

## 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 measuring spans of 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH<sub>2</sub>O)
- Extremely good total performance and conformity error values with no loss of performance up to a turndown of 10 guaranteed.
- Additional integrated sensor for static pressure
- Parameterization via on-site control keys or HART
- Short process flanges enable 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 temperature of mediums 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.

## Pressure Measurement

Pressure transmitters

for applications with highest requirements (Premium)

SITRANS P500

### Technical description

#### Pressure transmitters for differential pressure and flow

- Measured variables:
  - Differential pressure
  - Small positive or negative pressure
  - Flow  $q \sim \sqrt{\Delta p}$  (together with a primary element (see Chapter "Flow Meters"))
- Measuring span (freely adjustable)  
for SITRANS P500: 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH<sub>2</sub>O)

#### Pressure transmitters for level

- Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Measuring span (freely adjustable)  
for SITRANS P500: 1.25 to 6250 mbar (0.5 to 2509 inH<sub>2</sub>O)

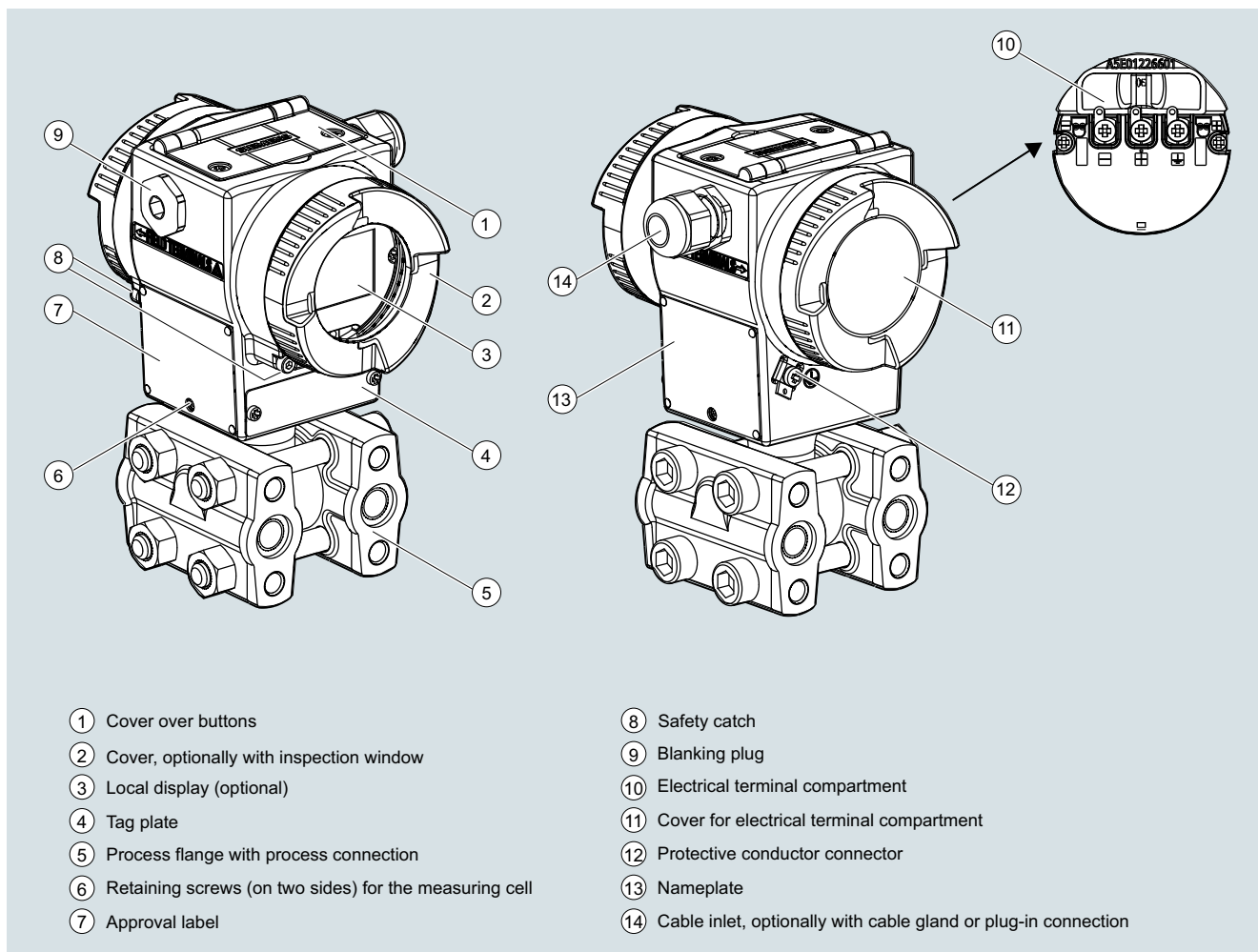
- Nominal diameter of the mounting flange
  - DN 50 / PN 40
  - DN 80 / PN 40
  - DN 100/ PN 16, PN 40
  - 2 inch/class 150, class 300
  - 3 inch/class 150, class 300
  - 4 inch/ class 150, class 300
  - customized special version

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.

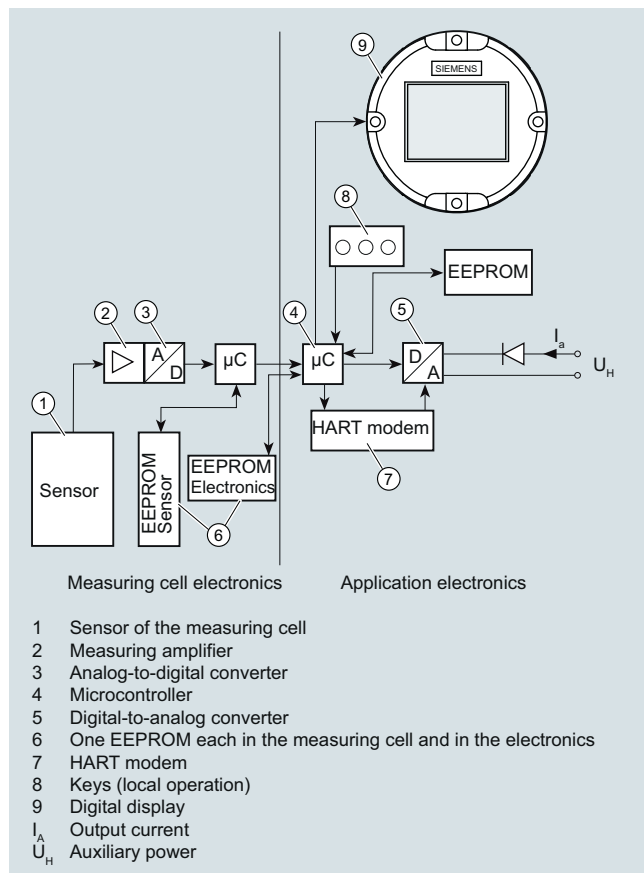
The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

### Design



View of transmitter

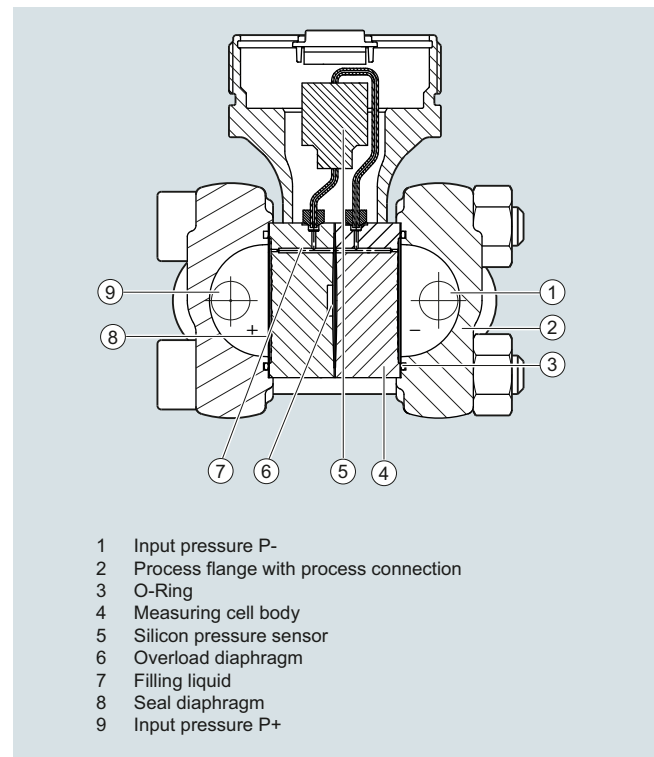
- The electronics enclosure is made of coated die-cast aluminum.
- The enclosure has round screwed covers front and back.
- Depending on the design the front cover is fitted with an inspection window. You can read off the measured value directly from the optional display through the window.
- The inlet 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 enclosure.
- Access to the terminal compartment for auxiliary power and shielding by unscrewing the cover.
- Beneath the electronic enclosure 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 enclosure 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**

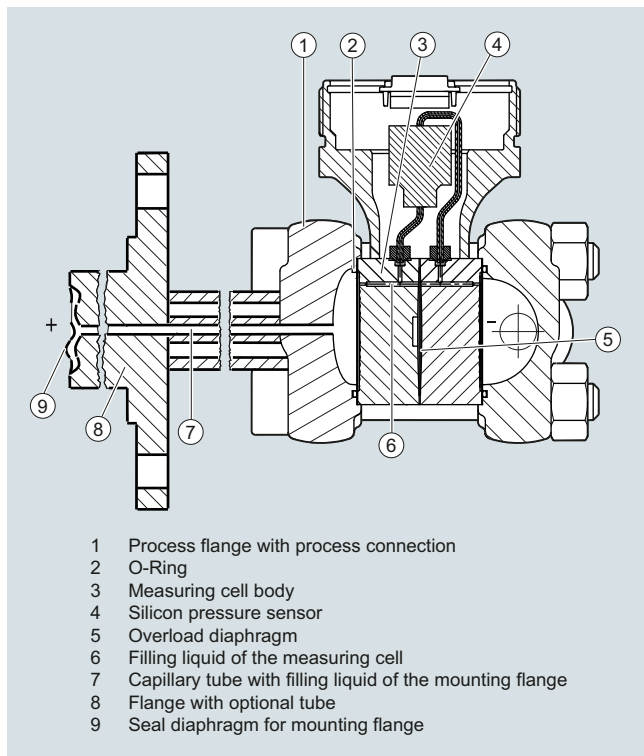
- The differential pressure is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- 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.

## Pressure Measurement

Pressure transmitters  
for applications with highest requirements (Premium)  
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.

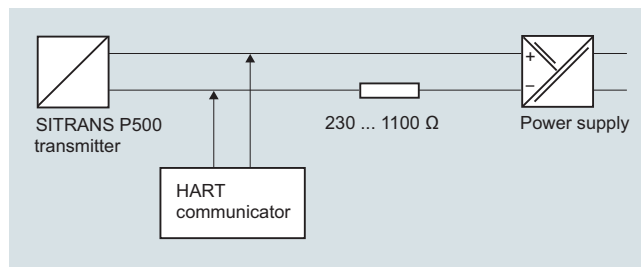
##### Configuration using the pushbuttons (local operation)

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.

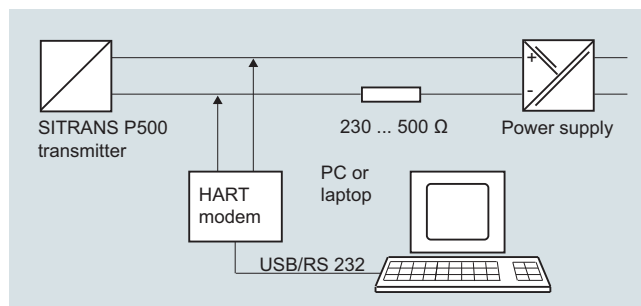
#### Configuration using HART

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

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 <sup>2</sup> , kg/cm <sup>2</sup> , mmH <sub>2</sub> O (4 °C), inH <sub>2</sub> O (4 °C), inH <sub>2</sub> O (20 °C), mmH <sub>2</sub> O, mmH <sub>2</sub> O (4 °C), ftH <sub>2</sub> O (20 °C), inHg, mmHg, hPA
Level	m, cm, mm, ft, in
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , gallon, Imp. gallon, bushel, barrel, barrel liquid, l; Norm (standard) l; Norm (standard) m <sup>3</sup> , Norm (standard) feet <sup>3</sup>
Mass	g, kg, t (metric), lb, Ston, Lton, oz
Volume flow	m <sup>3</sup> /d, m <sup>3</sup> /h, m <sup>3</sup> /s, l/min, l/s, ft <sup>3</sup> /d, ft <sup>3</sup> /min, ft <sup>3</sup> /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 <sup>3</sup> /h, Norm (standard) l/h, Norm (standard) ft <sup>3</sup> /h, Norm (standard) ft <sup>3</sup> /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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## Technical specifications

Input		Measuring accuracy								
Measured variable	Differential pressure and flow	Reference conditions (in accordance with IEC 60770-1)	<ul style="list-style-type: none"> <li>• Rising characteristic curve</li> <li>• Lower range value 0 bar</li> <li>• Stainless steel seal diaphragm</li> <li>• Measuring cell with silicone oil filling</li> <li>• Room temperature (25 °C (77 °F))</li> </ul>							
Measuring span (infinitely adjustable)	<table border="1"> <thead> <tr> <th>Measuring span (min. ... max.)</th> <th>Maximum operating pressure (static pressure)</th> </tr> </thead> <tbody> <tr> <td>1.00 ... 50 mbar (0.4 ... 20 inH<sub>2</sub>O)</td> <td rowspan="5">160 bar (2320 psi)</td> </tr> <tr> <td>1.25 ... 250 mbar (0.5 ... 100 inH<sub>2</sub>O)</td> </tr> <tr> <td>6.25 ... 1250 mbar (2.5 ... 502 inH<sub>2</sub>O)</td> </tr> <tr> <td>31.25 ... 6250 mbar (12.54 ... 2509 inH<sub>2</sub>O)</td> </tr> <tr> <td>0.16 ... 32 bar (2.33 ... 465 psi)</td> </tr> </tbody> </table>	Measuring span (min. ... max.)		Maximum operating pressure (static pressure)	1.00 ... 50 mbar (0.4 ... 20 inH <sub>2</sub> O)	160 bar (2320 psi)	1.25 ... 250 mbar (0.5 ... 100 inH <sub>2</sub> O)	6.25 ... 1250 mbar (2.5 ... 502 inH <sub>2</sub> O)	31.25 ... 6250 mbar (12.54 ... 2509 inH <sub>2</sub> O)	0.16 ... 32 bar (2.33 ... 465 psi)
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0.16 ... 32 bar (2.33 ... 465 psi)										
Lower range limit	-100 % of max. measuring span and/or 30 mbar a (0.44 psi a)	<ul style="list-style-type: none"> <li>• 50 mbar (20 inH<sub>2</sub>O)</li> <li>• 250 mbar (100 inH<sub>2</sub>O)</li> <li>• 1250 mbar (502 inH<sub>2</sub>O)</li> <li>• 6250 mbar (2509 inH<sub>2</sub>O)</li> <li>• 32 bar (465 psi)</li> </ul>	<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									
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Upper range limit	100 % of max. measuring span	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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≤ 0.03 %	≤ (0.003 · r) %									
Lower range value	Between measuring limits (freely adjustable)	<ul style="list-style-type: none"> <li>• Flow &gt; 50 %</li> <li>- 50 mbar (20 inH<sub>2</sub>O)</li> <li>- 250 mbar (100 inH<sub>2</sub>O)</li> <li>- 1250 mbar (502 inH<sub>2</sub>O)</li> <li>- 6250 mbar (2509 inH<sub>2</sub>O)</li> <li>- 32 bar (465 psi)</li> </ul>	<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) %									
<b>Output</b>		Influence of ambient temperature per 28 °C (50 °F)	<table border="1"> <tbody> <tr> <td>≤ 0.04 · r + 0.05 %</td> </tr> <tr> <td>≤ (0.025 · r + 0.014) %</td> </tr> <tr> <td>≤ (0.006 · r + 0.03) %</td> </tr> </tbody> </table>	≤ 0.04 · r + 0.05 %	≤ (0.025 · r + 0.014) %	≤ (0.006 · r + 0.03) %				
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≤ (0.006 · r + 0.03) %										
Output current signal	4 ... 20 mA	Influence of static pressure	<ul style="list-style-type: none"> <li>• At the lower range value (PKN)</li> <li>- 50 mbar (20 inH<sub>2</sub>O)</li> <li>- 250 mbar (100 inH<sub>2</sub>O)</li> <li>- 1250 mbar (502 inH<sub>2</sub>O)</li> <li>- 6250 mbar (2509 inH<sub>2</sub>O)</li> <li>- 32 bar (465 psi)</li> </ul>							
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA	<ul style="list-style-type: none"> <li>• On the measuring span (PKS)</li> <li>- 50 mbar (20 inH<sub>2</sub>O)</li> <li>- 250 mbar (100 inH<sub>2</sub>O)</li> <li>- 1250 mbar (502 inH<sub>2</sub>O)</li> <li>- 6250 mbar (2509 inH<sub>2</sub>O)</li> <li>- 32 bar (465 psi)</li> </ul>								
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA		<table border="1"> <tbody> <tr> <td>≤ 0.13 % per 70 bar (1015 psi)</td> </tr> <tr> <td>≤ 0.03 % per 70 bar (1015 psi)</td> </tr> <tr> <td>≤ 0.09 % per 70 bar (1015 psi)</td> </tr> <tr> <td>≤ 0.05 % per 70 bar (1015 psi)</td> </tr> </tbody> </table>	≤ 0.13 % per 70 bar (1015 psi)	≤ 0.03 % per 70 bar (1015 psi)	≤ 0.09 % per 70 bar (1015 psi)	≤ 0.05 % per 70 bar (1015 psi)			
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• Ripple (without HART communication)	I <sub>pp</sub> ≤ 0.4 % of max. output current									
• adjustable damping	0... 100 s in steps of 0.1 s, factory-setting: 2 s									
• current transmitter	3.55 ... 23 mA									
• Failure signal	adjustable within limits:: <ul style="list-style-type: none"> <li>• Bottom: 3.55 ... 3.7 mA (default value: 3.6 mA)</li> <li>• Top: 21.0 ... 23 mA (default value: 22.8 mA)</li> </ul>									
Load										
• Without HART communication	$R_B \leq (U_H - 10.5 \text{ V}) / 0.023 \text{ A}$ in $\Omega$ , U <sub>H</sub> : Power supply in V									
• With HART communication										
- HART Communicator	R <sub>B</sub> = 230 ... 1100 $\Omega$									
- HART modem	R <sub>B</sub> = 230 ... 500 $\Omega$									
Characteristic curve	Linearly rising, linearly falling, square rooted characteristic rising, bidirectional square rooted characteristic and user-specific									

# Pressure Measurement

## Pressure transmitters for applications with highest requirements (Premium) SITRANS P500

for differential pressure and flow

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Total Performance <sup>1)</sup>		Design	
<ul style="list-style-type: none"> <li>Linear characteristic</li> <li>- 50 mbar (20 inH<sub>2</sub>O)</li> <li>- 250 mbar (100 inH<sub>2</sub>O)</li> <li>- 1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	$r \leq 5$ $\leq 0.27\%$ $\leq 0.14\%$ $\leq 0.09\%$	$5 < r \leq 10$ $\leq 0.46\%$ $\leq 0.27\%$ $\leq 0.14\%$	<b>Weight (without options)</b> Approx. 3.3 kg (7.3 lb)
Square rooted characteristic			<b>Material of parts in contact with the medium</b> <ul style="list-style-type: none"> <li>Seal diaphragm</li> </ul>
<ul style="list-style-type: none"> <li>Flow &gt; 50 %</li> <li>- 50 mbar (20 inH<sub>2</sub>O)</li> <li>- 250 mbar (100 inH<sub>2</sub>O)</li> <li>- 1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	$r \leq 5$ $\leq 0.27\%$ $\leq 0.14\%$ $\leq 0.09\%$	$5 < r \leq 10$ $\leq 0.46\%$ $\leq 0.27\%$ $\leq 0.14\%$	<ul style="list-style-type: none"> <li>Process connection and sealing screw</li> <li>Sealing material in the process connections</li> <li>- O-Ring</li> </ul>
<ul style="list-style-type: none"> <li>Flow 25 % ... 50 %</li> <li>- 50 mbar (20 inH<sub>2</sub>O)</li> <li>- 250 mbar (100 inH<sub>2</sub>O)</li> <li>- 1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	$r \leq 5$ $\leq 0.54\%$ $\leq 0.28\%$ $\leq 0.18\%$	$5 < r \leq 10$ $\leq 0.92\%$ $\leq 0.54\%$ $\leq 0.28\%$	<ul style="list-style-type: none"> <li>Standard: Viton (FKM (FPM))</li> <li>Optional: NBR, PTFE (virginal), PTFE (glass fiber-reinforced), FFPM (Kalrez)<sup>2)</sup>, Graphite</li> </ul>
Step response time $T_{63}$ without electrical damping			<b>Material of parts not in contact with media</b>
<ul style="list-style-type: none"> <li>50 mbar (20 inH<sub>2</sub>O)</li> </ul>	$\leq 140$ ms, contains a dead time of $\leq 45$ ms		Die-cast aluminum enclosure
<ul style="list-style-type: none"> <li>250 mbar (100 inH<sub>2</sub>O)</li> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	$\leq 88$ ms, contains a dead time of $\leq 45$ ms		<ul style="list-style-type: none"> <li>Low copper die-cast aluminum AC-AISI12 (Fe) or AC-AISI 10 Mg (Fe) to DIN EN 1706</li> <li>Lacquer on polyurethane base, optional epoxy-based primer</li> <li>Stainless steel name plates (mat. no. 1.4404/316L)</li> </ul>
Long-term stability	$\leq (0.05 \cdot r)\%$ per 5 years $\leq (0.08 \cdot r)\%$ per 10 years		Stainless steel precision cast enclosure
Influence of power supply	$\leq 0.005\%/1$ V		Process connection screws
<b>Operating conditions</b>			Mounting bracket
Mounting position	Any		Measuring cell filling
Ambient conditions			Process connection
<ul style="list-style-type: none"> <li>Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)</li> <li>- Total device</li> <li>- Readable display</li> <li>- Storage temperature</li> </ul>	$-40 \dots +85$ °C ( $-40 \dots +185$ °F) $-20 \dots +85$ °C ( $-4 \dots +185$ °F) $-50 \dots +90$ °C ( $-58 \dots +194$ °F)		Electrical connection
Climatic class			<ul style="list-style-type: none"> <li>Screw terminals</li> <li>Cable entry via the following screwed glands:               <ul style="list-style-type: none"> <li>- M20 x 1.5</li> <li>- 1/2-14 NPT</li> <li>- Device plug Han 7D/Han 8D</li> <li>- Device plug M12</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Condensation</li> </ul>	Relative humidity 0 ... 100 % (condensation permissible)		Displays and controls
Degree of protection (to IEC 60529)	IP66/IP 68 and NEMA 4X (with corresponding cable gland)		Pushbuttons
Electromagnetic Compatibility			Display
<ul style="list-style-type: none"> <li>Emitted interference and interference immunity</li> </ul>	Acc. to IEC 61326 and NAMUR NE 21		<b>Auxiliary power supply</b>
Permissible pressures	According to 2014/68/EU pressure equipment directive		Terminal voltage on transmitter
Temperature of medium			<ul style="list-style-type: none"> <li>DC 10.6 ... 44 V</li> <li>With intrinsically-safe operation DC 10.6 ... 30 V</li> </ul>
<ul style="list-style-type: none"> <li>Measuring cell with silicone oil filling</li> </ul>	$-40 \dots +125$ °C ( $-40 \dots +257$ °F)		

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## Certificates and approvals

Classification according to PED  
2014/68/EU

- PN 160 (MAWP 2320 psi) For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, 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:  $L_i = 400 \mu\text{H}$
- Explosion-proof "d"
  - Marking BVS 09 ATEX E 027
  - Permissible ambient temperature Ex II 1/2 G Ex db ia IIC T4/T6 Ga/Gb
  - Connection -40 ... +85 °C (-40 ... +185 °F)
  - Effective internal inductance: -40 ... +60 °C (-40 ... +140 °F)
  - Effective inner capacitance: temperature class T6
- Dust explosion protection for zone 20
  - Marking To circuits with values:  
 $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
  - Permissible ambient temperature BVS 09 ATEX E 027
  - Max. surface temperature Ex II 1 D Ex ta ia IIIC T120°C Da
  - Connection -40 ... +85 °C (-40 ... +185 °F)
  - Effective internal inductance: 120 °C (248 °F)
  - Effective inner capacitance: To certified intrinsically-safe circuits with peak values:  
 $U_i = 30 \text{ V}$ ,  $I_i = 100 \text{ mA}$ ,  $P_i = 750 \text{ mW}$ ,  $R_i = 300 \Omega$
- Dust explosion protection for zone 21/22
  - Marking Ex II 2D Ex tb ia IIIC T120°C Db
  - Connection 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:  $U_m = 45 \text{ V DC}$
  - "nL, ic" connection  $U_i = 45 \text{ V}$
  - Effective internal inductance:  $L_i = 400 \mu\text{H}$
  - Effective inner capacitance:  $C_i = 6 \text{ nF}$

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

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

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

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

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

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

According to "control drawing":  
A5E02189134N

$U_m = 45 \text{ V}$

According to "control drawing":  
A5E02189134N

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



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 measuring 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

Pressure 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)**

7MF54 - 0

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

### Enclosure

Die-cast aluminum, dual chamber enclosure

### Thread for cable gland<sup>1)</sup>

M20x1.5

Die-cast aluminum, dual chamber enclosure

½-14 NPT

Stainless steel precision casting, dual chamber enclosure

M20x1.5

Stainless steel precision casting, dual chamber enclosure

½-14 NPT

### Output

4 ... 20 mA, HART

### Measuring cell filling

Silicone oil

### Measuring cell cleaning

normal

### Measuring span

1.00 ... 50 mbar (0.4 ... 20 inH<sub>2</sub>O)1.25 ... 250 mbar (0.5 ... 100.4 inH<sub>2</sub>O)6.25 ... 1250 mbar (2.5 ... 502 inH<sub>2</sub>O)31.25 ... 6250 mbar (12.54 ... 2509 inH<sub>2</sub>O)

0.16 ... 32 bar (2.33 ... 465 psi)

### Wetted parts materials

Seal diaphragm

Process flange

Stainless steel 1.4404/316L

Stainless steel 1.4404/316L

Hastelloy C276<sup>2)</sup>

Stainless steel 1.4404/316L

Monel 400<sup>2)</sup>

Stainless steel 1.4404/316L

Hastelloy

Hastelloy

### Process connection

Female thread ¼-18 NPT

#### • Sealing screw opposite process connection

- Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518
- Mounting thread M10 to DIN 19213

#### • Vent on side of process flange<sup>3)</sup>

- Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518
- Mounting thread M10 to DIN 19213

<sup>1)</sup> Cable glands must be ordered separately from "Further designs" (add "-Z" to Article No. and specify order code).

<sup>2)</sup> Not together with Measuring span "C".

<sup>3)</sup> Not in conjunction with remote seals (option V00).

	0	
	1	
	2	
	3	
	3	
	1	
		C
		D
		E
		F
		G
		A
		B
		C
		R
	0	
	1	
	4	
	5	

Selection and Ordering data	Order code	Selection and Ordering data	Order code
<b>Further designs</b> Add "-Z" to Article No. and specify Order code.		<b>Further designs</b> Add "-Z" to Article No. and specify Order code.	
<b>Attachments</b>		<b>Degree of protection approvals: Ex ia/ib (intrinsic safety)</b>	
Mounting bracket made of steel	<b>A01</b>	Ex ia/ib protection (ATEX) (T4)	<b>E00</b>
Mounting bracket made of stainless steel 304	<b>A02</b>	Ex IS protection (FM) (T4)	<b>E01</b>
Mounting bracket made of stainless steel 316L	<b>A03</b>	Ex IS protection (cCSA <sub>US</sub> ) (T4)	<b>E02</b>
<b>Display</b> (Standard: no display, cover closed)		Ex ia/ib protection (NEPSI) (T4)	<b>E06</b>
With display and blanking cover	<b>A10</b>	<b>Degree of protection approvals: Ex d (flameproof)</b>	
With display and glass cover	<b>A11</b>	Ex d explosion-proof (ATEX)(T4/T6)	<b>E20</b>
<b>Special enclosure / cover version</b>		Ex XP explosion-proof and DIP (FM)(T4/T6)	<b>E21</b>
Two coats of lacquer on enclosure, cover (PU on epoxy)	<b>A20</b>	Ex XP explosion-proof and DIP (cCSA <sub>US</sub> )(T4/T6)	<b>E22</b>
<b>Electrical connection and cable entry</b> (Standard: no cable gland, only dust protection caps)		Ex d explosion-proof (NEPSI)(T4/T6)	<b>E26</b>
Cable gland made of plastic (IP66/68) <sup>4)</sup>	<b>A50</b>	<b>Degree of protection approvals: n/NI</b>	
Cable glands made of metal (IP66/68)	<b>A51</b>	Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	<b>E40</b>
Cable glands made of stainless steel (IP66/68)	<b>A52</b>	Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	<b>E41</b>
Device plug M12 without cable socket (IP66/67) <sup>4)</sup>	<b>A60</b>	Zone 2 (nA, nL), Div2 NI (cCSA <sub>US</sub> ) (T4/T6)	<b>E42</b>
Device plug M12 complete with cable socket (IP66/67) <sup>4)</sup>	<b>A61</b>	Zone 2 (nA, nL) (NEPSI) (T4/T6)	<b>E46</b>
Device plug Han 7D, plastic, straight (with cable socket) (IP65) <sup>4)</sup>	<b>A71</b>	<b>Degree of protection approvals: Dust Zone 20/21/22</b>	
Device plug Han 7D, plastic, angled (with cable socket) (IP65) <sup>4)</sup>	<b>A72</b>	Use in Zone 21/22 (Ex tD) (ATEX) Ex tb	<b>E60</b>
Device plug Han 7D, metal enclosure, straight (with cable socket) (IP65) <sup>4)</sup>	<b>A73</b>	Use in Zone 20/21/22 (Ex iaD) (ATEX) Ex ta	<b>E61</b>
Device plug Han 7D, metal enclosure, angled (with cable socket) (IP65) <sup>4)</sup>	<b>A74</b>	Use in Zone 21/22 (Ex DIP) (NEPSI)	<b>E66</b>
Device plug Han 8D, plastic, straight (with cable socket) (IP65) <sup>4)7)</sup>	<b>A75</b>	<b>Degree of protection approvals: Combinations</b>	
Device plug Han 8D, plastic, angled (with cable socket) (IP65) <sup>4)7)</sup>	<b>A76</b>	IS protection and XP and DIP (FM)	<b>E71</b>
Device plug Han 8D, metal enclosure, straight (with cable socket) (IP65) <sup>4)7)</sup>	<b>A77</b>	IS protection and XP and DIP (cCSA <sub>US</sub> )	<b>E72</b>
Device plug Han 8D, metal enclosure, angled (with cable socket) (IP65) <sup>4)7)</sup>	<b>A78</b>	IS protection and XP and DIP (FM/cCSA <sub>US</sub> )	<b>E73</b>
PG 13.5 adapters <sup>4)</sup>	<b>A82</b>	<b>Supplementary approvals/degree of protection</b>	
<b>Language for labels, quick-start guide, menu language default<sup>9)</sup></b> (instead of English as standard)		Ex-protection Ex ia according to EAC Ex (Russia)	<b>E80</b>
German	<b>B10</b>	Ex-protection Ex d according to EAC Ex (Russia)	<b>E81</b>
French	<b>B12</b>	Dual Seal approval <sup>5)</sup>	<b>E85</b>
Spanish	<b>B13</b>	Export approval Korea	<b>E86</b>
Italian	<b>B14</b>	<b>Special process connection versions (diff. pressure)</b>	
Chinese	<b>B15</b>	Side vents for gas measurements <sup>9)</sup>	<b>L32</b>
Russian	<b>B16</b>	Swap process connection: high-pressure side at front	<b>L33</b>
Japanese	<b>B17</b>	<b>Mosquito protection</b>	
English with units psi/inH <sub>2</sub> O/°F	<b>B21</b>	4 pcs. for ¼-18 NPT thread	<b>L36</b>
<b>Special version: Supplementary menu languages</b> (Standard: English, German, French, Spanish, Italian)		<b>Process flanges, O-rings, special material</b> <b>Standard: Viton (FKM) (FPM)</b>	
Asia language package (in addition: Chinese, Japanese, Russian)	<b>B80</b>	Process connection sealing rings made of FFPM (Kalrez) <sup>10)</sup>	<b>L62</b>
<b>Certificates</b> (available online for downloading) <sup>1)</sup>		Process connection sealing rings made of NBR	<b>L63</b>
Quality test certificate, 5-point factory calibration (IEC 60770-2) <sup>2)</sup>	<b>C11</b>	Process connection sealing rings made of graphite	<b>L64</b>
Inspection certificate according to EN 10204-3.1 <sup>3)</sup>	<b>C12</b>	<b>Drain/Vent valve (1 set = 2 units)</b>	
Inspection certificate (EN 10204-3.1); PMI test of parts in contact with medium	<b>C15</b>	2 ventilation valves ¼- 18 NPT, in material of process flanges)	<b>L80</b>
<b>Functional Safety (SIL2)</b> Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	<b>C20</b>	<b>Remote seals</b>	
		Transmitters with connection of remote seal <sup>6)</sup> (For premounted valve manifolds see page 1/321)	<b>V00</b>

<sup>1)</sup> Enclosed in print or as DVD: see page 1/319.

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

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

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

<sup>5)</sup> Only in conjunction with FM and/or cCSA<sub>US</sub>

<sup>6)</sup> Please select a remote seal separately. Also refer to the information under footnote 2). Remote seals see page 1/401.

<sup>7)</sup> The device plug Han 8D is identical with the former Han 8U version.

<sup>8)</sup> For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

<sup>9)</sup> Only in conjunction with process connection "Vent on side".

<sup>10)</sup> Not together with measuring span "G".

# Pressure Measurement

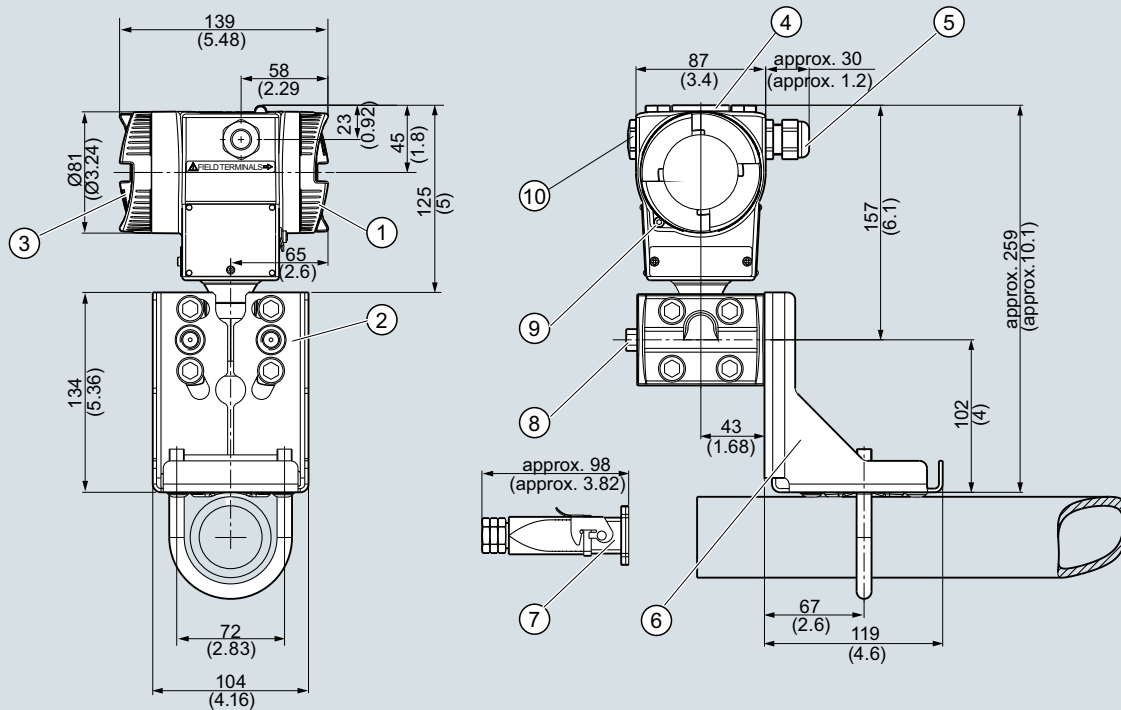
Pressure transmitters  
for applications with highest requirements (Premium)  
SITRANS P500

for differential pressure and flow

1

Selection and Ordering data	Order code
<b>Additional data</b>	
Please add <b>"-Z"</b> to Article No. and specify Order code(s) and plain text.	
<b>Measuring range to be set</b>	
Specify in plain text:	
• In the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	<b>Y01</b>
• In the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	<b>Y02</b>
<b>Measuring point number and measuring point identifier (only standard ASCII character set)</b>	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15: .....	<b>Y15</b>
Measuring point text (max. 27 char.) Y16: .....	<b>Y16</b>
Entry of HART address (TAG), max. 32 characters Y17: .....	<b>Y17</b>
<b>Setting of pressure indication in pressure units</b>	
<b>Y21</b>	
Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ...	
Note: The following pressure units are selectable: bar, mbar, mm H <sub>2</sub> O*, in H <sub>2</sub> O*, ftH <sub>2</sub> O*, mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM, % or mA	
*) Reference temperature 20 °C	
<b>Setting of pressure indication in non-pressure units<sup>1)</sup></b>	
<b>Y22 + Y01 or Y02</b>	
Specify in plain text: Y22: ... up to ... l/min, m <sup>3</sup> /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	
<b>Customer-specific settings</b>	
<b>Y30</b>	
Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	

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

**Dimensional drawings**

- ① Connection side<sup>1)</sup>
- ② Process connection: ¼-18 NPT (IEC 61518)
- ③ Electronics side, local display<sup>1)</sup>
- ④ Cover over buttons
- ⑤ Electrical connection:
  - M20 x 1,5 or ½-14 NPT screw gland
  - Han 7D/Han 8D<sup>2)</sup> or M12<sup>3)</sup> device plug
- ⑥ Mounting bracket (optional)
- ⑦ Electrical connection:
  - Han 7D/Han 8D device plug<sup>2)</sup><sup>3)</sup>
- ⑧ Process connection, with valve (optional) or screwed joint (optional)
- ⑨ Screw lid - safety bracket
- ⑩ Screw-type blank cap

<sup>1)</sup> In addition, allow approx. 20 mm (0.79 inch) for the thread length

<sup>2)</sup> Not with "flameproof enclosure" type of protection

<sup>3)</sup> Not with type of protection "FM + CSA" [is + XP]"

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

# Pressure Measurement

Pressure transmitters  
for applications with highest requirements (Premium)  
SITRANS P500

for level

1

## Technical specifications

Input		Output						
Measured variable	Level	Output current signal	4 ... 20 mA					
Measuring span (infinitely adjustable)	<table border="1"> <thead> <tr> <th>Measuring span (min. ... max.)</th> <th>Maximum operating pressure</th> </tr> </thead> <tbody> <tr> <td>1.25 ... 250 mbar (0.5 ... 100 inH<sub>2</sub>O)</td> <td rowspan="3">See "Mounting flange"</td> </tr> <tr> <td>6.25 ... 1250 mbar (2.5 ... 500 inH<sub>2</sub>O)</td> </tr> <tr> <td>31.25 ... 6250 mbar (12.54 ... 2509 inH<sub>2</sub>O)</td> </tr> </tbody> </table>	Measuring span (min. ... max.)	Maximum operating pressure	1.25 ... 250 mbar (0.5 ... 100 inH <sub>2</sub> O)	See "Mounting flange"	6.25 ... 1250 mbar (2.5 ... 500 inH <sub>2</sub> O)	31.25 ... 6250 mbar (12.54 ... 2509 inH <sub>2</sub> O)	<ul style="list-style-type: none"> <li>Lower current limit (freely adjustable) 3.55 mA, factory setting 3.8 mA</li> <li>Upper current limit (freely adjustable) 23 mA, factory setting 20.5 mA</li> <li>Ripple (without HART communication) <math>I_{pp} \leq 0.4</math> of max. output current</li> <li>adjustable damping 0... 100 s in steps of 0.1 s, factory setting 2 s</li> <li>current transmitter 3.55 ... 23 mA</li> <li>Failure signal Adjustable within limits:           <ul style="list-style-type: none"> <li>Lower: 3.55 ... 3.7 mA (factory setting 3.6 mA)</li> <li>Upper: 21.0 ... 23 mA (factory setting 22.8 mA)</li> </ul> </li> </ul>
Measuring span (min. ... max.)	Maximum operating pressure							
1.25 ... 250 mbar (0.5 ... 100 inH <sub>2</sub> O)	See "Mounting flange"							
6.25 ... 1250 mbar (2.5 ... 500 inH <sub>2</sub> O)								
31.25 ... 6250 mbar (12.54 ... 2509 inH <sub>2</sub> O)								
Lower range limit	-100 % of max. measuring span or 500 mbar a (7.25 psi a) vacuum resistance Also available as vacuum-resistant remote seal: 30 mbar a (0.44 psi a)	Load	<ul style="list-style-type: none"> <li>Without HART communication <math>R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}</math> in <math>\Omega</math>, <math>U_H</math>: Power supply in V</li> <li>With HART communication           <ul style="list-style-type: none"> <li>- HART Communicator <math>R_B = 230 \dots 1100 \Omega</math></li> <li>- HART modem <math>R_B = 230 \dots 500 \Omega</math></li> </ul> </li> </ul>					
Upper range limit	100% of max. measuring span	Characteristic curve	Linearly rising or linearly falling and user-specific					
Lower range value	Between measuring limits (freely adjustable)							
Measuring accuracy								
Reference conditions (in accordance with IEC 60770-1)	<ul style="list-style-type: none"> <li>Rising characteristic curve</li> <li>Lower range value 0 bar</li> <li>Stainless steel seal diaphragm</li> <li>Measuring cell with silicone oil filling</li> <li>Room temperature (25 °C (77 °F))</li> </ul>							
All error information always refers to the set measuring span.								
Error in measurement at limit setting incl. hysteresis and reproducibility								
r: measuring span ratio (r = max. measuring span / set measuring span)								
Linear characteristic	<table border="1"> <thead> <tr> <th><math>r \leq 10</math></th> <th><math>r \geq 10</math></th> </tr> </thead> <tbody> <tr> <td><math>\leq 0.03 \%</math></td> <td><math>\leq (0.003 \cdot r) \%</math></td> </tr> </tbody> </table>	$r \leq 10$	$r \geq 10$	$\leq 0.03 \%$	$\leq (0.003 \cdot r) \%$			
$r \leq 10$	$r \geq 10$							
$\leq 0.03 \%$	$\leq (0.003 \cdot r) \%$							
<ul style="list-style-type: none"> <li>250 mbar (100 inH<sub>2</sub>O)</li> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> </ul>								
Long-term stability	<ul style="list-style-type: none"> <li><math>\leq (0.05 \cdot r) \%</math> per 5 years</li> <li><math>\leq (0.08 \cdot r) \%</math> per 10 years</li> </ul>							
Influence of ambient temperature per 28 °C (50 °F) <sup>1)</sup>	<ul style="list-style-type: none"> <li>250 mbar (100 inH<sub>2</sub>O) <math>\leq (0.025 \cdot r + 0.014) \%</math></li> <li>1250 mbar (502 inH<sub>2</sub>O) 6250 mbar (2509 inH<sub>2</sub>O) <math>\leq (0.006 \cdot r + 0.03) \%</math></li> </ul>							
Influence of static pressure	<ul style="list-style-type: none"> <li>At the lower range value (PKN)<sup>1) 2)</sup> <ul style="list-style-type: none"> <li>- 250 mbar (100 inH<sub>2</sub>O) <math>\leq (0.035 \cdot r) \%</math> je 70 bar (1015 psi) correction via zero point correction</li> <li>- 1250 mbar (502 inH<sub>2</sub>O) 6250 mbar (2509 inH<sub>2</sub>O) <math>\leq (0.007 \cdot r) \%</math> je 70 bar (1015 psi) correction via zero point correction</li> </ul> </li> <li>On the measuring span (PKS)<sup>1)</sup> <ul style="list-style-type: none"> <li>- 250 mbar (100 inH<sub>2</sub>O) 1250 mbar (502 inH<sub>2</sub>O) <math>\leq 0.03 \%</math> je 70 bar (1015 psi)</li> <li>- 6250 mbar (2509 inH<sub>2</sub>O) <math>\leq 0.09 \%</math> je 70 bar (1015 psi)</li> </ul> </li> </ul>							
Influence of power supply	$\leq 0.005 \%$ /1 V							
Operating conditions								
Mounting position	Defined by flange							
Ambient conditions	<ul style="list-style-type: none"> <li>Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)           <ul style="list-style-type: none"> <li>- total device -40 ... +85 °C (-40 ... +185 °F)</li> <li>- Readable display -20 ... +85 °C (-4 ... +185 °F)</li> <li>- Storage temperature -50 ... +90 °C (-58 ... +194 °F)</li> </ul> </li> </ul>							
Climatic class	<ul style="list-style-type: none"> <li>Condensation Relative humidity 0 ... 100 % (condensation permissible)</li> </ul>							
Degree of protection to IEC 60529	IP66/IP68 and NEMA 4X (with corresponding cable gland)							
Electromagnetic Compatibility	<ul style="list-style-type: none"> <li>Emitted interference and interference immunity Acc. to IEC 61326 and NAMUR NE 21</li> </ul>							
Permissible pressures	According to 2014/68/EU pressure equipment directive							
Medium temperature of high-pressure side	<ul style="list-style-type: none"> <li>Measuring cell with silicone oil filling           <ul style="list-style-type: none"> <li>- <math>p_{abs} \geq 1 \text{ bar}</math> -40 ... +175<sup>3)</sup> °C (-40 ... +347<sup>3)</sup> °F)</li> <li>- <math>p_{abs} &lt; 1 \text{ bar}</math> -40 ... +80 °C (-40 ... +176 °F)</li> </ul> </li> </ul>							
Design								
Weight	<ul style="list-style-type: none"> <li>To EN (pressure transmitter with mounting flange, without tube) approx. 9.8 ... 11.8 kg (21.6 ... 26.0 lb)</li> <li>To ASME (pressure transmitter with mounting flange, without tube) approx. 9.8 ... 16.8 kg (21.6 ... 37.0 lb)</li> </ul>							

Material of wetted parts at the high-pressure side		<b>Auxiliary power supply</b>	
• 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"> <li>• DC 10.6 ... 44 V</li> <li>• With intrinsically-safe operation DC 10.6 ... 30 V</li> </ul>
• Sealing surface	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	<b>Certificates and approvals</b>	
• Sealing material in the process connection		Classification according to PED 2014/68/EU	
- O-Ring	<ul style="list-style-type: none"> <li>• Standard: Viton (FKM (FPM))</li> <li>• Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FFPM (Kalrez), Graphite</li> </ul>	• PN 160 (MAWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, 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"> <li>• Standard: Viton (FKM (FPM))</li> <li>• Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FFPM (Kalrez), Graphite</li> </ul>	- 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:	$L_i = 400 \mu\text{H}$
Die-cast aluminum enclosure	<ul style="list-style-type: none"> <li>• Low copper die-cast aluminum AC-AISI12 (Fe) or AC-AISI 10 Mg (Fe) to DIN EN 1706</li> <li>• Lacquer on polyurethane base, optional epoxy-based primer</li> <li>• Stainless steel serial plate</li> </ul>	- Effective inner capacitance:	$C_i = 6 \text{ nF}$
Stainless steel precision cast enclosure	Stainless steel, mat. no. 1.4404/316L	• Explosion-proof "d"	BVS 09 ATEX E 027
Process connection screws	Stainless steel	- Marking	Ex II 1/2 G Ex db ia IIC T4/T6 Ga/Gb
Measuring cell filling	Silicone oil	- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) -40 ... +60 °C (-40 ... +140 °F) temperature class T6
• Liquid mounting flange	Silicone oil or other material	- Connection	To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
Process connection		• Dust explosion protection for zone 20	BVS 09 ATEX E 027
• High-pressure side	Flange to EN and ASME	- Marking	Ex II 1 D Ex ta ia IIC T120°C Da
• 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/DIN EN 61518	- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Electrical connection	<ul style="list-style-type: none"> <li>• Screw terminals</li> <li>• Cable entry via the following screwed glands: <ul style="list-style-type: none"> <li>- M20 x 1.5</li> <li>- ½-14 NPT</li> <li>- Device plug Han 7D/Han 8D</li> <li>- Device plug M12</li> </ul> </li> </ul>	- Max. surface temperature	120 °C (248 °F)
Displays and controls		- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$ , $I_i = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ , $R_i = 300 \Omega$
Push buttons	3; for operation directly on the device	- Effective internal inductance:	$L_i = 400 \mu\text{H}$
Display	<ul style="list-style-type: none"> <li>• With or without integrated display</li> <li>• Cover with or without window</li> </ul>	- 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 tb ia IIIC T120°C Db
		- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$ ; $P_{\text{max}} = 1.2 \text{ W}$
		• Type of protection "n" (zone 2)	PTB 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

Pressure transmitters  
for applications with highest requirements (Premium)  
SITRANS P500

## for level

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### Explosion protection for USA (to FM)

Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEx ib 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)
- Entity parameters	According to "control drawing": A5E02189134N $U_m = 30 \text{ V}$ , $I_m = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ , $L_i = 400 \text{ } \mu\text{H}$ , $C_i = 6 \text{ nF}$
• Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)
- (NI/S) parameters	According to "control drawing": A5E02189134N $U_m = 45 \text{ V}$ , $L_i = 400 \text{ } \mu\text{H}$ , $C_i = 6 \text{ nF}$

### Explosion protection for Canada

(to $c_{CSA_{US}}$ )	
Certificate of Compliance	No. 2280963
• Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$
• Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F)
- Entity parameters	$U_i = 30 \text{ V}$ , $I_i = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ , $R_i = 300 \text{ } \Omega$ , $L_i = 400 \text{ } \mu\text{H}$ , $C_i = 6 \text{ nF}$
• Marking (NI/n)	CL I, DIV2, GP ABCD T4/T6 CL II, III, DIV2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ °C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)
- NI/nA parameters	According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$
- nL parameters	According to "control drawing": A5E02189134N, $U_i = 45 \text{ V}$ , $I_i = 100 \text{ mA}$ , $L_i = 400 \text{ } \mu\text{H}$ , $C_i = 6 \text{ nF}$

### Explosion protection for China (acc. to NEPSI)

• Intrinsic safety "i"	GYJ111111X Ex ia/ib IIB/IIC T4 40 ... +85 °C (-40 ... +185 °F)
- Marking	
- Permissible ambient temperature	
- 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) 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	$R_B = 230 \dots 1100 \text{ } \Omega$
• HART modem	$R_B = 230 \dots 500 \text{ } \Omega$
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



Selection and Ordering data		Article No.	Order code
<b>Pressure transmitters for level, SITRANS P500 HART</b>		7MF56	- - - - - 0 - - - - -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
<b>Enclosure</b>	<b>Thread for cable gland<sup>9)</sup></b>		
Die-cast aluminum, dual chamber enclosure	M20x1.5	0	
Die-cast aluminum, dual chamber enclosure	½-14 NPT	1	
Stainless steel precision casting, dual chamber enclosure	M20x1.5	2	
Stainless steel precision casting, dual chamber enclosure	½-14 NPT	3	
<b>Output</b>		3	
4 ... 20 mA, HART			
<b>Measuring cell filling</b>	<b>Measuring cell cleaning</b>		
Silicone oil	normal	1	
<b>Measuring span (min. ... max.)</b>			
1.25 ... 250 mbar	(0.5 ... 100 inH <sub>2</sub> O)		D
6.25 ... 1250 mbar	(2.5 ... 500 inH <sub>2</sub> O)		E
31.25 ... 6250 mbar	(12.54 ... 2509 inH <sub>2</sub> O)		F
<b>Wetted parts of the low-pressure side</b>			
(stainless steel process flanges)			
<b>Seal diaphragm</b>	<b>Process connection</b>		
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
<b>Process connection of low-pressure side</b>			
Female thread ¼-18 NPT			
• Sealing screw opposite process connection			
- Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518			0
- Mounting thread M10 to DIN 19213			1
• Vent on side of process flange			
- Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518			4
- Mounting thread M10 to DIN 19213			5
<b>Wetted parts materials (high-pressure side)</b>			
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
Add Order code and plain text:			
Material: ... ; Extension length: ...			N 1 Y
<b>Process connection on high-pressure side: Extension length</b>			
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"			
<b>Process connection on high-pressure side: Nominal diameter/Nominal pressure</b>			
DN 50, PN 40 <sup>6)</sup>			B
DN 80, PN 40			D
DN 100, PN 16			G
DN 100, PN 40			H
2", class 150 <sup>6)</sup>			L
2", class 300 <sup>6)</sup>			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

Pressure transmitters  
for applications with highest requirements (Premium)  
SITRANS P500

for level

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Selection and Ordering data	Article No.	Order code
<b>Pressure transmitters for level, SITRANS P500 HART</b>	7MF56 - - 0 - - - - -	
<b>Process connection on high-pressure side: Filling liquid</b>		
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 R 1 Y
Order code and plain text:		
Filling liquid: ...		

Selection and Ordering data	Order code	Selection and Ordering data	Order code
<b>Further designs</b> Add "-Z" to Article No. and specify Order code.		<b>Further designs</b> Add "-Z" to Article No. and specify Order code.	
<b>Display</b> (Standard: no display, cover closed)		<b>Degree of protection approvals: Ex d (flameproof)</b>	
With display and blanking cover	<b>A10</b>	Ex d explosion-proof (ATEX)(T4/T6)	<b>E20</b>
With display and glass cover	<b>A11</b>	Ex XP explosion-proof and DIP (FM)(T4/T6)	<b>E21</b>
<b>Special version: cover/enclosure</b>		Ex XP explosion-proof and DIP (cCSA <sub>US</sub> )(T4/T6)	<b>E22</b>
Two coats of lacquer on enclosure, cover (PU on epoxy)	<b>A20</b>	Ex d explosion-proof (NEPSI)(T4/T6)	<b>E26</b>
<b>Electrical connection and cable entry</b> (Standard: no cable gland, only dust protection caps)		<b>Degree of protection approvals: n/NI</b>	
Cable gland made of plastic (IP66/68) <sup>4)</sup>	<b>A50</b>	Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	<b>E40</b>
Cable glands made of metal (IP66/68)	<b>A51</b>	Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	<b>E41</b>
Cable glands made of stainless steel (IP66/68)	<b>A52</b>	Zone 2 (nA, nL), Div2 NI (cCSA <sub>US</sub> ) (T4/T6)	<b>E42</b>
Device plug M12 without cable socket (IP66/67) <sup>4)</sup>	<b>A60</b>	Zone 2 (nA, nL) (NEPSI) (T4/T6)	<b>E46</b>
Device plug M12, cable socket (IP66/67) <sup>4)</sup>	<b>A61</b>	<b>Degree of protection approvals: Zone 20/21/22</b>	
Device plug Han 7D, plastic, straight (with cable socket) (IP65) <sup>4)</sup>	<b>A71</b>	Use in Zone 21/22 (Ex tD) (ATEX) Ex tb	<b>E60</b>
Device plug Han 7D, plastic, angled (with cable socket) (IP65) <sup>4)</sup>	<b>A72</b>	Use in Zone 20/21/22 (Ex iaD) (ATEX) Ex ta	<b>E61</b>
Device plug Han 7D, metal enclosure, straight (with cable socket) (IP65) <sup>4)</sup>	<b>A73</b>	Use in Zone (Ex DIP) (ATEX) (NEPSI)	<b>E66</b>
Device plug Han 7D, metal enclosure, angled (with cable socket) (IP65) <sup>4)</sup>	<b>A74</b>	<b>Degree of protection approvals: Combinations</b>	
Device plug Han 8D, plastic, straight (with cable socket) (IP65) <sup>4)</sup> <sup>7)</sup>	<b>A75</b>	IS protection and XP and DIP (FM)	<b>E71</b>
Device plug Han 8D, plastic, angled (with cable socket) (IP65) <sup>4)</sup> <sup>7)</sup>	<b>A76</b>	IS protection and XP and DIP (cCSA <sub>US</sub> )	<b>E72</b>
Device plug Han 8D, metal enclosure, straight (with cable socket) (IP65) <sup>4)</sup> <sup>7)</sup>	<b>A77</b>	IS protection and XP and DIP (FM/cCSA <sub>US</sub> )	<b>E73</b>
Device plug Han 8D, metal enclosure, angled (with cable socket) (IP65) <sup>4)</sup> <sup>7)</sup>	<b>A78</b>	<b>Supplementary approvals / degree of protection</b>	
PG 13.5 adapters <sup>4)</sup>	<b>A82</b>	Ex-protection Ex ia according to EAC Ex (Russia)	<b>E80</b>
<b>Language for labels, quick-start guide and menu language default<sup>8)</sup></b> (instead of English as standard)		Ex-protection Ex d according to EAC Ex (Russia)	<b>E81</b>
German	<b>B10</b>	Dual Seal approval <sup>5)</sup>	<b>E85</b>
French	<b>B12</b>	Export approval Korea	<b>E86</b>
Spanish	<b>B13</b>	<b>Special process connection versions (diff. pressure)</b>	
Italian	<b>B14</b>	Swap process connection: high-pressure side at front	<b>L33</b>
Chinese	<b>B15</b>	<b>Mosquito protection</b>	
Russian	<b>B16</b>	4 pcs. for ¼-18 NPT thread	<b>L36</b>
Japanese	<b>B17</b>	<b>Process flanges, O-rings, special material</b>	
English with units: psi/inH <sub>2</sub> O	<b>B21</b>	<b>Standard: Viton (FKM (FPM))</b>	
<b>Special version: Supplementary menu languages</b> (Standard: English, German, French, Spanish, Italian)		Process connection sealing rings made of FFPM (Kalrez)	<b>L62</b>
Asia language package (in addition: Chinese, Japanese, Russian)	<b>B80</b>	Process connection sealing rings made of NBR	<b>L63</b>
<b>Certificates (available online for downloading)<sup>1)</sup></b>		Process connection sealing rings made of graphite	<b>L64</b>
Quality test certificate, 5-point factory calibration (IEC 60770-2) <sup>2)</sup>	<b>C11</b>	<b>Drain/Vent valve (1 set = 2 units)</b>	
Inspection certificate according to EN 10204-3.1 <sup>3)</sup>	<b>C12</b>	2 ventilation valves ¼- 18 NPT, in material of process flange)	<b>L80</b>
Inspection certificate (EN 10204-3.1); PMI test of parts in contact with medium	<b>C15</b>	<b>Vacuum-proof design</b>	
<b>Functional Safety (SIL2)</b> Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	<b>C20</b>	Vacuum service	<b>V04</b>
<b>Degree of protection approvals: Ex ia/ib (intrinsic safety)</b>		Spark arrester	<b>V05</b>
Ex ia/ib protection (ATEX) (T4)	<b>E00</b>	For mounting on zone 0 (including documentation)	
Ex IS protection (FM) (T4)	<b>E01</b>		
Ex IS protection (cCSA <sub>US</sub> ) (T4)	<b>E02</b>		
Ex ia/ib protection (NEPSI) (T4)	<b>E06</b>		

<sup>1)</sup> Enclosed in print or as DVD: see page 1/319.

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

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

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

<sup>5)</sup> Only in conjunction with FM and/or cCSA<sub>US</sub>

<sup>6)</sup> Not recommended for measuring span "D"

<sup>7)</sup> The device plug Han 8D is identical with the former Han 8U versio.

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

<sup>9)</sup> Cable glands must be ordered separately from "Further designs" (add "-Z" to Article No. and specify order code).

# Pressure Measurement

Pressure transmitters  
for applications with highest requirements (Premium)  
SITRANS P500

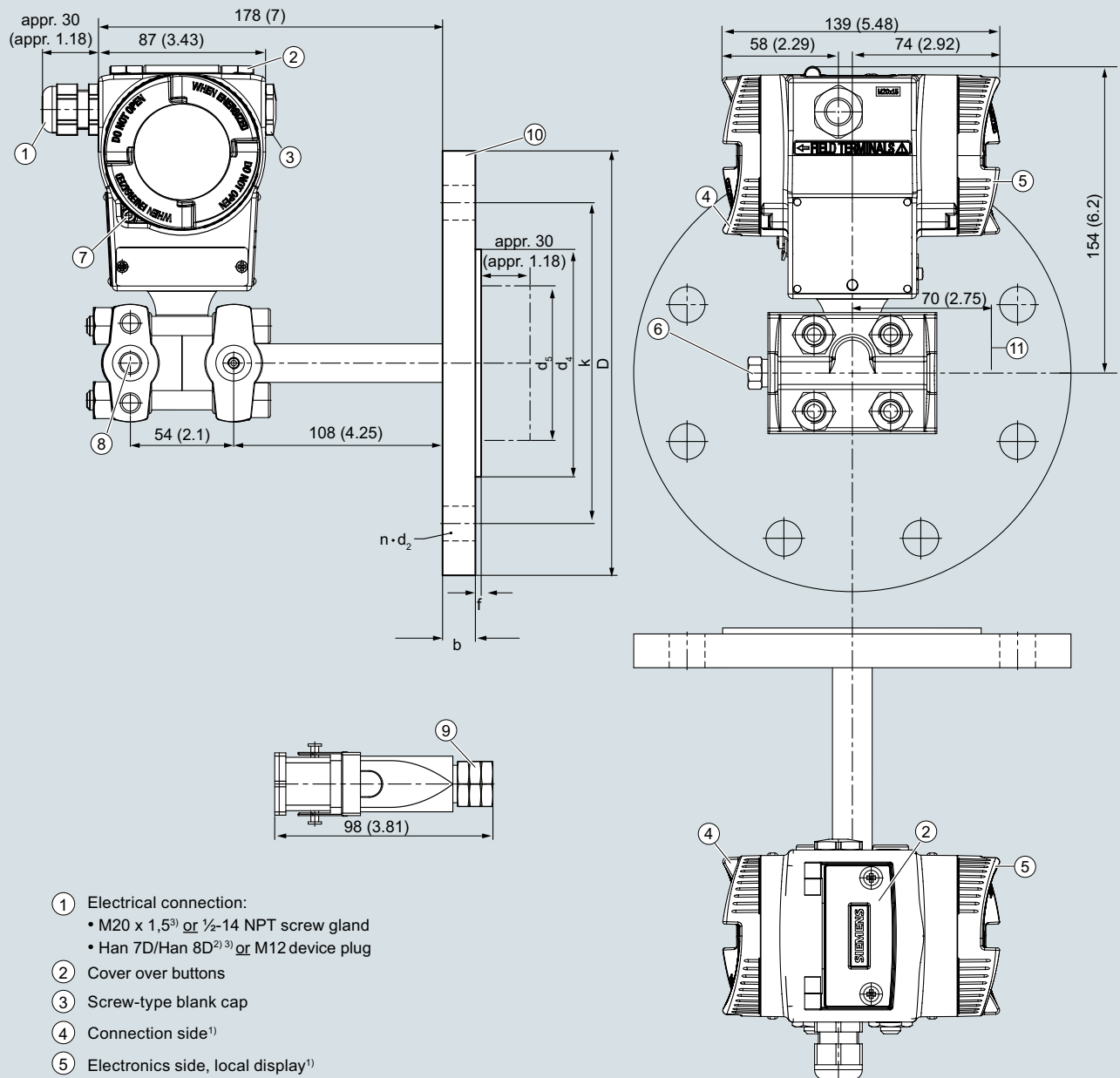
for level

1

Selection and ordering data	Order code
<b>Additional data</b>	
Please add <b>"-Z"</b> to Article No. and specify Order code(s) and plain text.	
<b>Measuring range to be set</b>	
Specify in plain text:	
Linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, kPa, MPa, psi	<b>Y01</b>
<b>Measuring point number and measuring point identifier (only standard ASCII character set)</b>	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15: .....	<b>Y15</b>
Measuring point text (max. 27 char.) Y16: .....	<b>Y16</b>
Entry of HART address (TAG), max. 32 characters Y17: .....	<b>Y17</b>
<b>Setting of pressure indication in pressure units</b>	
<b>Y21</b>	
Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ...	
Note: The following pressure units are selectable: bar, mbar, mm H <sub>2</sub> O <sup>*</sup> , in H <sub>2</sub> O <sup>*</sup> , ftH <sub>2</sub> O <sup>*</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM, % or mA	
*) Reference temperature 20 °C	
<b>Setting of pressure indication in non-pressure units<sup>1)</sup></b>	
<b>Y22 + Y01</b>	
Specify in plain text: Y22: ... up to ... l/min, m <sup>3</sup> /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	
<b>Customer-specific settings</b>	
<b>Y30</b>	
Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	

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

## Dimensional drawings



- ① Electrical connection:
  - M20 x 1,5<sup>3)</sup> or ½-14 NPT screw gland
  - Han 7D/Han 8D<sup>2) 3)</sup> or M12 device plug
- ② Cover over buttons
- ③ Screw-type blank cap
- ④ Connection side<sup>1)</sup>
- ⑤ Electronics side, local display<sup>1)</sup>
- ⑥ Process connection, negative side with valve (optional) or screwed joint (optional)
- ⑦ Screw lid - safety bracket
- ⑧ Process connection: negative side ¼-18 NPT (IEC 61518)
- ⑨ Electrical connection:
  - Han 7D/Han 8D device plug<sup>2) 3)</sup>
- ⑩ Mounting flange as per EN 1092-1 or ASME B16.5
- ⑪ Space for rotation of enclosure

- 1) In addition, allow approx. 20 mm (0.79 inch) for the thread length
- 2) Not with "flameproof enclosure" type of protection
- 3) Not with type of protection "FM + CSA" [is + XP]

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

# Pressure Measurement

Pressure 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 <sub>2</sub> mm	d <sub>4</sub> mm	d <sub>5</sub> mm	d <sub>M</sub> mm	f mm	k mm	n	L mm
DN50	PN 40	20	165	61	18	102	48.3	45 <sup>1)</sup>	2	125	4	0, 50, 100, 150 or 200
DN 80	PN 40	24	200	90	18	138	76	72 <sup>2)</sup>	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 <sub>2</sub> inch (mm)	d <sub>4</sub> inch (mm)	d <sub>5</sub> inch (mm)	d <sub>M</sub> 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) <sup>1)</sup>	0.079 (2.0)	4.75 (120.7)	4	0, 2, 3.94, 5.94 or 7.87
	class 300	0.89 (22.7)	6.49 (165)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45) <sup>1)</sup>	0.079 (2.0)	5.0 (127)	8	
3 inch	class 150	0.96 (24.3)	7.5 (190.5)	0.75 (19.0)	5 (127)	3.0 (76)	2.83 (72) <sup>2)</sup>	0.079 (2.0)	6 (152.4)	4	
	class 300	1.14 (29.0)	8.27 (210)	0.87 (22.2)	5 (127)	3.0 (76)	2.83 (72) <sup>2)</sup>	0.079 (2.0)	6.69 (168.3)	8	
4 inch	class 150	0.96 (24.3)	9.06 (230)	0.75 (19.0)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.5 (190.5)	8	
	class 300	1.27 (32.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.88 (200)	8	

Explanations of tables:

d: Internal diameter of gasket to DIN 2690

d<sub>M</sub>: Effective diaphragm diameter

d<sub>5</sub>: Diameter of extension

f: Milling edge

L: Extension length

<sup>1)</sup> 59 mm = 2.32 inch with tube length L=0.

<sup>2)</sup> 89 mm = 3½ inch with tube length L=0.

## Selection and Ordering data

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

## Selection and Ordering data

	Article No.
<b>Documentation</b> The entire documentation is available for download free-of-charge in various languages at: <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a> Compact operating instructions	
• German, Spanish, French, Italian, Dutch	<b>A5E02344532</b>
• Estonian, Latvian, Lithuanian, Polish, Romanian	<b>A5E02307339</b>
• Bulgarian, Czech, Finnish, Slovakian, Slovenian	<b>A5E02307340</b>
• Danish, Greek, Portuguese, Swedish, Hungarian	<b>A5E02307341</b>
• Russian	<b>A5E02307338</b>
<b>HART modem</b> With USB interface	<b>7MF4997-1DB</b>
<b>Certificates (order only via SAP) additional to internet download</b> • Hard copy (to order) • On DVD (to order)	<b>A5E03252406</b> <b>A5E03252407</b>
For power supply units, see catalog FI01 "Supplementary Components".	

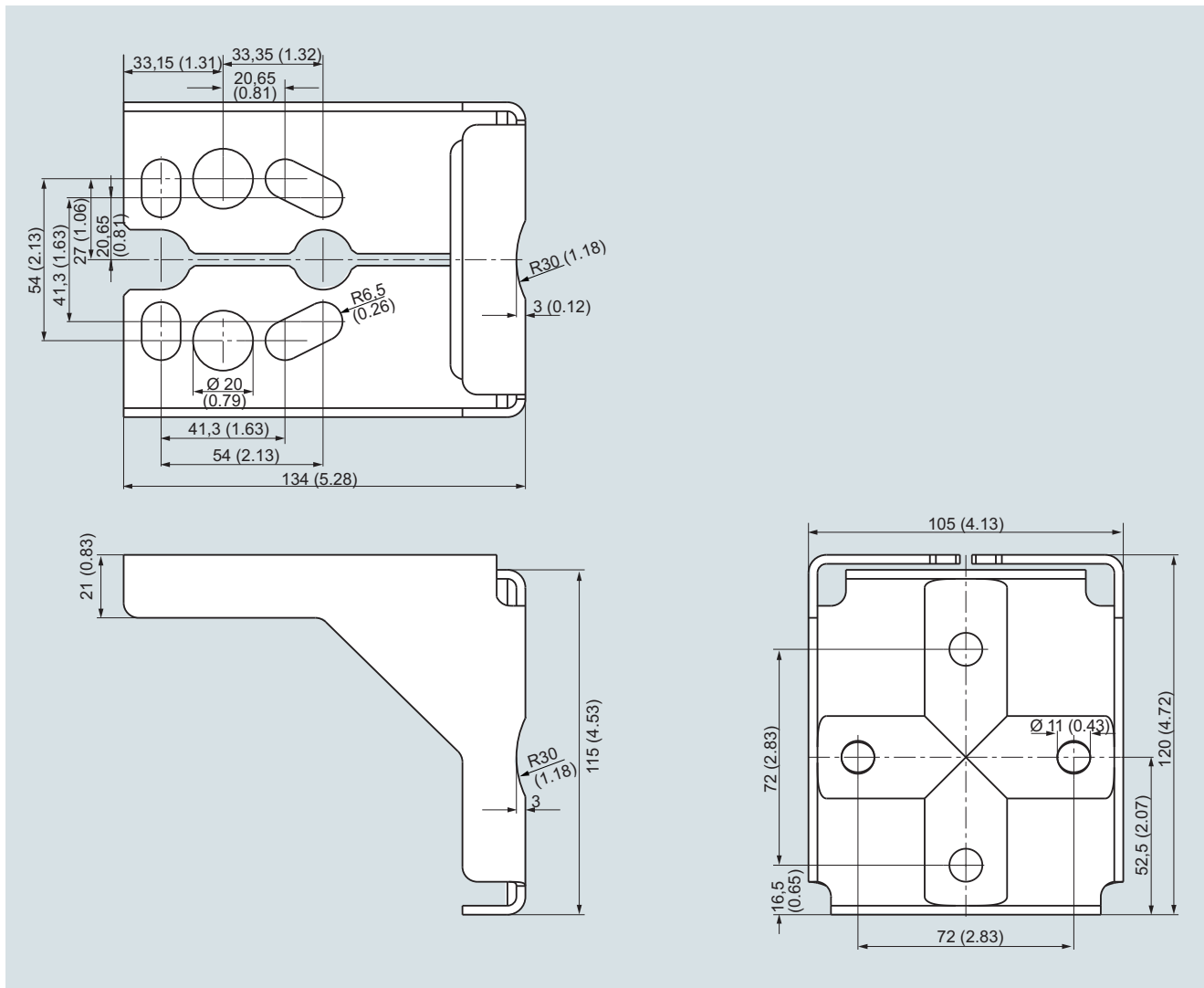
## Pressure Measurement

Pressure 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)



**Overview**

The SITRANS P500 transmitter can be delivered factory-fitted with the following valve 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 valve manifolds are sealed with PTFE gaskets between the transmitter and the valve manifold.


Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (24.11 inH<sub>2</sub>O)) and is certified leak-proof with a factory certificate to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the corresponding 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 inspection certificate 3.1 to EN 10204 after choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitter and for the valve manifold.

**Selection and ordering Data****Valve 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"> <li>• Chromized steel</li> </ul>	<b>U01</b>
	<ul style="list-style-type: none"> <li>• Stainless steel</li> </ul>	<b>U02</b>
	Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2	
	<b>Further designs:</b>	
	Delivery includes mounting bracket and mounting clips made of	
	<ul style="list-style-type: none"> <li>• Steel</li> </ul>	<b>A01</b>
	<ul style="list-style-type: none"> <li>• Stainless steel</li> </ul>	<b>A02</b>
	(instead of the mounting bracket supplied with the transmitter)	
	Inspection certificate according to EN 10204-3.1 supplied for transmitters and mounted valve manifold	<b>C12</b>

**Valve 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"> <li>• Chromized steel</li> </ul>	<b>U03</b>
	<ul style="list-style-type: none"> <li>• Stainless steel</li> </ul>	<b>U04</b>
	Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2	
	<b>Further designs:</b>	
	Delivery includes mounting bracket and mounting clips made of	
	<ul style="list-style-type: none"> <li>• Steel</li> </ul>	<b>A01</b>
	<ul style="list-style-type: none"> <li>• Stainless steel</li> </ul>	<b>A02</b>
	(instead of the mounting bracket supplied with the transmitter)	
	Inspection certificate according to EN 10204-3.1 supplied for transmitters and mounted valve manifold	<b>C12</b>

## Pressure Measurement

Pressure transmitters  
for applications with highest requirements (Premium)  
SITRANS P500

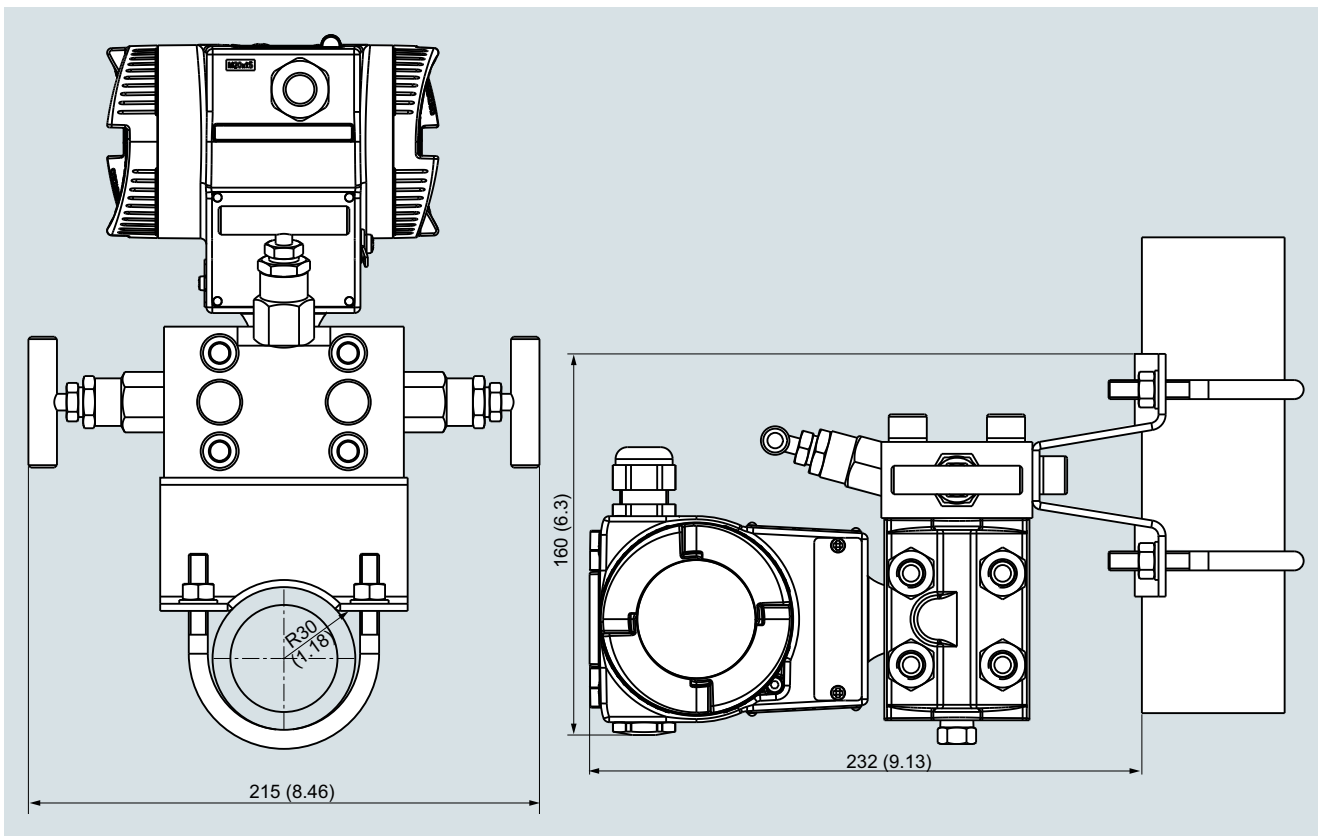
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### Factory-mounting of valve manifolds on transmitters

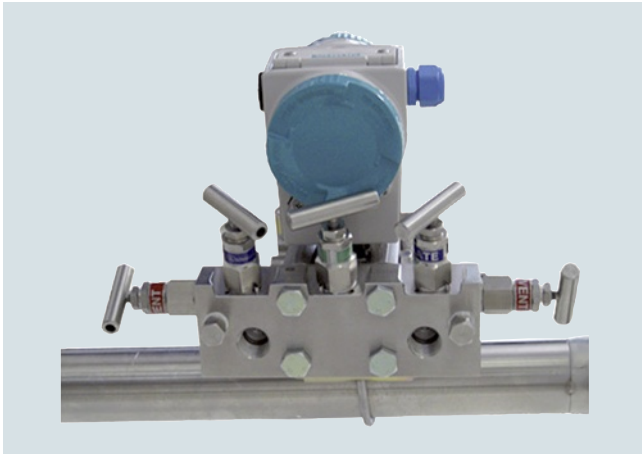
#### Dimensional drawings



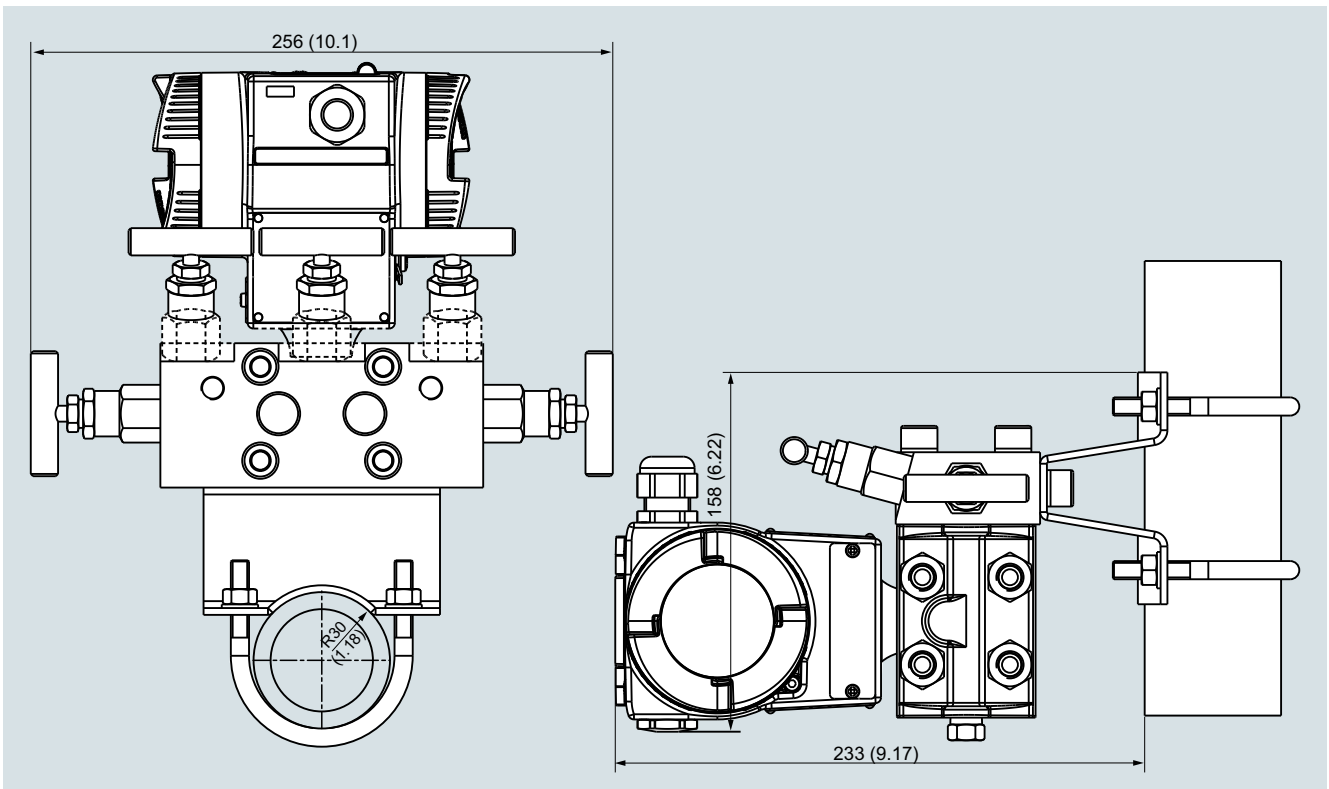
Valve manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



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



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



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