

# SITRANS P measuring instruments for pressure

## Transmitters for gage pressure and absolute pressure

SITRANS P300

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### Overview



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

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

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

### Benefits

- High quality and long life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of high-grade materials (such as stainless steel, Hastelloy)
- Measuring range 8 mbar to 400 bar
- High measuring accuracy
- Parameterization over control keys and HART communication or PROFIBUS PA communication

### Application

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

It can be used for the following measurement types:

- Gage pressure
- Absolute pressure

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

- Level
- Volume
- Mass

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

### Gage pressure

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

The smallest measuring span is 10 mbar g, the largest 400 bar g.

### Level

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

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

### Absolute pressure

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

The smallest measuring span is 8 mbar a, the largest 30 bar a.

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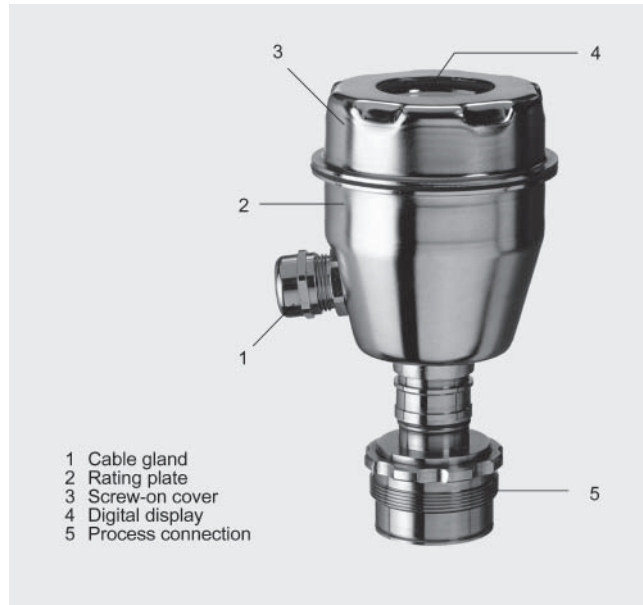
## Transmitters for gage pressure and absolute pressure

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#### Design

The device comprises:

- Electronics
- Housing
- Measuring cell

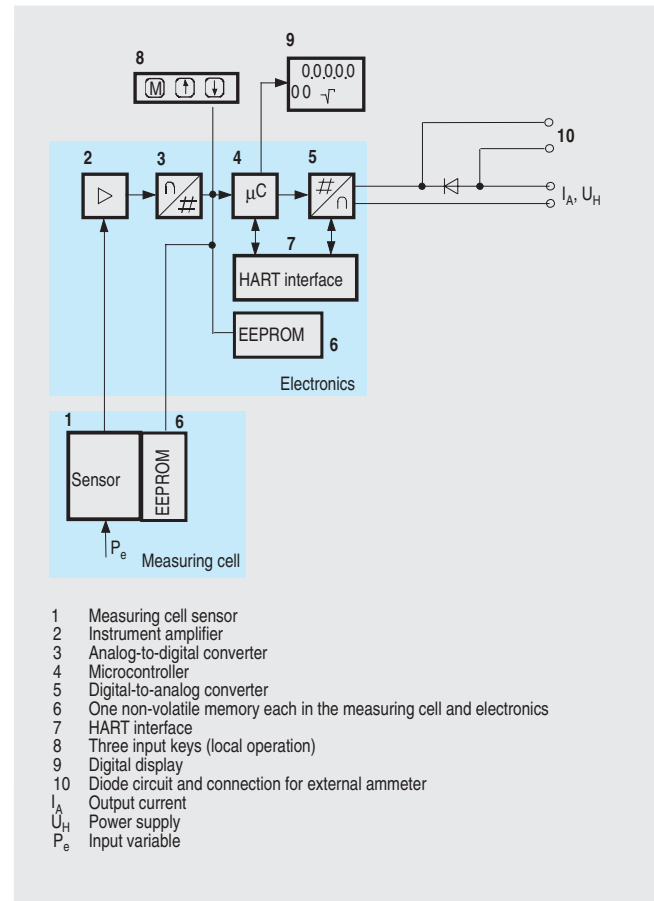


Perspective view of the SITRANS P300

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

#### Function

##### Operation of the electronics with HART communication



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

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

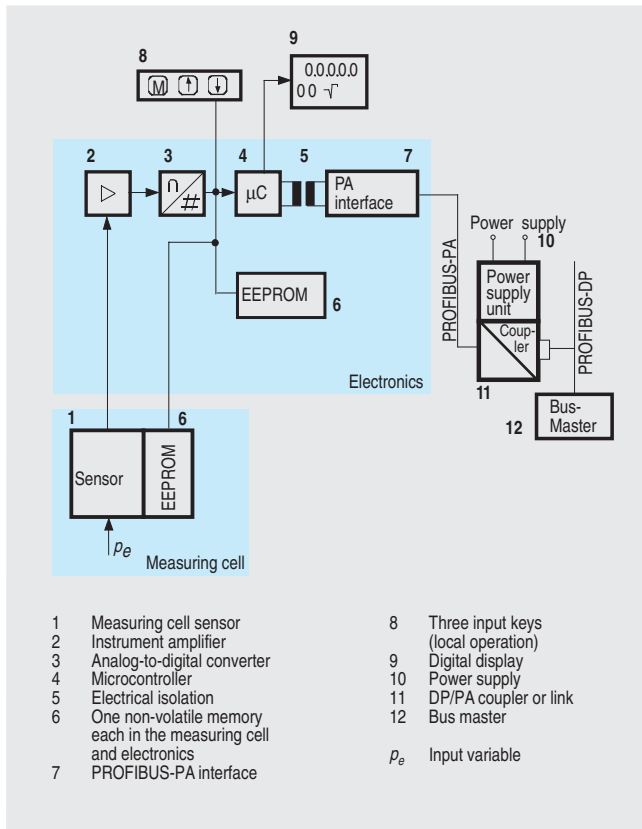
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### Operation of the electronics with PROFIBUS PA communication



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

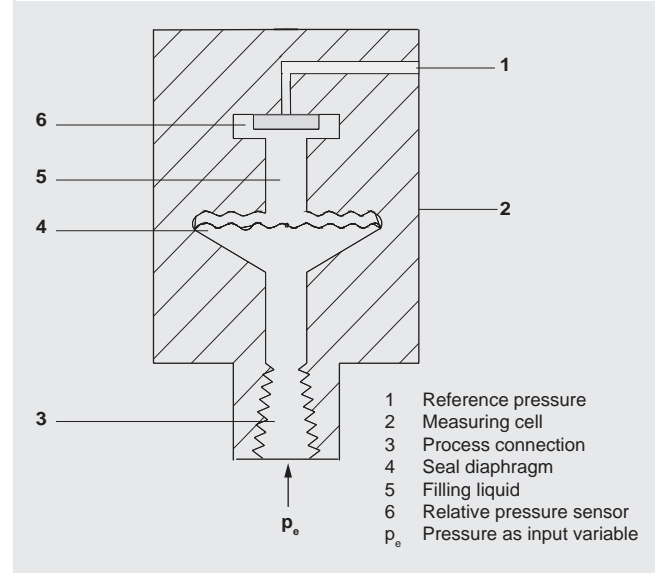
The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a digital display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer over the bus master (12).

### Mode of operation of the measuring cells

The process connections available include the following:

- G $\frac{1}{2}$
- $\frac{1}{2}$ -14 NPT
- Front-flush diaphragm:
  - Flanges to EN
  - Flanges to ASME
  - NuG and pharmaceutical connections

### Measuring cell for gage pressure

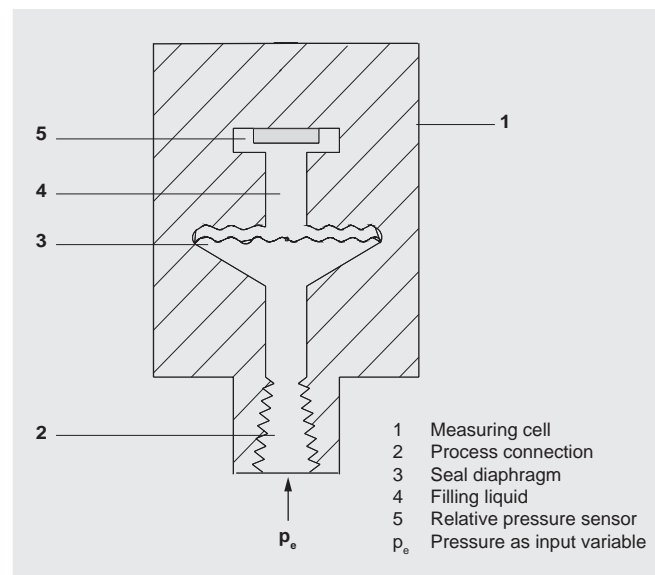


Measuring cell for gage pressure, function chart

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

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

### Measuring cell for absolute pressure



Measuring cell for absolute pressure, function chart

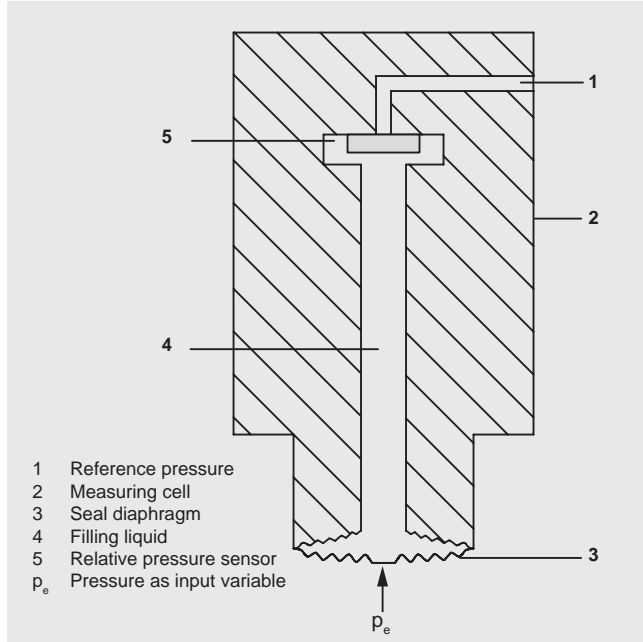
The input pressure ( $p_e$ ) is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change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

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

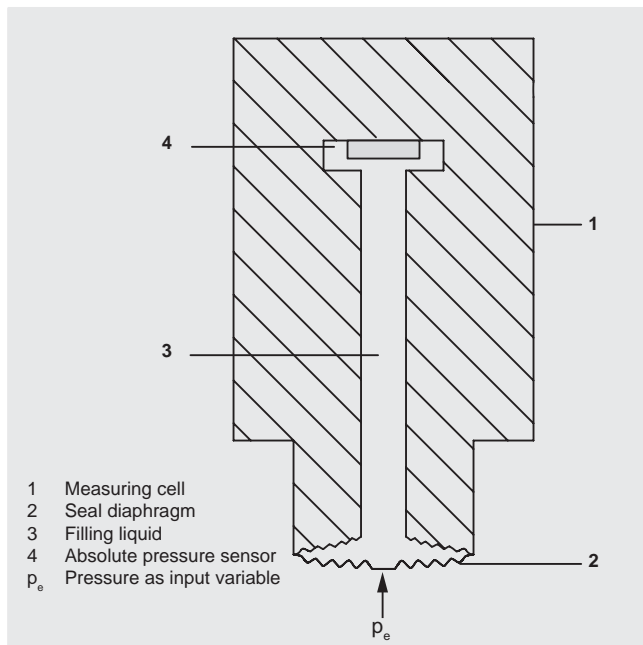


#### Measuring cell for gage pressure, front-flush diaphragm, function chart

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

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

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



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

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

#### Parameterization of SITRANS P300

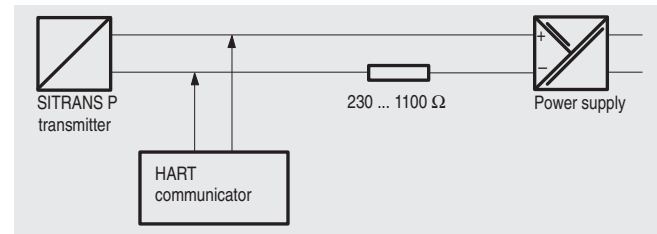
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

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

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

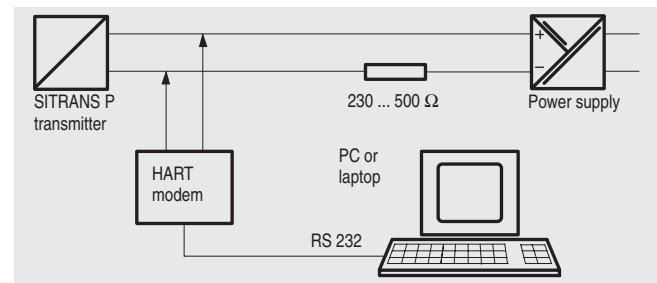
#### Parameterization using HART communication

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



Communication between a HART communicator and a pressure transmitter

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



HART communication between a PC communicator and a pressure transmitter

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

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

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### Adjustable parameters on SITRANS P300 with HART communication

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

1) Cancel apart from write protection

### Diagnostic functions for SITRANS P300 with HART communication

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

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

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> , inH <sub>2</sub> O, inH <sub>2</sub> O (4 °C), mmH <sub>2</sub> O, ftH <sub>2</sub> O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

### Parameterization through PROFIBUS PA interface

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

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

### Adjustable parameters on SITRANS P300 with PROFIBUS PA

Parameters	Input keys	PROFIBUS PA communication
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Key and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostics functions		x

### Diagnostic functions for SITRANS P300 PROFIBUS PA

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

### Physical dimensions available for the display

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

### Hygiene version

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

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#### Technical specifications

#### SITRANS P300 for gage pressure and absolute pressure

	HART		PROFIBUS PA	
<b>Gage pressure input</b>				
Measured variable	Gage pressure (flush-mounted)			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar g (0.15 ... 14.5 psi g)	6 bar g (87 psi g)	1 bar g (14.5 psi g)	6 bar g (87 psi g)
	0.04 ... 4 bar g (0.58 ... 58 psi g)	10 bar g (145 psi g)	4 bar g (58 psi g)	10 bar g (145 psi g)
	0.16 ... 16 bar g (2.3 ... 232 psi g)	32 bar g (464 psi g)	16 bar g (232 psi g)	32 bar g (464 psi g)
	0.6 ... 63 bar g (9.1 ... 914 psi g)	100 bar g (1450 psi g)	63 bar g (914 psi g)	100 bar g (1450 psi g)
	1.6 ... 160 bar g (23.2 ... 2321 psi g)	250 bar g (3626 psi g)	160 bar g (2321 psi g)	250 bar g (3626 psi g)
	4.0 ... 400 bar g (58 ... 5802 psi g)	500 bar g (7252 psi g)	400 bar g (5802 psi g)	500 bar g (7252 psi g)
	Depending on the process connection, the span may differ from these values			
Lower measuring limit	30 mbar a (0.44 psi a)			
• Measuring cell with silicone oil				
Upper measuring limit	100% of max. span		100% of the max. nominal measuring range	
• Measuring cell with silicone oil				
<b>Absolute pressure input</b>				
Measured variable	Absolute pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	8 ... 250 mbar a (0.12 ... 3.6 psi a)	6 bar a (87 psi a)	250 mbar a (3.6 psi a)	6 bar a (87 psi a)
	0.043 ... 1.30 bar a (0.62 ... 19 psi a)	10 bar a (145 psi a)	1.30 bar a (19 psi a)	10 bar a (145 psi a)
	0.16 ... 5 bar a (2.3 ... 73 psi a)	30 bar a (435 psi a)	5 bar a (73 psi a)	30 bar a (435 psi a)
	1 ... 30 bar a (14.5 ... 435 psi a)	100 bar a (1450 psi a)	30 bar a (435 psi a)	100 bar a (1450 psi a)
Lower measuring limit	0 mbar a (0 psi a)			
• Measuring cell with silicone oil				
Upper measuring limit	100% of max. span		100% of the max. nominal measuring range	
• Measuring cell with silicone oil				
<b>Input of gage pressure, with front-flush diaphragm</b>				
Measured variable	Gage pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	8 ... 250 mbar g (0.12 ... 3.6 psi g)	6 bar g (87 psi g)	250 mbar g (3.6 psi g)	6 bar g (87 psi g)
	0.01 ... 1 bar g (0.15 ... 14.5 psi g)	6 bar g (87 psi g)	1 bar g (14.5 psi g)	6 bar g (87 psi g)
	0.04 ... 4 bar g (0.58 ... 58 psi g)	10 bar g (145 psi g)	4 bar g (58 psi g)	10 bar g (145 psi g)
	0.16 ... 16 bar g (2.3 ... 232 psi g)	32 bar g (464 psi g)	16 bar g (232 psi g)	32 bar g (464 psi g)
	0.6 ... 63 bar g (9.1 ... 914 psi g)	100 bar g (1450 psi g)	63 bar g (914 psi g)	100 bar g (1450 psi g)
	Depending on the process connection, the span may differ from these values			



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### SITRANS P300 for gage pressure and absolute pressure

	HART	PROFIBUS PA
Lower measuring limit • Measuring cell with silicone oil	30 mbar a (0.44 psi a)	
Upper measuring limit • Measuring cell with silicone oil	100% of max. span	100% of the max. nominal measuring range
<b>Output</b>		
Output signal	4 ... 20 mA	Digital PROFIBUS PA signal
Physical bus	-	IEC 61158-2
With polarity reversal protection	No	Yes
Electrical damping $T_{63}$ (step width 0.1 s)	Set to 0.1 s (0 ... 100 s)	
<b>Accuracy</b>	To EN 60770-1	
Reference conditions	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, measuring cell with silicone oil, room temperature 25 °C (77 °F), span ratio ( $r = \text{max. span} / \text{set span}$ )	
Measurement deviation with cut-off point setting, including hysteresis and repeatability.		
Linear characteristic curve	Gage pressure	Absolute pressure
• $r \leq 10$	$\leq (0.0029 \cdot r + 0.071)\%$	$\leq 0,1\%$
• $10 < r \leq 30$	$\leq (0.0045 \cdot r + 0.071)\%$	$\leq 0,2\%$
• $30 < r \leq 100$	$\leq (0.005 \cdot r + 0.05)\%$	-
Settling time $T_{63}$ without electrical damping	Approx. 0.2 s	
Long-term drift at $\pm 30$ °C ( $\pm 54$ °F)	$\leq (0.25 \cdot r)\%/5$ years	$\leq (0.1 \cdot r)\%/year$
Influence of ambient temperature		
• at -10 ... +60 °C (14 ... 140 °F)	$\leq (0.1 \cdot r + 0.2)\%$	$\leq 0,3\%$
• at -40 ... -10 °C and +60 ... +85 °C (-40 ... 14 °F and 140 ... 185 °F)	$\leq (0.1 \cdot r + 0.15)\% / 10$ K	$\leq 0.25\% / 10$ K
Influence of the medium temperature (only with front-flush diaphragm)		
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (0.04 psi/10 K)	
<b>Rated operating conditions</b>		
<u>Installation conditions</u>		
Ambient temperature	Observe the temperature class in areas subject to explosion hazard.	
• Measuring cell with silicone oil	-40 ... +85 °C (-40 ... +185 °F)	
• Measuring cell with medical whiteoil and Neobee oil (with front-flush diaphragm)	-10 ... +85 °C (14 ... +185 °F)	
• Measuring cell with inert liquid (not with front-flush diaphragm)	-20 ... +85 °C (-4 ... +185 °F)	
• Digital display	-30 ... +85 °C (-22 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
Climatic class	Permissible	
Condensation	IP65, IP68, NEMA X, enclosure cleaning, resistant to lyes, steam to 150° C (302 °F)	
Degree of protection to EN 60529		
Electromagnetic compatibility	To EN 61326 and NAMUR NE 21	
• Emitted interference and noise immunity		
<u>Medium conditions</u>		
Process temperature		
• Measuring cell with silicone oil	-40 ... +100 °C (-40 ... +212 °F)	
• Measuring cell with silicone oil (with front-flush diaphragm)	-40 ... +150 °C (-40 ... +302 °F)	
• Measuring cell with medical whiteoil and Neobee oil (with front-flush diaphragm)	-40 ... +150 °C (-40 ... +302 °F)	
• Measuring cell with silicone oil, with temperature isolator (only with front-flush diaphragm)	-25 ... +200 °C (-13 ... +392 °F)	
• Measuring cell with inert liquid	-20 ... +100 °C (-4 ... +212 °F)	

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	HART	PROFIBUS PA
<b>Design (standard version)</b>		
Weight (without options)	Approx. 800 g (1.8 lb)	
Housing material	Stainless steel, mat. No. 1.4301/304	
Material of parts in contact with the medium	Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819	
<ul style="list-style-type: none"> <li>• Connection shank</li> <li>• Oval flange</li> <li>• Seal diaphragm</li> <li>• Measuring cell filling</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel, mat. No. 1.4404/316L</li> <li>• Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819</li> <li>• Silicone oil</li> <li>• Inert filling liquid</li> </ul>	
Process connection	<ul style="list-style-type: none"> <li>• G<math>\frac{1}{2}</math>A to DIN EN 837-1</li> <li>• Female thread <math>\frac{1}{2}</math>-14 NPT</li> <li>• Oval flange PN 160 (MWP 2320 psi) with fastening thread: <ul style="list-style-type: none"> <li>- <math>\frac{7}{16}</math>-20 UNF to IEC 61518</li> <li>- M10 as per DIN 19213</li> </ul> </li> </ul>	
<b>Design (version with front-flush diaphragm)</b>		
Weight (without options)	Approx. 1 ... 13 kg (2.2 ... 29 lb)	
Housing material	Stainless steel, mat. No. 1.4301/304	
Material of parts in contact with the medium	Stainless steel, mat. No. 1.4404/316L	
<ul style="list-style-type: none"> <li>• Process connection</li> <li>• Seal diaphragm</li> <li>• Measuring cell filling</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel, mat. No. 1.4404/316L</li> <li>• Silicone oil</li> <li>• Inert filling liquid</li> <li>• FDA compliant fill fluid</li> </ul>	
Process connection	<ul style="list-style-type: none"> <li>• Flanges as per EN and ASME</li> <li>• F&amp;B and pharmaceutical flanges</li> </ul>	
<b>Power supply U<sub>H</sub></b>		
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	Supplied through bus
Separate power supply	-	Not necessary
Bus voltage		
<ul style="list-style-type: none"> <li>• Without EEx</li> <li>• For intrinsically-safe operation</li> </ul>	-	9 ... 32 V 9 ... 24 V
Current consumption		
<ul style="list-style-type: none"> <li>• Max. basic current</li> <li>• Startup current <math>\leq</math> basic current</li> <li>• Max. fault current in the event of a fault</li> </ul>	-	12.5 mA Yes 15.5 mA
Fault disconnection electronics (FDE)	-	Available



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	HART	PROFIBUS PA
<b>Certificate and approvals</b>		
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)	
Water, waste water	Available soon	
Explosion protection		
Intrinsic safety "i"	PTB 05 ATEX 2048	
Identification	Ex II 1/2 G EEx ia/ib IIB/IIC T4, T5, T6	
Permissible ambient temperature		
• Temperature class T4	-40 ... +85 °C (-40 ... +185 °F)	
• Temperature class T5	-40 ... +70 °C (-40 ... +158 °F)	
• Temperature class T6	-40 ... +60 °C (-40 ... +140 °F)	
Connection	To certified intrinsically-safe circuits with maximum values: U <sub>i</sub> = 30 V, I <sub>i</sub> = 100 mA, P <sub>i</sub> = 750 mW, R <sub>i</sub> = 300 Ω	To certified intrinsically-safe circuits with maximum values: <u>FISCO supply unit:</u> U <sub>i</sub> = 17.5 V, I <sub>i</sub> = 380 mA, P <sub>i</sub> = 5.32 W <u>Linear barrier:</u> U <sub>i</sub> = 24 V, I <sub>i</sub> = 250 mA, P <sub>i</sub> = 1.2 W
Effective inner capacitance:	C <sub>i</sub> = 6 nF	C <sub>i</sub> = 1.1 nF
Effective inner inductance:	L <sub>i</sub> = 0.4 mH	L <sub>i</sub> ≤ 7 μH
Explosion protection to FM for USA and Canada (cFMUS)		
• Identification (DIP) or (IS); (NI)	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	

### SITRANS P300 for gage pressure and absolute pressure

#### HART communication

HART communication	230 ... 1100 Ω;
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM

#### PROFIBUS PA communication

Simultaneous communication with master class 2 (max.)	4
The address can be set using	configuration tool Local operation (standard setting Address 126)
Cyclic data usage	
• Output byte	One measuring value: 5 bytes Two measuring values: 10 bytes
• Input byte	Register operating mode: 1 bytes Reset function due to metering: 1 bytes
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Linearly rising or falling characteristic
- Electrical damping T <sub>63</sub>	0 ... 100 s adjustable
- Simulation function	Input /Output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively

• Register (totalizer)	Can be reset and preset Optional direction of counting Simulation function of the register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 31 nodes
- Characteristic	Linear
- Simulation function	available
• Transducer block "Electronic temperature"	
- Simulation function	available

# SITRANS P measuring instruments for pressure

## Transmitters for gage pressure and absolute pressure

### SITRANS P300

2

Selection and Ordering data		Order No.
<b>SITRANS P300 pressure transmitters for gage and absolute pressure</b> , single-chamber measuring housing, rating plate inscription in English		
<b>4 ... 20 mA/HART</b>		7 MF 8 0 2 3 -
<b>PROFIBUS PA</b>		7 MF 8 0 2 4 -
		■ ■ ■ ■ ■ - ■ ■ ■ ■ ■
<b>Measuring cell filling</b>	<b>Measuring cell cleaning</b>	
Silicone oil	Standard	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
<b>max. span</b>		
1 bar g	(14.5 psi g)	B
4 bar g	(58 psi g)	C
16 bar g	(232 psi g)	D
63 bar g	(914 psi g)	E
160 bar g	(2320 psi g)	F
400 bar g	(5800 psi g)	G
0.25 bar a	(3.63 psi a)	Q
1.3 bar a	(18.9 psi a)	S
5 bar a	(72.5 psi a)	T
30 bar a	(435 psi a)	U
<b>Wetted parts materials</b>		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version for diaphragm seal <sup>1) 2)</sup>		Y
<b>Process connection</b>		
• G $\frac{1}{2}$ A to EN 837-1		0
• $\frac{1}{2}$ -14 NPT		1
• Oval flange made of stainless steel, max. span 160 bar g (2320 psi g)		
- Mounting thread $\frac{7}{16}$ -20 UNF to EN 61518		2
- Mounting thread M10 to DIN 19213		3
- Mounting thread M12 to DIN 19213		4
<b>Non-wetted parts materials</b>		
• St. steel, deep-drawn and electrolytically polished		4
<b>Version</b>		
• Standard version		1
<b>Explosion protection</b>		
• Without		A
• With ATEX, Type of protection: - "Intrinsic safety (EEx ia)"		B
• With FM „Intrinsic safe“ (cFM <sub>US</sub> )		M
<b>Electrical connection / cable entry</b>		
• Screwed gland M20x1.5 (Polyamide) <sup>3)</sup>		A
• Screwed gland M20x1.5 (metal)		B
• Screwed gland M20x1.5 (stainless steel)		C
• M12 connector (metal, without cable socket)		F
• M12 connector (stainless steel, without cable socket)		G
• $\frac{1}{2}$ -14 NPT thread, metal		H
• $\frac{1}{2}$ -14 NPT thread, stainless steel		J
<b>Display</b>		
• Without display, with keys, closed lid <sup>3)</sup>		1
• With display and keys, closed lid		2
• With display and keys, lid with glass pane (setting on HART devices: mA, on PROFIBUS devices: pressure units)		6
• With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane		7

Power supply units see "SITRANS I power supply units and isol. amplifiers".

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

Selection and Ordering data		Order No.
<b>SITRANS P300 pressure transmitters for gage and absolute pressure with front-flush membrane</b> , single-chamber measuring housing, rating plate inscription in English		
<b>4 ... 20 mA/HART</b>		7 MF 8 1 2 3 -
<b>PROFIBUS PA</b>		7 MF 8 1 2 4 -
		■ ■ ■ ■ ■ - ■ ■ ■ ■ ■
<b>Measuring cell filling</b>	<b>Measuring cell cleaning</b>	
Silicone oil	Standard	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
FDA compliant fill fluid		
• Neobee oil	Standard	4
• Medical whiteoil	Standard	6
<b>max. span</b>		
1 bar g	(14.5 psi g)	B
4 bar g	(58 psi g)	C
16 bar g	(232 psi g)	D
63 bar g	(914 psi g)	E
<b>Wetted parts materials</b>		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	A
<b>Process connection</b>		
• Flange version with Order code M.., N.. or Q.. (see "Further designs")		7
<b>Non-wetted parts materials</b>		
• Stainless steel, deep-drawn and electrolytically polished		4
<b>Version</b>		
• Standard version		1
<b>Explosion protection</b>		
• Without		A
• With ATEX, Type of protection: - "Intrinsic safety (EEx ia)"		B
• With FM „Intrinsic safe“ (cFM <sub>US</sub> )		M
<b>Electrical connection / cable entry</b>		
• Screwed gland M20x1.5 (Polyamide) <sup>3)</sup>		A
• Screwed gland M20x1.5 (metal)		B
• Screwed gland M20x1.5 (stainless steel)		C
• M12 connector (without cable socket)		F
• M12 connector (stainless steel, without cable socket) <sup>4)</sup>		G
• $\frac{1}{2}$ -14 NPT thread, metal <sup>4)</sup>		H
• $\frac{1}{2}$ -14 NPT thread, stainless steel		J
<b>Display</b>		
• Without display, with keys, closed lid <sup>3)</sup>		1
• With display and keys, closed lid		2
• With display and keys, lid with glass pane (setting on HART devices: mA, on PROFIBUS devices: pressure units)		6
• With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane		7

Power supply units see "SITRANS I power supply units and isol. amplifiers".

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

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

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

3) Only together with HART electronics.

4) Without cable gland.

# SITRANS P measuring instruments for pressure

## Transmitters for gage pressure and absolute pressure

SITRANS P300

2

Selection and Ordering data		Order code		Selection and Ordering data		Order code	
<b>Further designs</b> Add "-Z" to Order No. and specify Order code.		HART	PA	<b>Further designs</b> Add "-Z" to Order No. and specify Order code.		HART	PA
<b>Mounting bracket</b> made completely of stainless steel, for wall or pipe mounting	A02	✓	✓	<b>Sanitary process connection to DRD</b> • DN 65, PN40	M32	✓	✓
<b>Cable socket for M12 plug</b> • Metal	A50		✓	<b>Sanitary process connection to NEUMO Bio-Connect screw connection</b> certified to 3A and EHEDG <sup>3)</sup>			
• Stainless steel	A51		✓	• DN 40, PN16	Q04	✓	✓
<b>Rating plate inscription</b> (instead of English)				• DN 50, PN16	Q05	✓	✓
• German	B10	✓	✓	• DN 65, PN16	Q06	✓	✓
• French	B12	✓	✓	• DN 80, PN16	Q07	✓	✓
• Spanish	B13	✓	✓	• DN 100, PN16	Q08	✓	✓
• Italian	B14	✓	✓	• DN 2", PN16	Q13	✓	✓
<b>English rating plate</b> Pressure units in inH <sub>2</sub> O or psi	B21	✓	✓	• DN 2½", PN16	Q14	✓	✓
<b>Manufacturer's test certificate M<sup>1)</sup></b> (calibration certificate) to DIN 55350, Part 18 and to ISO 8402	C11	✓	✓	• DN 3", PN16	Q15	✓	✓
<b>Acceptance test certificate<sup>2)</sup></b> to EN 10204-3.1	C12	✓	✓	• DN 4", PN16	Q16	✓	✓
<b>Factory certificate</b> to EN 10204-2.2	C14	✓	✓	<b>Sanitary process connection to NEUMO Bio-Connect flange connection</b> certified to 3A and EHEDG <sup>3)</sup>			
<b>Type of protection IP68</b>	D12	✓	✓	• DN 50, PN16	Q23	✓	✓
<b>Only for SITRANS P300 with front-flush diaphragm (7MF81...-...)</b>				• DN 65, PN16	Q24	✓	✓
<b>Flange to EN 1092-1</b>				• DN 80, PN16	Q25	✓	✓
• DN 25, PN 40	M11	✓	✓	• DN 100, PN16	Q26	✓	✓
• DN 25, PN 100	M21	✓	✓	• DN 2", PN16	Q31	✓	✓
• DN 40, PN 40	M13	✓	✓	• DN 2½", PN16	Q32	✓	✓
• DN 40, PN 100	M23	✓	✓	• DN 3", PN16	Q33	✓	✓
• DN 50, PN 16	M04	✓	✓	• DN 4", PN16	Q34	✓	✓
• DN 50, PN 40	M14	✓	✓	<b>Sanitary process connection to NEUMO Bio-Connect clamp connection</b> certified to 3A and EHEDG <sup>3)</sup>			
• DN 80, PN 25	M06	✓	✓	• DN 50, PN16	Q39	✓	✓
• DN 80, PN 40	M16	✓	✓	• DN 65, PN10	Q40	✓	✓
<b>Flanges to ASME B16.5</b>				• DN 80, PN10	Q41	✓	✓
• 1", class 150	M40	✓	✓	• DN 100, PN10	Q42	✓	✓
• 1½", class 150	M41	✓	✓	• DN 2½", PN16	Q48	✓	✓
• 2", class 150	M42	✓	✓	• DN 3", PN10	Q49	✓	✓
• 3", class 150	M43	✓	✓	• DN 4", PN10	Q50	✓	✓
• 4", class 150	M44	✓	✓	<b>Sanitary process connection to NEUMO Connect S flange connection</b> certified to 3A and EHEDG			
• 1", class 300	M45	✓	✓	• DN 50, PN16	Q63	✓	✓
• 1½", class 300	M46	✓	✓	• DN 65, PN10	Q64	✓	✓
• 2", class 300	M47	✓	✓	• DN 80, PN10	Q65	✓	✓
• 3", class 300	M48	✓	✓	• DN 100, PN10	Q66	✓	✓
• 4", class 300	M49	✓	✓	• DN 2", PN16	Q72	✓	✓
<b>Sanitary process connection according DIN 11851 (Dairy connection)</b> certified to 3A <sup>3)</sup>				• DN 2½", PN10	Q73	✓	✓
• DN 50, PN 25	N04	✓	✓	• DN 3", PN10	Q74	✓	✓
• DN 80, PN 25	N06	✓	✓	• DN 4", PN10	Q75	✓	✓
<b>Tri-Clamp connection according DIN 32676/ISO 2892</b> certified to 3A <sup>3)</sup>							
• DN 50/2", PN 16	N14	✓	✓				
• DN 65/3", PN 10	N15	✓	✓				
<b>Varivent connection</b> certified to 3A and EHEDG <sup>3)</sup>							
• Type D = 68 for Varivent housing DN 40 ... 125 and 1½" ... 6", PN 40	N28	✓	✓				
<b>Temperature decoupler up to 200 °C<sup>4)</sup></b> for version with front-flush diaphragm	P00	✓	✓				
<b>Bio-Control (Neumo) sanitary connection</b> certified to 3A and EHEDG <sup>3)</sup>							
• DN 50, PN16	Q53	✓	✓				
• DN 65, PN16	Q54	✓	✓				

- 1) When the manufacturer's certificate M (calibration certificate) has to be ordered for transmitters with diaphragm seals, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) When the acceptance test certificate 3.1 for transmitters with direct-connected diaphragm seals is ordered, this certificate must also be ordered with the corresponding seals.
- 3) 3A certification only if used in conjunction with 3A-compliant gaskets.
- 4) Certified to 3A.  
The maximum temperatures of the medium depend on the respective cell fillings.

# SITRANS P measuring instruments for pressure

## Transmitters for gage pressure and absolute pressure

### SITRANS P300

2

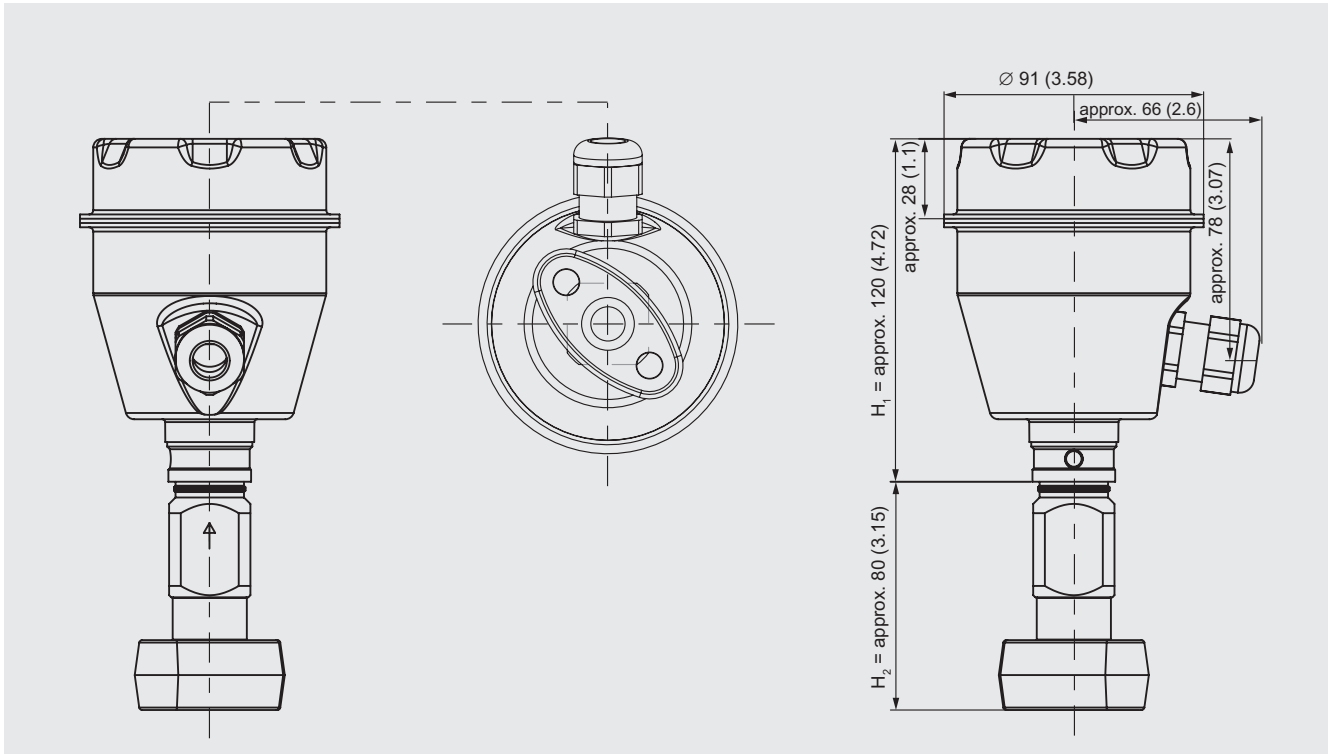
Selection and Ordering data	Order code	
<i>Additional data</i>	HART	PA
<p><b>Measuring range to be set</b> Specify in plain text V (max. 5 digits): Y01: ... up to ... mbar, bar, kPa, MPa, psi</p>	Y01	✓
<p><b>Measuring point number (TAG No.)</b> Max. 16 characters, specify in plain text: Y15: .....</p>	Y15	✓
<p><b>Measuring point text</b> Max. 27 characters, specify in plain text: Y16: .....</p>	Y16	✓
<p><b>Entry of HART TAG</b> Max. 8 characters, specify in plain text: Y17: .....</p>	Y17	✓
<p><b>Setting of pressure indication in pressure units</b> Specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H<sub>2</sub>O<sup>(*)</sup>, inH<sub>2</sub>O<sup>(*)</sup>, ftH<sub>2</sub>O<sup>(*)</sup>, mmHG, inHG, psi, Pa, kPa, MPa, g/cm<sup>2</sup>, kg/cm<sup>2</sup>, Torr, ATM or % (*) ref. temperature 20 °C</p>	Y21	✓

Selection and Ordering data	Order code	
<i>Additional data</i>	HART	PA
<p><b>Setting of pressure indicator in non-pressure units</b> Specify in plain text: Y22: ..... up to ..... l, m<sup>3</sup>, m, USg, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)</p>	Y22 + Y01	✓
<p><b>Preset bus address</b> Specify in plain text: Y25: .....</p>	Y25	✓

Only "Y01" and "Y21" can be factory preset  
✓ = available

**Ordering example**  
Item line: 7MF8023-1DB24-1AB7-Z  
B line: A02 + Y01 + Y21  
C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)  
C line: Y21: bar (psi)

### Dimensional drawings



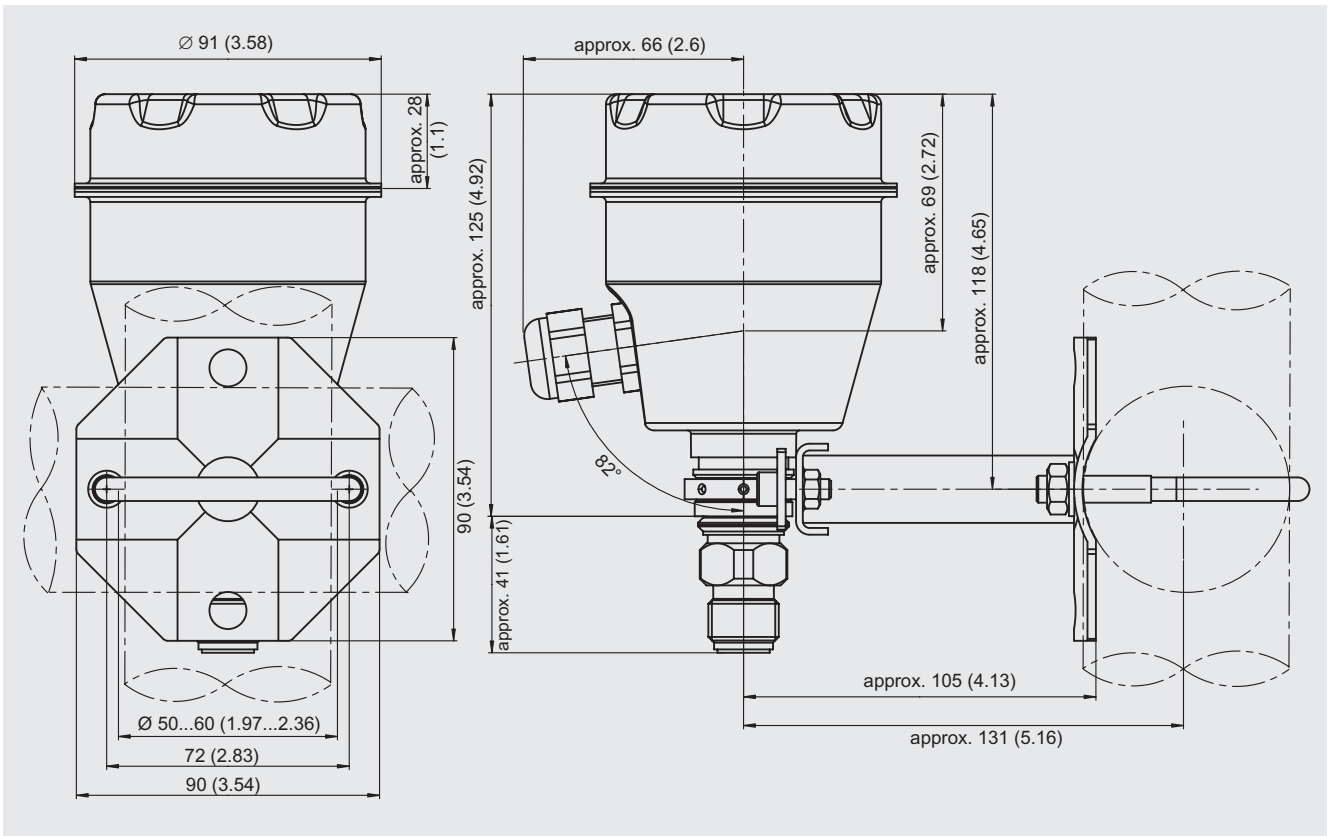
SITRANS P300, with oval flange, dimensions in mm (inch)

# SITRANS P measuring instruments for pressure

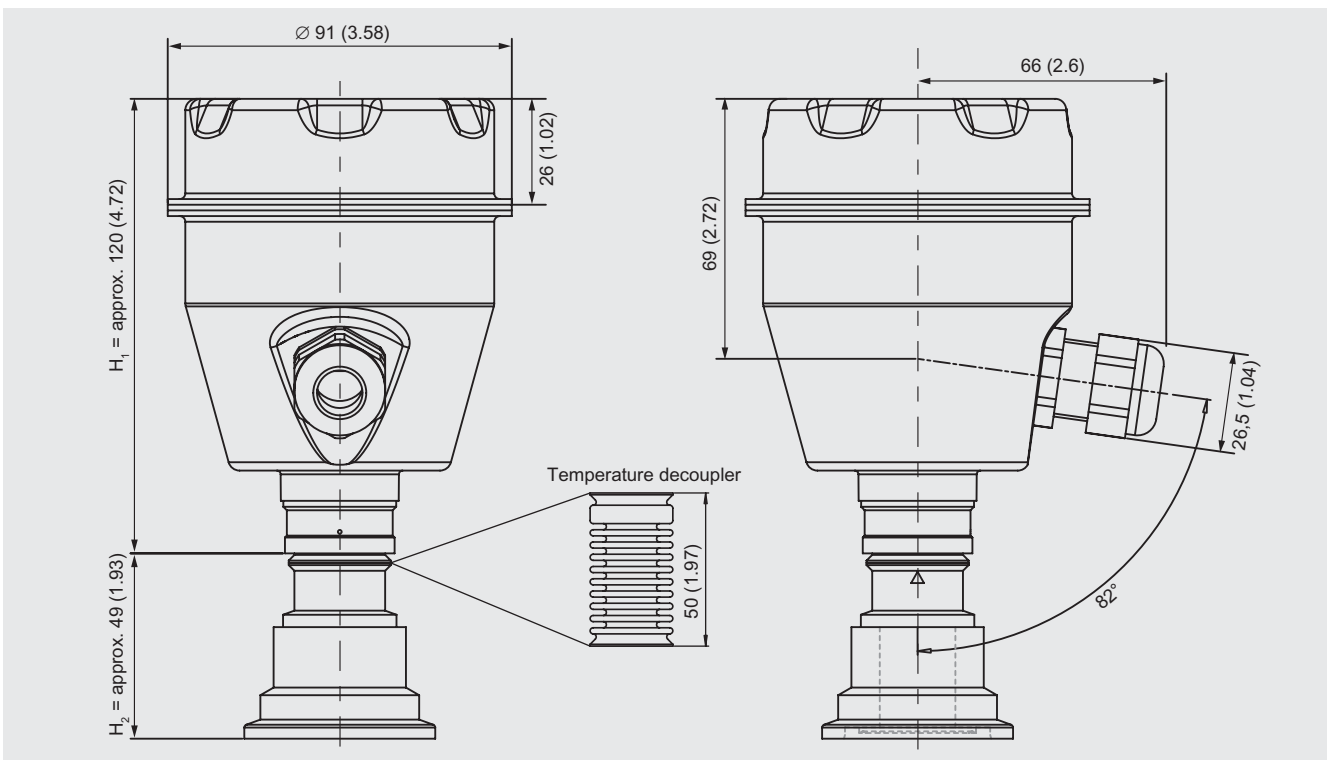
## Transmitters for gage pressure and absolute pressure

SITRANS P300

2



SITRANS P300 with mounted mounting bracket, dimensions in mm (inch)



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

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

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

# SITRANS P measuring instruments for pressure

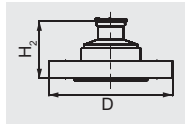
## Transmitters for gage pressure and absolute pressure

### SITRANS P300

#### Flanges to EN and ASME

##### Flanges to EN

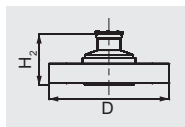
###### EN 1092-1



DN	PN	ØD	H <sub>2</sub>
25	40	115 mm (4.5")	Approx. 52 mm (2")
25	100	140 mm (5.5")	
40	40	150 mm (5.9")	
40	100	170 mm (6.7")	
50	16	165 mm (6.5")	
50	40	165 mm (6.5")	
80	16	200 mm (7.9")	
80	40	200 mm (7.9")	

##### Flanges to ASME

###### ASME B16.5

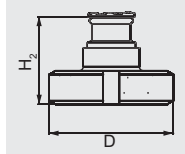


DN	class	ØD	H <sub>2</sub>
1"	150	110 mm (4.3")	Approx. 52 mm (2")
1"	300	125 mm (4.9")	
1½"	150	130 mm (5.1")	
1½"	300	155 mm (6.1")	
2"	150	150 mm (5.9")	
2"	300	165 mm (6.5")	
3"	150	190 mm (7.5")	
3"	300	210 mm (8.1")	
4"	150	230 mm (9.1")	
4"	300	255 mm (10.0")	

#### NuG and pharmaceutical flange

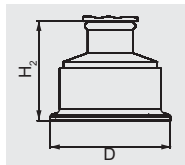
##### Connections to DIN

###### DIN 11851 (Dairy connection)



DN	PN	ØD	H <sub>2</sub>
50	25	92 mm (3.6")	Approx. 52 mm (2")
80	25	127 mm (5.0")	

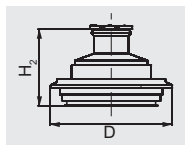
###### Tri-Clamp according DIN 32676



DN	PN	ØD	H <sub>2</sub>
50	16	64 mm (2.5")	Approx. 52 mm (2")
65	16	91 mm (3.6")	

##### Other connections

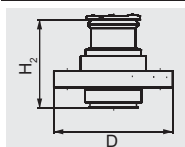
###### Varivent connection



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

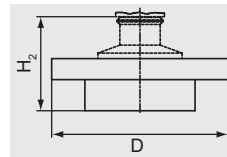
#### Bio-Control connections

###### Bio-Control connection



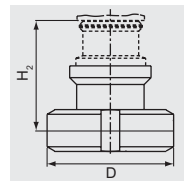
DN	PN	ØD	H <sub>2</sub>
50	16	90 mm (3.5")	Approx. 52 mm (2")
65	16	120 mm (4.7")	

##### Sanitary process connection to DRD



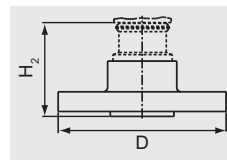
DN	PN	ØD	H <sub>2</sub>
65	40	105 mm (4.1")	Approx. 52 mm (2")

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



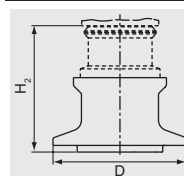
DN	PN	ØD	H <sub>2</sub>
50	16	82 mm (3.2")	Approx. 52 mm (2")
65	16	105 mm (4.1")	
80	16	115 mm (4.5")	
100	16	145 mm (5.7")	
2"	16	82 mm (3.2")	
2½"	16	105 mm (4.1")	
3"	16	105 mm (4.1")	
4"	16	145 mm (5.7")	

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



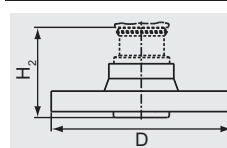
DN	PN	ØD	H <sub>2</sub>
50	16	110 mm (4.3")	Approx. 52 mm (2")
65	16	140 mm (5.5")	
80	16	150 mm (5.9")	
100	16	175 mm (6.9")	
2"	16	100 mm (3.9")	
2½"	16	110 mm (4.3")	
3"	16	140 mm (5.5")	
4"	16	175 mm (6.9")	

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



DN	PN	ØD	H <sub>2</sub>
50	16	77,4 mm (3.0")	Approx. 52 mm (2")
65	10	90,9 mm (3.6")	
80	10	106 mm (4.2")	
100	10	119 mm (4.7")	
2"	16	64 mm (2.5")	
2½"	16	77,4 mm (3.0")	
3"	10	90,9 mm (3.6")	
4"	10	119 mm (4.7")	

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



DN	PN	ØD	H <sub>2</sub>
50	16	125 mm (4.9")	Approx. 52 mm (2")
65	10	145 mm (5.7")	
80	10	155 mm (6.1")	
100	10	180 mm (7.1")	
2"	16	125 mm (4.9")	
2½"	10	135 mm (5.3")	
3"	10	145 mm (5.7")	
4"	10	180 mm (7.1")	