

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 - Technical description

1

Overview



SITRANS P500 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and which fulfil the most stringent demands of accuracy, long-term stability, speed and lots more.

Extensive functionality allows you to set the pressure transmitter specifically to your own requirements. Despite their many settings options, local set-up is easy. A multi-lingual menu with clear text instructions guides you through the process. There are also help texts available.

The innovative EDD with integrated QuickStart assistance is also quick and easy to configure by computer using the HART protocol.

Extensive diagnostic functions, e.g. min/max pointer for pressure and temperature, or limit value indicator, make sure you always have the process under control. You can also display additional process values such as temperature or static pressure. The simultaneous display of mass, resulting from a volume, is also easy.

The SITRANS P500 pressure transmitters can be configured to measure:

- Differential pressure
- Level
- Volume
- Mass
- Volume flow
- Mass flow

Benefits

- High measuring accuracy
- Very fast response time
- Extremely good long-term stability
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions which can be used both on site as well as via HART.
- Optional separate replacement of measuring cell and electronics without recalibration.
- Extremely low conformity error values

- Infinitely adjustable spans of 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH₂O)
- Extremely good total performance and conformity error values with no loss of performance up to a turndown of 10 guaranteed.
- Additional integrated sensor for static pressure
- Parameterization via on-site control keys or HART
- Short process flanges nable space-saving installation.

Application

The SITRANS P500 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

Pressure transmitters with ratings "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitter comes with a CE-declaration of conformity and fulfils the corresponding unified European directives (ATEX).

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

With newly designed measuring cell, it is possible to work with process temperatures of -40 to 125 °C (-40 to +257 °F) without having to use a remote seal.

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

The pressure transmitter can be fully parameterized locally via the three operating keys and externally via HART.

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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 element (see Chapter "Flow Meters"))
- Span (freely adjustable)
for SITRANS P500: 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH₂O)

Pressure transmitters for level

- Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Span (freely adjustable)
for SITRANS P500: 1.25 to 6250 mbar (0.5 to 2509 inH₂O)

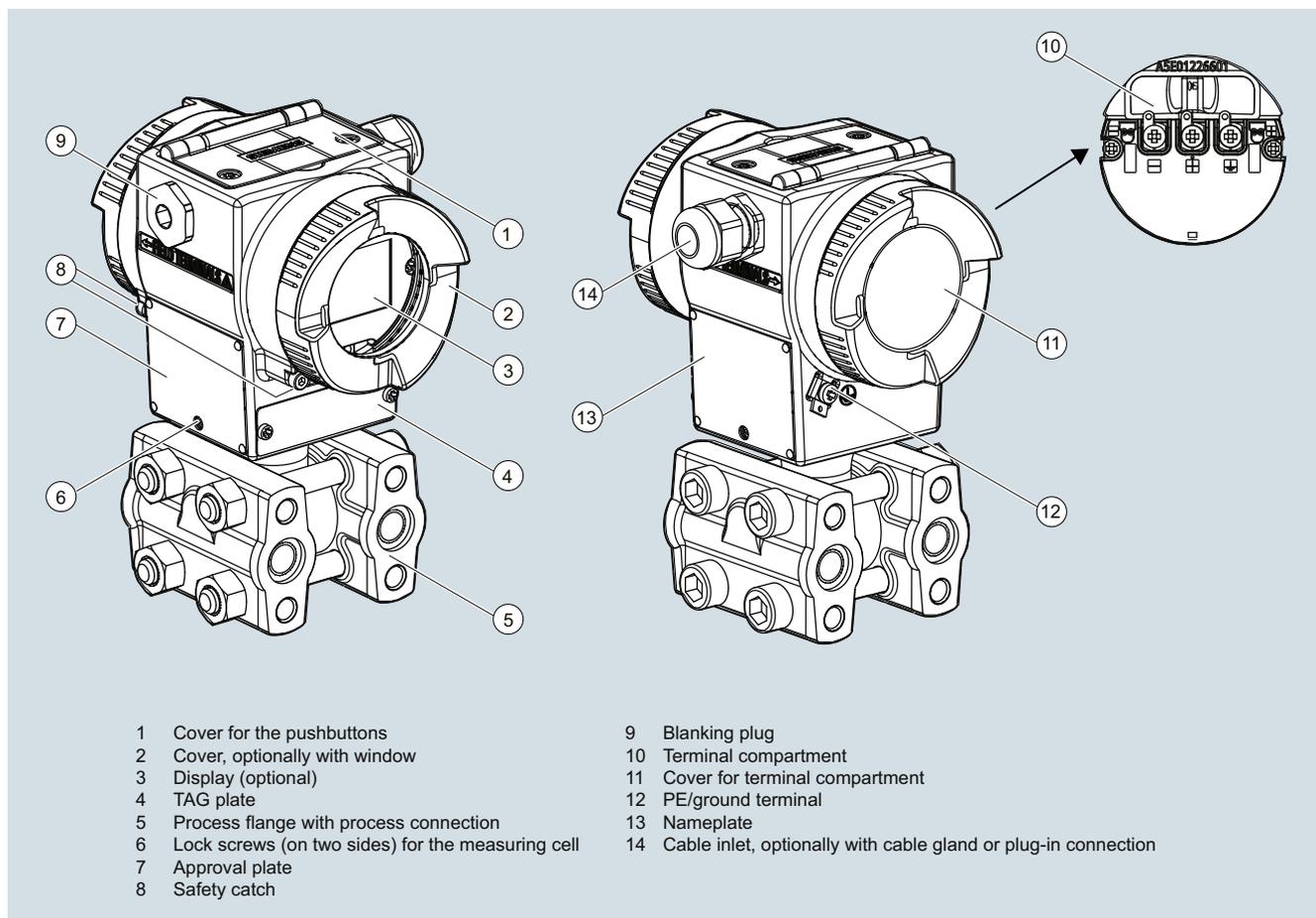
- Nominal diameter of the mounting flange
 - DN 50 / PN 40
 - DN 80 / PN 40
 - DN 100/ PN 16, PN 40
 - 2 inch/class 150, class 300
 - 3 inch/class 150, class 300
 - 4 inch/ class 150, class 300
 - customized special version

In the case of level measurements in open vessels, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed vessels, the lower-pressure connection has to be connected to the vessel in order to compensate the static pressure.

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

Design

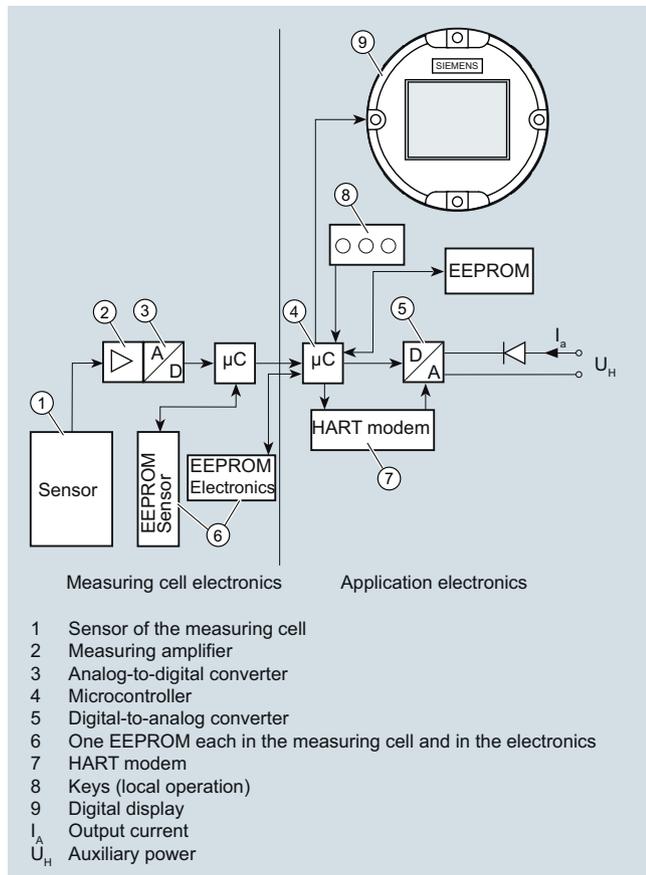


View of transmitter

- The electronics housing is made of coated die-cast aluminum.
- The casing has round screwed covers front and back.
- Depending on the design the front cover is fitted with an inspection window. You can read off the measured value directly from the optional display through the window.
- The inlet to the terminal compartment is located either on the left or right side. The unused opening in each case is sealed by a blanking plug.
- The PE/ground terminal is on the back of the housing.
- Access to the terminal compartment for auxiliary power and shielding by unscrewing the cover.
- Beneath the electronic housing is the measuring cell with its process flanges at which the process connections are available. The modular design of the pressure transmitter lets you replace the measuring cell, electronics and connection board as required.
- On the top of the housing you can see the screwed cover of the three local pushbuttons of the transmitter.

Function

Operation of electronics with HART communication



Function diagram of electronics

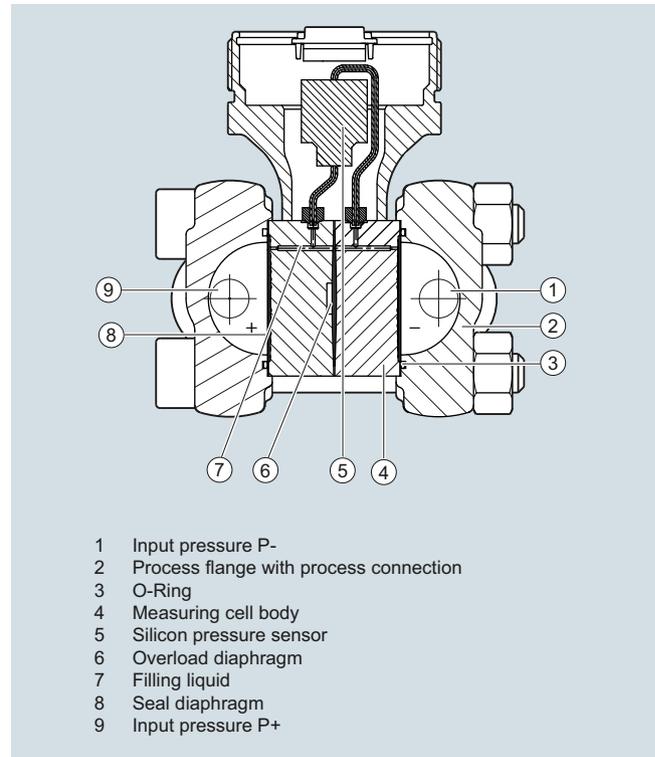
- The input pressure is converted into an electrical signal by the sensor.
- This signal is amplified by the measuring amplifier and digitalized in an analog-to-digital converter.
- The digital signal is analyzed in a microcontroller and corrected according to linearity and thermal characteristics.
- In a digital-to-analog converter it is then converted into the output current of 4 to 20 mA. When connected to supply lines, a diode circuit provides reverse polarity protection.
- The measuring cell-specific data, the electronic data and the parameterization data is held in two EEPROMs. One EEPROM is incorporated into the measuring cell electronics, the other is incorporated into the application electronics.

Operation

- The three local pushbuttons enable you both to navigate and carry out configuration and to visually track messages and process values, provided a display is available.
- If you have a device without a display, you can carry out zero adjustment using the three local pushbuttons. It is possible to retrofit a display at any time.
- You can also carry out settings by computer via a HART modem.

Mode of operation of the measuring cells

Measuring cell for differential pressure and flow



Measuring cell for differential pressure and flow, function diagram

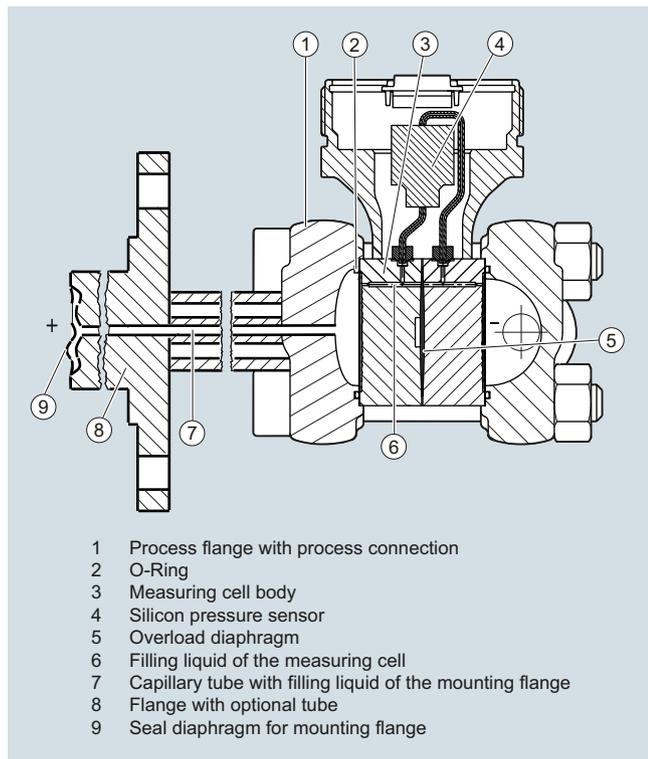
- The differential pressure is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a bridge output voltage proportional to the input pressure.

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SITRANS P500 - Technical description

Measuring cell for level



Measuring cell for level, function diagram

- The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell via the seal diaphragm on the mounting flange.
- The differential pressure applied to the measuring cell is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a differential pressure proportional to the input pressure.

Configuration of SITRANS P500 HART

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

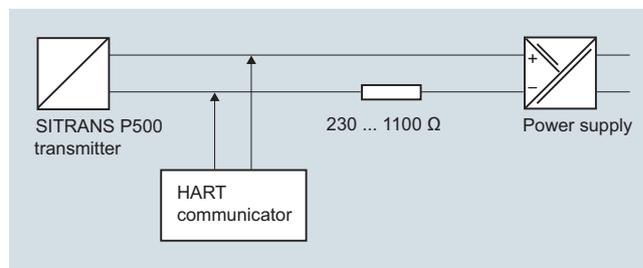
Configuration using the pushbuttons (local operation)

You can configure the transmitter in situ using the three keys provided a display is available. If you have no display, you can only carry out zero adjustment.

It is possible to retrofit a display. See accessories.

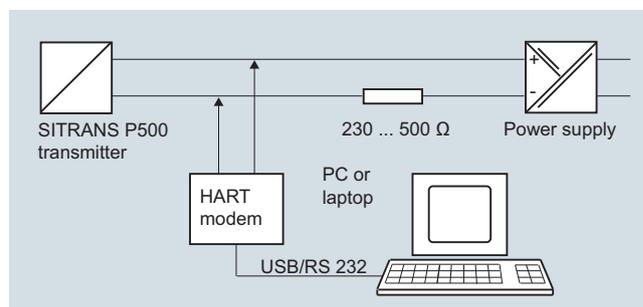
Configuration using HART

Parameterization using HART is carried out using a HART Communicator or a PC in conjunction with a HART modem.



Communication between a HART Communicator and a pressure transmitter

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



HART communication between a PC communicator and a pressure transmitter

For configuring via PC a HART modem is used which connects the transmitter to the PC.

The signals needed for communication in conformity with the HART 6.0 protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

The necessary device files are available for download on the Internet.

SITRANS P500 configuration options

The transmission offers you full configuring options both via HART as well as in situ provided the optional display is available.

For simple parameterizing we also offer the easy to understand QuickStart function with guided commissioning.

SITRANS P500 diagnostic functions

- Maintenance timer
- Min/Max pointer (both resetable and non-resetable)
 - Pressure (incl. time and temperature stamp)
 - Static pressure (incl. time and temperature stamp)
 - Sensor temperature (incl. time stamp)
 - Electronic temperature (incl. time stamp)
- Limit monitor block
- Diagnostic warning
- Diagnostic alarm
- Simulation functions
- Display of trends and histograms
- Operating hours meter

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1

Physical dimensions available for the SITRANS P500 HART display

| Physical variable | Physical dimensions |
|--|---|
| Pressure (setting can also be made in the factory) | Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O (4 °C), inH ₂ O (4 °C), inH ₂ O (20 °C), mmH ₂ O, mmH ₂ O (4 °C), ftH ₂ O (20 °C), inHg, mmHg, hPA |
| Level | m, cm, mm, ft, in |
| Volume | m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , gallon, Imp. gallon, bushel, barrel, barrel liquid, l; Norm (standard) l; Norm (standard) m ³ , Norm (standard) feet ³ |
| Mass | g, kg, t (metric), lb, Ston, Lton, oz |
| Volume flow | m ³ /d, m ³ /h, m ³ /s, l/min, l/s, ft ³ /d, ft ³ /min, ft ³ /s, US gallon/min, gallon/s, l/h, milL/d, gallon/d, gallon/h, milgallon/d, Imp.gallon/s, Imp.gallon/m, Imp.gallon/h, Imp.gallon/d, Norm (standard) m ³ /h, Norm (standard) l/h, Norm (standard) ft ³ /h, Norm (standard) ft ³ /m, barrel liquid/s, barrel liquid/m, barrel liquid/h |
| Mass flow | t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/h, g/min, g/s, lb/d, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min |
| Temperature | K, °C, °F, °R |
| Miscellaneous | %, mA |

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SITRANS P500 for differential pressure and flow

Technical specifications

| Input | | Measuring accuracy | | | | | | | | | |
|---|--|---|---|--------------------------------|---|--|---|--|---|--|--|
| Measured variable | Differential pressure and flow | Reference conditions (in accordance with IEC 60770-1) All error information always refers to the set span. | <ul style="list-style-type: none"> Rising characteristic curve Start of scale 0 bar Stainless steel seal diaphragm Measuring cell with silicone oil filling Room temperature (25 °C (77 °F)) | | | | | | | | |
| Span (infinitely adjustable) | Span (min. ... max.) 1.00 ... 50 mbar (0.4 ... 20 inH ₂ O) 1.25 ... 250 mbar (0.5 ... 100 inH ₂ O) 6.25 ... 1250 mbar (2.5 ... 502 inH ₂ O) 31.25 ... 6250 mbar (12.54 ... 2509 inH ₂ O) 0.16 ... 32 bar (2.33 ... 465 psi) | Maximum operating pressure (static pressure) 160 bar (2320 psi) | Error in measurement at limit setting incl. hysteresis and reproducibility r: Span ratio (r: Span ratio (r = max. span / set span)) Linear characteristic <table border="1"> <thead> <tr> <th>r ≤ 10</th> <th>r ≥ 10</th> </tr> </thead> <tbody> <tr> <td>≤ 0.06 %</td> <td>≤ (0.006 · r) %</td> </tr> <tr> <td>≤ 0.03 %</td> <td>≤ (0.003 · r) %</td> </tr> </tbody> </table> | r ≤ 10 | r ≥ 10 | ≤ 0.06 % | ≤ (0.006 · r) % | ≤ 0.03 % | ≤ (0.003 · r) % | | |
| r ≤ 10 | r ≥ 10 | | | | | | | | | | |
| ≤ 0.06 % | ≤ (0.006 · r) % | | | | | | | | | | |
| ≤ 0.03 % | ≤ (0.003 · r) % | | | | | | | | | | |
| Lower range limit | -100 % of max. span and/or 30 mbar a (0.44 psia) | Square-rooted characteristic <table border="1"> <thead> <tr> <th>r ≤ 10</th> <th>r ≥ 10</th> </tr> </thead> <tbody> <tr> <td>≤ 0.06 %</td> <td>≤ (0.006 · r) %</td> </tr> <tr> <td>≤ 0.03 %</td> <td>≤ (0.003 · r) %</td> </tr> </tbody> </table> | r ≤ 10 | r ≥ 10 | ≤ 0.06 % | ≤ (0.006 · r) % | ≤ 0.03 % | ≤ (0.003 · r) % | | | |
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| ≤ 0.06 % | ≤ (0.006 · r) % | | | | | | | | | | |
| ≤ 0.03 % | ≤ (0.003 · r) % | | | | | | | | | | |
| <ul style="list-style-type: none"> Measuring cell with silicone oil filling | | | | | | | | | | | |
| Upper range limit | 100 % of max. span | | | | | | | | | | |
| Start of scale | Between measuring limits (freely adjustable) | | | | | | | | | | |
| Output | | | | | | | | | | | |
| Output current signal | 4 ... 20 mA | | | | | | | | | | |
| <ul style="list-style-type: none"> Lower current limit (freely adjustable) | 3.55 mA, factory setting 3.8 mA | • 50 mbar (20 inH ₂ O) • 250 mbar (100 inH ₂ O) 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi) | | | | | | | | | |
| <ul style="list-style-type: none"> Upper current limit (freely adjustable) | 23 mA, factory setting 20.5 mA | | | | | | | | | | |
| <ul style="list-style-type: none"> Ripple (without HART communication) | $I_{pp} \leq 0.4$ % of max. output current | | | | | | | | | | |
| <ul style="list-style-type: none"> adjustable damping | 0... 100 s in steps of 0.1 s, factory-setting: 2 s | | | | | | | | | | |
| <ul style="list-style-type: none"> current transmitter | 3.55 ... 23 mA | • Flow > 50 % <table border="1"> <thead> <tr> <th>r ≤ 10</th> <th>r ≥ 10</th> </tr> </thead> <tbody> <tr> <td>≤ 0.06 %</td> <td>≤ (0.006 · r) %</td> </tr> <tr> <td>≤ 0.03 %</td> <td>≤ (0.003 · r) %</td> </tr> </tbody> </table> | r ≤ 10 | r ≥ 10 | ≤ 0.06 % | ≤ (0.006 · r) % | ≤ 0.03 % | ≤ (0.003 · r) % | | | |
| r ≤ 10 | r ≥ 10 | | | | | | | | | | |
| ≤ 0.06 % | ≤ (0.006 · r) % | | | | | | | | | | |
| ≤ 0.03 % | ≤ (0.003 · r) % | | | | | | | | | | |
| <ul style="list-style-type: none"> Failure signal | adjustable within limits: <ul style="list-style-type: none"> Bottom: 3.55 ... 3.7 mA (default value: 3.6 mA) Top: 21.0 ... 23 mA (default value: 22.8 mA) | • Flow 25 % ... 50 % <table border="1"> <thead> <tr> <th>r ≤ 10</th> <th>r ≥ 10</th> </tr> </thead> <tbody> <tr> <td>≤ 0.12 %</td> <td>≤ (0.012 · r) %</td> </tr> <tr> <td>≤ 0.06 %</td> <td>≤ (0.006 · r) %</td> </tr> </tbody> </table> | r ≤ 10 | r ≥ 10 | ≤ 0.12 % | ≤ (0.012 · r) % | ≤ 0.06 % | ≤ (0.006 · r) % | | | |
| r ≤ 10 | r ≥ 10 | | | | | | | | | | |
| ≤ 0.12 % | ≤ (0.012 · r) % | | | | | | | | | | |
| ≤ 0.06 % | ≤ (0.006 · r) % | | | | | | | | | | |
| Load | | | | | | | | | | | |
| <ul style="list-style-type: none"> Without HART communication | $R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in Ω , U_H : Power supply in V | Influence of ambient temperature per 28 °C (50 °F) <table border="1"> <tbody> <tr> <td>• 50 mbar (20 inH₂O)</td> <td>≤ (0.04 · r + 0.05) %</td> </tr> <tr> <td>• 250 mbar (100 inH₂O)</td> <td>≤ (0.025 · r + 0.014) %</td> </tr> <tr> <td>• 1250 mbar (502 inH₂O) 6250 mbar (2509 inH₂O) 32 bar (465 psi)</td> <td>≤ (0.006 · r + 0.03) %</td> </tr> </tbody> </table> | • 50 mbar (20 inH ₂ O) | ≤ (0.04 · r + 0.05) % | • 250 mbar (100 inH ₂ O) | ≤ (0.025 · r + 0.014) % | • 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi) | ≤ (0.006 · r + 0.03) % | | | |
| • 50 mbar (20 inH ₂ O) | ≤ (0.04 · r + 0.05) % | | | | | | | | | | |
| • 250 mbar (100 inH ₂ O) | ≤ (0.025 · r + 0.014) % | | | | | | | | | | |
| • 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi) | ≤ (0.006 · r + 0.03) % | | | | | | | | | | |
| <ul style="list-style-type: none"> With HART communication | | | | | | | | | | | |
| <ul style="list-style-type: none"> - HART Communicator | $R_B = 230 \dots 1100 \Omega$ | Influence of static pressure <table border="1"> <tbody> <tr> <td>• At the start of scale value (PKN)</td> <td></td> </tr> <tr> <td>- 50 mbar (20 inH₂O)</td> <td>≤ (0.1 · r) % per 70 bar (1015 psi) correction via zero point correction</td> </tr> <tr> <td>- 250 mbar (100 inH₂O)</td> <td>≤ (0.035 · r) % per 70 bar (1015 psi) correction via zero point correction</td> </tr> <tr> <td>- 1250 mbar (502 inH₂O) 6250 mbar (2509 inH₂O) 32 bar (465 psi)</td> <td>≤ (0.007 · r) % per 70 bar (1015 psi) correction via zero point correction</td> </tr> </tbody> </table> | • At the start of scale value (PKN) | | - 50 mbar (20 inH ₂ O) | ≤ (0.1 · r) % per 70 bar (1015 psi) correction via zero point correction | - 250 mbar (100 inH ₂ O) | ≤ (0.035 · r) % per 70 bar (1015 psi) correction via zero point correction | - 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi) | ≤ (0.007 · r) % per 70 bar (1015 psi) correction via zero point correction | |
| • At the start of scale value (PKN) | | | | | | | | | | | |
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| - 250 mbar (100 inH ₂ O) | ≤ (0.035 · r) % per 70 bar (1015 psi) correction via zero point correction | | | | | | | | | | |
| - 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi) | ≤ (0.007 · r) % per 70 bar (1015 psi) correction via zero point correction | | | | | | | | | | |
| <ul style="list-style-type: none"> - HART modem | $R_B = 230 \dots 500 \Omega$ | | | | | | | | | | |
| Characteristic curve | Linearly rising, linearly falling, square rooted characteristic rising, bidirectional square rooted characteristic and user-specific | • On the span (PKS) <table border="1"> <tbody> <tr> <td>- 50 mbar (20 inH₂O)</td> <td>≤ 0.13 % per 70 bar (1015 psi)</td> </tr> <tr> <td>- 250 mbar (100 inH₂O) 1250 mbar (502 inH₂O)</td> <td>≤ 0.03 % per 70 bar (1015 psi)</td> </tr> <tr> <td>- 6250 mbar (2509 inH₂O)</td> <td>≤ 0.09 % per 70 bar (1015 psi)</td> </tr> <tr> <td>- 32 bar (465 psi)</td> <td>≤ 0.05 % per 70 bar (1015 psi)</td> </tr> </tbody> </table> | - 50 mbar (20 inH ₂ O) | ≤ 0.13 % per 70 bar (1015 psi) | - 250 mbar (100 inH ₂ O) 1250 mbar (502 inH ₂ O) | ≤ 0.03 % per 70 bar (1015 psi) | - 6250 mbar (2509 inH ₂ O) | ≤ 0.09 % per 70 bar (1015 psi) | - 32 bar (465 psi) | ≤ 0.05 % per 70 bar (1015 psi) | |
| - 50 mbar (20 inH ₂ O) | ≤ 0.13 % per 70 bar (1015 psi) | | | | | | | | | | |
| - 250 mbar (100 inH ₂ O) 1250 mbar (502 inH ₂ O) | ≤ 0.03 % per 70 bar (1015 psi) | | | | | | | | | | |
| - 6250 mbar (2509 inH ₂ O) | ≤ 0.09 % per 70 bar (1015 psi) | | | | | | | | | | |
| - 32 bar (465 psi) | ≤ 0.05 % per 70 bar (1015 psi) | | | | | | | | | | |

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1

| Total Performance ¹⁾ | | Design | |
|---|---|--|--|
| <ul style="list-style-type: none"> Linear characteristic - 50 mbar (20 inH₂O) - 250 mbar (100 inH₂O) - 1250 mbar (502 inH₂O) 6250 mbar (2509 inH₂O) 32 bar (465 psi) | $r \leq 5$ $\leq 0.27\%$ $\leq 0.14\%$ $\leq 0.09\%$ | $5 < r \leq 10$ $\leq 0.46\%$ $\leq 0.27\%$ $\leq 0.14\%$ | Weight (without options) Approx. 3.3 kg (7.3 lb) |
| Square rooted characteristic <ul style="list-style-type: none"> Flow > 50 % - 50 mbar (20 inH₂O) - 250 mbar (100 inH₂O) - 1250 mbar (502 inH₂O) 6250 mbar (2509 inH₂O) 32 bar (465 psi) | $r \leq 5$ $\leq 0.27\%$ $\leq 0.14\%$ $\leq 0.09\%$ | $5 < r \leq 10$ $\leq 0.46\%$ $\leq 0.27\%$ $\leq 0.14\%$ | Material of parts in contact with the medium <ul style="list-style-type: none"> Seal diaphragm <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400 Process connection and sealing screw <ul style="list-style-type: none"> PN 160: stainless steel, mat.-No. 1.4404/316L Sealing material in the process connections <ul style="list-style-type: none"> - O-Ring <ul style="list-style-type: none"> Standard: Viton (FKM (FPM)) Optional: NBR, PTFE (virginal), PTFE (glass fiber-reinforced), FFPM (Kalrez)²⁾, Graphite |
| <ul style="list-style-type: none"> Flow 25 % ... 50 % - 50 mbar (20 inH₂O) - 250 mbar (100 inH₂O) - 1250 mbar (502 inH₂O) 6250 mbar (2509 inH₂O) 32 bar (465 psi) | $r \leq 5$ $\leq 0.54\%$ $\leq 0.28\%$ $\leq 0.18\%$ | $5 < r \leq 10$ $\leq 0.92\%$ $\leq 0.54\%$ $\leq 0.28\%$ | Material of parts not in contact with media Electronics housing <ul style="list-style-type: none"> Low copper die-cast aluminum AC-AISI12 (Fe) or AC-AISI 10 Mg (Fe) to DIN EN 1706 Lacquer on polyurethane base, optional epoxy-based primer Stainless steel name plates (mat. no. 1.4404/316L) |
| Step response time T ₆₃ without electrical damping <ul style="list-style-type: none"> 50 mbar (20 inH₂O) 250 mbar (100 inH₂O) 1250 mbar (502 inH₂O) 6250 mbar (2509 inH₂O) 32 bar (465 psi) | ≤ 140 ms, contains a dead time of ≤ 45 ms ≤ 88 ms, contains a dead time of ≤ 45 ms | | Process connection screws Mounting bracket Measuring cell filling Process connection Electrical connection <ul style="list-style-type: none"> Stainless steel, mat. no. 1.4404/316L Steel or stainless steel mat. no. 1.4301 Silicone oil 1/4-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518 Screw terminals Cable entry via the following screwed glands: <ul style="list-style-type: none"> - M20 x 1.5 - 1/2-14 NPT - Han 7D/Han 8D connector - M12 plug |
| Long-term stability <ul style="list-style-type: none"> $\leq (0.05 \cdot r) \%$ per 5 years $\leq (0.08 \cdot r) \%$ per 10 years | $\leq 0.005 \%$ /1 V | | Displays and controls Pushbuttons Display <ul style="list-style-type: none"> 3 for local programming directly on transmitter With or without integrated display Cover with or without window |
| Influence of power supply | $\leq 0.005 \%$ /1 V | | Auxiliary power supply Terminal voltage on transmitter <ul style="list-style-type: none"> DC 10.6 ... 44 V With intrinsically-safe operation DC 10.6 ... 30 V |
| Rated conditions | Any | | |
| Mounting position | Any | | |
| Ambient conditions <ul style="list-style-type: none"> Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.) - Total device - Readable display - Storage temperature | -40 ... +85 °C (-40 ... +185 °F) -20 ... +85 °C (-4 ... +185 °F) -50 ... +90 °C (-58 ... +194 °F) | | |
| Climatic class <ul style="list-style-type: none"> Condensation | Relative humidity 0 ... 100 % (condensation permissible) | | |
| Degree of protection (to IEC 60529) | IP66/IP 68 and NEMA 4X (with corresponding cable gland) | | |
| Electromagnetic Compatibility <ul style="list-style-type: none"> Emitted interference and interference immunity | Acc. to IEC 61326 and NAMUR NE 21 | | |
| Permissible pressures | According to 97/23/EC pressure equipment directive | | |
| Temperature of medium <ul style="list-style-type: none"> Measuring cell with silicone oil filling | -40 ... +125 °C (-40 ... +257 °F) | | |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for differential pressure and flow

Certificates and approvals

Classification according to PED 97/23/EC

- PN 160 (MAWP 2320 psi) For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Explosion protection

Explosion protection for Europe (to ATEX)

- Intrinsic safety "i"
 - Marking PTB 09 ATEX 2004 X
 - Permissible ambient temperature Ex II 1/2 G Ex ia/ib IIC T4
 - Connection -40 ... +85 °C (-40 ... +185 °F)
 - Effective internal inductance: To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$
 - Effective inner capacitance: $L_i = 400 \mu\text{H}$
 - Effective inner capacitance: $C_i = 6 \text{ nF}$
- Explosion-proof "d"
 - Marking BVS 09 ATEX E 027
 - Permissible ambient temperature Ex II 1/2 G Ex d IIC T4/T6
 - Connection -40 ... +85 °C (-40 ... +185 °F)
 - Effective internal inductance: -40 ... +60 °C (-40 ... +140 °F) temperature class T6
 - Effective inner capacitance: To circuits with values:
 $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
- Dust explosion protection for zone 20
 - Marking PTB 09 ATEX 2004 X
 - Permissible ambient temperature Ex II 1 D Ex iaD 20 T 120 °C
 - Max. surface temperature -40 ... +85 °C (-40 ... +185 °F)
 - Connection 120 °C (248 °F)
 - Effective internal inductance: To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$
 - Effective inner capacitance: $L_i = 400 \mu\text{H}$
 - Effective inner capacitance: $C_i = 6 \text{ nF}$
- Dust explosion protection for zone 21/22
 - Marking BVS 09 ATEX E 027
 - Connection Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia D21
 - Effective internal inductance: To circuits with values:
 $U_m = 10.5 \dots 45 \text{ V DC}$; $P_{\text{max}} = 1.2 \text{ W}$
- Type of protection "n" (zone 2)
 - Marking PTB 09 ATEX 2004 X
 - "nA" connection Ex II 3 G Ex nA II T4/T6
 - "nL, ic" connection Ex II 2/3 G Ex ib/nL IIC T4/T6
 - Effective internal inductance: Ex II 2/3 G Ex ib/ic IIC T4/T6
 - Effective inner capacitance: $U_m = 45 \text{ V DC}$
 - Effective inner capacitance: $U_i = 45 \text{ V}$
 - Effective inner capacitance: $L_i = 400 \mu\text{H}$
 - Effective inner capacitance: $C_i = 6 \text{ nF}$

Explosion protection for USA

(to FM)

Certificate of Compliance

- Identification (XP/DIP) or (IS)

- Permissible Ambient Temperature

- Entity parameters

- Marking (NI/NO)

- Permissible Ambient Temperature

- (NI/S) parameters

Explosion protection for Canada (to cCSAUS)

Certificate of Compliance

- Marking (XP/DIP)

- Permissible ambient temperature

- Entity parameters

- Marking (ia/ib)

- Permissible ambient temperature

- Entity parameters

- Marking (NI/n)

- Permissible ambient temperature

- NI/nA parameters

- nL parameters

No. 3033013

XP CL I, DIV 1, GP ABCDEFG T4 / T6
DIP CL II, III, DIV1, GP EFG T4/T6
IS CL I, II, III, DIV1, GP ABCDEFG T4
CL I, Zone 0, AEx ia IIC T4
CL I, Zone 1, AEx ib IIC T4

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$
(-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$
(-40 ... +140 °F)

According to "control drawing":
A5E02189134N

$U_m = 30 \text{ V}$, $I_m = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $L_i = 400 \mu\text{H}$, $C_i = 6 \text{ nF}$

NI CL I, DIV 2, GP ABCD T4/T6
NI CL I, Zone 2, GP IIC T4/T6
S CL II, III, GPFG T4/T6
NI CL I, DIV 2, GP ABCD T4/T6, NIFW
NI CL I, Zone 2, GP IIC T4/T6, NIFW
NI CLII, III, DIV 2, GP FG T4/T6, NIFW

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$
(-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$
(-40 ... +140 °F)

According to "control drawing":
A5E02189134N

$U_m = 45 \text{ V}$, $L_i = 400 \mu\text{H}$, $C_i = 6 \text{ nF}$,

No. 2280963

CL I, DIV 1, GP ABCD T4 /T6;
CL II, DIV 1, GP EFG T4/T6

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$ (-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)

According to "control drawing":
A5E02189134N

$U_m = 45 \text{ V}$

CL I, Ex ia/Ex ib IIC, T4
CL II, III, Ex ia/Ex ib, GP EFG, T4
CL I, AEx ia/AEx ib IIC, T4
CL II, III, AEx ia/ AEx ib, GP EFG, T4

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$
(-40 ... +185 °F)

$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$,
 $R_i = 300 \Omega$, $L_i = 400 \mu\text{H}$, $C_i = 6 \text{ nF}$

CL I, DIV 2, GP ABCD T4/T6
CL II, III, DIV 2, GP FG T4/T6
Ex nA IIC T4/T6
AEx nA IIC T4/T6
Ex nL IIC T4/T6
AEx nL IIC T4/T6

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$ (-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)

According to "control drawing":
A5E02189134N

$U_m = 45 \text{ V}$

According to "control drawing":
A5E02189134N

$U_i = 45 \text{ V}$, $I_i = 100 \text{ mA}$, $L_i = 400 \mu\text{H}$,
 $C_i = 6 \text{ nF}$

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for differential pressure and flow

1

| Explosion protection for China (acc. to NEPSI) | |
|--|---|
| • Intrinsic safety "i" | GYJ111111X |
| - Marking | Ex ia/ib IIB/IIC T4 |
| - Perm. ambient temperature | 40 ... +85 °C (-40 ... +185 °F) |
| - Connection | To certified intrinsically-safe circuits with maximum values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$ |
| - Effective internal inductance | $L_i = 400 \text{ mH}$ |
| - Effective inner capacitance | $C_i = 6 \text{ nF}$ |
| • Explosion-proof "d" | GYJ111112 |
| - Marking | Ex dia 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: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$ |
| • Dust explosion protection for zone 21/22 | GYJ111112 |
| - Marking | DIP A21 TA, T120 °C IP68 D21 |
| - Connection | To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$ |
| • Type of protection "n" (zone 2) | GYJ111111X |
| - Marking | Ex nL IIB/IIC T4/T6 Ex nA II T4/T6 |
| - Connection | $U_i = 45 \text{ V DC}$ |
| - Effective internal inductance | $L_i = 400 \text{ mH}$ |
| - Effective inner capacitance | $C_i = 6 \text{ nF}$ |

1) The total performance includes the errors caused by temperature effects, static pressure effects and conformity error, including hysteresis and repeatability.

2) Not in combination with span "G".

| HART communication | |
|-------------------------|---|
| Load with connection of | |
| • HART communicator | $R_B = 230 \dots 1100 \Omega$ |
| • HART modem | $R_B = 230 \dots 500 \Omega$ |
| Cable | 2 wire shielded: $\leq 3.0 \text{ km}$ (1.86 miles), multiwire shielded: $\leq 1.5 \text{ km}$ (0.93 miles) |
| Protocol | HART Version 6.0 |
| PC/laptop requirements | IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics |
| Software for computer | SIMATIC PDM 6.0 |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for differential pressure and flow

1

Selection and Ordering data

Article No.

Pressure transmitters for differential pressure and flow, SITRANS P500 HART, PN 160 (MAWP 2320 psi)

7 MF 5 4 - - - - 0

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure

Die-cast aluminum, dual compartment
Die-cast aluminum, dual compartment

Thread for cable gland

M20x1.5
½-14 NPT

0

1

Output

4 ... 20 mA, HART

3

Measuring cell filling

Silicone oil

Measuring cell cleaning

normal

1

Measuring span

| | |
|---------------------|-------------------------------------|
| 1.00 ... 50 mbar | (0.4 ... 20 inH ₂ O) |
| 1.25 ... 250 mbar | (0.5 ... 100.4 inH ₂ O) |
| 6.25 ... 1250 mbar | (2.5 ... 502 inH ₂ O) |
| 31.25 ... 6250 mbar | (12.54 ... 2509 inH ₂ O) |
| 0.16 ... 32 bar | (2.33 ... 465 psi) |

C

D

E

F

G

Wetted parts materials

(stainless steel process flanges)

| | |
|------------------------------|-----------------------------|
| Seal diaphragm | Process connection |
| Stainless steel 1.4404/316L | Stainless steel 1.4404/316L |
| Hastelloy C276 ¹⁾ | Stainless steel 1.4404/316L |
| Monel 400 ¹⁾ | Stainless steel 1.4404/316L |

A

B

C

Process connection

Female thread ¼-18 NPT

- Sealing screw opposite process connection
 - Mounting thread 7/16 - 20 UNF according to EN 61518
 - Mounting thread M10 to DIN 19213
- Vent on side of process flange²⁾
 - Mounting thread 7/16 - 20 UNF according to EN 61518
 - Mounting thread M10 to DIN 19213

0

1

4

5

¹⁾ Not together with Measuring span "C".

²⁾ Not in conjunction with remote seals (option V00).

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for differential pressure and flow

1

| Selection and Ordering data | Order code | Selection and Ordering data | Order code |
|---|------------|--|------------|
| Further designs Add "-Z" to Article No. and specify Order code. | | Further designs Add "-Z" to Article No. and specify Order code. | |
| Attachments | | Degree of protection approvals: Ex ia/ib (intrinsic safety) | |
| Mounting bracket made of steel | A01 | Ex ia/ib protection (ATEX) (T4) | E00 |
| Mounting bracket made of stainless steel | A02 | Ex IS protection (FM) (T4) | E01 |
| Display (Standard: no display, cover closed) | | Ex IS protection (cCSA _{US}) (T4) | E02 |
| With display and blanking cover | A10 | Ex ia/ib protection (NEPSI) (T4) | E06 |
| With display and glass cover | A11 | Degree of protection approvals: Ex d (flameproof) | |
| Special casing / cover version | | Ex d explosion-proof (ATEX)(T4/T6) | E20 |
| Two coats of lacquer on casing, cover (PU on epoxy) | A20 | Ex XP explosion-proof and DIP (FM)(T4/T6) | E21 |
| Electrical connection and cable entry (Standard: no cable gland, only dust protection caps) | | Ex XP explosion-proof and DIP (cCSA _{US})(T4/T6) | E22 |
| Cable gland made of plastic (IP66/68) ⁴⁾ | A50 | Ex d explosion-proof (NEPSI)(T4/T6) | E26 |
| Cable glands made of metal (IP66/68) | A51 | Degree of protection approvals: n/NI | |
| Cable glands made of stainless steel (IP66/68) | A52 | Zone 2 (nA, nL, ic) (ATEX) (T4/T6) | E40 |
| M12 connectors without cable socket (IP66/67) ⁴⁾ | A60 | Div2 NI, Div2 NI-field wiring (FM) (T4/T6) | E41 |
| M12 connectors complete with cable socket (IP66/67) ⁴⁾ | A61 | Zone 2 (nA, nL), Div2 NI (cCSA _{US}) (T4/T6) | E42 |
| Han 7D connectors, plastic, straight (with cable socket) (IP65) ⁴⁾ | A71 | Zone 2 (nA, nL) (NEPSI) (T4/T6) | E46 |
| Han 7D connectors, plastic, angled (with cable socket) (IP65) ⁴⁾ | A72 | Degree of protection approvals: Dust Zone 20/21/22 | |
| Han 7D connectors, metal enclosure, straight (with cable socket) (IP65) ⁴⁾ | A73 | Use in Zone 21/22 (Ex tD) (ATEX) | E60 |
| Han 7D connectors, metal enclosure, angled (with cable socket) (IP65) ⁴⁾ | A74 | Use in Zone 20/21/22 (Ex iaD) (ATEX) | E61 |
| Han 8D connectors, plastic, straight (with cable socket) (IP65) ⁴⁾ ⁸⁾ | A75 | Use in Zone 21/22 (Ex DIP) (NEPSI) | E66 |
| Han 8D connectors, plastic, angled (with cable socket) (IP65) ⁴⁾ ⁸⁾ | A76 | Degree of protection approvals: Combinations | |
| Han 8D connectors, metal enclosure, straight (with cable socket) (IP65) ⁴⁾ ⁸⁾ | A77 | IS protection and XP and DIP (FM) | E71 |
| Han 8D connectors, metal enclosure, angled (with cable socket) (IP65) ⁴⁾ ⁸⁾ | A78 | IS protection and XP and DIP (cCSA _{US}) | E72 |
| PG 13.5 adapters ⁴⁾ | A82 | IS protection and XP and DIP (FM/cCSA _{US}) | E73 |
| Language for labels, leporellos, menu language default ⁹⁾ (instead of English as standard) | | Supplementary approvals/degree of protection | |
| German | B10 | Dual Seal approval ⁵⁾ | E85 |
| French | B12 | Export approval Korea | E86 |
| Spanish | B13 | Special process connection versions (diff. pressure) | |
| Italian | B14 | Side vents for gas measurements ⁷⁾ | L32 |
| Chinese | B15 | Swap process connection: high-pressure side at front | L33 |
| Russian | B16 | Mosquito protection | |
| Japanese | B17 | 4 pcs. for ¼-18 NPT thread | L36 |
| English with units psi/inH ₂ O/°F | B21 | Process flanges, O-rings, special material Standard: Viton (FKM (FPM)) | |
| Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian) | | Process conn. sealing rings made of PTFE (Teflon), virginal | L60 |
| Asia language package (in addition: Chinese, Japanese, Russian) | B80 | Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced | L61 |
| Certificates (available online for downloading) ¹⁾ | | Process connection sealing rings made of FFPM (Kalrez) ¹⁰⁾ | L62 |
| Quality inspection certificate (Five-step factory calibration) according to IEC 60770-2 ²⁾ | C11 | Process connection sealing rings made of NBR | L63 |
| Acceptance test certificate according to EN 10204-3.1 ³⁾ | C12 | Process connection sealing rings made of graphite | L64 |
| | | Drain/Vent valve (1 set = 2 units) | |
| | | 2 ventilation valves ¼- 18 NPT, in material of process flanges) | L80 |
| | | Remote seals | |
| | | Transmitters with connection of remote seal ⁶⁾ (For premounted valve manifolds see page 1/264) | V00 |

¹⁾ Enclosed in print or as DVD: see page 1/262.

²⁾ When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

³⁾ When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

⁴⁾ Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

⁵⁾ Only in conjunction with FM and/or cCSA_{US}

⁶⁾ Please select a remote seal separately. Also refer to the information under footnote 2). Remote seals see page 1/199.

⁷⁾ Only in conjunction with process connection "Vent on side".

⁸⁾ The Han 8D plug is identical with the former Han 8U version.

⁹⁾ For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

¹⁰⁾Not together with Measuring span "G".

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for differential pressure and flow

1

| Selection and Ordering data | Order code |
|--|---|
| <p>Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.</p> | |
| <p>Measuring range to be set Specify in plain text:</p> <ul style="list-style-type: none"> • In the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi • In the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi | <p>Y01</p> <p>Y02</p> |
| <p>Measuring point number and measuring point identifier (only standard ASCII character set) Specify in plain text:</p> <p>Measuring point number (TAG No.), max. 16 characters Y15:</p> <p>Measuring point text (max. 27 char.) Y16:</p> <p>Entry of HART address (TAG), max. 32 characters Y17:</p> | <p>Y15</p> <p>Y16</p> <p>Y17</p> |
| <p>Setting of pressure indication in pressure units Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ...</p> <p>Note: The following pressure units are selectable: bar, mbar, mm H₂O[*], in H₂O[*], ftH₂O[*], mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM, % or mA</p> <p>*) Reference temperature 20 °C</p> | <p>Y21</p> |
| <p>Setting of pressure indication in non-pressure units¹⁾ Specify in plain text: Y22: ... up to ... l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)</p> | <p>Y22 + Y01 or Y02</p> |
| <p>Customer-specific settings Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)</p> | <p>Y30</p> |

¹⁾ Preset values can only be changed over SIMATIC PDM.

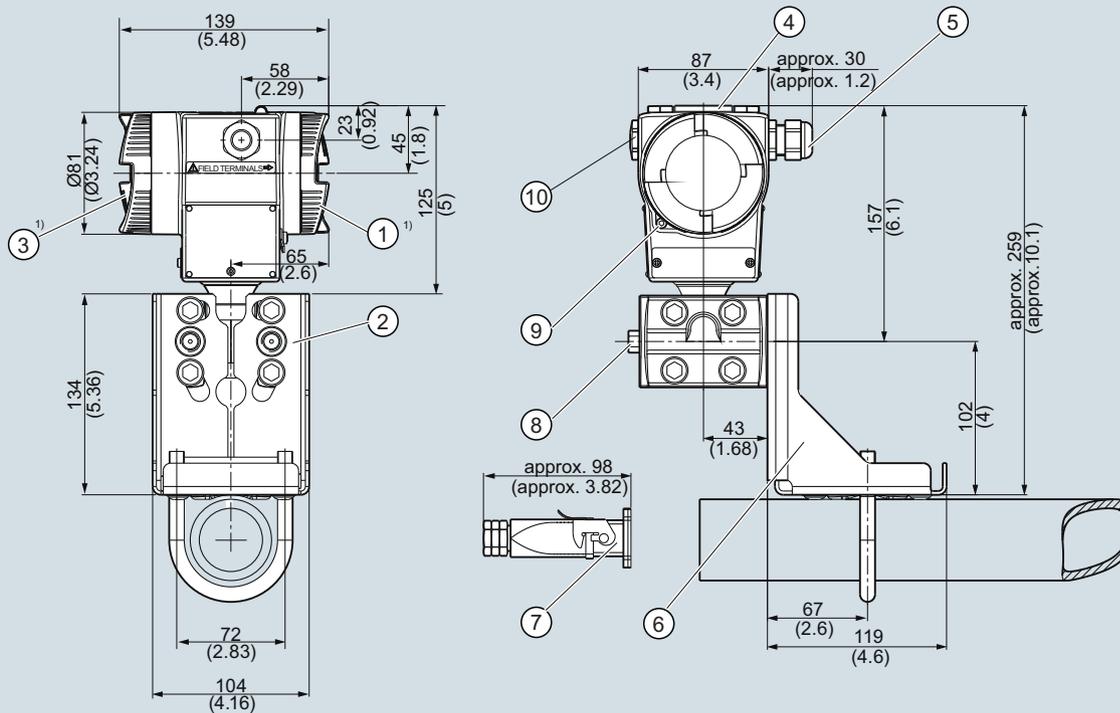
Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for differential pressure and flow

1

Dimensional drawings



- 1 Terminal side
- 2 Process connection: 1/4-18 NPT (EN 61518)
- 3 Electronics side, digital display
- 4 Protective cover for the pushbuttons
- 5 Cable entry:
 - Screwed gland M20 x 1.5³⁾
 - Screwed gland 1/2-14 NPT
 - Han 7D/Han 8D connector²⁾³⁾
 - M12 connector
- 6 Mounting bracket (optional)

- 7 Electrical connection:
 - Han 7D/Han 8D connector/socket²⁾³⁾
- 8 Vent valve (optional)
- 9 Safety catch
- 10 Blanking plug

¹⁾ Allow approx. 20 mm (0.79 inch) additional thread length

²⁾ Not with type of protection "Explosion-proof"

³⁾ Not with type of protection "FM + cCSA_{US} [IS + XP]"

SITRANS P pressure transmitter for differential pressure and flow, P500 series, measurements in mm (inch)

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

1

| | | | |
|--|--|--|---|
| Material of wetted parts at the high-pressure side | | Auxiliary power supply | |
| • Seal diaphragm of mounting flange | Stainless steel 1.4404/316L, Hastelloy C276, mat. no. 2.4819, Monel 400, mat. no. 2.4360, Tantal, PFA auf Edelstahl 1.4404/316L, PTFE auf Edelstahl 1.4404/316L | Terminal voltage on transmitter | <ul style="list-style-type: none"> • DC 10.6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V |
| • Sealing face | Smooth to EN 1092-1, Form B1 and/or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 1092-1 Form B2 and/or ASME B16.5 RFSF in the case of other materials | Certificates and approvals | |
| • Sealing material in the process connection | | Classification according to PED 97/23/EC | |
| - O-Ring | <ul style="list-style-type: none"> • Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FFPM (Kalrez), Graphite | • PN 160 (MAWP 2320 psi) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice) |
| - For vacuum application of mounting flange | Copper | Explosion protection | |
| Material of wetted parts at the low-pressure side | | <u>Explosion protection for Europe (to ATEX)</u> | |
| • Seal diaphragm | Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400 | • Intrinsic safety "i" | PTB 09 ATEX 2004 X |
| • Process connection and sealing screw | • Stainless steel, mat. no. 1.4404/316L | - Marking | Ex II 1/2 G Ex ia/ib IIC T4 |
| • Sealing material in the process connection | | - Permissible ambient temperature | -40 ... +85 °C (-40 ... +185 °F) |
| - O-Ring | <ul style="list-style-type: none"> • Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FFPM (Kalrez), Graphite | - Connection | To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$ |
| Material of parts not in contact with media | | - Effective internal inductance: | $L_i = 400 \mu\text{H}$ |
| Electronics housing | <ul style="list-style-type: none"> • Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706 • Lacquer on polyurethane base, optional epoxy-based primer • Stainless steel serial plate | - Effective inner capacitance: | $C_i = 6 \text{ nF}$ |
| Process connection screws | Stainless steel | • Explosion-proof "d" | BVS 09 ATEX E 027 |
| Measuring cell filling | Silicone oil | - Marking | Ex II 1/2 G Ex d IIC T4/T6 |
| • Liquid mounting flange | Silicone oil or other material | - Permissible ambient temperature | -40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6 |
| Process connection | | - Connection | To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$ |
| • High-pressure side | Flange to EN and ASME | • Dust explosion protection for zone 20 | PTB 09 ATEX 2004 X |
| • Low-pressure side | ¼-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518 | - Marking | Ex II 1 D Ex iaD 20 T 120 °C |
| Electrical connection | <ul style="list-style-type: none"> • Screw terminals • Cable entry via the following screwed glands: <ul style="list-style-type: none"> - M20 x 1.5 - ½-14 NPT - Han 7D/Han 8D connector - M12 plug | - Permissible ambient temperature | -40 ... +85 °C (-40 ... +185 °F) |
| Displays and controls | | - Max. surface temperature | 120 °C (248 °F) |
| Push buttons | 3; for operation directly on the device | - Connection | To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$ |
| Display | <ul style="list-style-type: none"> • With or without integrated display • Cover with or without window | - Effective internal inductance: | $L_i = 400 \mu\text{H}$ |
| | | - Effective inner capacitance: | $C_i = 6 \text{ nF}$ |
| | | • Dust explosion protection for zone 21/22 | BVS 09 ATEX E 027 |
| | | - Marking | Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia D21 |
| | | - Connection | To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\text{max}} = 1.2 \text{ W}$ |
| | | • Type of protection "n" (zone 2) | PTB 09 ATEX 2004 X |
| | | - Marking | Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6 |
| | | - "nA" connection | $U_m = 45 \text{ V DC}$ |
| | | - "nL, ic" connection | $U_i = 45 \text{ V}$ |
| | | - Effective internal inductance | $L_i = 400 \mu\text{H}$ |
| | | - Effective inner capacitance | $C_i = 6 \text{ nF}$ |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

| Explosion protection for USA (to FM) | | Explosion protection for China (acc. to NEPSI) | |
|--|--|---|---|
| Certificate of Compliance | No. 3033013 | • Intrinsic safety "i" | GYJ111111X |
| • Identification (XP/DIP) or (IS) | XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEx ib IIC T4 | - Marking | Ex ia/ib IIB/IIC T4 |
| - Permissible Ambient Temperature | $T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F) | - Permissible ambient temperature | 40 ... +85 °C (-40 ... +185 °F) |
| - Entity parameters | According to "control drawing": A5E02189134N $U_m = 30 \text{ V}, I_m = 100 \text{ mA},$ $P_i = 750 \text{ mW}, L_i = 400 \text{ μH}, C_i = 6 \text{ nF}$ | - Connection | To certified intrinsically-safe circuits with maximum values: $U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 750 \text{ mW}$ |
| • Marking (NI/NO) | NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW | - Effective internal inductance | $L_i = 400 \text{ mH}$ |
| - Permissible Ambient Temperature | $T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F) | - Effective inner capacitance | $C_i = 6 \text{ nF}$ |
| - (NI/S) parameters | According to "control drawing": A5E02189134N $U_m = 45 \text{ V}, L_i = 400 \text{ μH}, C_i = 6 \text{ nF}$ | • Explosion-proof "d" | GYJ111112 |
| Explosion protection for Canada (to cCSA US) | | - Marking | Ex dia IIC T4/T6 |
| Certificate of Compliance | No. 2280963 | - Permissible ambient temperature | -40 ... +85 °C (-40 ... +185 °F) -40 ... +60 °C (-40 ... +140 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6 |
| • Marking (XP/DIP) | CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6 | - Connection | To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$ |
| - Permissible Ambient Temperature | $T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F) | • Dust explosion protection for zone 21/22 | GYJ111112 |
| - Entity parameters | According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$ | - Marking | DIP A21 TA,T120 °C IP68 D21 |
| • Marking (ia/ib) | CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4 | - Connection | To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$ |
| - Permissible Ambient Temperature | $T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) | • Type of protection "n" (zone 2) | GYJ111111X |
| - Entity parameters | $U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 750 \text{ mW},$ $R_i = 300 \text{ Ω}, L_i = 400 \text{ μH}, C_i = 6 \text{ nF}$ | - Marking | Ex nL IIB/IIC T4/T6 Ex nA II T4/T6 |
| • Marking (NI/n) | CL I, DIV2, GP ABCD T4/T6 CL II, III, DIV2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6 | - Connection | $U_i = 45 \text{ V DC}$ |
| - Permissible Ambient Temperature | $T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F) | - Effective internal inductance | $L_i = 400 \text{ mH}$ |
| - NI/nA parameters | According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$ | - Effective inner capacitance | $C_i = 6 \text{ nF}$ |
| - nL parameters | According to "control drawing": A5E02189134N, $U_i = 45 \text{ V},$ $I_i = 100 \text{ mA}, L_i = 400 \text{ μH},$ $C_i = 6 \text{ nF}$ | | |

- 1) Only relevant for the pressure transmitter. The temperature error of the remote seal must be calculated separately.
- 2) If the Type "D" measuring cell is used, the error should be increased by a factor of 5. This error can be reduced to 0 by a means of a zero adjustment.
- 3) This value may be increased if the process connection is sufficiently insulated.

HART communication

| | |
|-------------------------|--|
| Load with connection of | |
| • HART Communicator | $R_B = 230 \dots 1100 \text{ Ω}$ |
| • HART modem | $R_B = 230 \dots 500 \text{ Ω}$ |
| Cable | 2 wire shielded: ≤ 3.0 km (1.86 miles), multiwire shielded: ≤ 1.5 km (0.93 miles) |
| Protocol | HART Version 6.0 |
| PC/laptop requirements | IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics |
| Software for computer | SIMATIC PDM 6.0 |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

1

| Selection and Ordering data | | Article No. | Order code |
|---|-------------------------------------|-------------|------------|
| Pressure transmitters for level, SITRANS P500 HART | | 7MF56 | - 0 - |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | |
| Enclosure | Thread for cable gland | | |
| Die-cast aluminum, dual compartment | M20x1.5 | 0 | |
| Die-cast aluminum, dual compartment | ½-14 NPT | 1 | |
| Output | | | |
| 4 ... 20 mA, HART | | 3 | |
| Measuring cell filling | Measuring cell cleaning | | |
| Silicone oil | normal | 1 | |
| Measuring span (min. ... max.) | | | |
| 1.25 ... 250 mbar | (0.5 ... 100 inH ₂ O) | D | |
| 6.25 ... 1250 mbar | (2.5 ... 500 inH ₂ O) | E | |
| 31.25 ... 6250 mbar | (12.54 ... 2509 inH ₂ O) | F | |
| Wetted parts of the low-pressure side | | | |
| (stainless steel process flanges) | | | |
| Seal diaphragm | Process connection | | |
| Stainless steel 1.4404/316L | Stainless steel 1.4404/316L | A | |
| Hastelloy C276 | Stainless steel 1.4404/316L | B | |
| Monel 400 | Stainless steel 1.4404/316L | C | |
| Process connection of low-pressure side | | | |
| Female thread ¼-18 NPT | | | |
| <ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16 - 20 UNF according to IEC 61518 Mounting thread M10 to DIN 19213 Vent on side of process flange <ul style="list-style-type: none"> Mounting thread 7/16 - 20 UNF according to IEC 61518 Mounting thread M10 to DIN 19213 | | 0 | |
| | | 1 | |
| | | 4 | |
| | | 5 | |
| Wetted parts materials (high-pressure side) | | | |
| Stainless steel 1.4404/316L | | 0 | |
| Hastelloy C276 mat. no. 2.4819 | | 1 | |
| Monel 400 mat. no. 2.4360 | | 2 | |
| Tantalum | | 3 | |
| PFA coated on stainless steel | | 4 | |
| PTFE on stainless steel 1.4404/316L (not in combination with an extension) | | 6 A | |
| Other version | | 9 Y | N 1 Y |
| Add Order code and plain text: | | | |
| Material: ... ; Extension length: ... | | | |
| Process connection on high-pressure side: Extension length | | | |
| None | | A | |
| 50 mm (1.97 inch) | | B | |
| 100 mm (3.94 inch) | | C | |
| 150 mm (5.90 inch) | | D | |
| 200 mm (7.87 inch) | | E | |
| Other version: See option "9" for "Wetted parts materials" | | | |
| Process connection on high-pressure side: Nominal diameter/Nominal pressure | | | |
| DN 50, PN 40 ⁶⁾ | | B | |
| DN 80, PN 40 | | D | |
| DN 100, PN 16 | | G | |
| DN 100, PN 40 | | H | |
| 2", class 150 ⁶⁾ | | L | |
| 2", class 300 ⁶⁾ | | M | |
| 3", class 150 | | Q | |
| 3", class 300 | | R | |
| 4", class 150 | | T | |
| 4", class 300 | | U | |
| Other version, add | | Z | |
| Order code and plain text: | | | |
| Nominal diameter: ... ; Nominal pressure: ... | | | Q 1 Y |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

1

| Selection and Ordering data | Article No. | Order code |
|---|--------------------------|------------|
| Pressure transmitters for level, SITRANS P500 HART | 7 MF 5 6 - - 0 - - - - - | |
| Process connection on high-pressure side: Filling liquid | | |
| Silicone oil M5 | | 0 |
| Silicone oil M50 | | 1 |
| High-temperature oil | | 2 |
| Halocarbon (for oxygen measurement) | | 3 |
| FDA compliant oil | | 4 |
| Other version, add | | 9 |
| Order code and plain text: | | R 1 Y |
| Filling liquid: ... | | |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

1

| Selection and Ordering data | Order code | Selection and Ordering data | Order code |
|--|------------|--|------------|
| Further designs Add "-Z" to Article No. and specify Order code. | | Further designs Add "-Z" to Article No. and specify Order code. | |
| Display (Standard: no display, cover closed) | | Degree of protection approvals: Ex d (flameproof) | |
| With display and blanking cover | A10 | Ex d explosion-proof (ATEX)(T4/T6) | E20 |
| With display and glass cover | A11 | Ex XP explosion-proof and DIP (FM)(T4/T6) | E21 |
| Special version: cover/casing | | Ex XP explosion-proof and DIP (C _{CSA} US)(T4/T6) | E22 |
| Two coats of lacquer on casing, cover (PU on epoxy) | A20 | Ex d explosion-proof (NEPSI)(T4/T6) | E26 |
| Electrical connection and cable entry (Standard: no cable gland, only dust protection caps) | | Degree of protection approvals: n/NI | |
| Cable gland made of plastic (IP66/68) ⁴⁾ | A50 | Zone 2 (nA, nL, ic) (ATEX) (T4/T6) | E40 |
| Cable glands made of metal (IP66/68) | A51 | Div2 NI, Div2 NI-field wiring (FM) (T4/T6) | E41 |
| Cable glands made of stainless steel (IP66/68) | A52 | Zone 2 (nA, nL), Div2 NI (C _{CSA} US) (T4/T6) | E42 |
| M12 connectors without cable socket (IP66/67) ⁴⁾ | A60 | Zone 2 (nA, nL) (NEPSI) (T4/T6) | E46 |
| M12 connectors, cable socket (IP66/67) ⁴⁾ | A61 | Degree of protection approvals: Zone 20/21/22 | |
| Han 7D connectors, plastic, straight (with cable socket) (IP65) ⁴⁾ | A71 | Use in Zone 21/22 (Ex tD) (ATEX) | E60 |
| Han 7D connectors, plastic, angled (with cable socket) (IP65) ⁴⁾ | A72 | Use in Zone 20/21/22 (Ex iaD) (ATEX) | E61 |
| Han 7D connectors, metal enclosure, straight (with cable socket) (IP65) ⁴⁾ | A73 | Use in Zone (Ex DIP) (ATEX) | E66 |
| Han 7D connectors, metal enclosure, angled (with cable socket) (IP65) ⁴⁾ | A74 | Degree of protection approvals: Combinations | |
| Han 8D connectors, plastic, straight (with cable socket) (IP65) ⁴⁾⁷⁾ | A75 | IS protection and XP and DIP (FM) | E71 |
| Han 8D connectors, plastic, angled (with cable socket) (IP65) ⁴⁾⁷⁾ | A76 | IS protection and XP and DIP (C _{CSA} US) | E72 |
| Han 8D connectors, metal enclosure, straight (with cable socket) (IP65) ⁴⁾⁷⁾ | A77 | IS protection and XP and DIP (FM/C _{CSA} US) | E73 |
| Han 8D connectors, metal enclosure, angled (with cable socket) (IP65) ⁴⁾⁷⁾ | A78 | Supplementary approvals / degree of protection | |
| PG 13.5 adapters ⁴⁾ | A82 | Dual Seal approval ⁵⁾ | E85 |
| Language for labels, leprellos and menu language default⁸⁾ (instead of English as standard) | | Export approval Korea | E86 |
| German | B10 | Special process connection versions (diff. pressure) | |
| French | B12 | Swap process connection: high-pressure side at front | L33 |
| Spanish | B13 | Mosquito protection | |
| Italian | B14 | 4 pcs. for ¼-18 NPT thread | L36 |
| Chinese | B15 | Process flanges, O-rings, special material | |
| Russian | B16 | Standard: Viton (FKM) (FPM) | |
| Japanese | B17 | Process connection sealing rings made of PTFE (Teflon), virginal | L60 |
| English with units: psi/inH ₂ O | B21 | Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced | L61 |
| Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian) | | Process connection sealing rings made of FFPM (Kalrez) | L62 |
| Asia language package (in addition: Chinese, Japanese, Russian) | B80 | Process connection sealing rings made of NBR | L63 |
| Certificates (available online for downloading)¹⁾ | | Process connection sealing rings made of graphite | L64 |
| Quality inspection certificate (Five-step factory calibration) according to IEC 60770-2 ²⁾ | C11 | Drain/Vent valve (1 set = 2 units) | |
| Acceptance test certificate according to EN 10204-3.1 ³⁾ | C12 | 2 ventilation valves ¼- 18 NPT, in material of process flange) | L80 |
| Degree of protection approvals: Ex ia/ib (intrinsic safety) | | Vacuum-proof design | |
| Ex ia/ib protection (ATEX) (T4) | E00 | Vacuum service | V04 |
| Ex IS protection (FM) (T4) | E01 | Spark arrester | V05 |
| Ex IS protection (C _{CSA} US) (T4) | E02 | For mounting on zone 0 (including documentation) | |
| Ex ia/ib protection (NEPSI) (T4) | E06 | | |

¹⁾ Enclosed in print or as DVD: see page 1/262.

²⁾ When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

³⁾ When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

⁴⁾ Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

⁵⁾ Only in conjunction with FM and/or C_{CSA}US

⁶⁾ Not recommended for Measuring span "D"

⁷⁾ The Han 8D plug is identical with the former Han 8U version.

⁸⁾ For option B15, B16 and B17 the menu language default is English. Otherwise the Option B80 (Asia language package) is necessary.

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

1

| Selection and ordering data | Order code |
|---|------------------|
| <p>Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.</p> | |
| <p>Measuring range to be set Specify in plain text: Linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, kPa, MPa, psi</p> | Y01 |
| <p>Measuring point number and measuring point identifier (only standard ASCII character set) Specify in plain text: Measuring point number (TAG No.), max. 16 characters Y15:</p> | Y15 |
| <p>Measuring point text (max. 27 char.) Y16:</p> | Y16 |
| <p>Entry of HART address (TAG), max. 32 characters Y17:</p> | Y17 |
| <p>Setting of pressure indication in pressure units Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ... Note: The following pressure units are selectable: bar, mbar, mm H₂O[*], in H₂O[*], ftH₂O[*], mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM, % or mA *) Reference temperature 20 °C</p> | Y21 |
| <p>Setting of pressure indication in non-pressure units¹⁾ Specify in plain text: Y22: ... up to ... l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)</p> | Y22 + Y01 |
| <p>Customer-specific settings Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)</p> | Y30 |

¹⁾ Preset values can only be changed over SIMATIC PDM.

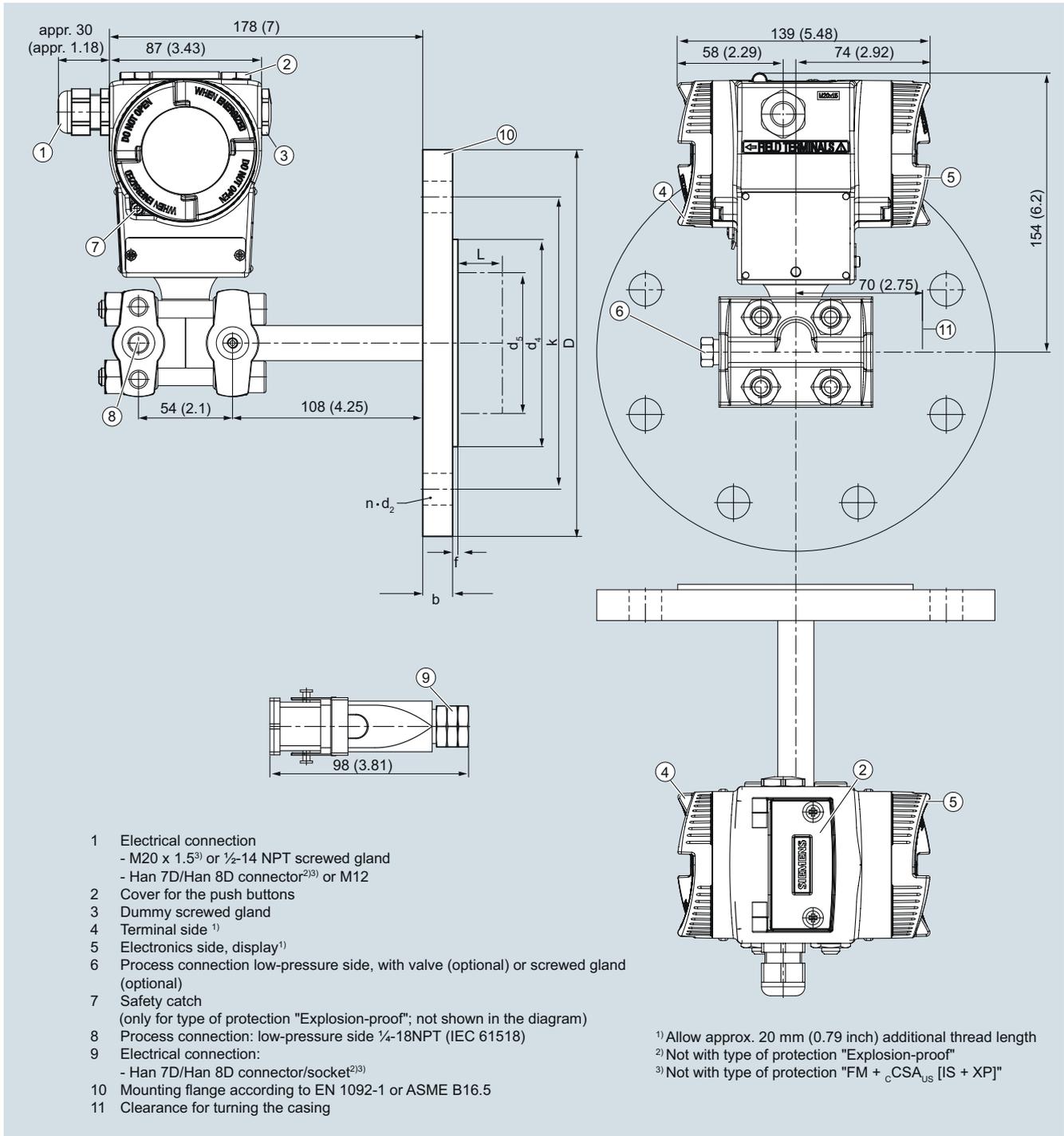
Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

1

Dimensional drawings



SITRANS P pressure transmitter for filling level, P500 series, measurements in mm (inch)

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

Connection to EN 1092-1

| Nominal diameter | Nominal pressure | b mm | D mm | d mm | d ₂ mm | d ₄ mm | d ₅ mm | d _M mm | f mm | k mm | n | L mm |
|------------------|------------------|---------|---------|---------|----------------------|----------------------|----------------------|----------------------|---------|---------|---|---------------------------|
| DN50 | PN 40 | 20 | 165 | 61 | 18 | 102 | 48.3 | 45 ¹⁾ | 2 | 125 | 4 | 0, 50, 100, 150 or 200 |
| DN 80 | PN 40 | 24 | 200 | 90 | 18 | 138 | 76 | 72 ²⁾ | 2 | 160 | 8 | |
| DN 100 | PN 16 | 20 | 220 | 115 | 18 | 158 | 94 | 89 | 2 | 180 | 8 | |
| | PN 40 | 24 | 235 | 115 | 22 | 162 | 94 | 89 | 2 | 190 | 8 | |

Connection to ASME B16.5

| Nominal diameter | Nominal pressure lb/sq.in. | b inch (mm) | D inch (mm) | d ₂ inch (mm) | d ₄ inch (mm) | d ₅ inch (mm) | d _M inch (mm) | f inch (mm) | k inch (mm) | n | L inch (mm) |
|------------------|-------------------------------|----------------|----------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------|----------------|---|--|
| 2 inch | class 150 | 0.77 (19.5) | 5.91 (150) | 0.75 (19.0) | 3.62 (92) | 1.9 (48.3) | 1.77 (45) ¹⁾ | 0.079 (2.0) | 4.75 (120.7) | 4 | 0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200) |
| | class 300 | 0.89 (22.7) | 6.49 (165) | 0.75 (19.0) | 3.62 (92) | 1.9 (48.3) | 1.77 (45) ¹⁾ | 0.079 (2.0) | 5.0 (127) | 8 | |
| 3 inch | class 150 | 0.96 (24.3) | 7.5 (190.5) | 0.75 (19.0) | 5 (127) | 3.0 (76) | 2.83 (72) ²⁾ | 0.079 (2.0) | 6 (152.4) | 4 | |
| | class 300 | 1.14 (29.0) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3.0 (76) | 2.83 (72) ²⁾ | 0.079 (2.0) | 6.69 (168.3) | 8 | |
| 4 inch | class 150 | 0.96 (24.3) | 9.06 (230) | 0.75 (19.0) | 6.19 (157.2) | 3.69 (94) | 3.5 (89) | 0.079 (2.0) | 7.5 (190.5) | 8 | |
| | class 300 | 1.27 (32.2) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.5 (89) | 0.079 (2.0) | 7.88 (200) | 8 | |

Explanations of tables:

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

d₅: Diameter of extension

f: Milling edge

L: Extension length

¹⁾ 59 mm = 2.32 inch with tube length L=0.

²⁾ 89 mm = 3½ inch with tube length L=0.

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 - Supplementary electronics for 4-wire connection

1

Overview



SITRANS P pressure transmitter with supplementary electronics for 4-wire connection

Direct connection of the supplementary electronics to a SITRANS P pressure transmitter from the P500 series produces a transmitter for four-wire connection.

The supplementary electronics cannot be attached to explosion-protected pressure transmitters. The supplementary electronics is fitted in a light metal housing which is mounted on the left side of the pressure transmitter.

Note on ordering:

The supplementary electronics has to be ordered through the **supplementary options** of the pressure transmitter in question.

Technical specifications

| | |
|---|--|
| Output | |
| Output signal | 0 ... 20 mA or 4 ... 20 mA |
| Load | Max. 750 Ω |
| Voltage measurement | Linear (square-rooting in transmitter if necessary) |
| Electrical isolation | Between power supply and input/output |
| Measuring accuracy | |
| Conformity error (in addition to transmitter) | ≤ 0.15 % of set span |
| Influence of ambient temperature | ≤ 0.1 % per 10 K |
| Power supply effect | ≤ 0.1 % per 10 % change in voltage or frequency |
| Load effect | ≤ 0.1 % per 100 % change |
| Rated conditions | |
| Ambient temperature | |
| • 24 V version | -20 ... +80 °C (-4 ... +176 °F) |
| • 230 V version | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Degree of protection | IP54 to IEC 60529 |
| Electromagnetic compatibility (EMC) | IEC 61236-1 |
| Condensation | Relative humidity 0 ... 95 % condensation permissible |

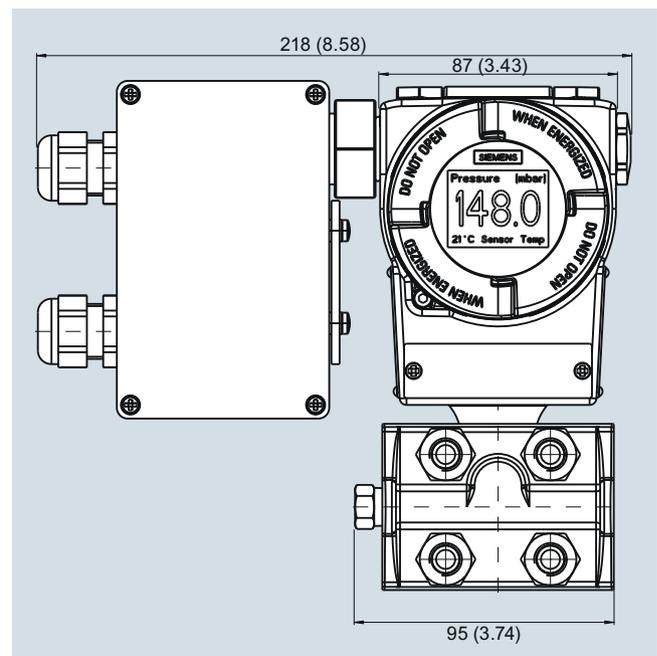
Structural design

| | |
|-------------------------------------|---|
| Dimensions (W x H x D) in mm (inch) | 80 x 120 x 60 (3.15 x 4.72 x 2.36) |
| Electrical connection | Screw terminals (Pg 13.5 cable inlet) or Han 7D / Han 8D plug |

Power supply

| | |
|--|--|
| Supply voltage | 230 V AC (-10 ... +6 %, 47 ... 63 Hz, approx. 6 VA) or 24 V AC/DC (24 V AC ± 10 %, 47 ... 63 Hz, approx. 3 VA) |
| Permissible ripple (within the specified limits) | Approx. 2.5 V _{pp} |

Dimensional drawings



SITRANS P pressure transmitters with supplementary electronics for four-wire connection, dimension drawing, dimensions in mm (inch)

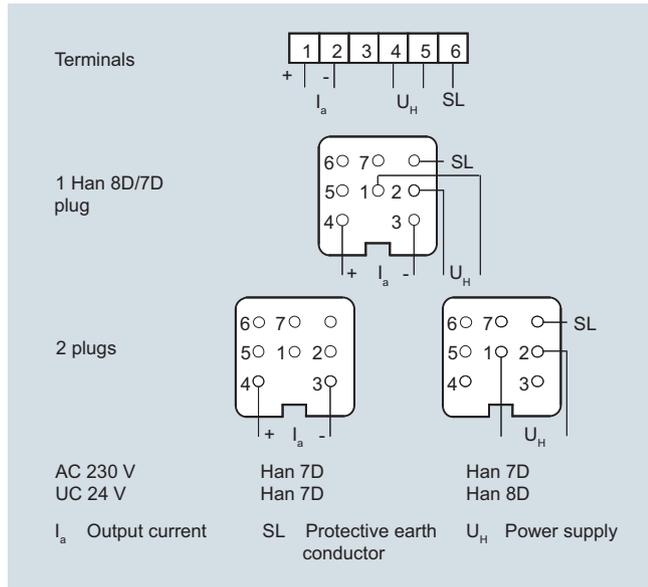
Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 - Supplementary electronics for 4-wire connection

1

Schematics



Supplementary electronics for 4-wire connection, connection diagram (the HAN 8D connector is identical to the previous version of the HAN 8U)

Selection and Ordering data

Order code

Supplementary electronics for 4-wire connection

Article No. of the transmitter
7MF54..-.....-..... or **7MF56..-.....-.....** add **"-Z"**
 and Order code.

Power supply Electrical connection

| | | |
|------------|--|---|
| 24 V AC/DC | Terminals; 2 Pg screwed glands, to left | 1 |
| | 2 Han 7D/Han 8D plugs incl. mating connector, to left | 3 |
| 230 V AC | 1 Han 7D plug incl. mating connector, angled | 5 |
| | Terminals; 1 Pg screwed gland, downwards | 6 |
| 230 V AC | 1 Han 8D plug incl. mating connector, downwards (observe arrangement of plug and differential pressure line) | 9 |
| | Terminals; 2 Pg screwed glands, to left | 7 |
| 230 V AC | 2 Han 7D plugs incl. mating connector, to left | 8 |

Output current

| | |
|-------------|---|
| 0 ... 20 mA | 0 |
| 4 ... 20 mA | 1 |

Accessories

Article No.

Instruction Manual
 German/English

A5E00322799

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 Accessories/Spare parts

1

Selection and Ordering data

| | Article No. |
|--|--|
| Mounting brackets For differential pressure transmitters with flange thread M10 (7MF54...10 and 7MF54...50) • Made of steel • Made of stainless steel | 7MF5987-1AA ▶ 7MF5987-1AD |
| Mounting brackets for differential pressure transmitter with flange thread 7/16-20 UNF (7MF54...00 and 7MF54...40) • Made of steel • Made of stainless steel | 7MF5987-1AC 7MF5987-1AF |
| Cover Made of die-cast aluminum, including O-ring • Without window • With window | 7MF5987-1BE ▶ 7MF5987-1BF |
| Digital indicator Including mounting material | 7MF5987-1BR |
| TAG plate (incl. fastening material) Without inscription (5 pcs.) Printed (1 pc.) Data according to Y01 or Y02, Y15 and Y16 (see "SITRANS P transmitters") | 7MF5987-1CA 7MF5987-1CB-Z Y...: |
| Mounting screws For TAG plate, grounding and connection terminals and securing and locking screws (30 units) | 7MF5987-1CC |
| Sealing plugs for process flange (1 set = 2 units) • Made of stainless steel • Made of Hastelloy | 7MF4997-1CG 7MF4997-1CH |
| Vent valve Complete (1 set = 2 units) • Made of stainless steel • Made of Hastelloy | ▶ 7MF4997-1CP 7MF4997-1CQ |
| Electronics module HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions) | 7MF5987-1DC |
| Connection board (incl. fastening material) HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions) | 7MF5987-1DM |
| O-rings for process flanges made of: • Viton (FKM (FPM)) (10 pcs.) • NBR (Buna N) (10 pcs.) | 7MF5987-2DA 7MF5987-2DE |
| Push buttons assembly (incl. fastening material) For replacement of operating keys for on-site operation of the transmitter | 7MF5987-2AF |
| Sealing ring for • Process connection • NBR sealing ring for screw cover (10 pcs.) • NBR sealing ring for interface measuring cell/housing (10 pcs.) | See catalog FI01, "Fittings" 7MF4997-2EA 7MF4997-2EB |

Selection and Ordering data

| | Article No. |
|---|---|
| Operating Instructions¹⁾ German English French Italian Spanish | A5E02344527 A5E02344528 A5E02344529 A5E02344530 A5E02344531 |
| Compact operating instructions¹⁾ English, German, Spanish, French, Italian, Dutch English, Estonian, Latvian, Lithuanian, Polish, Romanian English, Bulgarian, Czech, Finnish, Slovakian, Slovenian English, Danish, Greek, Portuguese, Swedish, Hungarian Russian | A5E02344532 A5E02307339 A5E02307340 A5E02307341 A5E02307338 |
| Brief instructions (Leporello) German, English, French, Italian, Spanish, Chinese | A5E02344536 |
| DVD with SITRANS P documentation German, English, French, Spanish, Italian Compact operating instructions in 21 EU languages | A5E00090345 |
| Service Instructions¹⁾ for replacement of electronics, measuring cell and terminal board • German • English | A5E02822443 A5E02344534 |
| HART modem With USB interface | ▶ 7MF4997-1DB |
| Operating instruction¹⁾ Supplementary electronics for 4-wire connection German, English | A5E00322799 |
| Certificates (order only via SAP) additional to internet download • Hard copy (to order) • On DVD (to order) | A5E03252406 A5E03252407 |

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

▶ Available ex stock.

For power supply units, see catalog FI01 "Supplementary Components".

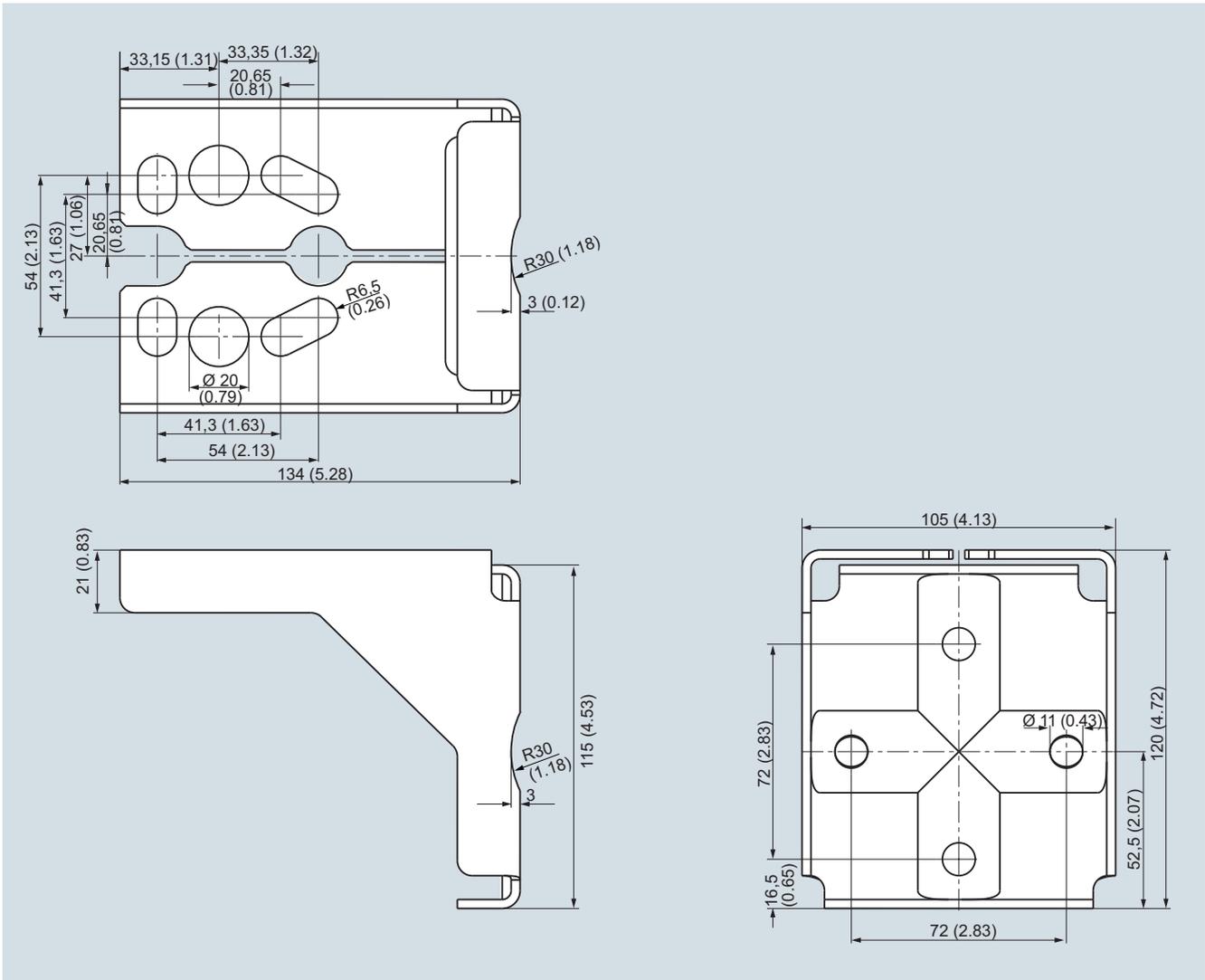
Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 Accessories/Spare parts

1

Dimensional drawings



Mounting bracket for SITRANS P pressure transmitter, P500 series, measurements in mm (inch)

Mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500 Factory-mounting of valve manifolds on transmitters

Overview

The SITRANS P500 transmitter can be delivered factory-fitted with the following manifolds:

- Valve manifolds 7MF9411-5BA: Three valve manifold for differential pressure transmitter
- Valve manifolds 7MF9411-5CA: Three valve manifold for differential pressure transmitter

Design

The 7MF9411-5BA and 7MF9411-5CA manifolds are sealed with PTFE sealing rings between the transmitter and the manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (2411 inH₂O)) and is certified leak-proof with a test report to EN 10204 - 2.2.

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

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

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

Selection and ordering Data

Manifold 7MF9411-5BA on SITRANS P pressure transmitter P500 for differential pressure and flow

|  | Add -Z to the Article No. of the transmitter and add Order codes | Order code |
|---|--|--------------------------|
| | SITRANS P500 7MF54...-... | |
| | mounted with gaskets made of PTFE and screws made of | |
| | <ul style="list-style-type: none"> • Chromized steel • Stainless steel | U01 U02 |
| | Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2 | |
| | Further designs: | |
| | Delivery includes mounting bracket and mounting clips made of | |
| | <ul style="list-style-type: none"> • Steel • Stainless steel | A01 A02 |
| | (instead of the mounting bracket supplied with the transmitter) | |
| | Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold | C12 |

Manifold 7MF9411-5CA on SITRANS P500 pressure transmitter for differential pressure and flow

|  | Add -Z to the Article No. of the transmitter and add Order codes | Order code |
|---|--|--------------------------|
| | SITRANS P500 7MF54...-... | |
| | mounted with gaskets made of PTFE and screws made of | |
| | <ul style="list-style-type: none"> • Chromized steel • Stainless steel | U03 U04 |
| | Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2 | |
| | Further designs: | |
| | Delivery includes mounting bracket and mounting clips made of | |
| | <ul style="list-style-type: none"> • Steel • Stainless steel | A01 A02 |
| | (instead of the mounting bracket supplied with the transmitter) | |
| | Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold | C12 |

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

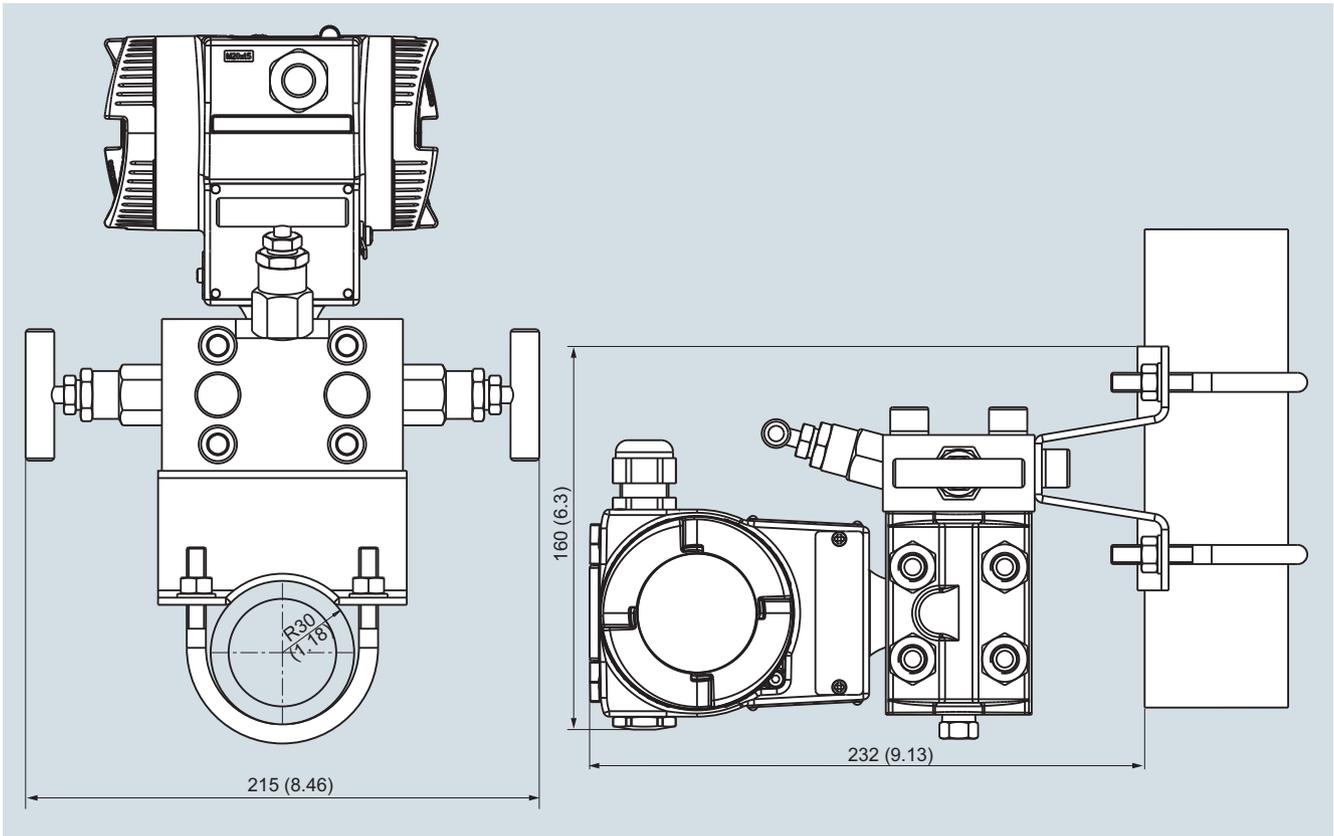
SITRANS P500 Factory-mounting of valve manifolds on transmitters

1

Dimensional drawings



Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



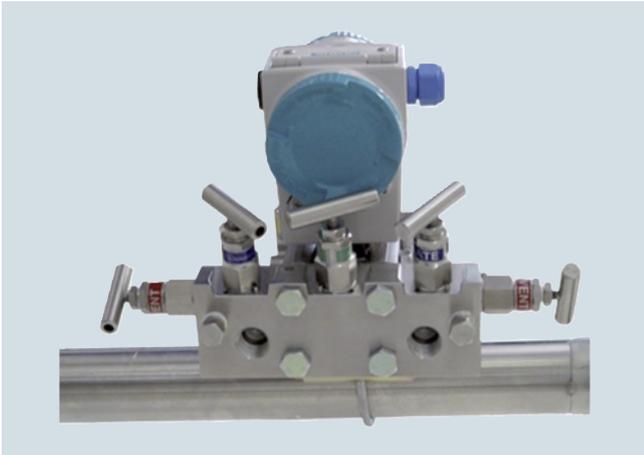
Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

Pressure Measurement

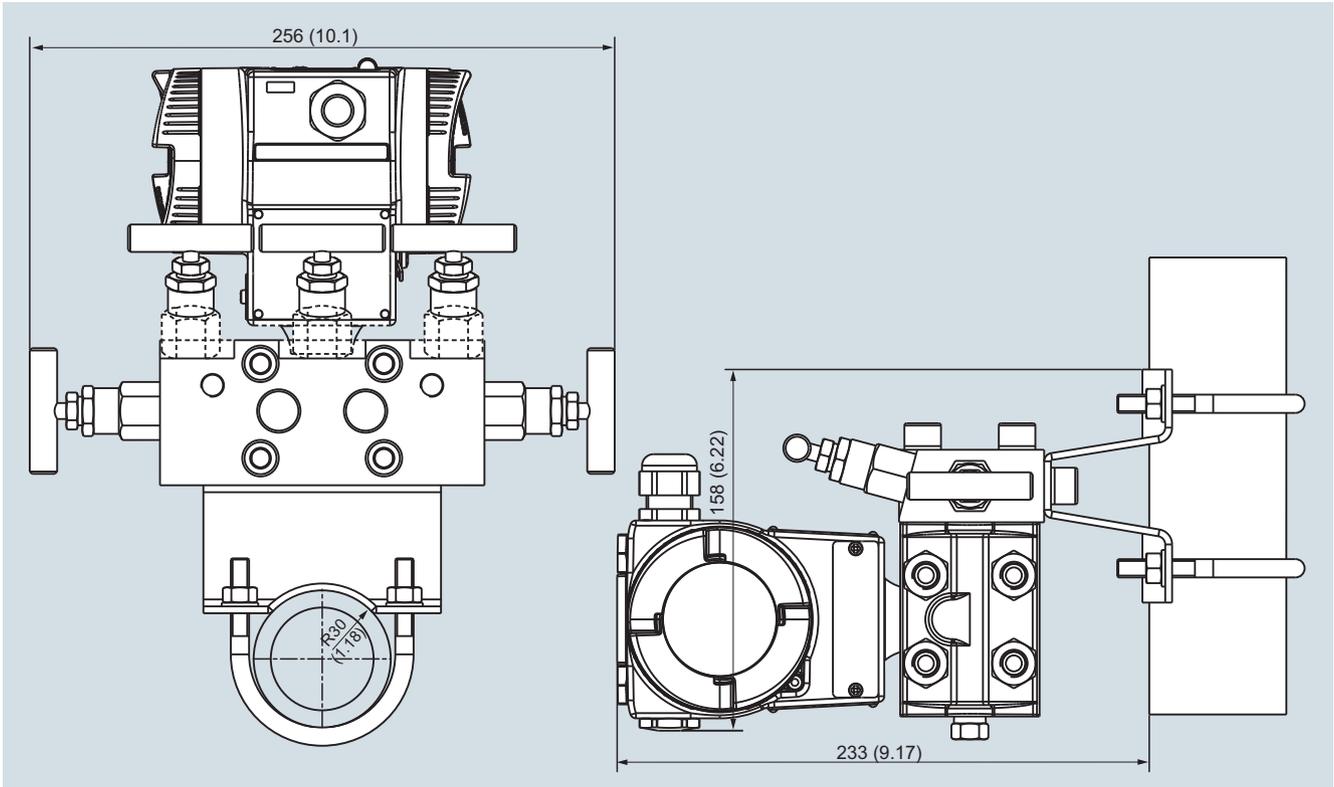
Transmitters for applications with highest requirements (Premium)

SITRANS P500 Factory-mounting of valve manifolds on transmitters

1



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)