options 1, 3 and 5 only
2) Available with approval option 1 only
3) Available with approval option 4 only
Process protection
Acoustic sensors for material flow monitoring

SITRANS AS100

Dimensional drawings

SITRANS AS100 (ST and ET versions)

SITRANS AS100 (Class I Rated ST and ET versions)

SITRANS AS100, dimensions in mm (inch)

Accessories

Extension Tab - Bolt on (304 stainless steel)

Mounting Disc - Bonded or Welded (304 stainless steel)

SITRANS AS100 accessories, dimensions in mm (inch)
**Process protection**

**Acoustic sensors for material flow monitoring**

**SITRANS AS100**

### Schematics

#### Standard Temperature Range

- **+Vsens:** analog output (0.08 to 10 V DC nominal)
- **-Vsens:**
- **shield, tied to Sensor casing**
- **high sensitivity range = green to Vsup+**
- **low sensitivity range = green to Vsup-**

#### Extended Temperature Range

- **+Vsens:** analog output (0.08 to 10 V DC nominal)
- **-Vsens:**
- **shield, tied to Sensor casing**
- **high sensitivity range = orange to Vsup+**
- **low sensitivity range = orange to Vsup-**

### 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.

The following table provides a guideline for suitable wire gauges where distances are considerable.

<table>
<thead>
<tr>
<th>AWG</th>
<th>Wire size</th>
<th>Distance</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>7 x 0.20</td>
<td>500</td>
<td>0.25</td>
</tr>
<tr>
<td>22</td>
<td>7 x 0.25</td>
<td>800</td>
<td>0.35</td>
</tr>
<tr>
<td>20</td>
<td>10 x 0.35</td>
<td>1200</td>
<td>0.5</td>
</tr>
</tbody>
</table>

© Siemens AG 2010
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.

Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Controller for acoustic sensing (SITRANS AS100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Acoustic sensors for material flow monitoring</td>
</tr>
<tr>
<td>Typical application</td>
<td>Connects to SITRANS AS100 to detect burst filter bag</td>
</tr>
<tr>
<td>Input</td>
<td>0 to 10 V DC, from sensor</td>
</tr>
<tr>
<td>Output</td>
<td>4 to 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 amp at 250 V AC non-inductive</td>
</tr>
<tr>
<td>Sensor excitation</td>
<td>26 V DC</td>
</tr>
<tr>
<td>Max. load</td>
<td>750 Ω</td>
</tr>
</tbody>
</table>

Rated operating conditions
- Location: Indoor
- Ambient temperature for enclosure: -20 ... +50 °C (-4 ... +122 °F)
- Relative humidity: 80 % for temperatures up to 50 °C (122 °F)
- Degree of protection: IP20
- Installation category: II
- Pollution degree: 2

Design
- Weight: 550 g (18 oz)
- Dimensions (W x H x D): 55 mm x 75 mm x 110 mm (2.2" x 3" x 4.4")
- Material enclosure: Polycarbonate
- Mounting: DIN Rail (DIN 46277 or DIN EN50022), or wall mount, up to 500 m (1500 ft) from sensor
- Cable: 2 twisted pair, 24 AWG (22 mm²), shielded. Mount up to 500 m (1500 ft) from sensor

Display
- Type: Liquid crystal, three digits, 9 mm (0.35"), high and multisegment 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
- CSAUS/C, CE
Selection and Ordering data

Order No.

SITRANS CU02 Control Unit
Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow

Power Supply
100 V AC
115 V AC
200 V AC
230 V AC

Enclosure
Standard DIN Rail

Approvals
CSA, UL, CE

Further designs
Please add "Z" to Order No. and specify Order code(s).

Manufacturer’s test certificate M to DIN 55 350, Part 18 and to ISO 9000

Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2")]: Measuring-point number/identification (max. 16 characters), specify in plain text

Instruction manual
English
French
German

Note: The instruction manual should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.

Order code

C11

Y18

Order No.

7ML1998-5DN01
7ML1998-5DN11
7ML1998-5DN31

Dimensional drawings

Wall/Panel Mounting

38 mm (1.5")

61 mm (2.4")

drill and tap for 4 mm (#8) screw, (2 places)

4.5 x 5.75 mm (0.18"x0.2") mounting slot (2 places)

SITRANS CU02 dimensions
Process protection
Acoustic sensors for material flow monitoring

SITRANS CU02

Schematics

**Standard Temperature Version**

*Sensor range selection:
high sensitivity range = green to 'Vsup'
low sensitivity range = green to 'com'

**Extended Temperature Version**

*Sensor range selection:
high sensitivity range = orange to 'Vsup'
low sensitivity range = orange to 'com'

Mounting
Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
This product is susceptible to electrostatic shock. Follow proper grounding procedures.

Interconnection
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
Overview

MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP and XPP probes.

Benefits

- Up to 100 mm (4") gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 2 to 3000 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, corrosive, and Class I, II and III 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, XPP-5 mounting

Note: For dimensional and/or mounting details for MSP-9 and MSP-1, see instruction manual.
Process protection

Motion sensors

Milltronics MFA 4p

Probes

**Standard Milltronics MSP-12**
- Heavy-duty general purpose motion probe
- Long lasting phenolic body with internal pre-amp
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 to 60 °C (-40 to 140 °F)

**High temperature Milltronics MSP-3**
- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures to 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.
- Pre-amp remote mounted in painted cast aluminum NEMA 4 enclosure 140 mm x 140 mm x 100 mm (5.5” x 5.5” x 4”), 1/2” NPT conduit entry
- Pre-amp temperature rating -40 to 60 °C (-40 to 140 °F)

**Stainless high temperature Milltronics MSP-9**
- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment up to 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Pre-amp remote mounted in enameled painted steel (optional stainless steel) enclosure 150 mm x 150 mm x 100 mm (6” x 6” x 4”)

**Miniature Milltronics MSP-1**
- Miniature probe for installations with limited mounting space
- CPVC probe body complete with locknuts
- 1.8 m (6 ft) cable provided. Up to 30 m (100 ft) may be used.
- Pre-amp remote mounted in painted cast aluminum NEMA 4 enclosure 140 mm x 140 mm x 100 mm (5.5” x 5.5” x 4”), 1/2” NPT conduit entry
- Due to smaller size, probe sensitivity is reduced, gap max. 13 mm (0.5”)
- Temperature rating: -40 to 80 °C (-40 to 180 °F)

**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)
- Phenolic / aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4” NPT male hub connection
- Operating temperature from -40 to 60 °C (-40 to 140 °F)

---

Technical specifications

**Mode of operation**
- Motion monitor and alarm

**Measuring principle**
- Monitoring loss of motion in tail pulley, screw flights, bucket elevators

**Features**
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment: 2 to 3000 PPM
- Adjustable start-up time delay: 0 to 60 seconds
- Visual indication of probe operation and relay status

**Output**
- 2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A @ 250 V AC resistive

**Performance**
- Repeatability: ± 1%
- Dead band: ± 0.25%

**Dynamic Range**
- 0 to 7200 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 mm x 240 mm x 82 mm (6.3” x 9.5” x 3.2”)
- **Enclosure material**
  - Polycarbonate (optional: mild steel or stainless steel, 203 mm x 254 mm x 102 mm (8” x 10” x 4”))

**Power Supply**
- 100/115/200/230 V AC switch selectable, 50/60 Hz, 15 VA ± 10% of rated voltage

**Certificates and approvals**
- CE, CSAUS/C, FM
## Selection and Ordering data

### MFA 4P Motion Failure Alarm Controller
- A highly sensitive single setpoint motion sensor system, used with MSP and XPP probes.

### Enclosure
- NEMA 4X, polycarbonate enclosure
- NEMA 4, painted mild steel enclosure
- NEMA 4X, stainless steel enclosure

### Input Voltage
- 100/115/200/230 V AC, 50/60 Hz, switch selectable

### Speed detection version
- Standard, underspeed (U/S) or overspeed (O/S), switch selectable
- Slow speed (S/S), U/S or O/S detection, switch selectable

### Approvals
- CE, CSA, FM

### Instruction manual
- Order code

### Spare parts
- Transformer
- Circuit Card, standard
- Circuit Card, Slow speed
- Lid with overlay for MFA 4p

### Further designs
- Please add “-Z” to Order No. and specify Order code(s).
- Manufacturer’s test certificate M to DIN 55 350, Part 18 and to ISO 9000
- Acrylic coated, stainless steel tag

### Selection and Ordering data

#### Order No.

<table>
<thead>
<tr>
<th>Model</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSP-1 with 1.8 m (6 ft) of cable</td>
<td>7MH7145-Z2</td>
</tr>
<tr>
<td>MSP-3, ½” NPT cable inlet with 1.5 m (5 ft) high temperature cable</td>
<td>7MH7145-Z3</td>
</tr>
<tr>
<td>MSP-9 with 1.5 m (5 ft) high temperature cable</td>
<td>7MH7145-Z4</td>
</tr>
<tr>
<td>MSP-12, ½” NPT cable inlet</td>
<td>7MH7145-Z5</td>
</tr>
<tr>
<td>XPP-5, with 1.5 m (5 ft) cable, (CSA Class I, Group A, B, C and D, Class II Group E, F and G)</td>
<td>7MH7145-Z6</td>
</tr>
<tr>
<td>XPP-5, with 10 m (32.8 ft) cable, (CSA Class I, Group A, B, C and D, Class II Group E, F and G)</td>
<td>7MH7145-Z7</td>
</tr>
<tr>
<td>XPP-5, with 15 m (49.2 ft) cable, (CSA Class I, Group A, B, C and D, Class II Group E, F and G)</td>
<td>7MH7145-Z8</td>
</tr>
</tbody>
</table>

### Approvals
- CE

### Selection and Ordering data

#### Order No.

<table>
<thead>
<tr>
<th>Model</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milltronics MFA 4p Remote Mounted Amplifier</td>
<td>7MH714G-0</td>
</tr>
</tbody>
</table>

### Enclosure
- Aluminum enclosure, 1/2” NPT entry
- Painted steel, NEMA 4 rating
- Stainless steel enclosure, NEMA 4X rating

### Further designs
- Please add “-Z” to Order No. and specify Order code(s).
- Manufacturer’s test certificate M to DIN 55 350, Part 18 and to ISO 9000
- Acrylic coated, stainless steel tag

### Selection and Ordering data

#### Order No.

<table>
<thead>
<tr>
<th>Model</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milltronics RMA Remote Mounted Amplifier</td>
<td>7ML1998-5FM01</td>
</tr>
</tbody>
</table>

### Enclosure
- Locknut, for MSP-1
- Locknut, for MSP-3, MSP-4, MSP-12, XPP-5
- Mounting flange, for MSP-3, MSP-4, MSP-12, XPP-5
- Mounting bracket for MSP-9
- Lid, 1/2” NPT cable inlet, for MSP-3, MSP-12
- Lid for MSP-9
- Lid gasket, for MSP-3, MSP-9
- Lid gasket, for MSP-12

### Approvals
- CE, CSA, FM
Process protection
Motion sensors

Milltronics MFA 4p

Dimensional drawings

MFA 4p dimensions
Overview

Milltronics Millpulse 600 is a heavy-duty 2-wire motion sensor that provides solid state switch output to PLCs between 18 to 135 V AC or DC.

Benefits

- Up to 100 mm (4") gap between Millpulse and targets
- Two-wire unit
- PLC compatible
- Rugged, low maintenance suitable for tough environments
- Visual indication of target triggered pulses

Application

Millpulse supplies cost-effective equipment protection even in the harshest conditions.

This rugged unit is impervious to dust, dirt, build-up, and moisture, and is ideal for such primary industries as mining, aggregate, and cement plants. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning, and part replacement. It will reduce downtime and clean-up expenses associated with conveying equipment failure. Its pulse output can be used to minimize spillage, prevent damage, detect fire caused by belt slippage at the head pulley, and warn of other conveyor malfunction.

The Millpulse 600 offers underspeed, overspeed, differential speed, and speed indication functions by a PLC. With an all aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The Millpulse 600 should be mounted in an area classified as non-hazardous, that is suitable to the enclosure rating and materials and is within the temperature range specified. The cap should be accessible to allow for wiring and viewing of the status display LED.

When mounting the Millpulse onto a vibration-free structure, use the supplied mounting flange to ensure that there is no danger of the target damaging the unit.

Where possible, mount the probe so the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Where wiring must be run in conduit, use a flexible conduit for easier removal or adjustment of the probe. Keep the Millpulse away from high voltage or current runs, contractors and the SCR drives.

Do not connect the Millpulse 600 directly to supply.

Technical specifications

Mode of operation

- Measuring principle: Disruption of magnetic field by ferrous target
- Typical application: Provides pulse output to PLC when monitoring screw conveyor flight

Rated operating conditions

- Operating temperature: -40 to +60 °C (-40 to +140 °F)

Design

- Probe body: Aluminum
- Process mounting: 2" NPSL
- Connection box: Aluminum, ¾" NPT conduit entrance, 4 screw terminals for max. 12 AWG (3.30 mm²) wire size
- Gasketing: Neoprene
- Display: Red LED for switch status
- Enclosure rating: Type NEMA 4X, 6, IP67

Shipping weight: 2 kg (4.4 lbs)

Power supply

- Switching capability:
  - Voltage: 18 to 48 V AC/DC
  - Current: 60 to 135 V AC/DC
  - Current: 5 to 400 mA continuous, 2 A surge for 20 ms at 1 operation per second

- Voltage drop: 8 V
- Residual current: 1.5 mA
- Switch duration: On: 50 ms minimum
- Off: 50 ms minimum

Operating limit: 600 pulses per minute maximum

Certificates and approvals: CSAUS/C, CE
Process protection

Motion sensors

Milltronics Millpulse 600

Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7MH7142-0AA10</td>
<td>Milltronics Millpulse 600 Heavy-duty 2-wire motion sensor that provides solid state switch output to PLCs between 18 to 135 V AC or DC.</td>
</tr>
<tr>
<td>7MH77123-1CS</td>
<td>Mounting flange</td>
</tr>
<tr>
<td>7MH7723-1CR</td>
<td>Locknut</td>
</tr>
<tr>
<td>C11</td>
<td>Milltronics test certificate M to DIN 55 350, Part 18 and to ISO 9000</td>
</tr>
<tr>
<td>Y17</td>
<td>Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75’’)]; Measuring-point number/identification (max. 16 characters), specify in plain text</td>
</tr>
<tr>
<td>7ML1998-5DG02</td>
<td>Milltronics Millpulse 600, English</td>
</tr>
<tr>
<td>7ML1998-5DG22</td>
<td>Milltronics Millpulse 600, Spanish</td>
</tr>
</tbody>
</table>

Further designs

- Please add "-Z" to Order No. and specify Order code(s).
- Order code: C)

Instruction manual

- Order No.:
  - 7ML1998-5DG02 Milltronics Millpulse 600, English
  - 7ML1998-5DG22 Milltronics Millpulse 600, Spanish
- Note: The instruction manual should be ordered as a separate item on the order.
- This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

Spare Parts

- Locknut: 7MH7723-1CR
- Mounting flange: 7MH7723-1CS

Dimensional drawings

- Operating voltage: jumper in 18 to 48 V AC/DC
- jumper out 60 to 135 V AC/DC

Interconnection

If the manufacturer of your PLC does not state that it is compatible with CENELEC 50040/36/37/38 electrical standards, then ensure that the switching current of the PLC input is above the residual current of the MillPulse. If your PLC does not meet the requirements, a resistor across the PLC inputs can be used to increase the switching current.
Overview

Milltronics ZSS 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”) gap between ZSS 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 ZSS. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley and warn against conveyor malfunction.

The ZSS has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The ZSS 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”) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16”) keyway. The Zero Speed Switch is sensitive to lateral disturbances to its magnetic field. If the Zero Speed Switch is responding to motion from an interfering target, move the ZSS or install a ferrous plate (steel) as a shield between the ZSS 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.

Technical specifications

Mode of operation
- Disruption of magnetic field by ferrous target

Measuring principle
- Monitors absence or presence of motion in harsh conditions

Typical application
- Monitors absence or presence of motion in harsh conditions

Output
- 1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation

Time delay
- Start up: 10 to 14 seconds (5 to 7 seconds with 12 ppm jumper installed)
- Zero Speed (selected via a common jumper)
  - 5 seconds ± 1 (minimum speed 10 to 15 ppm) or
  - 10 seconds ± 2 (minimum speed 5 to 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

Shipment weight
- 2 kg (4.4 lbs)

Power supply
- • 115 V AC/50 to 60 Hz, 7 VA
- • 230 V AC/50 to 60 Hz, 7 VA
- • ± 10 % of rated voltage

Certificates and approvals
- CSAUS/C, CE
### Process protection

#### Motion sensors

### Milltronics ZSS

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBD-92712000</td>
<td>Milltronics ZSS motion sensing switch</td>
</tr>
<tr>
<td>PBD-92722000</td>
<td>A heavy-duty zero-speed alarm switch that does not require a controller.</td>
</tr>
</tbody>
</table>

#### Model

- Zero Speed Switch (ZSS), 115 V AC
- Zero Speed Switch (ZSS), 230 V AC

#### Instruction manual

- Zero Speed Switch (ZSS), English
- Zero Speed Switch (ZSS), German

Note: The instruction manual should be ordered as a separate item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

#### Spare Parts

- Locknut C) 7MH7723-1CR
- Mounting flange 7MH7723-1CS

C) Subject to export regulations AL: N, ECCN: EAR99

---

### Dimensional drawings

**Dimensions**

- 10-32 screw x 4
- Circuit card

**Detail A**

- 3/4” NPT conduit entrance
- Cap, aluminum
d- Casing gasket, neoprene

**Mounting**

- 6 mm dia. hole for 1/4-20 bolt on 114 mm (4.5”) BCD, 4 places

**Zero Speed Switch dimensions and mounting**
Zero Speed Switch wiring

1. Dry contacts shown in de-energized (alarm or shelf) state.

2. ZSS is manufactured for either 115 or 230 V AC operation. Check ZSS 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.
## Communication and Software

### Communication
- 9/2 HART protocol
- 9/3 WirelessHART
- 9/6 PROFIBUS
- 9/7 FOUNDATION Fieldbus

### WirelessHART products
- 9/8 SITRANS AW200 - WirelessHart adapter
- 9/14 IE/WSN-PA LINK
- 9/17 Communication blocks
- 9/18 SITRANS MDS

### Software
- 9/19 SIMATIC PDM
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, multi-vendor 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 P DS III
- SITRANS P P300

Measuring instruments for temperature

- SITRANS TF
- SITRANS TH300
- SITRANS TR300
- SITRANS TW

Flowmeters

- SITRANS F M MAG 5000 HART
- SITRANS F M MAG 6000 19" / IP67 / I / I Ex d
- SITRANS F M Transmag 2
- SITRANS F C MASS 6000 19" / IP67 / Ex d
- SITRANS fus060

Measuring instruments for level

- Pointek CLS 500
- SITRANS Probe LR
- SITRANS Probe LU
- SITRANS LR200
- SITRANS LR250
- SITRANS LR260
- SITRANS LR300
- SITRANS LR400
- SITRANS LR460
- SITRANS LC 500

Electropneumatic positioners

- SIPART PS2

Power supply units and isolation amplifiers

- SITRANS I

Selection and Ordering data

<table>
<thead>
<tr>
<th>Device</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART modem</td>
<td>7MF4997-1DA</td>
</tr>
<tr>
<td>With RS 232 connection</td>
<td>D)</td>
</tr>
<tr>
<td>With USB connection</td>
<td>7MF4997-1DB</td>
</tr>
<tr>
<td>Available ex stock</td>
<td>D)</td>
</tr>
</tbody>
</table>

D) Subject to export regulations AL:N, ECCN: EAR99H
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 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 ... 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 ... 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 ... 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 ... 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 ... 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 9/18 of this catalog.
Communication and software

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...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 4-20 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 always 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
- Faster commissioning
- Self-organizing and self-healing networks
- Support of star-shaped and meshed network topologies
- Faster transmission times for data between the field device and the gateway
- Simplicity in handling and engineering
- 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.

- Support of star-shaped and meshed network topologies

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.

- 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.

- 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.
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 authentication 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 network’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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Products</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Diagnostic Station</td>
<td>SITRANS MDS</td>
<td>6ES7 658-3AX06-0YA5</td>
</tr>
<tr>
<td>WirelessHART gateway</td>
<td>IE/WSN-PA LINK with integrated non-removable antenna</td>
<td>6GK1 411-6CA40-0AA0</td>
</tr>
<tr>
<td>WirelessHART adapter</td>
<td>SITRANS AW200^2)</td>
<td>7MP3112-1AA00-0AA0</td>
</tr>
<tr>
<td>Process control system</td>
<td>SIMATIC PCS 7</td>
<td>9AE4110-3AA00</td>
</tr>
<tr>
<td>WirelessHART gateway</td>
<td>IE/WSN-PA LINK with integrated non-removable aerial^2)</td>
<td>6GK1 411-6CA40-0AA0</td>
</tr>
<tr>
<td>Field devices</td>
<td>SITRANS AW200^2)</td>
<td>7MP3112-1AA00-0AA0</td>
</tr>
<tr>
<td>SITRANS P280^2)</td>
<td>7MP1120-...</td>
<td></td>
</tr>
<tr>
<td>SITRANS TF280^2)</td>
<td>MP1110-...</td>
<td></td>
</tr>
</tbody>
</table>

^1) You can also contact your Siemens contact person.
^2) Other versions and accessories can be found in the product descriptions of this catalog.

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.
Communication and software

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 PD III PA
  - SITRANS P 300

- Measuring instruments for temperature
  - SITRANS TH 400

- Flowmeters
  - SITRANS F M MAG 6000 19" / IP67 / I / I Ex d
  - SITRANS F M Transmag 2
  - SITRANS F C MASS 6000 19" / IP67 / Ex d
  - SITRANS F C MASS 6000 19" / IP67 / Ex d
  - SITRANS FUS060

- Measuring instruments for level
  - Pointek CLS 200
  - Pointek CLS 300
  - SITRANS Probe LU
  - SITRANS LR 200
  - SITRANS LR 250
  - SITRANS LR 300
  - SITRANS LR 400
  - SITRANS LR 460

- Electropneumatic positioners
  - SIPART PS 2

- Acoustic sensor for pump monitoring
  - SITRANS DA 400

PROFIBUS DP

- Flowmeters
  - SITRANS F M MAG 6000 19" / IP67 / I
  - SITRANS F C MASS 6000 19" / IP67
  - SIFLOW FC 070

- Measuring instruments for level
  - SITRANS LUC 500
  - HydroRanger 200
  - MultiRanger 100/200
  - SITRANS Probe LU 01, LU 02, LU 10

- Acoustic sensor for pump monitoring
  - SITRANS DA 400
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
- 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 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 FF
- SITRANS P DS III FF

**Measuring instruments for temperature**
- SITRANS TH400 FF

**Electropneumatic positioners**
- SIPART PS2 FF

**Flowmeters**
- SITRANS F C MASS 6000
Overview

The SITRANS AW200 WirelessHART adapter is a battery-powered communication component, which integrates HART and 4...20 mA field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4...20 mA field devices are connected on the field device side.

The SITRANS AW200 WirelessHART adapter
- supports the WirelessHART standard (HART V 7.1)
- features a very high degree of security for wireless data transmission
- integrates one 4...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 9 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...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 WirelessHART adapter, and is sent to an asset management software 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...20 mA 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.

The SITRANS AW200 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 WirelessHART adapter, and is sent to an asset management software 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...20 mA 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.

The SITRANS AW200 WirelessHART adapter consists of
- a housing with mounted antenna.
- electronics.
- a high-performance lithium battery unit.

The SITRANS AW200 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 WirelessHART adapter, and is sent to an asset management software near the system, e.g. SITRANS MDS.
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...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 two-wire 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.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Connection</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Power supply for the field device</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>HART/4 ... 20 mA</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>External supply/Dimensions</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>High-resistance HART connection</td>
</tr>
<tr>
<td>5, 7</td>
<td></td>
<td>High-resistance HART connection</td>
</tr>
<tr>
<td>6, 8</td>
<td></td>
<td>Mass, high-resistance connection</td>
</tr>
</tbody>
</table>

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...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. The table below illustrates the different options for Siemens HART field devices.

<table>
<thead>
<tr>
<th>Field device</th>
<th>Power supply from WirelessHART adapter</th>
<th>External power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P DSIII</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS P300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS TH300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 5000/6000</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 5100 W</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M TRANSMAG 2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F C MASS 6000</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 1100</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 3100 HT</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS FUS060</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR 250</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR 460</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS Probe LU</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS Probe LR</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR200</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS FX300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LG200</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SIPART PS2</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Note:

Siemens will only approve the Siemens HART field devices listed in the table 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
## Technical specifications

### SITRANS AW200 WirelessHART adapter

<table>
<thead>
<tr>
<th>Input</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td>Point-to-Point connection to a HART field device or Point-to-Point connection to a 4 ... 20 mA field device or up to four HART field devices with external power supply which are integrated using the multidrop method</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication</strong></td>
<td>HART communication using multidrop method, 4 ... 20 mA power signal with Point-to-Point connection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protocol</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protocol</strong></td>
<td>HART V7 (compatible with previous HART versions)</td>
</tr>
</tbody>
</table>

| Transfer rate | 1200 bits/s using HART multidrop method |

### Design

<table>
<thead>
<tr>
<th>Design</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td>0.5 kg without battery, 0.75 kg with battery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enclosure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enclosure</strong></td>
<td>Polyester (PBT FR)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td>2x M20x1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable entry</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable entry</strong></td>
<td>IP65, IP66, NEMA 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of protection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree of protection</strong></td>
<td>Omnidirectional dipolar aerial, vertical rotation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antenna</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antenna</strong></td>
<td>M20x1.5 on M20x1.5, M20x1.5 on G½, M20x1.5 on ½ - 14 NPT, M20x1.5 on ¾ - 14 NPT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting adapter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mounting adapter</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Power supply

<table>
<thead>
<tr>
<th>Power supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Battery</strong></td>
<td>Lithium thionylchloride high-performance battery unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply voltage</strong></td>
<td>5 V DC ... 7.2 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>19 AH at 20 °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service life</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service life</strong></td>
<td>up to 5 years, depending on update rate, connected field device and ambient conditions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage supply for one field device (independent of multidrop)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage supply for one field device (independent of multidrop)</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage</strong></td>
<td>&lt; 30 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current</strong></td>
<td>&lt; 25 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage</strong></td>
<td>&lt; 30 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current</strong></td>
<td>&lt; 25 mA</td>
</tr>
</tbody>
</table>

### Measuring accuracy (as per reference conditions IEC 61298-2)

<table>
<thead>
<tr>
<th>Measuring accuracy (as per reference conditions IEC 61298-2)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max. measuring error (4 ... 20 mA circuit)</strong></td>
<td>0.125 % re: measuring range</td>
</tr>
</tbody>
</table>

| Effect of ambient temperature (4 ... 20 mA circuit) | 5 μA/0°K |

### Rated conditions

<table>
<thead>
<tr>
<th>Rated conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Outside/Inside</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
</tbody>
</table>

| The capacity of the battery decreases rapidly if ambient temperature falls below -30 °C. |

<table>
<thead>
<tr>
<th>Storage temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-40 ... +85 °C (-40 ... +185 °F)</td>
</tr>
</tbody>
</table>

| Without batteries: < 21 °C with batteries |

<table>
<thead>
<tr>
<th>Relative humidity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relative humidity</strong></td>
<td>Max 90 % at 25 °C (non-condensing)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resistance to vibration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resistance to vibration</strong></td>
<td>20 ± 1 s ≤ 2000 Hz: 0.01 g²/Hz as per IEC 68-2-64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shock resistance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shock resistance</strong></td>
<td>15 g, 11 ms as per IEC 68-2-27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electromagnetic compatibility</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electromagnetic compatibility</strong></td>
<td>As per EN 61326, EN 301 489-1/17 and NAMUR NE 21</td>
</tr>
</tbody>
</table>

### Certificates and approvals

<table>
<thead>
<tr>
<th>Certificates and approvals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wireless communication approvals</strong></td>
<td>ETSI (R&amp;TTE)</td>
</tr>
</tbody>
</table>

| **FCC Part 15.247 for wireless applications in the 2.4 GHz transmission frequency band** | EN 300 328 |
### Selection and ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS AW200; adapter for WirelessHART communication</td>
<td>7MP3112-000AA00</td>
</tr>
<tr>
<td>WirelessHART adapter AW200 with 4...20 mA- or HART interface</td>
<td>1</td>
</tr>
<tr>
<td>Without battery</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>A</td>
</tr>
<tr>
<td>Battery powered</td>
<td></td>
</tr>
<tr>
<td>Certificates and approvals&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>A</td>
</tr>
<tr>
<td>Without</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td></td>
</tr>
<tr>
<td>Polyester</td>
<td>0</td>
</tr>
</tbody>
</table>

**Accessories**

- Lithium battery for SITRANS AW200: 7MP3990-0AA00
- Thread adapter for direct mounting of the adapter to a field device:
  - M20 thread adapter: 7MP3990-0BA00
  - Thread adapter G½: 7MP3990-0BB00
  - Thread adapter ½ - 14 NPT: 7MP3990-0BC00
  - Thread adapter ¾ - 14 NPT: 7MP3990-0BD00
- Mounting bracket for attaching to wall/pipe, material: stainless steel SS304, including cable gland: 7MP3990-0CA00

<sup>1</sup> Additional approvals in process.
SITRANS AW200 - WirelessHART adapter

Dimensional drawings

SITRANS AW200 WirelessHART adapter, dimensions in mm (inch)
**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 two-wire field device with external power supply**

- **Connection of a four-wire field device**

- **Connection of adapter parallel to wired 4...20 mA communication**
Communication and software

WirelessHART products

IE/WSN-PA LINK

Overview

• The IE/WSN-PA LINK is a gateway 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

Note:
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 www.siemens.com/wirelesshart

Benefits

• Extended possible solutions for connecting field devices of the process industry 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
• Saving 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.

Retrofitting of plants for diagnostics and maintenance
**Design**

- 2 x 10/100/1000 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 RS485
- 1 x screw terminal for the 24 V DC connection
- Rugged metal enclosure with degree of protection IP65 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
- With N connector for connection of external antennas

**Function**

**WirelessHART**

The IE/WSN-PA LINK establishes on the radio side an inter-meshed 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. The HART message frames are transmitted from the HART device to a maintenance or diagnostics station device without affecting the 4-20 mA interface.

In addition, as many as four standard HART field devices can be connected directly to the adapter. In this case, the 4-20 mA cabling is omitted completely.

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.

**Integration**

**Integration into automation systems**

The IE/WSN-PA LINK can be integrated into automation systems via Ethernet or Modbus TCP. For connection of the IE/WSN-PA LINK to SIMATIC S7-300/400 you can obtain function blocks and technical support from the following address:

Siemens AG
Industrial Technologies
IT4Industry Customer Support
Werner-von-Siemens-Strasse 60
91052 Erlangen
Germany
Phone: +49 91 31 7-461 11
Fax: +49 91 31 7-447 57
E-mail: it4.industry@siemens.com

**Integration in PCS 7**

For integration of the IE/WSN-PA LINK into PCS 7 you can obtain function blocks and technical support from the following address:

Siemens AG
I IS IN E&C OC A KHE
Siemensallee 84
76187 Karlsruhe
Germany
Phone: +49 721 595-6380
E-mail: function.blocks.industry@siemens.com
## Selection and ordering Data

<table>
<thead>
<tr>
<th>Network component</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IE/WSN-PA LINK</strong></td>
<td><strong>Order No.</strong></td>
</tr>
<tr>
<td>Network transition between WirelessHART and Industrial Ethernet; transmission frequency: 2.4 GHz</td>
<td>6GK1 411-6CA40-0AA0</td>
</tr>
<tr>
<td>• With integral, non-detachable antenna</td>
<td>6GK1 411-6CA40-0BA0</td>
</tr>
<tr>
<td>• N connector for connection of external antennas</td>
<td></td>
</tr>
<tr>
<td><strong>Antennas</strong></td>
<td></td>
</tr>
<tr>
<td>Antennas with omni-directional characteristics; country permits, compact instructions (hard copy), German/English</td>
<td></td>
</tr>
<tr>
<td>• ANT792-6MN antenna</td>
<td>6GK5 792-6MN00-0AA6</td>
</tr>
<tr>
<td>Antenna gain including N-Connect connector 6 dBi, 2.4 GHz</td>
<td></td>
</tr>
<tr>
<td><strong>Roof mounting</strong></td>
<td></td>
</tr>
<tr>
<td>• ANT795-6MN antenna</td>
<td>6GK5 795-6MN00-0AA6</td>
</tr>
<tr>
<td>Antenna gain incl. N-Connect connector 6/8 dBi, 2.4/5 GHz</td>
<td></td>
</tr>
<tr>
<td>• Antenna mounting tool (ANT795-6MN)</td>
<td>6GK5 795-6MN01-0AA6</td>
</tr>
<tr>
<td>Mounting tool for installation of ANT795-6MN under a roof</td>
<td></td>
</tr>
<tr>
<td><strong>LP798-1N lightning protector</strong></td>
<td>6GK5 798-2LP00-2AA6</td>
</tr>
<tr>
<td>Lightning protector with N/N female/female connector, IP65 (-40 … +100 °C)</td>
<td></td>
</tr>
<tr>
<td><strong>Antenna cables</strong></td>
<td></td>
</tr>
<tr>
<td>IWLAN N-Connect male/male flexible connection cable</td>
<td></td>
</tr>
<tr>
<td>Flexible connecting cable for connecting external antennas; assembled with two N-Connect male connectors</td>
<td></td>
</tr>
<tr>
<td>• 1 m</td>
<td>6XV1 875-5AH10</td>
</tr>
<tr>
<td>• 2 m</td>
<td>6XV1 875-5AH20</td>
</tr>
<tr>
<td>• 5 m</td>
<td>6XV1 875-5AH50</td>
</tr>
<tr>
<td>• 10 m</td>
<td>6XV1 875-5AN10</td>
</tr>
<tr>
<td><strong>HF coupling</strong></td>
<td>6GK5 798-0CP00-1AA00</td>
</tr>
<tr>
<td><strong>N-Connect coupler for connecting the LP798-1N lightning protector</strong></td>
<td></td>
</tr>
<tr>
<td><strong>IE FC M12 Plug PRO</strong></td>
<td>6GK1 901-0DB20-6AA0</td>
</tr>
<tr>
<td>M12 plug-in connector (D-coded, IP65/IP67) that can be assembled in the field, metal enclosure, Fast-Connect connection method, for SCALANCE X208 PRO and IM 154-4 PN</td>
<td></td>
</tr>
<tr>
<td>1 item</td>
<td></td>
</tr>
<tr>
<td><strong>IE FC TP Standard Cable GP 2 x 2 (Type A)</strong></td>
<td></td>
</tr>
<tr>
<td>4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval;</td>
<td></td>
</tr>
<tr>
<td>Sold by the meter</td>
<td></td>
</tr>
<tr>
<td>Max. length 1,000 m; minimum order 20 m</td>
<td>6XV1 840-2AH10</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Network components for IWLAN</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARTING adapter cable ¹</td>
<td>21 03 683 6420</td>
</tr>
<tr>
<td>M12 female NPT 1/2 thread to RJ45 11cm</td>
<td>Not included in the scope of delivery of the IE/WSN-PA LINK; You can find ordering information in the Internet at: <a href="http://www.harting.de/kontakt/adressen/">http://www.harting.de/kontakt/adressen/</a></td>
</tr>
</tbody>
</table>

¹ 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.
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.

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
Industry Sector
Industry Solutions Division
Industrial Technologies
Roland Heid
Siemensallee 84
76187 Karlsruhe
Germany
Tel: +49 721 595-6380
E-Mail: function.blocks.industry@siemens.com

Selection and ordering Data

Order 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

© Siemens AG 2010
Communication and software

WirelessHART products

SITRANS MDS - Maintenance Diagnostic Station

Overview

Maintenance Diagnostic Station

SITRANS MDS for flexible and automated diagnostic processing:

- 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 information 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 devices.

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 SIMATIC MDS therefore does not make sense in a SIMATIC PCS 7 environment and is hence not approved for that purpose.

Technical specifications

SITRANS MDS Maintenance Diagnostic Station

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Microsoft Windows XP professional</th>
</tr>
</thead>
</table>
| Additionally required software| SIMATIC PDM as of V 6.05 and options
|                               | • SIMATIC PDM Basic (4 Tags)
|                               | • SIMATIC PDM service (128 Tags)
|                               | • SIMATIC PDM Option HART Mux |
| 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.

Design

SITRANS MDS uses SIMATIC PDM project data to read and display diagnostic data from accessible devices.
Overview

Simulation options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameterization, 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 1,300 devices from Siemens and over 120 vendors worldwide on one homogeneous user interface. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface.

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 easily integrated in SIMATIC PDM at any time by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and consequential costs.

SIMATIC PDM is integrated in the asset management of SIMATIC PCS 7. The Process Device Manager provides wider information for all devices described by the Electronic Device Description (EDD), e.g. detailed diagnostics information (vendor information, information on fault diagnostics and troubleshooting, further documentation), modification logbook (audit trial), parameter information. It is possible to change directly to SIMATIC PDM from the diagnostics faceplates in the maintenance station.
Application

The SIMATIC PDM Process Device Manager can be used in a versatile manner in the context of Totally Integrated Automation (TIA). Use in the engineering system of SIMATIC PCS 7 is one possible application.

The customer-oriented product structure of SIMATIC PDM supports you in adaptation of the scope of functions and performance to your individual requirements. You can select the minimum configuration SIMATIC PDM Single Point, one of the application-specific, predefined product configurations SIMATIC PDM Service, SIMATIC PDM PCS 7 or SIMATIC PDM S7, or produce your desired configuration from the individual components offered (see table).

The selection depends on the application range and environment of use:
- System-integrated in a SIMATIC PCS 7/S7 configuration environment:
  - SIMATIC PDM PCS 7 (for integration in an engineering system for SIMATIC PCS 7)
  - SIMATIC PDM S7 (for integration in a SIMATIC S7 configuration environment)

- SIMATIC PDM stand-alone as service tool for operation on a mobile computer on the PROFIBUS or with direct connection to the device:
  - SIMATIC PDM Single Point (for processing of a single field device via a point-to-point coupling)
  - SIMATIC PDM Service (for enhanced servicing, including modification logbook and lifelist detailed diagnostics)

Design

Minimum configuration SIMATIC PDM Single Point

This low-cost minimum configuration with handheld functionality is tailored to processing exactly one field device via a point-to-point coupling. All device functions are supported as defined in the device description. These functions include:
- Unlimited selection of devices / management of device catalog
- Communication via PROFIBUS DP/PA, HART modem or Modbus
- Parameterization and diagnostics in accordance with the device description
- Exporting and importing of parameter data
- Device identification
- Lifelist

Table with SIMATIC PDM product structure

<table>
<thead>
<tr>
<th>SIMATIC PDM product structure</th>
<th>SIMATIC PDM stand-alone</th>
<th>SIMATIC PDM system-integrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum configuration</td>
<td>Components for individual configuration</td>
<td>Predefined product configurations</td>
</tr>
<tr>
<td>Product name</td>
<td>SIMATIC PDM Single Point</td>
<td>SIMATIC PDM Basic</td>
</tr>
<tr>
<td>Components/TAGs included in scope of delivery</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>TAG expansions</td>
<td>TAG options</td>
<td>Power Packs</td>
</tr>
<tr>
<td>Not expandable</td>
<td>- 128 TAGs</td>
<td>- From 128 to 512 TAGs</td>
</tr>
<tr>
<td></td>
<td>- 512 TAGs</td>
<td>- From 512 to 1 024 TAGs</td>
</tr>
<tr>
<td></td>
<td>- 1 024 TAGs</td>
<td>- From 1 024 to 2 048 TAGs</td>
</tr>
<tr>
<td></td>
<td>- 2 048 TAGs</td>
<td>- From 2 048 to unlimited TAGs</td>
</tr>
<tr>
<td>Option “Integration in STEP 7/PCS 7”</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Option “Routing through S7-400”</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Option “Communication through standard HART multiplexer”</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Note: For definition of TAG, see under TAG options/PowerPacks

© Siemens AG 2010
Predefined product configurations

SIMATIC PDM Service

This is a predefined product configuration especially for mobile use in servicing for projects with up to 128 TAGs. It offers service engineers all functions of SIMATIC PDM Basic, including modification logbook, calibration report and detailed diagnostics in the lifelist. SIMATIC PDM Service can be expanded by the functional options "Integration in STEP 7/PCS 7", "Routing through S7-400" and "Communication via standard HART multiplexer" as well as by SIMATIC PDM PowerPacks (see under TAG options/PowerPacks). The following program components are part of SIMATIC PDM Service:

- SIMATIC PDM Basic
- Option: 128 TAGs

SIMATIC PDM PCS 7

SIMATIC PDM PCS 7 is a predefined product configuration for integration into the engineering system (engineering tool set) and the maintenance station of SIMATIC PCS 7. The product version designed for projects with up to 128 TAGs allows the use of all functions of SIMATIC PDM Basic (including modification logbook, calibration report and detailed diagnostics in the lifelist). In addition, it contains the functionality for integration of the SIMATIC PDM into HW-Config as well as the routing from the central engineering system to the field devices. SIMATIC PDM PCS 7 can be expanded by the option "Communication via standard HART multiplexer" and by SIMATIC PDM PowerPacks (see under TAG options/PowerPacks). The following program components are part of SIMATIC PDM PCS 7:

- SIMATIC PDM Basic
- Option: 128 TAGs
- Option: Integration in STEP 7/SIMATIC PCS 7
- Option: Routing through S7-400

SIMATIC PDM S7

SIMATIC PDM S7 is a predefined product configuration tailored to the use of SIMATIC PDM in a SIMATIC S7 configuration environment. It offers all functions of SIMATIC PDM Basic (including modification logbook, calibration report and detailed diagnostics in the lifelist) as well as the functionality for integration of PDM into HW-Config. SIMATIC PDM S7 can be expanded by the functional options "Routing through S7-400" and "Communication via standard HART multiplexer" and by SIMATIC PDM PowerPacks (see under TAG options/PowerPacks). The following program components are part of SIMATIC PDM S7:

- SIMATIC PDM Basic
- Option: 128 TAGs
- Option: Integration in STEP 7/SIMATIC PCS 7

Components for individual configuration

SIMATIC PDM Basic

SIMATIC PDM Basic is the basic component for production of individual SIMATIC PDM configurations from single components. It contains all functions required for operation and parameterization of the devices, as well as enabling for the following communication modes:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and PROFIBUS)
- MODBUS
- SIREC bus
- SIPART DR

SIMATIC PDM Basic without TAG expansion can manage projects with as many as 4 TAGs and, provided the system requirements are met, can be used for stand-alone operation on any computers (PCs/notebooks) with local connection to bus segments or with direct connection to the device.

SIMATIC PDM Basic can be expanded by functional options and TAG options/PowerPacks. Use of the following functions requires at least 128 TAGs:

- Modification logbook
- Calibration report
- Detailed diagnostics in the lifelist

SIMATIC PDM Basic is also available in the form of a rental license for 50 operating hours for low-cost processing of short-term projects.

SIMATIC PDM option: Integration in STEP 7/PCS 7

This option is required for use of SIMATIC PDM within a SIMATIC S7 or SIMATIC PCS 7 project with a local connection to the PROFIBUS. SIMATIC PDM can then be started directly from the hardware project (HW-Config).

SIMATIC PDM option: Routing through S7-400

This option is required additive to the option "Integration in STEP7/PCS 7" if SIMATIC PDM is to be used in an engineering system for SIMATIC PCS 7/S7 with Ethernet bus connection to the automation systems for plant-wide configuration, parameterization, commissioning and diagnostics of field devices.

SIMATIC PDM option: Communication via standard HART multiplexer

This option permits SIMATIC PDM to use the HART OPC server for communication with HART field devices via HART multiplexers.

TAG options/PowerPacks

A 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. 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).

In contrast to PowerPacks, TAG options are only suitable for product configurations on the basis of individual components. Using the SIMATIC PDM TAG options, the basic software SIMATIC PDM Basic can be expanded from 4 TAGs to 128, 512, 1 024 or 2 048 TAGs, and with the help of an additive PowerPack also to unlimited TAGs.

The number of available TAGs can be subsequently increased for all SIMATIC PDM product configurations by means of the SIMATIC PDM PowerPacks. PowerPacks are available for expansion to 512, 1 024, 2 048 and unlimited TAGs.

Demonstration software

A demonstration version of SIMATIC PDM is also available. Online communication and storage functions are not available with this version.
Communication and software

SIMATIC PDM
Process Device Manager

Function

Core functions
- 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 with operating modes, alarms, and states
- Simulation
- Diagnostics (standard, detailed)
- Management (e.g., networks and PCs)
- Export/import (parameter data, reports)
- Commissioning functions, e.g., measuring circuit tests of device data
- Device replacement (lifecycle management)
- 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

Support of system management
SIMATIC PDM supports the operative system management in particular through:
- Uniform presentation and operation of devices
- 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
- Graded user privileges including password protection

Graphical user interface
The GUI of SIMATIC PDM satisfies the requirements of the directives VDI/VDE GMA 2187 and IEC 615934/CD. Even complex devices with several hundred parameters can thus 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.

Several views are available to users to help them with their tasks:
- Hardware project view
- Process device network view (preferably for stand-alone application)
- Process device plant view as TAG-related view, also with display of diagnostics information
- Parameter view for parameterizing the field devices
- Lifelist view for commissioning and service

Communication
SIMATIC PDM supports several communication protocols and components for communicating with devices that have the following interfaces:
- PROFIBUS DP/PA interface
- HART interface
- Modbus interface
- Special interface from Siemens

Further communication protocols on request.

Routing
From the central engineering system of the SIMATIC PCS 7 process control system, you can navigate with SIMATIC PDM through the various bus systems and remote I/Os down to the connected devices. Throughout the plant, every device which can be parameterized per EDD can be processed using this routing functionality. The following processing functions are available:
- Read diagnostics information from the device
- Modify device settings
- Adjust and calibrate devices
- Monitor process values
- Generate simulation values
- Reparameterize devices

© Siemens AG 2010
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 directive of the established organizations for PROFIBUS (PNO: PROFIBUS International) and HART (HCF: HART Communication Foundation).

The devices are directly integrated in SIMATIC PDM through their EDD or the current HCF catalog. In the EDD the device is described in terms of its functions and construction using the Electronic Device Description Language (EDDL) specified by PNO. Using this description, SIMATIC PDM automatically creates its user interface with the specific device data.

The current device catalog of SIMATIC PDM covers more than 1,300 devices from more than 120 manufacturers world-wide. In addition, devices from all manufacturers can be integrated in SIMATIC PDM by simply importing their EDDs. It is thus possible to keep the device range up to date at all times and to add to the number of manufacturers and devices supported by SIMATIC PDM. To permit improved transparency, SIMATIC PDM also allows the creation of project-specific device catalogs. If devices are to be used which cannot be found in the SIMATIC PDM device catalog, we will be glad to help you integrate them.

Contact addresses

Siemens AG, Automation and Drives, Technical Support

Europe

Phone: +49 180 50 50 222
Fax: +49 180 50 50 223
E-mail: FPlease fill in a Support Request on the Internet (see below for address)

Asia/Pacific

Phone: +86 1064 719 990
Fax: +86 1064 747 474
E-mail: adsupport.asia@siemens.com

America

Phone: +1 423 262 2522
Fax: +1 423 262 2200
E-mail: techsupport.sea@siemens.com

Support Request

You can also obtain corresponding support over the Internet per Support Request:

www.siemens.com/automation/support-request

Technical specifications

<table>
<thead>
<tr>
<th>Hardware minimum requirements</th>
<th>Operating systems (alternative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PG/PC/notebook with processor corresponding to operating system requirements</td>
<td>• Microsoft Windows 2000 Professional SP3/SP4</td>
</tr>
<tr>
<td>• Main memory 256 MB</td>
<td>• Microsoft Windows XP Professional SP2/SP3</td>
</tr>
<tr>
<td>• Vacant hard disk 370 MB</td>
<td>• Microsoft Windows Server 2003 SP2 (only for operation with a SIMATIC PCS 7 Engineering Station)</td>
</tr>
</tbody>
</table>

Further software components

• SIMATIC PDM option "Integration in STEP 7/PCS 7"
**Selection and ordering Data**

SIMATIC PDM belongs to the SIMATIC products which can be used both in the context of SIMATIC PCS 7 and in the extended context of Totally Integrated Automation (TIA). Depending on the field of application, SIMATIC PDM is used in various product versions with different functionalities, ordering data and type of delivery. To provide a better overview and to avoid faulty ordering, the special selection and ordering data for SIMATIC PCS 7 are listed separately.

**Selection and ordering data for SIMATIC PCS 7 applications**

<table>
<thead>
<tr>
<th>Selection and Ordering Data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMATIC PDM PCS 7 V6.0</td>
<td>6ES7 658-3LX06-0YA5</td>
</tr>
<tr>
<td>Complete package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system</td>
<td></td>
</tr>
<tr>
<td>6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows XP Professional</td>
<td></td>
</tr>
<tr>
<td>Floating license for 1 user, with</td>
<td></td>
</tr>
<tr>
<td>• SIMATIC PDM Basic</td>
<td></td>
</tr>
<tr>
<td>• Integration in STEP 7 / PCS 7</td>
<td></td>
</tr>
<tr>
<td>• Routing via S7-400</td>
<td></td>
</tr>
<tr>
<td>• 128 TAGs</td>
<td></td>
</tr>
<tr>
<td>Type of delivery: License Key Disk, Certificate of License incl. Terms and Conditions; CDs with SIMATIC PDM V6.0 and device library</td>
<td></td>
</tr>
</tbody>
</table>

**Power Packs**

SIMATIC PDM PowerPack for expanding the TAGs of SIMATIC PDM PCS 7 V6.0

6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows XP Professional

Floating license for 1 user

Type of delivery: License Key Disk, Certificate of License incl. Terms and Conditions;

| From 128 TAGs to 512 TAGs | 6ES7 658-3XBO6-2YD5 |
| 6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows XP Professional |
| Floating license for 1 user |
| Type of delivery: License Key Disk, Certificate of License incl. Terms and Conditions; CDs with SIMATIC PDM V6.0 and device library |

**Demonstration software**

SIMATIC PDM Demo V6.0

without online communication and storage functionality

6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows XP Professional

Type of delivery: CDs with SIMATIC PDM V6.0 and device library

6ES7 658-3GX06-0YC8

**Selection and ordering data for TIA applications**

**Minimum configuration**

**SIMATIC PDM Single Point**

For operation and parameterization of one field device; communication via PROFIBUS DP/PA, HART modem or Modbus, including 1 TAG, cannot be expanded with respect to functions or with TAG option/PowerPack

6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows 2000 Professional or Windows XP Professional

Floating license for 1 user

Type of delivery:

License Key Disk, Certificate of License incl. Terms and Conditions; CDs with SIMATIC PDM V6.0 and device library

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6ES7 658-3HX06-0YA5</td>
</tr>
</tbody>
</table>

**Predefined SIMATIC PDM V6.0 product configurations for special applications**

**SIMATIC PDM Service V6.0**

Complete package for stand-alone users for servicing, with:

• SIMATIC PDM Basic V6.0
• 128 TAGs

6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

Type of delivery:

License Key Disk, Certificate of License incl. Terms and Conditions; CDs with SIMATIC PDM V6.0 and device library

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6ES7 658-3JX06-0YA5</td>
</tr>
</tbody>
</table>

**SIMATIC PDM S7 V6.0**

Complete package for use in a SIMATIC S7 configuration environment, with:

• SIMATIC PDM Basic V6.0
• Integration in STEP 7 / PCS 7
• 128 TAGs

6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

Type of delivery:

License Key Disk, Certificate of License incl. Terms and Conditions; CDs with SIMATIC PDM V6.0 and device library

<table>
<thead>
<tr>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6ES7 658-3KX06-0YA5</td>
</tr>
</tbody>
</table>
## Selection and Ordering Data

### Components for individual configuration

**SIMATIC PDM Basic V6.0**
- for operation and parameterization of field devices and components, communication via PROFIBUS DP/PA, HART (modern, RS 232, PROFIBUS) and Modbus, including 4 TAGs
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Type of delivery:
  - License Key Disk, Certificate of License incl. Terms and Conditions; CDs with SIMATIC PDM V6.0 and device library
  - Floating license for 1 user
  - Rental license for 50 hours

### Integration in STEP 7 / SIMATIC PCS 7
- Only required if integration of SIMATIC PDM into HW-Config is to be used
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Type of delivery:
  - License Key Disk, Certificate of License incl. Terms and Conditions
  - Floating license for 1 user

### Routing via S7-400
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Type of delivery:
  - License Key Disk, Certificate of License incl. Terms and Conditions
  - Floating license for 1 user

### Communication via standard HART multiplexer
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Type of delivery:
  - License Key Disk, Certificate of License incl. Terms and Conditions
  - Floating license for 1 user

---

## Selection and Ordering Data

### TAG options / Power Packs

**SIMATIC PDM TAG option**
- for TAG expansion, additive to SIMATIC PDM Basic V6.0
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Floating license for 1 user
- Type of delivery:
  - License Key Disk, Certificate of License incl. Terms and Conditions
  - Up to 128 TAGs
  - Up to 512 TAGs
  - Up to 1,024 TAGs
  - Up to 2,048 TAGs

**SIMATIC PDM PowerPack**
- for subsequent TAG expansion of all SIMATIC PDM V6.0 product configurations
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Floating license for 1 user
- Type of delivery:
  - License Key Disk, Certificate of License incl. Terms and Conditions
  - From 128 TAGs to 512 TAGs
  - From 512 TAGs to 1,024 TAGs
  - From 1,024 TAGs to 2,048 TAGs
  - From 2,048 TAGs to unlimited TAGs

**Demonstration software**
- SIMATIC PDM Demo V6.0
- without online communication and storage functionality
- 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional
- Type of delivery:
  - CDs with SIMATIC PDM V6.0 and device library

---

## More information

### Update/Upgrade
- All SIMATIC PDM product variants and combinations with Version 5.x can be upgraded to Version 6.0 per SIMATIC PDM Upgrade. In addition, a Software Update Service in the form of a subscription is offered for SIMATIC PDM.
- For further information, see Sections "Updates/Upgrades asynchronous to the PCS 7 version" and "Software Update Service" in Chapter "Update/upgrade packages".
<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/2</td>
<td>Training</td>
</tr>
<tr>
<td>10/3</td>
<td>Partner at Industry Automation and Drive Technologies</td>
</tr>
<tr>
<td>10/4</td>
<td>Online Services Information and Ordering in the Internet and on DVD</td>
</tr>
<tr>
<td>10/5</td>
<td>Service &amp; Support Services covering the entire life cycle</td>
</tr>
<tr>
<td>10/7</td>
<td>Pressure Equipment Directive (97/23/EC)</td>
</tr>
<tr>
<td>10/10</td>
<td>Software Licenses</td>
</tr>
<tr>
<td>10/11</td>
<td>Subject Index</td>
</tr>
<tr>
<td>10/14</td>
<td>Order No. Index</td>
</tr>
<tr>
<td>10/30</td>
<td>Notes</td>
</tr>
<tr>
<td>10/32</td>
<td>Conditions of Sale and Delivery, Export Regulations</td>
</tr>
</tbody>
</table>
Faster and more applicable know-how: Hands-on training from the manufacturer

SITRAIN® – the Siemens Training for Automation and Industrial Solutions – provides you with comprehensive support in solving your tasks.

Training by the market leader in automation and plant engineering enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

First-class know-how directly pays for itself. In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with SITRAIN

• Shorter times for startup, maintenance and servicing
• Optimized production operations
• Reliable configuration and startup
• Minimization of plant downtimes
• 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

SITRAIN highlights

Top trainers
Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience
The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety
With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training
We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning
‘Blended learning’ means a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.

Contact

Visit our site on the Internet at:
http://www.siemens.com/sitrain

or let us advise you personally. You can request our latest training catalog from:

SITRAIN Customer Support USA:
Phone: +1-800-241-4453
+1-423-262-5711
Fax: +1-678-297-8316
E-Mail: info@sitrain.com
At Siemens Industry Automation and Drive Technologies, more than 85,000 people 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: http://www.siemens.com/automation/partner

You start by selecting a
- Product group
- Country
- City
- Service
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 http://www.siemens.com/automation you will find everything you need to know about products, systems and services.

Detailed information together with convenient interactive functions:

The Offline Mall 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 Offline Mall CA 01 can be found in the Internet under http://www.siemens.com/automation/ca01 or on DVD.

The Industry Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

http://www.siemens.com/automation/mall
Our Service & Support accompanies you worldwide in all concerns related to the automation and drive technology of Siemens. In more than 100 countries directly on site and covering all phases of the life cycle of your machines and plants. Round the clock.

An experienced team of specialists with their combined knowhow is ready to assist you. Regular training courses and a close contact of our employees among each other - also across continents - assure a reliable service for multifaceted scopes.

### Online Support

The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

http://www.siemens.com/automation/service&support

### Technical Support

Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

http://www.siemens.com/automation/support-request

### Engineering Support

Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.

### Field Service

With Field Service, we offer services for startup and maintenance essential for ensuring system availability.

### Spare Parts and Repairs

In the operating phase of a machine or automation system, we provide a comprehensive repair and spare parts service ensuring the highest degree of plant availability.

### Optimization and Upgrading

After startup or during the operating phase, additional potential for increasing productivity or for reducing costs often arises. For this purpose, we offer you high-quality services in optimization and upgrading.

You find contact details in the Internet under:

http://www.siemens.com/automation/service&support
Knowledge Base on DVD

For locations without online connections to the Internet there are excerpts of the free part of the information sources available on DVD (Service & Support Knowledge Base). This DVD contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service & Support. The DVD also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The DVD will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on DVD comes complete in 5 languages (German, English, French, Italian, Spanish). You can order the Service & Support Knowledge Base DVD from your Siemens contact.
Order no. 6ZB5310-0EP30-0BA2

Automation Value Card

Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn’t matter whether you want just specific services from our Technical Support or want to purchase something on our Online portal, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it’s done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card. By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Order your Automation and Value Card easily and comfortably like a product with your sales contact.

Detailed information on the services offered is available on our Internet site at:
http://www.siemens.com/automation/service&support

Service & Support à la Card: Examples

<table>
<thead>
<tr>
<th>Technical Support</th>
<th>Order no.</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Priority”</td>
<td>6ES7 997-0BA00-0XA0</td>
<td>200</td>
</tr>
<tr>
<td>“24 h”</td>
<td>6ES7 997-0BB00-0XA0</td>
<td>500</td>
</tr>
<tr>
<td>“Extended”</td>
<td>6ES7 997-0BC00-0XA0</td>
<td>1000</td>
</tr>
<tr>
<td>“Mature Products”</td>
<td>6ES7 997-0BG00-0XA0</td>
<td>10000</td>
</tr>
</tbody>
</table>

Support Tools in the Support Shop

Tools that can be used directly for configuration, analysis and testing.
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

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: Potentially explosive
  - R phrases: e.g.: 2, 3 (1, 4, 5, 6, 9, 16, 18, 19, 44)
- Group 2: Highly toxic
  - R phrases: e.g.: 26, 27, 28, 39 (32)
- Group 3: Highly flammable
  - R phrases: e.g.: 29, 31
- Group 4: Toxic
  - R phrases: e.g.: 23, 24, 25 (29, 31)

Flammable if the maximum permissible temperature is above the flash point.

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.
Appendix
Pressure Equipment Directive (97/23/EC)

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.

- 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 1
- Vessels according to Article 3 Number 1.1 Letter b) First dash

- 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.
• Gases of fluid group 1
• 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 dash
• Exception: liquids 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
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 Automation & Drives offers various types of software license:
- Floating license
- Single license
- Rental license
- Trial 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.
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 device, 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 number of hours (the operating hours do not have to be consecutive). One license is required for each installation of the software.

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.

Factory license
With the Factory License the user has the right to install and use the software at one permanent establishment only. The permanent establishment is defined by one address only. The number of hardware devices on which the software may be installed results from the order data or the Certificate of License (CoL).

Certificate of license
The Certificate of License (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.

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 Automation & Drives 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).

Detailed explanations concerning license conditions can be found in the "Terms and Conditions of Siemens AG" or under http://www.siemens.com/automation/mail (A&D Mail Online-Help System)
### Subject Index

<table>
<thead>
<tr>
<th>A</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>for ultrasonic level meters</td>
<td>4/431, 4/254</td>
</tr>
<tr>
<td>for rotary-piston meters</td>
<td>2/130</td>
</tr>
<tr>
<td>for SITRANS F US clamp-on</td>
<td>4/427</td>
</tr>
<tr>
<td>for older flowmeters SITRANS F US Sonoflo</td>
<td>2/28, 2/56, 2/64, 3/16, 3/49</td>
</tr>
<tr>
<td>HART modem</td>
<td>5/133</td>
</tr>
<tr>
<td>HydroRanger 200</td>
<td>5/142</td>
</tr>
<tr>
<td>HydroRanger Plus</td>
<td>5/133</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic sensors</td>
<td>8/5</td>
</tr>
<tr>
<td>SITRANS DA400 for pump monitoring</td>
<td>8/10</td>
</tr>
<tr>
<td>SITRANS CU 02 for material flow monitoring</td>
<td>8/14</td>
</tr>
<tr>
<td>Antenna configurations for SITRANS LR</td>
<td>5/297</td>
</tr>
<tr>
<td>Accessories set for SITRANS LC</td>
<td>5/235</td>
</tr>
<tr>
<td>Accessories set for SITRANS LR</td>
<td>4/427</td>
</tr>
<tr>
<td>Accessory devices for quantity preset registers</td>
<td>4/427</td>
</tr>
<tr>
<td>Accessory devices for quantity preset registers</td>
<td>4/254</td>
</tr>
<tr>
<td>Accessory devices for quantity preset registers</td>
<td>2/130</td>
</tr>
<tr>
<td>Accessories set for SITRANS LC</td>
<td>5/235</td>
</tr>
<tr>
<td>Accessories set for SITRANS LR</td>
<td>4/427</td>
</tr>
<tr>
<td>Antenna configurations for SITRANS LR</td>
<td>5/205</td>
</tr>
<tr>
<td>AS 100</td>
<td>8/10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable hanger for submersible sensor</td>
<td>2/142</td>
</tr>
<tr>
<td>Capacitive level measurements</td>
<td>5/262</td>
</tr>
<tr>
<td>Capacitance switches for level measurement</td>
<td>5/6</td>
</tr>
<tr>
<td>Clamp-on seals</td>
<td>2/170, 2/173</td>
</tr>
<tr>
<td>for flange-mounting</td>
<td>2/170</td>
</tr>
<tr>
<td>Quick-release</td>
<td>2/173</td>
</tr>
<tr>
<td>Clamp-on system</td>
<td>4/256</td>
</tr>
<tr>
<td>SITRANS F US ultrasonic flowmeters</td>
<td>9/..</td>
</tr>
<tr>
<td>Communications and software</td>
<td>5/301</td>
</tr>
<tr>
<td>Communications and displays</td>
<td>10/44</td>
</tr>
<tr>
<td>Conditions of sale and delivery</td>
<td>10/3</td>
</tr>
<tr>
<td>Contact partner</td>
<td>5/191</td>
</tr>
<tr>
<td>Continuous radar level instruments</td>
<td>5/126</td>
</tr>
<tr>
<td>Control of water distribution and wastewater collection systems</td>
<td>1/146</td>
</tr>
<tr>
<td>Control unit SITRANS CU 02</td>
<td>8/14</td>
</tr>
<tr>
<td>Cooling attachment</td>
<td>4/434</td>
</tr>
<tr>
<td>Criteria for selection of flow meters</td>
<td>4/9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Automatic batchmeters</td>
<td>4/421</td>
</tr>
<tr>
<td>Diaphragm seals</td>
<td>2/144</td>
</tr>
<tr>
<td>Digital display thermometers SITRANS TF2</td>
<td>3/36</td>
</tr>
<tr>
<td>Dolphin Plus Software</td>
<td>5/303</td>
</tr>
<tr>
<td>Double-pointer dial</td>
<td>4/425</td>
</tr>
<tr>
<td>DRD connection</td>
<td>2/42, 2/83</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy Aiming devices (EA)</td>
<td>5/183</td>
</tr>
<tr>
<td>Echomax</td>
<td>5/167, 5/182</td>
</tr>
<tr>
<td>Electrical switch for quantity preset registers</td>
<td>4/427</td>
</tr>
<tr>
<td>Electro-mechanical switches for level measurement</td>
<td>5/110</td>
</tr>
<tr>
<td>Electropneumatic positioners</td>
<td>6/..</td>
</tr>
<tr>
<td>SITPART PS2, PS2 PA, PS2 PA FF, PS2 EE d FF, PS2 EE d PA and PS2 EE d FF</td>
<td>6/3</td>
</tr>
<tr>
<td>Motion failure alarm controller (MFA 4p)</td>
<td>4/435</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory-mounting of valve manifolds on SITRANS P</td>
<td>2/136</td>
</tr>
<tr>
<td>Transmitters</td>
<td>3/44</td>
</tr>
<tr>
<td>Field indicator SITRANS TF</td>
<td>3/19, 3/51, 2/186</td>
</tr>
<tr>
<td>Fieldbus transmitter for temperature</td>
<td>2/183</td>
</tr>
<tr>
<td>Five-spindle valve manifold</td>
<td>4/..</td>
</tr>
<tr>
<td>Fittings for measuring instruments for pressure, mounting examples</td>
<td>4/11, 4/119</td>
</tr>
<tr>
<td>Flowmeters</td>
<td>4/220, 4/179</td>
</tr>
<tr>
<td>Electromagnetic, SITRANS F M</td>
<td>4/256, 4/318</td>
</tr>
<tr>
<td>SITRANS F US clamp-on</td>
<td>4/180, 4/255</td>
</tr>
<tr>
<td>Ultrasonic, SITRANS F US in-line flowmeters</td>
<td>4/322</td>
</tr>
<tr>
<td>Vortex, SITRANS FX</td>
<td>2/168</td>
</tr>
<tr>
<td>Flushing ring</td>
<td>5/191, 5/223, 5/230</td>
</tr>
<tr>
<td>PFCM principle</td>
<td>5/185</td>
</tr>
<tr>
<td>PMS mounting system for level measurements</td>
<td>2/26, 2/33, 2/47, 2/62, 6/3, 9/7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided wave radar transmitters for level measurement</td>
<td>5/239</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>H</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand lever for quantity preset registers</td>
<td>4/427</td>
</tr>
<tr>
<td>HART communicator</td>
<td>2/28, 2/56, 2/64, 3/16, 3/49, 9/2</td>
</tr>
<tr>
<td>HydroRanger 200</td>
<td>5/133</td>
</tr>
<tr>
<td>HydroRanger Plus</td>
<td>5/142</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE/WSN-PALINK</td>
<td>9/14</td>
</tr>
<tr>
<td>Information and ordering options on the Internet and on DVD</td>
<td>10/4</td>
</tr>
<tr>
<td>Installation conditions for SITRANS F flowmeter</td>
<td>4/124</td>
</tr>
<tr>
<td>Coriolis SITRANS F C</td>
<td>4/27</td>
</tr>
<tr>
<td>Electromagnetic SITRANS F M</td>
<td>4/186</td>
</tr>
<tr>
<td>Ultrasonic SITRANS F US</td>
<td>7/3</td>
</tr>
<tr>
<td>Isolating power supply with HART, SITRANS I</td>
<td>9/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>J</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level measurements using radar</td>
<td>5/191, 5/239</td>
</tr>
<tr>
<td>Level measurements with microwave pulse technology</td>
<td>5/191, 5/223</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Diagnostic Station</td>
<td>9/18</td>
</tr>
<tr>
<td>MDS</td>
<td>9/18</td>
</tr>
<tr>
<td>Measuring instruments for pressure</td>
<td>2/..</td>
</tr>
<tr>
<td>Measuring instruments for temperature</td>
<td>3/..</td>
</tr>
<tr>
<td>Measuring setups with remote seals</td>
<td>2/177</td>
</tr>
<tr>
<td>without remote seals</td>
<td>2/179</td>
</tr>
<tr>
<td>Milltronics MFA 4p motion failure alarm controller</td>
<td>8/17</td>
</tr>
<tr>
<td>Milltronics Millipulse 600</td>
<td>8/21</td>
</tr>
<tr>
<td>Milltronics ZZS</td>
<td>8/23</td>
</tr>
<tr>
<td>Miniature diaphragm seals</td>
<td>2/169</td>
</tr>
<tr>
<td>Minibolt</td>
<td>2/54, 2/75</td>
</tr>
<tr>
<td>Motion failure alarm controller MFA 4p</td>
<td>8/17</td>
</tr>
<tr>
<td>Mounting of SITPART PS2 on linear and part-turn actuators</td>
<td>6/24</td>
</tr>
<tr>
<td>MultiRanger 100/200</td>
<td>5/138</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NuG and pharmaceutical connections</td>
<td>2/42, 2/85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCM III</td>
<td>5/298</td>
</tr>
<tr>
<td>Output isolators with HART</td>
<td>7/6</td>
</tr>
<tr>
<td>Oval flange</td>
<td>2/189</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMC connection for paper industry</td>
<td>2/44</td>
</tr>
<tr>
<td>Point level measurement</td>
<td>5/10</td>
</tr>
<tr>
<td>Pointek CLS</td>
<td>5/10, 5/77</td>
</tr>
<tr>
<td>Positioners, electropneumatic</td>
<td>6/..</td>
</tr>
<tr>
<td>Position sensor NCS for linear and part-turn actuators</td>
<td>6/4</td>
</tr>
<tr>
<td>Power supply unit, SITRANS I</td>
<td>7/5</td>
</tr>
<tr>
<td>Pressure equipment directive 97/23/EC</td>
<td>10/7</td>
</tr>
<tr>
<td>Process monitoring</td>
<td>8/..</td>
</tr>
<tr>
<td>PROFIBUS PA interface</td>
<td>2/26, 2/46, 2/62, 6/3, 9/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire</td>
<td>2/181</td>
</tr>
<tr>
<td>Checking of transmitter/remote seal combinations</td>
<td>2/182</td>
</tr>
<tr>
<td>Hydrostatic level measurements</td>
<td>2/166</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radar level instruments</td>
<td>5/191, 5/238</td>
</tr>
<tr>
<td>Remote seals</td>
<td>2/144, 2/176</td>
</tr>
<tr>
<td>Rotating paddle switch, SITRANS LPS200</td>
<td>5/110</td>
</tr>
</tbody>
</table>
## Subject Index

<p>| S | Sanitary process connections |
|   | Bio-Connect, Bio-Control, DRD, Varivent | 2/142, 2/85 |
|   | Satellite alarm module SITRANS LU SAM | 5/159 |
| Sensors for electromagnetic flow measurements |
| SITRANS F M MAG 1100 | 4/47 |
| SITRANS F M MAG 1100 Food | 4/55 |
| SITRANS F M MAG 5100 W | 4/85 |
| SITRANS F M MAG 3100 | 4/74 |
| 911/E | 4/91 |
| Service &amp; Support | 10/5 |
| Shut-off valves | 2/267 |
| differential pressure transmitters | 2/267 |
| SIMATIC PDM | 9/19 |
| SIPART PS2, PS2 PA, PS2 FF | 6/3 |
| SITRANS AS 100 acoustic sensor | 8/10 |
| SITRANS AW200 WirelessHART-adapter | 9/8 |
| SITRANS CU 02 | 8/14 |
| SITRANS DA400 | 8/5 |
| SITRANS F C | 4/120 |
| Transmitters MAG 6000 IP67 | 4/129 |
| Transmitters MAG 6000 for 19&quot; | 4/133 |
| Transmitters MAG 6000 Ex d | 4/140 |
| Transmitters SiFLOW FC070 | 4/145 |
| Sensors SITRANS FC300 | 4/153 |
| Sensors MASS 2100 DI 1.5 | 4/149 |
| Sensors MASS 2100 DI 3 to DI 40 | 4/158 |
| Sensors MASS MC2 | 4/168 |
| SITRANS F M | 4/11 |
| Transmitters MAG 5000/6000 | 4/31 |
| Transmitters MAG 5000/6000 I Ex d | 4/42 |
| Sensor MAG 1100 | 4/47 |
| Sensor MAG 1100 Food | 4/55 |
| Sensor MAG 3100 | 4/85 |
| Sensor MAG 5100 W | 4/74 |
| Sensor 911/E | 4/91 |
| Transmitters Transmag 2 with sensor 911/E | 4/91 |
| Water meters MAG 8000 | 4/180 |
| SITRANS F US in-line flowmeters |
| SITRANS FUS600 | 4/180 |
| SITRANS FUS800 | 4/189 |
| SITRANS FUS808 | 4/193 |
| SITRANS FUE380 | 4/223 |
| SITRANS FUE389 | 4/229 |
| SITRANS FUE880 | 4/239 |
| SITRANS FUE960 | 4/85 |
| SITRANS FUH300/600 | 4/185 |
| SITRANS FUH3100/FUS600 | 4/199 |
| SITRANS FUH (with FUS600) | 4/212 |
| SITRANS F US clamp-on | 4/256 |
| SITRANS FUE1010 clamp-on energy | 4/285 |
| SITRANS FUE1010 HVAC Check metering kit | 4/292 |
| SITRANS FUG1010 clamp-on gas | 4/300 |
| SITRANS FUGH1010 clamp-on oil | 4/293 |
| SITRANS FUP1010 clamp-on portable | 4/278 |
| SITRANS FUP1010 Check metering kit | 4/284 |
| SITRANS FUS1010 standard clamp-on | 4/269 |
| SITRANS FUS1020 basic clamp-on | 4/307 |
| SITRANS FX300 | 4/322 |
| SITRANS I | 7/7 |
| SITRANS I100 | 7/3 |
| SITRANS 200 | 7/6 |
| SITRANS LC300 | 5/262 |
| SITRANS LC500 | 5/273 |
| SITRANS LG200 | 5/239 |
| SITRANS LPS200 | 5/110 |
| SITRANS LR | 5/191 ... 5/297 |
| SITRANS LU | 5/146 ... 5/163 |
| SITRANS LU AO analog output module | 5/161 |
| SITRANS LUC500 | 5/146 |
| SITRANS LVL200 | 5/84 |
| SITRANS LVS200 | 5/102 |
| SITRANS MDS | 9/18 |
| SITRANS P | 2/.. |
| SITRANS P spare parts | 2/30 |
| SITRANS P transmitters for differential pressure |
| DS III series | 2/60, 2/05 |
| P250 series | 2/10 |
| SITRANS P transmitters for gauge pressure |
| MPS series (submersible sensor) |
| DS III series | 2/60, 2/76 |
| P300 | 2/24 |
| Z series | 2/4 |
| SITRANS P transmitters for flow DS III series | 2/60, 2/105 |
| SITRANS P transmitters for level DS III series | 2/60, 2/121 |
| SITRANS P for gauge and absolute pressure with |
| front-flush diaphragm, DS III series | 2/42, 2/76 |
| SITRANS P with PMC connection for paper industry |
| diaphragm |
| DS III | 2/44, 2/49 |
| P300 | 2/49 |
| SITRANS P transmitters for absolute pressure |
| DS III series | 2/60, 2/87 |
| P300 | 2/24 |
| Z series | 2/4 |
| ZD series | 2/15 |
| SITRANS P280 | 2/19 |
| SITRANS P300 | 2/24, 2/55 |
| SITRANS Probe LR | 5/191 |
| SITRANS Probe LU | 5/129 |
| SITRANS RD100 | 5/304 |
| SITRANS RD200 | 5/306 |
| SITRANS RD500 | 5/ |
| SITRANS TF, 2-wire system | 3/44 |
| SITRANS TF, field indicator | 3/44 |
| SITRANS TF, fieldbus transmitter | 3/51 |
| SITRANS TF2 | 3/36 |
| SITRANS TF280, WirelessHART | 3/39 |
| SITRANS TH100 | 3/4 |
| SITRANS TH200 | 3/7 |
| SITRANS TH300 | 3/13 |
| SITRANS TH400 | 3/19 |
| SITRANS TR200 | 3/24 |
| SITRANS TR300 | 3/30 |
| SITRANS ULS200 | 5/122 |
| SmartLinx modules | 5/301 |
| Software |
| Dolphin Plus | 5/503 |
| SIMATIC PDM | 9/19 |
| SIPROM T | 3/5, 3/10, 3/16, 3/27, 3/33 |
| Software licenses | 10/10 |
| ST-H, ultrasonic sensor | 5/164 |
| Submersible sensor, SITRANS P MPS series | 2/140 |
| System information |
| SITRANS F C (Coriolis) | 4/120 |
| SITRANS F M (electromagnetic) | 4/11 |
| SITRANS F US (ultrasonic) clamp-on | 4/256 |
| SITRANS F US (ultrasonic) In-line flowmeters | 4/180 |
| T |
| Tank connection TG52/50 and TG52/150 | 2/43, 2/95 |
| Temperature errors when using remote seals | 2/147 |
| Temperature sensor |
| TS-3 for ultrasonic measuring instruments | 5/186 |
| Temperature transmitters for rail mounting |
| SITRANS TR200 | 3/24 |
| SITRANS TR500 | 3/30 |
| Terms of Sale and Delivery | 10/44 |
| The Probe, compact device | 5/126 |
| Thickness gauge | 4/257 |
| TS-3 for ultrasonic measuring instruments | 5/186 |
| Three-spindle valve manifold | 2/186 |
| Transmitters for gauge pressure and absolute pressure with |
| for food, pharmaceuticals and biotechnology | 2/42, 2/76 |
| Transmitter power supply, SITRANS I | 7/5 |
| Training | 10/2 |
| Transmag 2 with sensor 911/E | 4/91 |
| Transmitters for gauge pressure and absolute pressure with |
| for food, pharmaceuticals and biotechnology | 2/42, 2/76 |</p>
<table>
<thead>
<tr>
<th>Subject</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasonic switch for level measurement</td>
<td>5/119</td>
</tr>
<tr>
<td>Ultrasonic transmitters for level measurement</td>
<td>5/126</td>
</tr>
<tr>
<td>Ultrasonic transducers for level measurement</td>
<td>5/163</td>
</tr>
<tr>
<td>Echomax XLT</td>
<td>5/180</td>
</tr>
<tr>
<td>Echomax XPS and XCT</td>
<td>5/170</td>
</tr>
<tr>
<td>Echomax XRS-5</td>
<td>5/167</td>
</tr>
<tr>
<td>ST-H</td>
<td>5/164</td>
</tr>
<tr>
<td>Varivent connection</td>
<td>2/42, 2/85</td>
</tr>
<tr>
<td>Vibrating level limit switches</td>
<td>5/78</td>
</tr>
<tr>
<td>Vortex SITRANS FX</td>
<td>4/322</td>
</tr>
<tr>
<td>Water meters MAG 8000</td>
<td>4/100</td>
</tr>
<tr>
<td>Wireless communication</td>
<td>2/19, 3/53</td>
</tr>
<tr>
<td>WirelessHART</td>
<td>2/19, 3/53, 9/3</td>
</tr>
<tr>
<td>WirelessHART adapter</td>
<td>9/3, 9/8</td>
</tr>
<tr>
<td>WirelessHART gateway</td>
<td>9/4, 9/5, 9/9</td>
</tr>
<tr>
<td>6DR...</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td>6DR004-...</td>
<td>6/21, 6/22</td>
</tr>
<tr>
<td>6DR5-......</td>
<td>6/18, 6/20</td>
</tr>
<tr>
<td>6ES7...</td>
<td>Page</td>
</tr>
<tr>
<td>6ES7307-1BA00-0AA0</td>
<td>4/147</td>
</tr>
<tr>
<td>6ES7390-...</td>
<td>4/147</td>
</tr>
<tr>
<td>6ES7392-1AJ00-0AA0</td>
<td>4/147</td>
</tr>
<tr>
<td>6ES7651-5CX06-0YE5</td>
<td>9/10, 9/24</td>
</tr>
<tr>
<td>6ES7658-3AX06-0YA5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3AX06-0YA6</td>
<td>9/24</td>
</tr>
<tr>
<td>6ES7658-3BX06-2YB5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3CX06-2YB5</td>
<td>9/11, 9/24</td>
</tr>
<tr>
<td>6ES7658-3DX06-2YB5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3EX06-2YB5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3GX06-0YC8</td>
<td>9/10, 9/24</td>
</tr>
<tr>
<td>6ES7658-3HX06-0YA5</td>
<td>4/214, 9/24</td>
</tr>
<tr>
<td>6ES7658-3JX06-0YA5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3KX06-0YA5</td>
<td>9/24</td>
</tr>
<tr>
<td>6ES7658-3MX06-2YB5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3MX06-2YB5</td>
<td>9/11, 9/24</td>
</tr>
<tr>
<td>6ES7658-3SX06-2YB5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3EX06-2YB5</td>
<td>9/5, 9/24</td>
</tr>
<tr>
<td>6ES7658-3XX00-0YL8</td>
<td>9/10</td>
</tr>
<tr>
<td>6GK...</td>
<td>Page</td>
</tr>
<tr>
<td>6GK1411-6CA40-0AA0</td>
<td>9/5</td>
</tr>
<tr>
<td>7ME...</td>
<td>Page</td>
</tr>
<tr>
<td>7ME3050-2BA...</td>
<td>4/191</td>
</tr>
<tr>
<td>7ME3100-...</td>
<td>4/205</td>
</tr>
<tr>
<td>7ME3210-...</td>
<td>4/215</td>
</tr>
<tr>
<td>7ME3220-...</td>
<td>4/215</td>
</tr>
<tr>
<td>7ME3300-...</td>
<td>4/201</td>
</tr>
<tr>
<td>7ME3400-...</td>
<td>4/227</td>
</tr>
<tr>
<td>7ME3410-...</td>
<td>4/233</td>
</tr>
<tr>
<td>7ME3440-...</td>
<td>4/251, 4/252</td>
</tr>
<tr>
<td>7ME3440-0AA01-2DA4</td>
<td>4/253</td>
</tr>
<tr>
<td>7ME3440-0AA03-2DA4</td>
<td>4/253</td>
</tr>
<tr>
<td>7ME3470-...</td>
<td>4/245</td>
</tr>
<tr>
<td>7ME3500-...</td>
<td>4/288</td>
</tr>
<tr>
<td>7ME3502-...</td>
<td>4/288</td>
</tr>
<tr>
<td>7ME3510-...</td>
<td>4/280</td>
</tr>
<tr>
<td>7ME3530-...</td>
<td>4/274</td>
</tr>
<tr>
<td>7ME3531-...</td>
<td>4/274</td>
</tr>
<tr>
<td>7ME3532-...</td>
<td>4/274</td>
</tr>
<tr>
<td>7ME3533-...</td>
<td>4/274</td>
</tr>
<tr>
<td>7ME3570-...</td>
<td>4/309</td>
</tr>
<tr>
<td>7ME3600-...</td>
<td>4/298</td>
</tr>
<tr>
<td>7ME3601-...</td>
<td>4/298</td>
</tr>
<tr>
<td>7ME3602-...</td>
<td>4/298</td>
</tr>
<tr>
<td>7ME3603-...</td>
<td>4/266</td>
</tr>
<tr>
<td>7ME3610-...</td>
<td>4/304</td>
</tr>
<tr>
<td>7ME3611-...</td>
<td>4/304</td>
</tr>
<tr>
<td>7ME3612-...</td>
<td>4/304</td>
</tr>
<tr>
<td>7ME3613-...</td>
<td>4/304</td>
</tr>
<tr>
<td>7ME3940-...</td>
<td>4/313</td>
</tr>
<tr>
<td>7ME3950-...</td>
<td>4/311, 4/314</td>
</tr>
<tr>
<td>7ME3950-1TJ00...</td>
<td>4/318</td>
</tr>
<tr>
<td>7ME3951-...</td>
<td>4/311, 4/314</td>
</tr>
<tr>
<td>7ME3960-...</td>
<td>4/311, 4/312, 4/316</td>
</tr>
<tr>
<td>7ME4100-...</td>
<td>4/147, 4/163</td>
</tr>
<tr>
<td>7ME4110-...</td>
<td>4/131, 4/135, 4/142, 4/151</td>
</tr>
<tr>
<td>7ME4120-2DH20-0EA0</td>
<td>4/147</td>
</tr>
<tr>
<td>7ME4200-...</td>
<td>4/147</td>
</tr>
<tr>
<td>7ME4210-...</td>
<td>4/163</td>
</tr>
<tr>
<td>7ME4300-...</td>
<td>4/171</td>
</tr>
<tr>
<td>7ME4310-...</td>
<td>4/172</td>
</tr>
<tr>
<td>7ME4400-...</td>
<td>4/155</td>
</tr>
<tr>
<td>7ME5034-...</td>
<td>4/81</td>
</tr>
<tr>
<td>7ME51-......</td>
<td>4/86</td>
</tr>
<tr>
<td>7ME52-......</td>
<td>4/87</td>
</tr>
<tr>
<td>7ME53-......</td>
<td>4/95</td>
</tr>
<tr>
<td>7ME5610-...</td>
<td>4/95</td>
</tr>
<tr>
<td>7ME590-......</td>
<td>4/84</td>
</tr>
<tr>
<td>7ME5902-...</td>
<td>4/97</td>
</tr>
<tr>
<td>7ME591-......</td>
<td>4/97</td>
</tr>
<tr>
<td>7ME5912-...</td>
<td>4/97</td>
</tr>
<tr>
<td>7ME592-......</td>
<td>4/84</td>
</tr>
<tr>
<td>7ME5930-...</td>
<td>4/96</td>
</tr>
<tr>
<td>7ME5933-0AC..</td>
<td>4/41, 4/192</td>
</tr>
<tr>
<td>7ME6110-...</td>
<td>4/46</td>
</tr>
<tr>
<td>7ME6120-...</td>
<td>4/51</td>
</tr>
<tr>
<td>7ME6140-...</td>
<td>4/57</td>
</tr>
<tr>
<td>7ME6310-...</td>
<td>4/110</td>
</tr>
<tr>
<td>7ME6320-...</td>
<td>4/112</td>
</tr>
<tr>
<td>7ME6340-...</td>
<td>4/79</td>
</tr>
<tr>
<td>7ME6520-...</td>
<td>4/69</td>
</tr>
<tr>
<td>7ME6580-...</td>
<td>4/70</td>
</tr>
<tr>
<td>7ME6810-...</td>
<td>4/110</td>
</tr>
<tr>
<td>7ME6820-...</td>
<td>4/112</td>
</tr>
<tr>
<td>7ME6910-...</td>
<td>4/34</td>
</tr>
<tr>
<td>7ME6920-...</td>
<td>4/34</td>
</tr>
<tr>
<td>7ME6930-...</td>
<td>4/43</td>
</tr>
<tr>
<td>7MF1...</td>
<td>Page</td>
</tr>
<tr>
<td>7MF1564-....</td>
<td>2/7</td>
</tr>
<tr>
<td>7MF1564-8CC11</td>
<td>2/9, 2/18, 2/42, 3/52</td>
</tr>
<tr>
<td>7MF1570-....</td>
<td>2/142</td>
</tr>
<tr>
<td>7MF1570-8AA</td>
<td>2/142</td>
</tr>
<tr>
<td>7MF1570-8AB</td>
<td>2/142</td>
</tr>
<tr>
<td>7MF1580-....</td>
<td>2/18</td>
</tr>
<tr>
<td>7MF1641-....</td>
<td>2/14</td>
</tr>
<tr>
<td>7MF4...</td>
<td>Page</td>
</tr>
<tr>
<td>7MF4033-...</td>
<td>2/71</td>
</tr>
<tr>
<td>7MF4034-...</td>
<td>2/72</td>
</tr>
<tr>
<td>7MF4035-...</td>
<td>2/72</td>
</tr>
<tr>
<td>7MF4133-...</td>
<td>2/52, 2/80</td>
</tr>
<tr>
<td>7MF4134-...</td>
<td>2/52, 2/81</td>
</tr>
<tr>
<td>7MF4135-...</td>
<td>2/52, 2/81</td>
</tr>
<tr>
<td>7MF4233-...</td>
<td>2/91</td>
</tr>
<tr>
<td>7MF4234-...</td>
<td>2/92</td>
</tr>
<tr>
<td>7MF4235-...</td>
<td>2/92</td>
</tr>
<tr>
<td>7MF4333-...</td>
<td>2/100</td>
</tr>
<tr>
<td>7MF4334-...</td>
<td>2/101</td>
</tr>
<tr>
<td>7MF4335-...</td>
<td>2/101</td>
</tr>
<tr>
<td>7MF4433-...</td>
<td>2/109</td>
</tr>
<tr>
<td>7MF4434-...</td>
<td>2/110</td>
</tr>
<tr>
<td>7MF4435-...</td>
<td>2/110</td>
</tr>
<tr>
<td>7MF4533-...</td>
<td>2/113</td>
</tr>
<tr>
<td>7MF4534-...</td>
<td>2/114</td>
</tr>
<tr>
<td>7MF4535-...</td>
<td>2/114</td>
</tr>
<tr>
<td>7MF4633-...</td>
<td>2/125</td>
</tr>
<tr>
<td>7MF4634-...</td>
<td>2/126</td>
</tr>
<tr>
<td>Order No.</td>
<td>Index Page</td>
</tr>
<tr>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>7MF4635-...</td>
<td>2/126</td>
</tr>
<tr>
<td>7MF4800-...</td>
<td>2/150</td>
</tr>
<tr>
<td>7MF4801-...</td>
<td>2/150</td>
</tr>
<tr>
<td>7MF4803-...</td>
<td>2/150</td>
</tr>
<tr>
<td>7MF4810-...</td>
<td>2/152</td>
</tr>
<tr>
<td>7MF4812-...</td>
<td>2/153</td>
</tr>
<tr>
<td>7MF4813-...</td>
<td>2/153</td>
</tr>
<tr>
<td>7MF4820-...</td>
<td>2/157</td>
</tr>
<tr>
<td>7MF4821-...</td>
<td>2/157</td>
</tr>
<tr>
<td>7MF4823-...</td>
<td>2/157</td>
</tr>
<tr>
<td>7MF4825-...</td>
<td>2/163</td>
</tr>
<tr>
<td>7MF4826-...</td>
<td>2/159</td>
</tr>
<tr>
<td>7MF4827-...</td>
<td>2/161</td>
</tr>
<tr>
<td>7MF4828-...</td>
<td>2/161</td>
</tr>
<tr>
<td>7MF4840-...</td>
<td>2/166</td>
</tr>
<tr>
<td>7MF4850-...</td>
<td>2/168</td>
</tr>
<tr>
<td>7MF4861-...</td>
<td>2/169</td>
</tr>
<tr>
<td>7MF4862-...</td>
<td>2/170</td>
</tr>
<tr>
<td>7MF4863-...</td>
<td>2/171</td>
</tr>
<tr>
<td>7MF4880-...</td>
<td>2/172</td>
</tr>
<tr>
<td>7MF4883-...</td>
<td>2/173</td>
</tr>
<tr>
<td>7MF4890-...</td>
<td>2/175</td>
</tr>
<tr>
<td>7MF4997-1AB</td>
<td>2/133, 3/54</td>
</tr>
<tr>
<td>7MF4997-1AC</td>
<td>2/21, 2/133, 3/41, 3/49, 3/54</td>
</tr>
<tr>
<td>7MF4997-1AD</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1AE</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1AF</td>
<td>2/133, 3/49, 3/54</td>
</tr>
<tr>
<td>7MF4997-1AH</td>
<td>2/21, 2/133, 3/49, 3/54</td>
</tr>
<tr>
<td>7MF4997-1AJ</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1AK</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1AL</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1AM</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1AO</td>
<td>5/177</td>
</tr>
<tr>
<td>7MF4997-1BB</td>
<td>2/21, 2/133, 3/55</td>
</tr>
<tr>
<td>7MF4997-1BC</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1BE</td>
<td>2/21, 2/133, 3/55</td>
</tr>
<tr>
<td>7MF4997-1BF</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1BR</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1BS</td>
<td>3/49</td>
</tr>
<tr>
<td>7MF4997-1CA</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1CB-Z</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1CD</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1CG</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1CH</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1CP</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1CQ</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1DK</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1DL</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1DM</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1DN</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-1DP</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DA</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DB</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DC</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DD</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DE</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HA</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HB</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HC</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HD</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HF</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HG</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HH</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HJ</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HK</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2HL</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DA</td>
<td>2/133</td>
</tr>
<tr>
<td>7MF4997-2DB</td>
<td>2/133</td>
</tr>
<tr>
<td>Order No.</td>
<td>Index</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>7ML1830-1AM</td>
<td>7ML1830-1AN</td>
</tr>
<tr>
<td>7ML1830-1AP</td>
<td>7ML1830-1AQ</td>
</tr>
<tr>
<td>7ML1830-1AS</td>
<td>7ML1830-1AT</td>
</tr>
<tr>
<td>7ML1830-1AU</td>
<td>7ML1830-1AX</td>
</tr>
<tr>
<td>7ML1830-1AX</td>
<td>7ML1830-1AY</td>
</tr>
<tr>
<td>7ML1830-1AY</td>
<td>7ML1830-1AZ</td>
</tr>
<tr>
<td>7ML1830-1AZ</td>
<td>7ML1830-1BA</td>
</tr>
<tr>
<td>7ML1830-1BA</td>
<td>7ML1830-1BB</td>
</tr>
<tr>
<td>7ML1830-1BB</td>
<td>7ML1830-1BC</td>
</tr>
<tr>
<td>7ML1830-1BC</td>
<td>7ML1830-1BD</td>
</tr>
<tr>
<td>7ML1830-1BD</td>
<td>7ML1830-1BE</td>
</tr>
<tr>
<td>7ML1830-1BE</td>
<td>7ML1830-1BF</td>
</tr>
<tr>
<td>7ML1830-1BF</td>
<td>7ML1830-1BG</td>
</tr>
<tr>
<td>7ML1830-1BG</td>
<td>7ML1830-1BH</td>
</tr>
<tr>
<td>7ML1830-1BH</td>
<td>7ML1830-1BI</td>
</tr>
<tr>
<td>7ML1830-1BI</td>
<td>7ML1830-1BJ</td>
</tr>
<tr>
<td>7ML1830-1BJ</td>
<td>7ML1830-1BK</td>
</tr>
<tr>
<td>7ML1830-1BK</td>
<td>7ML1830-1BL</td>
</tr>
<tr>
<td>7ML1830-1BL</td>
<td>7ML1830-1BM</td>
</tr>
<tr>
<td>7ML1830-1BM</td>
<td>7ML1830-1BN</td>
</tr>
<tr>
<td>7ML1830-1BN</td>
<td>7ML1830-1BO</td>
</tr>
<tr>
<td>7ML1830-1BO</td>
<td>7ML1830-1BP</td>
</tr>
<tr>
<td>7ML1830-1BP</td>
<td>7ML1830-1BQ</td>
</tr>
<tr>
<td>7ML1830-1BQ</td>
<td>7ML1830-1BR</td>
</tr>
<tr>
<td>7ML1830-1BR</td>
<td>7ML1830-1BT</td>
</tr>
<tr>
<td>7ML1830-1BT</td>
<td>7ML1830-1BU</td>
</tr>
<tr>
<td>7ML1830-1BU</td>
<td>7ML1830-1CF</td>
</tr>
<tr>
<td>7ML1830-1CF</td>
<td>7ML1830-1CG</td>
</tr>
<tr>
<td>7ML1830-1CG</td>
<td>7ML1830-1CH</td>
</tr>
<tr>
<td>7ML1830-1CH</td>
<td>7ML1830-1CK</td>
</tr>
<tr>
<td>7ML1830-1CK</td>
<td>7ML1830-1CL</td>
</tr>
<tr>
<td>7ML1830-1CL</td>
<td>7ML1830-1CM</td>
</tr>
<tr>
<td>7ML1830-1CM</td>
<td>7ML1830-1CN</td>
</tr>
<tr>
<td>7ML1830-1CN</td>
<td>7ML1830-1CP</td>
</tr>
<tr>
<td>7ML1830-1CP</td>
<td>7ML1830-1CQ</td>
</tr>
<tr>
<td>7ML1830-1CQ</td>
<td>7ML1830-1CR</td>
</tr>
<tr>
<td>7ML1830-1CR</td>
<td>7ML1830-1CS</td>
</tr>
<tr>
<td>7ML1830-1CS</td>
<td>7ML1830-1DJ</td>
</tr>
<tr>
<td>7ML1830-1DJ</td>
<td>7ML1830-1DK</td>
</tr>
<tr>
<td>7ML1830-1DK</td>
<td>7ML1830-1DL</td>
</tr>
<tr>
<td>7ML1830-1DL</td>
<td>7ML1830-1DM</td>
</tr>
<tr>
<td>7ML1830-1DM</td>
<td>7ML1830-1DP</td>
</tr>
<tr>
<td>7ML1830-1DP</td>
<td>7ML1830-1DQ</td>
</tr>
<tr>
<td>7ML1830-1DQ</td>
<td>7ML1830-1DR</td>
</tr>
<tr>
<td>7ML1830-1DR</td>
<td>7ML1830-1DS</td>
</tr>
<tr>
<td>7ML1830-1DS</td>
<td>7ML1830-1DT</td>
</tr>
<tr>
<td>7ML1830-1DT</td>
<td>7ML1830-1GM</td>
</tr>
<tr>
<td>7ML1830-1GM</td>
<td>7ML1830-1GN</td>
</tr>
<tr>
<td>7ML1830-1GN</td>
<td>7ML1830-1HA</td>
</tr>
<tr>
<td>7ML1830-1HA</td>
<td>7ML1830-1HB</td>
</tr>
<tr>
<td>7ML1830-1HB</td>
<td>7ML1830-1HC</td>
</tr>
<tr>
<td>7ML1830-1HC</td>
<td>7ML1830-1HD</td>
</tr>
<tr>
<td>7ML1830-1HD</td>
<td>7ML1830-1HE</td>
</tr>
<tr>
<td>7ML1830-1HE</td>
<td>7ML1830-1HF</td>
</tr>
<tr>
<td>7ML1830-1HF</td>
<td>7ML1830-1HP</td>
</tr>
<tr>
<td>7ML1830-1HP</td>
<td>7ML1830-1HQ</td>
</tr>
<tr>
<td>7ML1830-1HQ</td>
<td>7ML1830-1HR</td>
</tr>
<tr>
<td>7ML1830-1HR</td>
<td>7ML1830-1HS</td>
</tr>
<tr>
<td>7ML1830-1HS</td>
<td>7ML1830-1HT</td>
</tr>
<tr>
<td>7ML1830-1HT</td>
<td>7ML1830-1JA</td>
</tr>
<tr>
<td>7ML1830-1JA</td>
<td>7ML1830-1JB</td>
</tr>
<tr>
<td>7ML1830-1JB</td>
<td>7ML1830-1JC</td>
</tr>
<tr>
<td>7ML1830-1JC</td>
<td>7ML1830-1JD</td>
</tr>
<tr>
<td>7ML1830-1JD</td>
<td>7ML1830-1JE</td>
</tr>
<tr>
<td>7ML1830-1JE</td>
<td>7ML1830-1JK</td>
</tr>
<tr>
<td>7ML1830-1JK</td>
<td>7ML1830-1JL</td>
</tr>
<tr>
<td>7ML1830-1JL</td>
<td>7ML1830-1JM</td>
</tr>
<tr>
<td>7ML1830-1JM</td>
<td>7ML1830-1JN</td>
</tr>
<tr>
<td>7ML1830-1JN</td>
<td>7ML1830-1JP</td>
</tr>
<tr>
<td>7ML1830-1JP</td>
<td>7ML1830-1JQ</td>
</tr>
<tr>
<td>7ML1830-1JQ</td>
<td>7ML1830-1JR</td>
</tr>
<tr>
<td>7ML1830-1JR</td>
<td>7ML1830-1JV</td>
</tr>
<tr>
<td>7ML1830-1JV</td>
<td>7ML1830-1KA</td>
</tr>
<tr>
<td>7ML1830-1KA</td>
<td>7ML1830-1KB</td>
</tr>
<tr>
<td>7ML1830-1KB</td>
<td>7ML1830-1KC</td>
</tr>
<tr>
<td>7ML1830-1KC</td>
<td>7ML1830-1KG</td>
</tr>
<tr>
<td>7ML1830-1KG</td>
<td>7ML1830-1KH</td>
</tr>
<tr>
<td>7ML1830-1KH</td>
<td>7ML1830-1KJ</td>
</tr>
<tr>
<td>7ML1830-1KJ</td>
<td>7ML1830-1KK</td>
</tr>
<tr>
<td>7ML1830-1KK</td>
<td>7ML1830-1KL</td>
</tr>
<tr>
<td>7ML1830-1KL</td>
<td>7ML1830-1KM</td>
</tr>
<tr>
<td>7ML1830-1KM</td>
<td>7ML1830-1KN</td>
</tr>
<tr>
<td>7ML1830-1KN</td>
<td>7ML1830-1KR</td>
</tr>
<tr>
<td>7ML1830-1KR</td>
<td>7ML1830-1KS</td>
</tr>
<tr>
<td>7ML1830-1KS</td>
<td>7ML1830-1KT</td>
</tr>
<tr>
<td>7ML1830-1KT</td>
<td>7ML1830-1KU</td>
</tr>
<tr>
<td>7ML1830-1KU</td>
<td>7ML1830-1KV</td>
</tr>
<tr>
<td>7ML1830-1KV</td>
<td>7ML1830-1KW</td>
</tr>
<tr>
<td>7ML1830-1KW</td>
<td>7ML1830-1KX</td>
</tr>
<tr>
<td>7ML1830-1KX</td>
<td>7ML1830-1KY</td>
</tr>
<tr>
<td>7ML1830-1KY</td>
<td>7ML1830-1LA</td>
</tr>
<tr>
<td>7ML1830-1LA</td>
<td>7ML1830-1LB</td>
</tr>
<tr>
<td>7ML1830-1LB</td>
<td>7ML1830-1LC</td>
</tr>
<tr>
<td>7ML1830-1LC</td>
<td>7ML1830-1LD</td>
</tr>
<tr>
<td>7ML1830-1LD</td>
<td>7ML1830-1LE</td>
</tr>
<tr>
<td>7ML1830-1LE</td>
<td>7ML1830-1LF</td>
</tr>
<tr>
<td>7ML1830-1LF</td>
<td>7ML1830-1LG</td>
</tr>
<tr>
<td>7ML1830-1LG</td>
<td>7ML1830-1LH</td>
</tr>
<tr>
<td>7ML1830-1LH</td>
<td>7ML1830-1LN</td>
</tr>
<tr>
<td>7ML1830-1LN</td>
<td>7ML1830-1LP</td>
</tr>
<tr>
<td>Order No.</td>
<td>Index Page</td>
</tr>
<tr>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>7ML1830-1LQ</td>
<td>5/153, 5/157</td>
</tr>
<tr>
<td>7ML1830-1LR</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LS</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LT</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1830-1LV</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LW</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LY</td>
<td>5/157</td>
</tr>
<tr>
<td>7ML1830-1MA</td>
<td>5/153</td>
</tr>
<tr>
<td>7ML1830-1MC</td>
<td>5/303</td>
</tr>
<tr>
<td>7ML1830-1MD</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1ME</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1MF</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1MG</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1830-1MM</td>
<td>5/303</td>
</tr>
<tr>
<td>7ML1830-1NC</td>
<td>5/89, 5/93</td>
</tr>
<tr>
<td>7ML1830-1NS</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1830-1NU</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1830-1NT</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1830-1LU</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LV</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LW</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LY</td>
<td>5/157</td>
</tr>
<tr>
<td>7ML1830-1MA</td>
<td>5/153</td>
</tr>
<tr>
<td>7ML1830-1MC</td>
<td>5/303</td>
</tr>
<tr>
<td>7ML1830-1MD</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1ME</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1MF</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1MG</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1830-1ML</td>
<td>5/157</td>
</tr>
<tr>
<td>7ML1830-1MM</td>
<td>5/303</td>
</tr>
<tr>
<td>7ML1830-1NC</td>
<td>5/89, 5/93</td>
</tr>
<tr>
<td>7ML1830-1NS</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1830-1NU</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1830-1NT</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1830-1LU</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LV</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LW</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-1LY</td>
<td>5/157</td>
</tr>
<tr>
<td>7ML1830-1MA</td>
<td>5/153</td>
</tr>
<tr>
<td>7ML1830-1MC</td>
<td>5/303</td>
</tr>
<tr>
<td>7ML1830-1MD</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1ME</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1MF</td>
<td>5/135, 5/136, 5/140</td>
</tr>
<tr>
<td>7ML1830-1MG</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1830-2AA</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-2AC</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1830-2AG</td>
<td>5/148</td>
</tr>
<tr>
<td>7ML1830-2AM</td>
<td>5/136</td>
</tr>
<tr>
<td>7ML1830-2AN</td>
<td>5/131, 5/135, 5/157</td>
</tr>
<tr>
<td>7ML1830-2BK</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1830-2BL</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1830-2BM</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1830-2BN</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1830-2BP</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1830-2BQ</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1841-...</td>
<td>5/303</td>
</tr>
<tr>
<td>7ML1930-1AA</td>
<td>5/89, 5/127</td>
</tr>
<tr>
<td>7ML1930-1AB</td>
<td>5/89, 5/127</td>
</tr>
<tr>
<td>7ML1930-1AD</td>
<td>5/143</td>
</tr>
<tr>
<td>7ML1930-1AE</td>
<td>5/148</td>
</tr>
<tr>
<td>7ML1930-1AF</td>
<td>5/148</td>
</tr>
<tr>
<td>7ML1930-1AG</td>
<td>5/148</td>
</tr>
<tr>
<td>7ML1930-1AH</td>
<td>5/225</td>
</tr>
<tr>
<td>7ML1930-1AJ</td>
<td>5/225</td>
</tr>
<tr>
<td>7ML1930-1AK</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1930-1AL</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1930-1AM</td>
<td>5/131, 5/197, 5/198, 5/200, 5/201</td>
</tr>
<tr>
<td>7ML1930-1AN</td>
<td>5/208</td>
</tr>
<tr>
<td>7ML1930-1BE</td>
<td>5/187</td>
</tr>
<tr>
<td>7ML1930-1BL</td>
<td>5/220, 5/232</td>
</tr>
<tr>
<td>7ML1930-1BM</td>
<td>5/220, 5/232</td>
</tr>
<tr>
<td>7ML1930-1BN</td>
<td>5/263</td>
</tr>
<tr>
<td>7ML1930-1BN</td>
<td>5/304</td>
</tr>
<tr>
<td>7ML1930-1BP</td>
<td>5/304</td>
</tr>
<tr>
<td>7ML1930-1BQ</td>
<td>5/304</td>
</tr>
<tr>
<td>7ML1930-1BR</td>
<td>5/308</td>
</tr>
<tr>
<td>Code</td>
<td>Page</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td>7ML1998-SAB01</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1998-SAN..</td>
<td>5/157</td>
</tr>
<tr>
<td>7ML1998-SAR..</td>
<td>5/23</td>
</tr>
<tr>
<td>7ML1998-SBD..</td>
<td>5/153</td>
</tr>
<tr>
<td>7ML1998-SBE..</td>
<td>5/153</td>
</tr>
<tr>
<td>7ML1998-SBK61</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1998-SBL61</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1998-SBM61</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1998-SBN61</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1998-SBP61</td>
<td>5/185</td>
</tr>
<tr>
<td>7ML1998-SCe..</td>
<td>4/161</td>
</tr>
<tr>
<td>7ML1998-SCF..</td>
<td>5/159</td>
</tr>
<tr>
<td>7ML1998-SDF..</td>
<td>8/24</td>
</tr>
<tr>
<td>7ML1998-SDG..</td>
<td>8/22</td>
</tr>
<tr>
<td>7ML1998-SDM..</td>
<td>8/11</td>
</tr>
<tr>
<td>7ML1998-SDN..</td>
<td>8/15</td>
</tr>
<tr>
<td>7ML1998-SEM01</td>
<td>5/187</td>
</tr>
<tr>
<td>7ML1998-SEW01</td>
<td>5/299</td>
</tr>
<tr>
<td>7ML1998-SFB..</td>
<td>5/140</td>
</tr>
<tr>
<td>7ML1998-SFC..</td>
<td>5/135</td>
</tr>
<tr>
<td>7ML1998-SFH..</td>
<td>5/225</td>
</tr>
<tr>
<td>7ML1998-SFM..</td>
<td>5/19</td>
</tr>
<tr>
<td>7ML1998-SCT63</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML1998-SCG62</td>
<td>5/127</td>
</tr>
<tr>
<td>7ML1998-SCD61</td>
<td>5/127</td>
</tr>
<tr>
<td>7ML1998-SGE..</td>
<td>5/281</td>
</tr>
<tr>
<td>7ML1998-SGG..</td>
<td>5/66</td>
</tr>
<tr>
<td>7ML1998-SCG..</td>
<td>5/148</td>
</tr>
<tr>
<td>7ML1998-SGE..</td>
<td>5/264, 5/266</td>
</tr>
<tr>
<td>7ML1998-SH..</td>
<td>5/193</td>
</tr>
<tr>
<td>7ML1998-SHT..</td>
<td>5/131</td>
</tr>
<tr>
<td>7ML1998-SHX61</td>
<td>5/177</td>
</tr>
<tr>
<td>7ML1998-SJB02</td>
<td>5/131</td>
</tr>
<tr>
<td>7ML1998-SJB32</td>
<td>5/131</td>
</tr>
<tr>
<td>7ML1998-SJE..</td>
<td>5/212</td>
</tr>
<tr>
<td>7ML1998-SJF..</td>
<td>5/213</td>
</tr>
<tr>
<td>7ML1998-SJH..</td>
<td>5/33, 5/34, 5/54</td>
</tr>
<tr>
<td>7ML1998-SJH01</td>
<td>5/33, 5/54</td>
</tr>
<tr>
<td>7ML1998-SJM..</td>
<td>5/232</td>
</tr>
<tr>
<td>7ML1998-SJ..</td>
<td>5/197, 5/198, 5/199, 5/201</td>
</tr>
<tr>
<td>7ML1998-SJ..</td>
<td>5/197, 5/198, 5/199, 5/201</td>
</tr>
<tr>
<td>7ML1998-SJS..</td>
<td>5/308</td>
</tr>
<tr>
<td>7ML1998-SJU..</td>
<td>5/304</td>
</tr>
<tr>
<td>7ML1998-SJ..</td>
<td>5/308</td>
</tr>
<tr>
<td>7ML1998-SJ..</td>
<td>5/308</td>
</tr>
<tr>
<td>7ML1998-SJ..</td>
<td>5/308</td>
</tr>
<tr>
<td>7ML1998-SKE..</td>
<td>5/220</td>
</tr>
<tr>
<td>7ML1998-SK..</td>
<td>5/220</td>
</tr>
<tr>
<td>7ML1998-SKN..</td>
<td>5/80</td>
</tr>
<tr>
<td>7ML1998-SKP31</td>
<td>5/80</td>
</tr>
<tr>
<td>7ML1998-SK..</td>
<td>5/89</td>
</tr>
<tr>
<td>7ML1998-SKR..</td>
<td>5/89</td>
</tr>
<tr>
<td>7ML1998-SKR01</td>
<td>5/89</td>
</tr>
<tr>
<td>7ML1998-SK..</td>
<td>5/93</td>
</tr>
<tr>
<td>7ML1998-SK..</td>
<td>5/93</td>
</tr>
<tr>
<td>7ML1998-SLS..</td>
<td>5/89, 5/93</td>
</tr>
<tr>
<td>7ML1998-SQA85</td>
<td>5/184, 5/185, 5/186</td>
</tr>
<tr>
<td>7ML1998-SQD83</td>
<td>5/140</td>
</tr>
<tr>
<td>7ML1998-SQJ81</td>
<td>5/12</td>
</tr>
<tr>
<td>7ML1998-SQK82</td>
<td>5/165</td>
</tr>
<tr>
<td>7ML1998-SQN83</td>
<td>5/225</td>
</tr>
<tr>
<td>7ML1998-SQP81</td>
<td>5/193</td>
</tr>
<tr>
<td>7ML1998-SQR81</td>
<td>5/131</td>
</tr>
<tr>
<td>7ML1998-SQ981</td>
<td>5/181</td>
</tr>
<tr>
<td>7ML1998-SQT81</td>
<td>5/168</td>
</tr>
<tr>
<td>7ML1998-SQV81</td>
<td>5/131</td>
</tr>
<tr>
<td>7ML1998-SQW82</td>
<td>5/232</td>
</tr>
<tr>
<td>7ML1998-SQX81</td>
<td>5/212</td>
</tr>
<tr>
<td>7ML1998-SQY81</td>
<td>5/33, 5/54</td>
</tr>
<tr>
<td>7ML1998-SX81</td>
<td>5/220</td>
</tr>
<tr>
<td>7ML1998-SXJ81</td>
<td>5/220</td>
</tr>
<tr>
<td>7ML5...</td>
<td>5/148</td>
</tr>
<tr>
<td>7ML5001...</td>
<td>5/153</td>
</tr>
<tr>
<td>7ML5004...</td>
<td>5/157</td>
</tr>
<tr>
<td>7ML5007...</td>
<td>5/140</td>
</tr>
<tr>
<td>7ML5033...</td>
<td>5/135</td>
</tr>
<tr>
<td>7ML5034...</td>
<td>5/131</td>
</tr>
<tr>
<td>7ML5221...</td>
<td>5/225</td>
</tr>
<tr>
<td>7ML5421...</td>
<td>5/197</td>
</tr>
<tr>
<td>7ML5422...</td>
<td>5/199</td>
</tr>
<tr>
<td>7ML5423...</td>
<td>5/198</td>
</tr>
<tr>
<td>7ML5424...</td>
<td>5/200</td>
</tr>
<tr>
<td>7ML5425...</td>
<td>5/232</td>
</tr>
<tr>
<td>7ML5426...</td>
<td>5/220</td>
</tr>
<tr>
<td>7ML5427...</td>
<td>5/93</td>
</tr>
<tr>
<td>7ML5430...</td>
<td>5/212</td>
</tr>
<tr>
<td>7ML5431...</td>
<td>5/276</td>
</tr>
<tr>
<td>7ML5501...</td>
<td>5/12</td>
</tr>
<tr>
<td>7ML5513...</td>
<td>5/277</td>
</tr>
<tr>
<td>7ML5515...</td>
<td>5/279</td>
</tr>
<tr>
<td>7ML5517...</td>
<td>5/281</td>
</tr>
<tr>
<td>7ML5523...</td>
<td>5/64</td>
</tr>
<tr>
<td>7ML5601...</td>
<td>5/64</td>
</tr>
<tr>
<td>7ML5602...</td>
<td>5/65</td>
</tr>
<tr>
<td>7ML5603...</td>
<td>5/66</td>
</tr>
<tr>
<td>7ML5604...</td>
<td>5/12</td>
</tr>
<tr>
<td>7ML5625...</td>
<td>5/264</td>
</tr>
<tr>
<td>7ML5626...</td>
<td>5/266</td>
</tr>
<tr>
<td>7ML5630...</td>
<td>5/18</td>
</tr>
<tr>
<td>7ML5631...</td>
<td>5/20</td>
</tr>
<tr>
<td>7ML5632...</td>
<td>5/21</td>
</tr>
<tr>
<td>7ML5633...</td>
<td>5/22</td>
</tr>
<tr>
<td>7ML5634...</td>
<td>5/23</td>
</tr>
<tr>
<td>7ML5640...</td>
<td>5/27</td>
</tr>
<tr>
<td>7ML5641...</td>
<td>5/28</td>
</tr>
<tr>
<td>7ML5642...</td>
<td>5/30</td>
</tr>
<tr>
<td>7ML5643...</td>
<td>5/31</td>
</tr>
<tr>
<td>7ML5644...</td>
<td>5/32</td>
</tr>
<tr>
<td>Order No.</td>
<td>Page</td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>7ML5650-...</td>
<td>5/43</td>
</tr>
<tr>
<td>7ML5651-...</td>
<td>5/45</td>
</tr>
<tr>
<td>7ML5652-...</td>
<td>5/46</td>
</tr>
<tr>
<td>7ML5660-...</td>
<td>5/50</td>
</tr>
<tr>
<td>7ML5661-...</td>
<td>5/51</td>
</tr>
<tr>
<td>7ML5662-...</td>
<td>5/53</td>
</tr>
<tr>
<td>7ML5711-...</td>
<td>5/65</td>
</tr>
<tr>
<td>7ML5711-0AA</td>
<td>5/111</td>
</tr>
<tr>
<td>7ML5711-1AA</td>
<td>5/111</td>
</tr>
<tr>
<td>7ML5711-2AA</td>
<td>5/111</td>
</tr>
<tr>
<td>7ML5725-...</td>
<td>5/111</td>
</tr>
<tr>
<td>7ML5725-5AC11-2AD0</td>
<td>5/111</td>
</tr>
<tr>
<td>7ML5725-6QC12-2AB0</td>
<td>5/112</td>
</tr>
<tr>
<td>7ML5726-5QB12-2BA2</td>
<td>5/113</td>
</tr>
<tr>
<td>7ML5726-5QC12-2BA1</td>
<td>5/113</td>
</tr>
<tr>
<td>7ML5727-...</td>
<td>5/114</td>
</tr>
<tr>
<td>7ML5727-5GB12-0AB0</td>
<td>5/114</td>
</tr>
<tr>
<td>7ML5727-5QC12-0AA0</td>
<td>5/114</td>
</tr>
<tr>
<td>7ML5728-...</td>
<td>5/115</td>
</tr>
<tr>
<td>7ML5730-...</td>
<td>5/116</td>
</tr>
<tr>
<td>7ML5731-...</td>
<td>5/103</td>
</tr>
<tr>
<td>7ML5731-7AA11-1BA0</td>
<td>5/104</td>
</tr>
<tr>
<td>7ML5731-7AB11-1AA0</td>
<td>5/104</td>
</tr>
<tr>
<td>7ML5732-...</td>
<td>5/105</td>
</tr>
<tr>
<td>7ML5733-...</td>
<td>5/106</td>
</tr>
<tr>
<td>7ML5734-...</td>
<td>5/107</td>
</tr>
<tr>
<td>7ML5735-...</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML5740-...</td>
<td>5/308</td>
</tr>
<tr>
<td>7ML5741-...</td>
<td>5/304</td>
</tr>
<tr>
<td>7ML5745-...</td>
<td>5/80</td>
</tr>
<tr>
<td>7ML5746-...</td>
<td>5/86</td>
</tr>
<tr>
<td>7ML5747-...</td>
<td>5/90</td>
</tr>
<tr>
<td>7ML5810-1A</td>
<td>5/12</td>
</tr>
<tr>
<td>7ML5811-1A</td>
<td>5/120</td>
</tr>
<tr>
<td>7ML5830-2AH</td>
<td>5/131, 5/193</td>
</tr>
<tr>
<td>7MP1...</td>
<td></td>
</tr>
<tr>
<td>7MP1110-...</td>
<td>3/41</td>
</tr>
<tr>
<td>7MP1120-...</td>
<td>2/21</td>
</tr>
<tr>
<td>7MP1990-0AA0</td>
<td>3/41</td>
</tr>
<tr>
<td>7MP1990-0BB0</td>
<td>3/41</td>
</tr>
<tr>
<td>7MP3112-1AA00-0AA0</td>
<td>9/5, 9/11</td>
</tr>
<tr>
<td>7MP3990-0AA00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BA00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BB00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BC00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BD00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0CA00</td>
<td>9/11</td>
</tr>
<tr>
<td>7NG3...</td>
<td></td>
</tr>
<tr>
<td>7NG3032-0JH00</td>
<td>3/27</td>
</tr>
<tr>
<td>7NG3032-1JH00</td>
<td>3/27</td>
</tr>
<tr>
<td>7NG3033-0JH00</td>
<td>3/33</td>
</tr>
<tr>
<td>7NG3033-1JH00</td>
<td>3/33</td>
</tr>
<tr>
<td>7NG3092-6KA</td>
<td>3/5, 3/10, 3/16, 3/22</td>
</tr>
<tr>
<td>7NG3092-6KC</td>
<td>3/5, 3/10, 3/16, 3/22</td>
</tr>
<tr>
<td>7NG3092-6KM</td>
<td>3/5, 3/10, 3/20, 3/21, 3/44</td>
</tr>
<tr>
<td>7NG3092-6KU</td>
<td>3/5, 3/10, 3/20, 3/21, 3/44</td>
</tr>
<tr>
<td>7NG313-...</td>
<td>3/44, 3/54</td>
</tr>
<tr>
<td>7NG314-...</td>
<td>3/43</td>
</tr>
<tr>
<td>7NG3211-0AN00</td>
<td>3/5</td>
</tr>
<tr>
<td>7NG3211-0BN00</td>
<td>3/5</td>
</tr>
<tr>
<td>7NG3211-0NN00</td>
<td>3/5</td>
</tr>
<tr>
<td>7NG3211-1AN00</td>
<td>3/10</td>
</tr>
<tr>
<td>7NG3211-1BN00</td>
<td>3/10</td>
</tr>
<tr>
<td>7NG3211-1NN00</td>
<td>3/10</td>
</tr>
<tr>
<td>7NG3212-0AN00</td>
<td>3/16</td>
</tr>
<tr>
<td>7NG3212-0BN00</td>
<td>3/16</td>
</tr>
<tr>
<td>7NG3212-0NN00</td>
<td>3/16</td>
</tr>
<tr>
<td>7NG3214-0AN00</td>
<td>3/22</td>
</tr>
<tr>
<td>7NG3214-0NN00</td>
<td>3/22</td>
</tr>
<tr>
<td>7NG3215-0AN00</td>
<td>3/22</td>
</tr>
<tr>
<td>7NG3215-0NN00</td>
<td>3/22</td>
</tr>
<tr>
<td>7NG4...</td>
<td></td>
</tr>
<tr>
<td>7NG4122-1AA10</td>
<td>5/12</td>
</tr>
<tr>
<td>7NG4124-0AA0</td>
<td>7/5</td>
</tr>
<tr>
<td>7NG4130-1AA11</td>
<td>6/21</td>
</tr>
<tr>
<td>7NG4130-1BA11</td>
<td>6/21</td>
</tr>
<tr>
<td>7NG4131-0AA0</td>
<td>7/7</td>
</tr>
<tr>
<td>7NG4998-1AA</td>
<td>7/5, 7/7</td>
</tr>
<tr>
<td>7NG4998-1AB</td>
<td>7/5, 7/7</td>
</tr>
<tr>
<td>7ML5726-5QC12-0AA0</td>
<td>5/114</td>
</tr>
<tr>
<td>7ML5727-5QC12-0AA0</td>
<td>5/114</td>
</tr>
<tr>
<td>7ML5728-...</td>
<td>5/115</td>
</tr>
<tr>
<td>7ML5730-...</td>
<td>5/116</td>
</tr>
<tr>
<td>7ML5731-...</td>
<td>5/103</td>
</tr>
<tr>
<td>7ML5731-7AB11-1AA0</td>
<td>5/104</td>
</tr>
<tr>
<td>7ML5732-...</td>
<td>5/105</td>
</tr>
<tr>
<td>7ML5733-...</td>
<td>5/106</td>
</tr>
<tr>
<td>7ML5734-...</td>
<td>5/107</td>
</tr>
<tr>
<td>7ML5735-...</td>
<td>5/101</td>
</tr>
<tr>
<td>7ML5740-...</td>
<td>5/308</td>
</tr>
<tr>
<td>7ML5741-...</td>
<td>5/304</td>
</tr>
<tr>
<td>7ML5745-...</td>
<td>5/80</td>
</tr>
<tr>
<td>7ML5746-...</td>
<td>5/86</td>
</tr>
<tr>
<td>7ML5747-...</td>
<td>5/90</td>
</tr>
<tr>
<td>7ML5810-1A</td>
<td>5/12</td>
</tr>
<tr>
<td>7ML5811-1A</td>
<td>5/120</td>
</tr>
<tr>
<td>7ML5830-2AH</td>
<td>5/131, 5/193</td>
</tr>
<tr>
<td>7MP1...</td>
<td></td>
</tr>
<tr>
<td>7MP1110-...</td>
<td>3/41</td>
</tr>
<tr>
<td>7MP1120-...</td>
<td>2/21</td>
</tr>
<tr>
<td>7MP1990-00A00</td>
<td>3/41</td>
</tr>
<tr>
<td>7MP1990-0BB00</td>
<td>3/41</td>
</tr>
<tr>
<td>7MP3112-01A00-00A00</td>
<td>9/5, 9/11</td>
</tr>
<tr>
<td>7MP3990-0AA00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BA00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BB00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BC00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0BD00</td>
<td>9/11</td>
</tr>
<tr>
<td>7MP3990-0CA00</td>
<td>9/11</td>
</tr>
</tbody>
</table>
### Appendix

#### Order No. Index

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E00695479</td>
<td>4/197, 4/235</td>
</tr>
<tr>
<td>A5E00695480</td>
<td>4/197, 4/235</td>
</tr>
<tr>
<td>A5E00695483</td>
<td>4/197, 4/235</td>
</tr>
<tr>
<td>A5E00695486</td>
<td>4/197, 4/235</td>
</tr>
<tr>
<td>A5E00822478</td>
<td>4/35</td>
</tr>
<tr>
<td>A5E00822479</td>
<td>4/35</td>
</tr>
<tr>
<td>A5E00822490</td>
<td>4/35, 4/131</td>
</tr>
<tr>
<td>A5E00823388</td>
<td>4/131</td>
</tr>
<tr>
<td>A5E00832342</td>
<td>4/219</td>
</tr>
<tr>
<td>A5E00832555</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00836448</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00836462</td>
<td>4/219</td>
</tr>
<tr>
<td>A5E00836465</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00838667</td>
<td>4/35</td>
</tr>
<tr>
<td>A5E00838688</td>
<td>4/35</td>
</tr>
<tr>
<td>A5E00839427</td>
<td>4/207, 4/219</td>
</tr>
<tr>
<td>A5E00839431</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00839435</td>
<td>4/219</td>
</tr>
<tr>
<td>A5E00839437</td>
<td>4/219</td>
</tr>
<tr>
<td>A5E00839440</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00839460</td>
<td>4/207, 4/219</td>
</tr>
<tr>
<td>A5E00839460</td>
<td>4/207, 4/219</td>
</tr>
<tr>
<td>A5E00839472</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00839476</td>
<td>4/219</td>
</tr>
<tr>
<td>A5E00839477</td>
<td>4/219</td>
</tr>
<tr>
<td>A5E00839479</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00861343</td>
<td>4/192, 4/202, 4/209, 4/221</td>
</tr>
<tr>
<td>A5E00861345</td>
<td>4/192, 4/202, 4/209, 4/221</td>
</tr>
<tr>
<td>A5E00875101</td>
<td>4/192, 4/202, 4/209, 4/221</td>
</tr>
<tr>
<td>A5E00875105</td>
<td>4/207, 4/209, 4/221</td>
</tr>
<tr>
<td>A5E00915707</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915764</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915771</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915773</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915775</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915780</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915782</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E00915784</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002946</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002947</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002948</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002950</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002952</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002953</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01002955</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01013127</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01150022</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01150028</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01150030</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01150378</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01150379</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E01150381</td>
<td>4/207</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01150880</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01150882</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01150883</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01150918</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01150922</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01150926</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151121</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151124</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151129</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151194</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151197</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151199</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01151539</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151553</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151569</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151571</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151573</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151577</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151584</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151585</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151587</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E01151587</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515967</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515827</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515832</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515834</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515835</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515836</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515838</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515839</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515841</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515843</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515844</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515846</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515848</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515875</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515886</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011515891</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E011519072</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519074</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519076</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519146</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519150</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519156</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519628</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519629</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E011519631</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01163671</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163672</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163673</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163674</td>
<td>5/76</td>
</tr>
<tr>
<td>Order No.</td>
<td>Page</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>A5E01163676</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163677</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163678</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163679</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163680</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163681</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163682</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163683</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163684</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163685</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163686</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163688</td>
<td>6/76, 5/297</td>
</tr>
<tr>
<td>A5E01163689</td>
<td>6/76, 5/297</td>
</tr>
<tr>
<td>A5E01163690</td>
<td>6/76, 5/297</td>
</tr>
<tr>
<td>A5E01163691</td>
<td>6/76, 5/297</td>
</tr>
<tr>
<td>A5E01163693</td>
<td>6/76, 5/297</td>
</tr>
<tr>
<td>A5E01163695</td>
<td>6/76, 5/297</td>
</tr>
<tr>
<td>A5E01163697</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163698</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163699</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163700</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163701</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163702</td>
<td>5/76</td>
</tr>
<tr>
<td>A5E01163709</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163710</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163711</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163712</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163713</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163714</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163717</td>
<td>5/297</td>
</tr>
<tr>
<td>A5E01163719</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163720</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163721</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163722</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163723</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163724</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163725</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163726</td>
<td>5/77</td>
</tr>
<tr>
<td>A5E01163727</td>
<td>5/207</td>
</tr>
<tr>
<td>A5E01163728</td>
<td>5/207</td>
</tr>
<tr>
<td>A5E01163729</td>
<td>5/77, 5/297</td>
</tr>
<tr>
<td>A5E01163730</td>
<td>5/77, 5/297</td>
</tr>
<tr>
<td>A5E01164206</td>
<td>4/131</td>
</tr>
<tr>
<td>A5E01164211</td>
<td>4/131</td>
</tr>
<tr>
<td>A5E01171569</td>
<td>4/115</td>
</tr>
<tr>
<td>A5E01181599</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181606</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181610</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181613</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181615</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181616</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181619</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181622</td>
<td>4/52</td>
</tr>
<tr>
<td>A5E01181647</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01181666</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01181689</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01181691</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01181699</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01181703</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01181705</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E01191940</td>
<td>4/85</td>
</tr>
<tr>
<td>A5E01191941</td>
<td>4/85</td>
</tr>
</tbody>
</table>
## Appendix

### Order No. Index

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E01209500</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E01259467</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01261834</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01261836</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01261979</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01261981</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01278662</td>
<td>4/192, 4/202, 4/209, 4/221</td>
</tr>
<tr>
<td>A5E01278687</td>
<td>4/192, 4/202, 4/209, 4/221</td>
</tr>
<tr>
<td>A5E01483323</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483368</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483389</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483440</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483456</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483468</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483536</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483547</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01483559</td>
<td>5/206</td>
</tr>
<tr>
<td>A5E01623511</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01623512</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01623513</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E01623514</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02054250</td>
<td>4/35, 4/43, 4/131, 4/135, 4/143</td>
</tr>
<tr>
<td>A5E02054630</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054633</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054634</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054635</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054637</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054638</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054640</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054643</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054644</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054646</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02054648</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02055286</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055287</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055290</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055291</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055292</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055293</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055295</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02055297</td>
<td>4/62</td>
</tr>
<tr>
<td>A5E02083905</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02083906</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02083914</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02083915</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02083916</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02165924</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02182085</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02196073</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196074</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196075</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196076</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196077</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196078</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196080</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02196082</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199113</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199114</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199115</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199116</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199117</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199118</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199119</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02199120</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02203605</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02211143</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211144</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211146</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211147</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211148</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211151</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211152</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02211153</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02212422</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02212423</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02212424</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02212425</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02212426</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02212428</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02212429</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02213423</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02213428</td>
<td>5/235</td>
</tr>
<tr>
<td>A5E02213581</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213582</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213583</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213584</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213585</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213586</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213587</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213596</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213597</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213598</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213599</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213600</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213601</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213602</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02213603</td>
<td>4/58</td>
</tr>
<tr>
<td>A5E02218293</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218294</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218295</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218296</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218297</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218298</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218299</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218300</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218301</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218302</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218310</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218312</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218313</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218314</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02218315</td>
<td>4/59</td>
</tr>
<tr>
<td>A5E02226423</td>
<td>3/63</td>
</tr>
<tr>
<td>A5E02246194</td>
<td>4/208, 4/222</td>
</tr>
<tr>
<td>A5E02246258</td>
<td>4/208, 4/222</td>
</tr>
<tr>
<td>A5E02246304</td>
<td>4/208, 4/222</td>
</tr>
<tr>
<td>A5E02246309</td>
<td>4/208, 4/222</td>
</tr>
<tr>
<td>A5E02246311</td>
<td>4/208, 4/222</td>
</tr>
<tr>
<td>A5E02246329</td>
<td>4/202</td>
</tr>
<tr>
<td>A5E02246350</td>
<td>4/192</td>
</tr>
<tr>
<td>A5E02246356</td>
<td>4/192</td>
</tr>
<tr>
<td>A5E02246378</td>
<td>4/192</td>
</tr>
<tr>
<td>A5E02246396</td>
<td>4/192</td>
</tr>
<tr>
<td>A5E02247682</td>
<td>4/255</td>
</tr>
<tr>
<td>A5E02247711</td>
<td>4/255</td>
</tr>
<tr>
<td>Appendix Order No. Index</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td>A5E02272692</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02272723</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02272730</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02296329</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02296464</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02296490</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02296494</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02296498</td>
<td>4/35, 4/44</td>
</tr>
<tr>
<td>A5E02328485</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02391790</td>
<td>3/68</td>
</tr>
<tr>
<td>A5E02448274</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E02448278</td>
<td>5/214</td>
</tr>
<tr>
<td>A5E02455728</td>
<td>4/114</td>
</tr>
<tr>
<td>A5E02475650</td>
<td>4/114</td>
</tr>
<tr>
<td>A5E02478541</td>
<td>4/197, 4/221</td>
</tr>
<tr>
<td>A5E02479158</td>
<td>5/248</td>
</tr>
<tr>
<td>A5E02551182</td>
<td>4/115</td>
</tr>
<tr>
<td>A5E02551263</td>
<td>4/115</td>
</tr>
<tr>
<td>A5E02559810</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02559911</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02559812</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02559813</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02559814</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02559815</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02559980</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02590427</td>
<td>4/151</td>
</tr>
<tr>
<td>A5E02590427</td>
<td>4/155</td>
</tr>
<tr>
<td>A5E02593512</td>
<td>4/208</td>
</tr>
<tr>
<td>A5E02593522</td>
<td>4/208</td>
</tr>
<tr>
<td>A5E02593524</td>
<td>4/207</td>
</tr>
<tr>
<td>A5E02593565</td>
<td>4/44</td>
</tr>
<tr>
<td>A5E02593566</td>
<td>4/202</td>
</tr>
<tr>
<td>A5E02593567</td>
<td>4/202</td>
</tr>
<tr>
<td>A5E02593568</td>
<td>4/202</td>
</tr>
<tr>
<td>A5E02593569</td>
<td>4/202</td>
</tr>
<tr>
<td>A5E02604272</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02604280</td>
<td>4/36</td>
</tr>
<tr>
<td>A5E02609214</td>
<td>4/221</td>
</tr>
<tr>
<td>A5E02609215</td>
<td>4/221</td>
</tr>
<tr>
<td>A5E02609216</td>
<td>4/221</td>
</tr>
<tr>
<td>A5E02609218</td>
<td>4/221</td>
</tr>
<tr>
<td>A5E02609219</td>
<td>4/221</td>
</tr>
<tr>
<td>A5E02611742</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611749</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611751</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611753</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611754</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611758</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611759</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611761</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611762</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611764</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611767</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611769</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611774</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611778</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611779</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611780</td>
<td>4/247</td>
</tr>
<tr>
<td>A5E02611781</td>
<td>4/247</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appendix Order No. Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5E02611783</td>
</tr>
<tr>
<td>A5E02611792</td>
</tr>
<tr>
<td>A5E02611793</td>
</tr>
<tr>
<td>A5E02611794</td>
</tr>
<tr>
<td>A5E02611795</td>
</tr>
<tr>
<td>A5E02611796</td>
</tr>
<tr>
<td>A5E02611798</td>
</tr>
<tr>
<td>A6X...</td>
</tr>
<tr>
<td>A6X30003981</td>
</tr>
<tr>
<td>A6X30004048</td>
</tr>
<tr>
<td>C70...</td>
</tr>
<tr>
<td>C70144-A336-A35</td>
</tr>
<tr>
<td>C70144-A336-A37</td>
</tr>
<tr>
<td>C70401-A26-C18</td>
</tr>
<tr>
<td>C70428-A17-B160</td>
</tr>
<tr>
<td>C73...</td>
</tr>
<tr>
<td>C73451-A430-D23</td>
</tr>
<tr>
<td>C73451-A430-D78</td>
</tr>
<tr>
<td>CQO...</td>
</tr>
<tr>
<td>CQO:FUEHVACKIT</td>
</tr>
<tr>
<td>CQO:FUPW-WWKIT</td>
</tr>
<tr>
<td>CQO-1012FFN-PB</td>
</tr>
<tr>
<td>CQO-1012FF-PB</td>
</tr>
<tr>
<td>CQO-1012NFPAB</td>
</tr>
<tr>
<td>CQO-1012NMB-1</td>
</tr>
<tr>
<td>CQO-1012TW-1</td>
</tr>
<tr>
<td>CQO-1012TW-1L</td>
</tr>
<tr>
<td>CQO-1012TW-2</td>
</tr>
<tr>
<td>CQO-1012TW-2L</td>
</tr>
<tr>
<td>CQO-1012TW-3</td>
</tr>
<tr>
<td>CQO-1012TW-3L</td>
</tr>
<tr>
<td>CQO-1012XMB-1</td>
</tr>
<tr>
<td>CQO-1012Z-1</td>
</tr>
<tr>
<td>CQO-1012Z-2</td>
</tr>
<tr>
<td>CQO-1015N-5M</td>
</tr>
<tr>
<td>CQO-1015N-5M-FK1</td>
</tr>
<tr>
<td>CQO-1015N-5M-MK1</td>
</tr>
<tr>
<td>CQO-1015N-5M-MK2</td>
</tr>
<tr>
<td>CQO-1015N-5M-MK3</td>
</tr>
<tr>
<td>CQO-992ECJ</td>
</tr>
<tr>
<td>CQO-992MTNMSH-1</td>
</tr>
<tr>
<td>CQO-992MTNMSH-2</td>
</tr>
<tr>
<td>CQO-992MTNMSH-3</td>
</tr>
<tr>
<td>CQO-992MTNMSH-4</td>
</tr>
<tr>
<td>CQO-CC112</td>
</tr>
<tr>
<td>CQO-CC117</td>
</tr>
<tr>
<td>CQO-CC117A</td>
</tr>
<tr>
<td>CQO-CC120</td>
</tr>
<tr>
<td>CQO-CDM0001</td>
</tr>
<tr>
<td>FDK...</td>
</tr>
<tr>
<td>FDK:083G0228</td>
</tr>
<tr>
<td>FDK:083B1080</td>
</tr>
<tr>
<td>FDK:083B1083</td>
</tr>
<tr>
<td>FDK:083B1084</td>
</tr>
<tr>
<td>FDK:083B1089</td>
</tr>
<tr>
<td>FDK:083B1096</td>
</tr>
<tr>
<td>FDK:083B1360</td>
</tr>
<tr>
<td>FDK:083B1362</td>
</tr>
<tr>
<td>FDK:083B1363</td>
</tr>
<tr>
<td>FDK:083B1373</td>
</tr>
<tr>
<td>Order No.</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>FDK:085B1374</td>
</tr>
<tr>
<td>FDK:085B1375</td>
</tr>
<tr>
<td>FDK:085B1376</td>
</tr>
<tr>
<td>FDK:085B1378</td>
</tr>
<tr>
<td>FDK:085B1379</td>
</tr>
<tr>
<td>FDK:085B1402</td>
</tr>
<tr>
<td>FDK:085B1403</td>
</tr>
<tr>
<td>FDK:085B1405</td>
</tr>
<tr>
<td>FDK:085B1406</td>
</tr>
<tr>
<td>FDK:085B1411</td>
</tr>
<tr>
<td>FDK:085B1419</td>
</tr>
<tr>
<td>FDK:085B1420</td>
</tr>
<tr>
<td>FDK:085B1459</td>
</tr>
<tr>
<td>FDK:085B1464</td>
</tr>
<tr>
<td>FDK:085B5329</td>
</tr>
<tr>
<td>FDK:085B5330</td>
</tr>
<tr>
<td>FDK:085B5331</td>
</tr>
<tr>
<td>FDK:085B5333</td>
</tr>
<tr>
<td>FDK:085B5335</td>
</tr>
<tr>
<td>FDK:085B5392</td>
</tr>
<tr>
<td>FDK:085B5416</td>
</tr>
<tr>
<td>FDK:085B5450</td>
</tr>
<tr>
<td>FDK:085B5451</td>
</tr>
<tr>
<td>FDK:085B5452</td>
</tr>
<tr>
<td>FDK:085B5453</td>
</tr>
<tr>
<td>FDK:085B5454</td>
</tr>
<tr>
<td>FDK:085B5455</td>
</tr>
<tr>
<td>FDK:085B5458</td>
</tr>
<tr>
<td>FDK:085B5459</td>
</tr>
<tr>
<td>FDK:085B5461</td>
</tr>
<tr>
<td>FDK:085B5462</td>
</tr>
<tr>
<td>FDK:085B5463</td>
</tr>
<tr>
<td>FDK:085B5464</td>
</tr>
<tr>
<td>FDK:085B5471</td>
</tr>
<tr>
<td>FDK:085B5501</td>
</tr>
<tr>
<td>FDK:085B5504</td>
</tr>
<tr>
<td>FDK:085B5505</td>
</tr>
<tr>
<td>FDK:085B5510</td>
</tr>
<tr>
<td>FDK:085B5511</td>
</tr>
<tr>
<td>FDK:085F5027</td>
</tr>
<tr>
<td>FDK:085F5327</td>
</tr>
<tr>
<td>FDK:085L1015</td>
</tr>
<tr>
<td>FDK:085L1023</td>
</tr>
<tr>
<td>FDK:085L1103</td>
</tr>
<tr>
<td>FDK:085L1104</td>
</tr>
<tr>
<td>FDK:085L1105</td>
</tr>
<tr>
<td>FDK:085L1107</td>
</tr>
<tr>
<td>FDK:085L1108</td>
</tr>
<tr>
<td>FDK:085L1109</td>
</tr>
<tr>
<td>FDK:085L1111</td>
</tr>
<tr>
<td>FDK:085L1112</td>
</tr>
<tr>
<td>FDK:085L1113</td>
</tr>
<tr>
<td>FDK:085L1114</td>
</tr>
<tr>
<td>FDK:085L1115</td>
</tr>
<tr>
<td>FDK:085L1118</td>
</tr>
<tr>
<td>FDK:085L1119</td>
</tr>
<tr>
<td>FDK:085L2400</td>
</tr>
<tr>
<td>FDK:085L2401</td>
</tr>
<tr>
<td>FDK:085L2402</td>
</tr>
<tr>
<td>FDK:085L2403</td>
</tr>
<tr>
<td>FDK:085U2002</td>
</tr>
<tr>
<td>FDK:085U2109</td>
</tr>
<tr>
<td>FDK:085H2255</td>
</tr>
<tr>
<td>FDK:087L4163</td>
</tr>
<tr>
<td>FDK:087L4201</td>
</tr>
<tr>
<td>FDK:087L4212</td>
</tr>
<tr>
<td>FDK:087L4213</td>
</tr>
<tr>
<td>FDK:521HAP0553</td>
</tr>
<tr>
<td>FDK:083F0121</td>
</tr>
<tr>
<td>FDK:083F0210</td>
</tr>
<tr>
<td>FDK:083F0211</td>
</tr>
<tr>
<td>FDK:083F0212</td>
</tr>
<tr>
<td>FDK:083F0213</td>
</tr>
<tr>
<td>FDK:083F3020</td>
</tr>
<tr>
<td>FDK:083F3052</td>
</tr>
<tr>
<td>FDK:083F3053</td>
</tr>
<tr>
<td>FDK:083F3054</td>
</tr>
<tr>
<td>FDK:083F3056</td>
</tr>
<tr>
<td>FDK:083F3057</td>
</tr>
<tr>
<td>FDK:083F3058</td>
</tr>
<tr>
<td>FDK:083F3092</td>
</tr>
<tr>
<td>FDK:083F3093</td>
</tr>
<tr>
<td>FDK:083F3094</td>
</tr>
<tr>
<td>FDK:083F3095</td>
</tr>
<tr>
<td>FDK:083F4123</td>
</tr>
<tr>
<td>FDK:083F4525</td>
</tr>
<tr>
<td>FDK:083F5030</td>
</tr>
<tr>
<td>FDK:083F5031</td>
</tr>
<tr>
<td>FDK:083F5032</td>
</tr>
<tr>
<td>FDK:083F5033</td>
</tr>
<tr>
<td>FDK:083F5034</td>
</tr>
<tr>
<td>FDK:083F5037</td>
</tr>
<tr>
<td>FDK:083F5038</td>
</tr>
<tr>
<td>FDK:083F5060</td>
</tr>
<tr>
<td>FDK:083F5061</td>
</tr>
<tr>
<td>FDK:083G0080</td>
</tr>
<tr>
<td>FDK:083G0116</td>
</tr>
<tr>
<td>FDK:083G0117</td>
</tr>
<tr>
<td>FDK:083G0119</td>
</tr>
<tr>
<td>FDK:083G0121</td>
</tr>
<tr>
<td>FDK:083G0122</td>
</tr>
<tr>
<td>FDK:083G0123</td>
</tr>
<tr>
<td>FDK:083G0124</td>
</tr>
<tr>
<td>FDK:083G0125</td>
</tr>
<tr>
<td>FDK:083G0156</td>
</tr>
<tr>
<td>FDK:083G0157</td>
</tr>
<tr>
<td>FDK:083G0159</td>
</tr>
<tr>
<td>FDK:083G0161</td>
</tr>
<tr>
<td>FDK:083G0162</td>
</tr>
<tr>
<td>FDK:083G0163</td>
</tr>
<tr>
<td>FDK:083G0164</td>
</tr>
<tr>
<td>FDK:083G0165</td>
</tr>
<tr>
<td>FDK:083G0226</td>
</tr>
<tr>
<td>FDK:083G0686</td>
</tr>
<tr>
<td>FDK:083G0687</td>
</tr>
<tr>
<td>FDK:083G0689</td>
</tr>
<tr>
<td>FDK:083G0691</td>
</tr>
<tr>
<td>FDK:083G0692</td>
</tr>
<tr>
<td>FDK:083G0693</td>
</tr>
<tr>
<td>FDK:083G0694</td>
</tr>
<tr>
<td>FDK:083G0695</td>
</tr>
<tr>
<td>FDK:083G2100</td>
</tr>
<tr>
<td>FDK:083G2101</td>
</tr>
<tr>
<td>FDK:083G2105</td>
</tr>
<tr>
<td>FDK:083G2109</td>
</tr>
<tr>
<td>Order No.</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>FDK-083G2111</td>
</tr>
<tr>
<td>FDK-083G2112</td>
</tr>
<tr>
<td>FDK-083G2113</td>
</tr>
<tr>
<td>FDK-083G2114</td>
</tr>
<tr>
<td>FDK-083G2115</td>
</tr>
<tr>
<td>FDK-083G2116</td>
</tr>
<tr>
<td>FDK-083G2117</td>
</tr>
<tr>
<td>FDK-083G2118</td>
</tr>
<tr>
<td>FDK-083G2119</td>
</tr>
<tr>
<td>FDK-083G2120</td>
</tr>
<tr>
<td>FDK-083G2121</td>
</tr>
<tr>
<td>FDK-083G2122</td>
</tr>
<tr>
<td>FDK-083G2123</td>
</tr>
<tr>
<td>FDK-083G2124</td>
</tr>
<tr>
<td>FDK-083G2125</td>
</tr>
<tr>
<td>FDK-083G2139</td>
</tr>
<tr>
<td>FDK-083G2141</td>
</tr>
<tr>
<td>FDK-083G2142</td>
</tr>
<tr>
<td>FDK-083G2143</td>
</tr>
<tr>
<td>FDK-083G2144</td>
</tr>
<tr>
<td>FDK-083G2145</td>
</tr>
<tr>
<td>FDK-083G2149</td>
</tr>
<tr>
<td>FDK-083G2151</td>
</tr>
<tr>
<td>FDK-083G2152</td>
</tr>
<tr>
<td>FDK-083G2153</td>
</tr>
<tr>
<td>FDK-083G2154</td>
</tr>
<tr>
<td>FDK-083G2155</td>
</tr>
<tr>
<td>FDK-083G2156</td>
</tr>
<tr>
<td>FDK-083G2157</td>
</tr>
<tr>
<td>FDK-083G2158</td>
</tr>
<tr>
<td>FDK-083G2159</td>
</tr>
<tr>
<td>FDK-083G2160</td>
</tr>
<tr>
<td>FDK-083G2161</td>
</tr>
<tr>
<td>FDK-083G2162</td>
</tr>
<tr>
<td>FDK-083G2163</td>
</tr>
<tr>
<td>FDK-083G2164</td>
</tr>
<tr>
<td>FDK-083G2165</td>
</tr>
<tr>
<td>FDK-083G2179</td>
</tr>
<tr>
<td>FDK-083G2181</td>
</tr>
<tr>
<td>FDK-083G2182</td>
</tr>
<tr>
<td>FDK-083G2183</td>
</tr>
<tr>
<td>FDK-083G2184</td>
</tr>
<tr>
<td>FDK-083G2185</td>
</tr>
<tr>
<td>FDK-083G2186</td>
</tr>
<tr>
<td>FDK-083G2187</td>
</tr>
<tr>
<td>FDK-083G2190</td>
</tr>
<tr>
<td>FDK-083G2191</td>
</tr>
<tr>
<td>FDK-083G2192</td>
</tr>
<tr>
<td>FDK-083G2193</td>
</tr>
<tr>
<td>FDK-083G2194</td>
</tr>
<tr>
<td>FDK-083G2195</td>
</tr>
<tr>
<td>FDK-083G2206</td>
</tr>
<tr>
<td>FDK-083G2207</td>
</tr>
<tr>
<td>FDK-083G2209</td>
</tr>
<tr>
<td>FDK-083G2211</td>
</tr>
<tr>
<td>FDK-083G2212</td>
</tr>
<tr>
<td>FDK-083G2213</td>
</tr>
<tr>
<td>FDK-083G2214</td>
</tr>
<tr>
<td>FDK-083G2215</td>
</tr>
<tr>
<td>FDK-083G2216</td>
</tr>
<tr>
<td>FDK-083G2217</td>
</tr>
<tr>
<td>FDK-083G2219</td>
</tr>
<tr>
<td>FDK-083G2221</td>
</tr>
<tr>
<td>Appendix</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Page</td>
</tr>
<tr>
<td>FDK-083H4410</td>
</tr>
<tr>
<td>FDK-083H5056</td>
</tr>
<tr>
<td>FDK-083L889</td>
</tr>
<tr>
<td>FDK-083N8008</td>
</tr>
<tr>
<td>FDK-083N8011</td>
</tr>
<tr>
<td>FDK-083N8012</td>
</tr>
<tr>
<td>FDK-083N8013</td>
</tr>
<tr>
<td>FDK-083N8035</td>
</tr>
<tr>
<td>FDK-083N8070</td>
</tr>
<tr>
<td>FDK-083N8071</td>
</tr>
<tr>
<td>FDK-083N8072</td>
</tr>
<tr>
<td>FDK-083N8073</td>
</tr>
<tr>
<td>FDK-083N8074</td>
</tr>
<tr>
<td>FDK-083N8075</td>
</tr>
<tr>
<td>FDK-083N8076</td>
</tr>
<tr>
<td>FDK-083N8078</td>
</tr>
<tr>
<td>FDK-083N8079</td>
</tr>
<tr>
<td>FDK-083N8080</td>
</tr>
<tr>
<td>FDK-083N8081</td>
</tr>
<tr>
<td>FDK-083N8082</td>
</tr>
<tr>
<td>FDK-083N8083</td>
</tr>
<tr>
<td>FDK-083N8084</td>
</tr>
<tr>
<td>FDK-083N8085</td>
</tr>
<tr>
<td>FDK-083N8086</td>
</tr>
<tr>
<td>FDK-083N8087</td>
</tr>
<tr>
<td>FDK-083N8088</td>
</tr>
<tr>
<td>FDK-083N8089</td>
</tr>
<tr>
<td>FDK-083N8100</td>
</tr>
<tr>
<td>FDK-083N8101</td>
</tr>
<tr>
<td>FDK-083N8102</td>
</tr>
<tr>
<td>FDK-083N8103</td>
</tr>
<tr>
<td>FDK-083N8104</td>
</tr>
<tr>
<td>FDK-083N8105</td>
</tr>
<tr>
<td>FDK-083N8106</td>
</tr>
<tr>
<td>FDK-083N8107</td>
</tr>
<tr>
<td>FDK-083N8108</td>
</tr>
<tr>
<td>FDK-083N8109</td>
</tr>
<tr>
<td>FDK-083N8110</td>
</tr>
<tr>
<td>FDK-083N8111</td>
</tr>
<tr>
<td>FDK-083N8112</td>
</tr>
<tr>
<td>FDK-083N8113</td>
</tr>
<tr>
<td>FDK-083N8114</td>
</tr>
<tr>
<td>FDK-083N8116</td>
</tr>
<tr>
<td>FDK-083N8117</td>
</tr>
<tr>
<td>FDK-083N8118</td>
</tr>
<tr>
<td>FDK-083N8119</td>
</tr>
<tr>
<td>FDK-083N8120</td>
</tr>
<tr>
<td>FDK-083N8121</td>
</tr>
<tr>
<td>FDK-083N8122</td>
</tr>
<tr>
<td>FDK-083N8123</td>
</tr>
<tr>
<td>FDK-083N8124</td>
</tr>
<tr>
<td>FDK-083N8125</td>
</tr>
<tr>
<td>FDK-083N8126</td>
</tr>
<tr>
<td>FDK-083N8127</td>
</tr>
<tr>
<td>FDK-083N8128</td>
</tr>
<tr>
<td>FDK-083N8129</td>
</tr>
<tr>
<td>FDK-083N8130</td>
</tr>
<tr>
<td>FDK-083N8131</td>
</tr>
<tr>
<td>FDK-083N8132</td>
</tr>
<tr>
<td>FDK-083N8133</td>
</tr>
<tr>
<td>FDK-083N8134</td>
</tr>
<tr>
<td>FDK-083N8135</td>
</tr>
<tr>
<td>FDK-083N8136</td>
</tr>
<tr>
<td>FDK-083N8137</td>
</tr>
<tr>
<td>FDK-083N8138</td>
</tr>
<tr>
<td>FDK-083N8139</td>
</tr>
<tr>
<td>FDK-083N8140</td>
</tr>
<tr>
<td>FDK-083N8141</td>
</tr>
<tr>
<td>FDK-083N8143</td>
</tr>
<tr>
<td>FDK-083N8144</td>
</tr>
<tr>
<td>FDK-083N8145</td>
</tr>
<tr>
<td>FDK-083N8146</td>
</tr>
<tr>
<td>FDK-083N8147</td>
</tr>
<tr>
<td>FDK-083N8148</td>
</tr>
<tr>
<td>FDK-083N8149</td>
</tr>
<tr>
<td>FDK-083N8150</td>
</tr>
<tr>
<td>FDK-083N8151</td>
</tr>
<tr>
<td>FDK-083N8152</td>
</tr>
<tr>
<td>FDK-083N8153</td>
</tr>
<tr>
<td>FDK-083N8154</td>
</tr>
<tr>
<td>FDK-083N8155</td>
</tr>
<tr>
<td>FDK-083N8156</td>
</tr>
<tr>
<td>FDK-083N8157</td>
</tr>
<tr>
<td>FDK-083N8158</td>
</tr>
<tr>
<td>FDK-083N8160</td>
</tr>
<tr>
<td>FDK-083N8161</td>
</tr>
<tr>
<td>FDK-083N8162</td>
</tr>
<tr>
<td>FDK-083N8163</td>
</tr>
<tr>
<td>FDK-083N8164</td>
</tr>
<tr>
<td>FDK-083N8165</td>
</tr>
<tr>
<td>FDK-083N8166</td>
</tr>
<tr>
<td>FDK-083N8168</td>
</tr>
<tr>
<td>FDK-083N8169</td>
</tr>
<tr>
<td>FDK-083N8170</td>
</tr>
<tr>
<td>FDK-083N8171</td>
</tr>
<tr>
<td>FDK-083N8172</td>
</tr>
<tr>
<td>FDK-083N8173</td>
</tr>
<tr>
<td>FDK-083N8174</td>
</tr>
<tr>
<td>FDK-083N8176</td>
</tr>
<tr>
<td>FDK-083N8177</td>
</tr>
<tr>
<td>FDK-083N8178</td>
</tr>
<tr>
<td>FDK-083N8179</td>
</tr>
<tr>
<td>FDK-083N8180</td>
</tr>
<tr>
<td>FDK-083N8181</td>
</tr>
<tr>
<td>FDK-083N8182</td>
</tr>
<tr>
<td>FDK-083N8183</td>
</tr>
<tr>
<td>FDK-083N8185</td>
</tr>
<tr>
<td>FDK-083N8186</td>
</tr>
<tr>
<td>FDK-083N8187</td>
</tr>
<tr>
<td>FDK-083N8188</td>
</tr>
<tr>
<td>FDK-083N8189</td>
</tr>
<tr>
<td>FDK-083N8190</td>
</tr>
<tr>
<td>FDK-083N8191</td>
</tr>
<tr>
<td>FDK-083N8193</td>
</tr>
<tr>
<td>FDK-083N8271</td>
</tr>
<tr>
<td>FDK-083N8272</td>
</tr>
<tr>
<td>FDK-083N8278</td>
</tr>
<tr>
<td>FDK-083N8279</td>
</tr>
<tr>
<td>FDK-083N8280</td>
</tr>
<tr>
<td>FDK-083N8281</td>
</tr>
<tr>
<td>FDK-083N8282</td>
</tr>
<tr>
<td>FDK-083N8283</td>
</tr>
<tr>
<td>FDK-083N8284</td>
</tr>
<tr>
<td>FDK-083N8285</td>
</tr>
<tr>
<td>FDK-083N8286</td>
</tr>
<tr>
<td>FDK-083N8287</td>
</tr>
<tr>
<td>FDK-083N8288</td>
</tr>
<tr>
<td>Appendix Order No. Index</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>FDK-083N8289</td>
</tr>
<tr>
<td>FDK-083N8290</td>
</tr>
<tr>
<td>FDK-083N8291</td>
</tr>
<tr>
<td>FDK-083N8292</td>
</tr>
<tr>
<td>FDK-083N8293</td>
</tr>
<tr>
<td>FDK-083N8294</td>
</tr>
<tr>
<td>FDK-083N8300</td>
</tr>
<tr>
<td>FDK-083N8302</td>
</tr>
<tr>
<td>FDK-083N8303</td>
</tr>
<tr>
<td>FDK-083N8304</td>
</tr>
<tr>
<td>FDK-083N8306</td>
</tr>
<tr>
<td>FDK-083N8307</td>
</tr>
<tr>
<td>FDK-083N8308</td>
</tr>
<tr>
<td>FDK-083N8309</td>
</tr>
<tr>
<td>FDK-083N8310</td>
</tr>
<tr>
<td>FDK-083N8311</td>
</tr>
<tr>
<td>FDK-083N8312</td>
</tr>
<tr>
<td>FDK-083N8313</td>
</tr>
<tr>
<td>FDK-083N8314</td>
</tr>
<tr>
<td>FDK-083N8344</td>
</tr>
<tr>
<td>FDK-083N8345</td>
</tr>
<tr>
<td>FDK-083N8346</td>
</tr>
<tr>
<td>FDK-083N8347</td>
</tr>
<tr>
<td>FDK-083N8361</td>
</tr>
<tr>
<td>FDK-083N8362</td>
</tr>
<tr>
<td>FDK-083N8365</td>
</tr>
<tr>
<td>FDK-083N8366</td>
</tr>
<tr>
<td>FDK-083N8367</td>
</tr>
<tr>
<td>FDK-083N8370</td>
</tr>
<tr>
<td>FDK-083N8372</td>
</tr>
<tr>
<td>FDK-083N8373</td>
</tr>
<tr>
<td>FDK-083N8394</td>
</tr>
<tr>
<td>FDK-083N8395</td>
</tr>
<tr>
<td>FDK-083N8396</td>
</tr>
<tr>
<td>FDK-083N8397</td>
</tr>
<tr>
<td>FDK-083N8398</td>
</tr>
<tr>
<td>FDK-083N8467</td>
</tr>
<tr>
<td>FDK-083N8468</td>
</tr>
<tr>
<td>FDK-083N8469</td>
</tr>
<tr>
<td>FDK-083N8470</td>
</tr>
<tr>
<td>FDK-083N8471</td>
</tr>
<tr>
<td>FDK-083N8472</td>
</tr>
<tr>
<td>FDK-083N8473</td>
</tr>
<tr>
<td>FDK-083N8474</td>
</tr>
<tr>
<td>FDK-083N8475</td>
</tr>
<tr>
<td>FDK-083N8476</td>
</tr>
<tr>
<td>FDK-083N8477</td>
</tr>
<tr>
<td>FDK-083N8478</td>
</tr>
<tr>
<td>FDK-083N8479</td>
</tr>
<tr>
<td>FDK-083N8480</td>
</tr>
<tr>
<td>FDK-083N8481</td>
</tr>
<tr>
<td>FDK-083N8482</td>
</tr>
<tr>
<td>FDK-083N8483</td>
</tr>
<tr>
<td>FDK-083N8484</td>
</tr>
<tr>
<td>FDK-083N8485</td>
</tr>
<tr>
<td>FDK-083N8486</td>
</tr>
<tr>
<td>FDK-083N8487</td>
</tr>
<tr>
<td>FDK-083N8488</td>
</tr>
<tr>
<td>FDK-083N8489</td>
</tr>
<tr>
<td>FDK-083N8490</td>
</tr>
<tr>
<td>FDK-083N8491</td>
</tr>
<tr>
<td>FDK-083N8492</td>
</tr>
<tr>
<td>FDK-083N8493</td>
</tr>
<tr>
<td>FDK-083N8494</td>
</tr>
<tr>
<td>FDK-083N8495</td>
</tr>
<tr>
<td>FDK-083N8496</td>
</tr>
<tr>
<td>FDK-083N8497</td>
</tr>
<tr>
<td>FDK-083N8498</td>
</tr>
<tr>
<td>FDK-083N8499</td>
</tr>
<tr>
<td>FDK-083N8500</td>
</tr>
<tr>
<td>FDK-083N8501</td>
</tr>
<tr>
<td>FDK-083N8502</td>
</tr>
<tr>
<td>FDK-083N8503</td>
</tr>
<tr>
<td>FDK-083N8504</td>
</tr>
<tr>
<td>FDK-083N8505</td>
</tr>
<tr>
<td>FDK-083N8506</td>
</tr>
<tr>
<td>FDK-083N8507</td>
</tr>
<tr>
<td>FDK-085U0221</td>
</tr>
<tr>
<td>FDK-085U0226</td>
</tr>
<tr>
<td>FDK-085U0229</td>
</tr>
<tr>
<td>FDK-085U0234</td>
</tr>
<tr>
<td>FDK-085U0237</td>
</tr>
<tr>
<td>FDK-085U0321</td>
</tr>
<tr>
<td>FDK-085U1002</td>
</tr>
<tr>
<td>FDK-085U1003</td>
</tr>
<tr>
<td>FDK-085U1005</td>
</tr>
<tr>
<td>FDK-085U1006</td>
</tr>
<tr>
<td>FDK-085U1007</td>
</tr>
<tr>
<td>FDK-085U1008</td>
</tr>
<tr>
<td>FDK-085U1009</td>
</tr>
<tr>
<td>FDK-085U1010</td>
</tr>
<tr>
<td>FDK-085U1011</td>
</tr>
<tr>
<td>FDK-085U1012</td>
</tr>
<tr>
<td>FDK-085U1013</td>
</tr>
<tr>
<td>FDK-085U1016</td>
</tr>
<tr>
<td>FDK-085U1017</td>
</tr>
<tr>
<td>FDK-085U1018</td>
</tr>
<tr>
<td>FDK-085U1019</td>
</tr>
<tr>
<td>FDK-085U1020</td>
</tr>
<tr>
<td>FDK-085U1021</td>
</tr>
<tr>
<td>FDK-085U1022</td>
</tr>
<tr>
<td>FDK-085U1023</td>
</tr>
<tr>
<td>FDK-085U1029</td>
</tr>
<tr>
<td>FDK-085U1031</td>
</tr>
<tr>
<td>FDK-085U1032</td>
</tr>
<tr>
<td>FDK-085U1038</td>
</tr>
<tr>
<td>FDK-085U1039</td>
</tr>
<tr>
<td>FDK-085U1050</td>
</tr>
<tr>
<td>FDK-085U1052</td>
</tr>
<tr>
<td>FDK-085U1053</td>
</tr>
<tr>
<td>FDK-085U2373</td>
</tr>
<tr>
<td>FDK-085U2374</td>
</tr>
<tr>
<td>FDK-085U3122</td>
</tr>
<tr>
<td>FDK-085U3123</td>
</tr>
<tr>
<td>FDK-085U3124</td>
</tr>
<tr>
<td>FDK-085U3125</td>
</tr>
<tr>
<td>FDK-085U3144</td>
</tr>
<tr>
<td>FDK-085U3349</td>
</tr>
<tr>
<td>FDK-087L4080</td>
</tr>
<tr>
<td>FDK-087L4108</td>
</tr>
<tr>
<td>FDK-087L4109</td>
</tr>
<tr>
<td>FDK-087L4110</td>
</tr>
<tr>
<td>FDK-087L4111</td>
</tr>
<tr>
<td>FDK-087L4112</td>
</tr>
<tr>
<td>Appendix</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>FDK-067L4142</td>
</tr>
<tr>
<td>FDK-067L4150</td>
</tr>
<tr>
<td>FDK-067L4151</td>
</tr>
<tr>
<td>FDK-067L4152</td>
</tr>
<tr>
<td>FDK-067L4154</td>
</tr>
<tr>
<td>FDK-067L4155</td>
</tr>
<tr>
<td>FDK-067L4156</td>
</tr>
<tr>
<td>FDK-067L4157</td>
</tr>
<tr>
<td>FDK-067L4158</td>
</tr>
<tr>
<td>FDK-067L4159</td>
</tr>
<tr>
<td>FDK-067L4162</td>
</tr>
<tr>
<td>FDK-067L4163</td>
</tr>
<tr>
<td>FDK-067L4165</td>
</tr>
<tr>
<td>FDK-067L4166</td>
</tr>
<tr>
<td>FDK-067L4167</td>
</tr>
<tr>
<td>FDK-067L4168</td>
</tr>
<tr>
<td>FDK-067L4196</td>
</tr>
<tr>
<td>FDK-067L4201</td>
</tr>
<tr>
<td>FDK-067L4202</td>
</tr>
<tr>
<td>FDK-067L4203</td>
</tr>
<tr>
<td>FDK-067L4204</td>
</tr>
<tr>
<td>FDK-067L4210</td>
</tr>
<tr>
<td>FDK-067L4211</td>
</tr>
<tr>
<td>FDK-067L4212</td>
</tr>
<tr>
<td>FDK-067L4213</td>
</tr>
<tr>
<td>FDK-067L6001</td>
</tr>
</tbody>
</table>

**PBD...**

<table>
<thead>
<tr>
<th></th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBD-22475K1A</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-22475K2A</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-22475K3A</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-22475K4A</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-25500K02A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25500K03A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25500K05A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25500K07A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25501K0100A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25501K0150A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25501K0200A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25501K0250A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25501K0500A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-25501K1000A</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51002K0100AA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51002K0100BAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51002K0100CAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51003K0200AAA</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51003K0500AA</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51004K1AAA</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51004K2AAA</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51004K3AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51005K1AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51005K2AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51005K3AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0200AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0200ABAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0200ACAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0200AADA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0500AJAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0500AJBA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0500AJCA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51006K0500AJDA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51010K1AA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51010K1AB</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51010K2AA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51010K2AB</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51010K3AA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51010K3AB</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51014K0100AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51014K0100EJA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51014K0150AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51014K0150EJA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51014K0200AAA</td>
<td>5/207</td>
</tr>
<tr>
<td>PBD-51014K0200EJA</td>
<td>5/208</td>
</tr>
<tr>
<td>PBD-51014K0250AAA</td>
<td>5/208</td>
</tr>
<tr>
<td>PBD-51014K0250EJA</td>
<td>5/208</td>
</tr>
<tr>
<td>PBD-51034039</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034040</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034041</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034042</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034043</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034044</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034045</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034046</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034047</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034048</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034272</td>
<td>5/148</td>
</tr>
<tr>
<td>PBD-51034273</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51034277</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51034510</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51034573</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51034574</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035566</td>
<td>5/206</td>
</tr>
<tr>
<td>PBD-51035810</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035811</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035812</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035813</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035814</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035815</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035816</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035860</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035867</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035871</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035872</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51035873</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036065</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036110</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036180</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036479</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036480</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036481</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036482</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036483</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036484</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036485</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-51036486</td>
<td>5/226</td>
</tr>
<tr>
<td>PBD-92720000</td>
<td>8/24</td>
</tr>
<tr>
<td>PBD-92722000</td>
<td>8/24</td>
</tr>
</tbody>
</table>

**TGX...**

<table>
<thead>
<tr>
<th></th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGX:16152-105</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16152-110</td>
<td>6/22</td>
</tr>
<tr>
<td>TGX:16152-117</td>
<td>6/22</td>
</tr>
<tr>
<td>TGX:16152-328</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16152-336</td>
<td>6/22</td>
</tr>
<tr>
<td>TGX:16152-348</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16152-350</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16152-364</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16300-147</td>
<td>6/21</td>
</tr>
<tr>
<td>Order No.</td>
<td>Page</td>
</tr>
<tr>
<td>----------------</td>
<td>------</td>
</tr>
<tr>
<td>TGX:16300-149</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16300-151</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16300-1556</td>
<td>6/21</td>
</tr>
<tr>
<td>TGX:16347-81</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-82</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-83</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-84</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-85</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-86</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-89</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-90</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-91</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-92</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-93</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-94</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-95</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-96</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-97</td>
<td>4/253</td>
</tr>
<tr>
<td>TGX:16347-98</td>
<td>4/253</td>
</tr>
</tbody>
</table>
Appendix

Conditions of Sale and Delivery & Export Regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The “General Terms of Payment” as well as the “General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry” shall apply.

For software products, the “General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany” shall apply.

For customers with a seat or registered office outside of Germany

The “General Terms of Payment” as well as the “General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany” shall apply.

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” shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.

The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used.

The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1 (for customers based in Germany)
- 6ZB5310-0KS53-0BA1 (for customers based outside Germany)

or download them from the Internet http://www.siemens.com/automation/mail

(Germany: Industry Mail Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations. Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

| AL | Number of the German Export List
| ECCN | Export Control Classification Number

Products marked other than “N” require an export license.
In the case of software products, the export designations of the relevant data medium must also be generally adhered to.
Goods labeled with an “AL” not equal to “N” are subject to a European or German export authorization when being exported out of the EU.

Goods labeled with an “ECCN” not equal to “N” are subject to a US re-export authorization.

Even without a label or with an “AL: N” or “ECCN: N”, authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.