

Overview



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

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

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

Benefits

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

Application

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

It can be used for the following measurement types:

- Gauge pressure
- Absolute pressure

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

- Level
- Volume
- Mass

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

Gauge pressure

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

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

Level

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

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

Absolute pressure

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

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

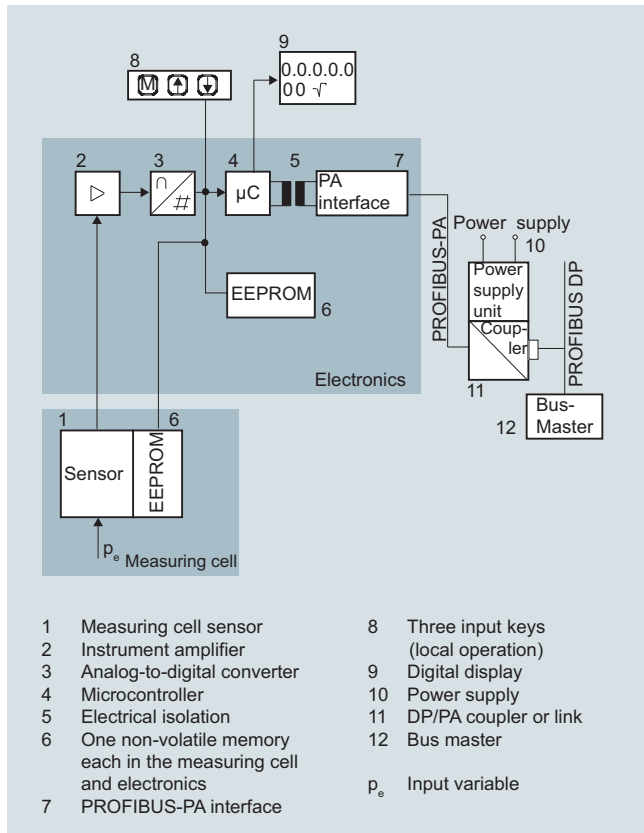
Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

Operation of electronics with PROFIBUS PA communication

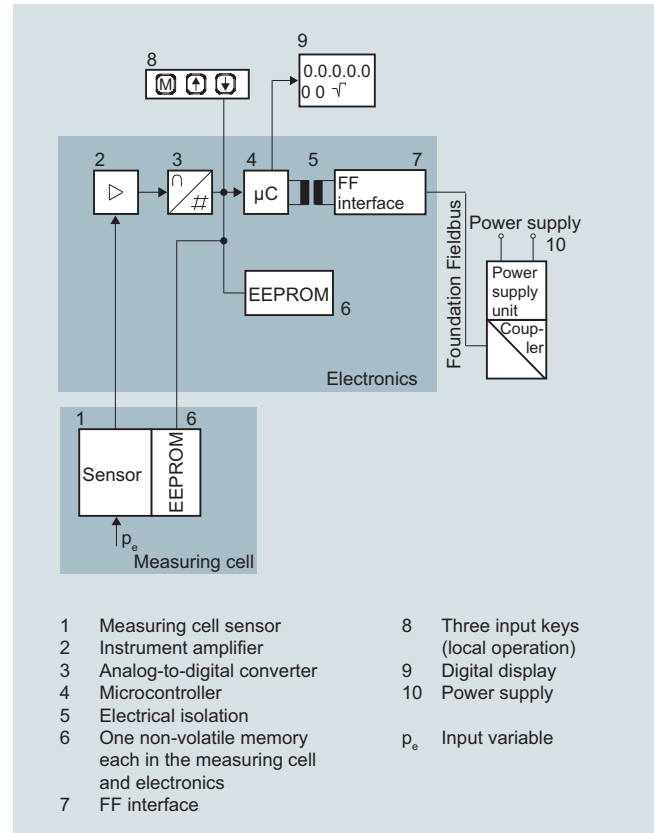


Function diagram of electronics

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

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

Operation of electronics with FOUNDATION Fieldbus communication



Function diagram of electronics

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

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

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

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

Mode of operation of the measuring cells

The process connections available include the following:

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

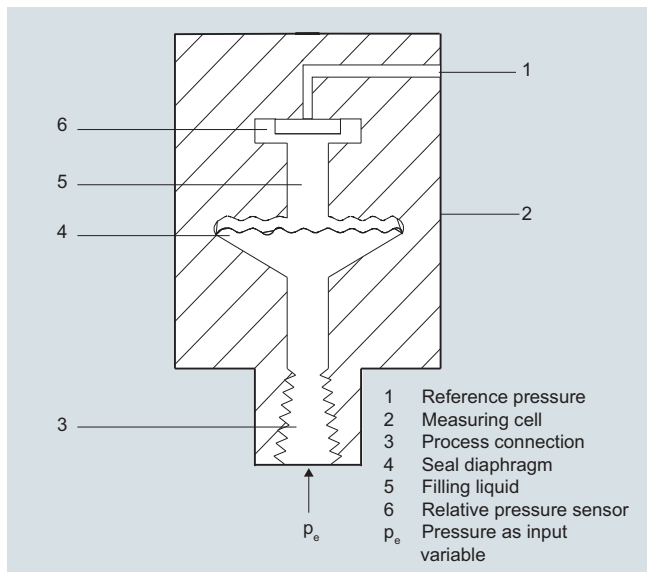
Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

1

SITRANS P300 for gauge and absolute pressure

Measuring cell for gauge pressure

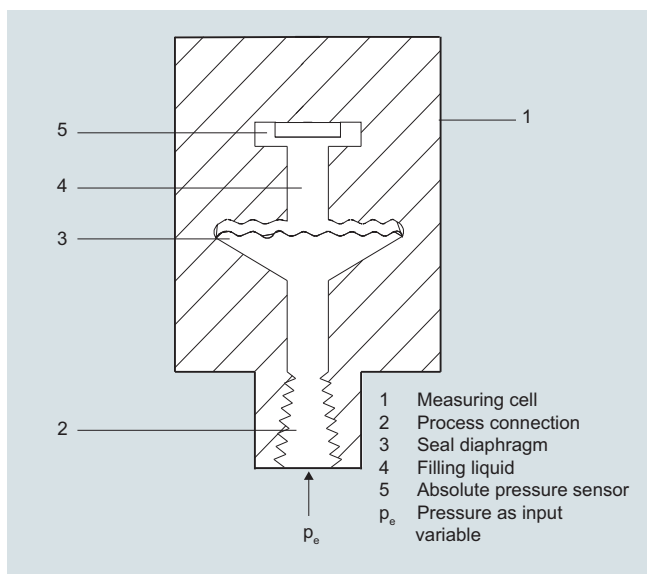


Measuring cell for gauge pressure, function diagram

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

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

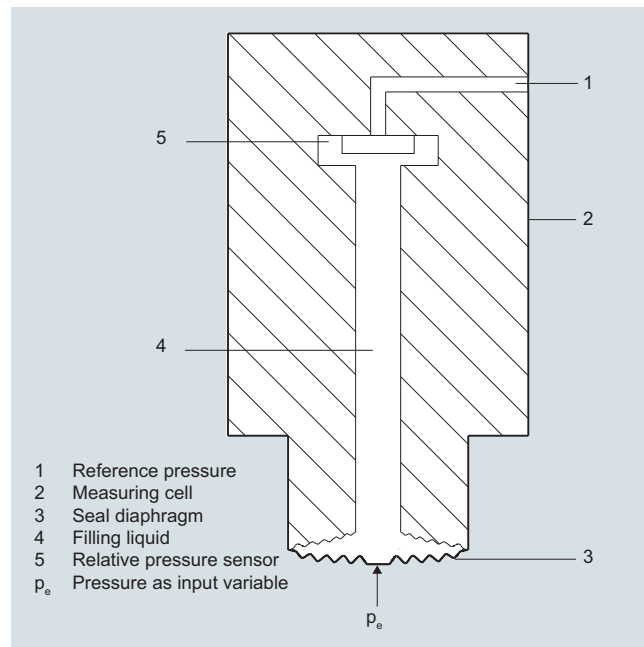
Measuring cell for absolute pressure



Measuring cell for absolute pressure, function diagram

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

Measuring cell for gauge pressure, front-flush diaphragm

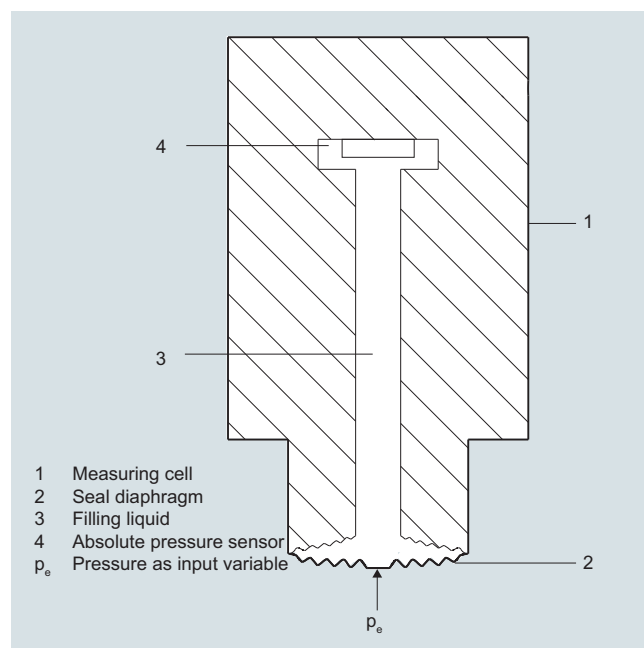


Measuring cell for gauge pressure, front-flush diaphragm, function diagram

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

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

Measuring cell for absolute pressure, front-flush diaphragm



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

Pressure Measurement

Pressure transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

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

Parameterization

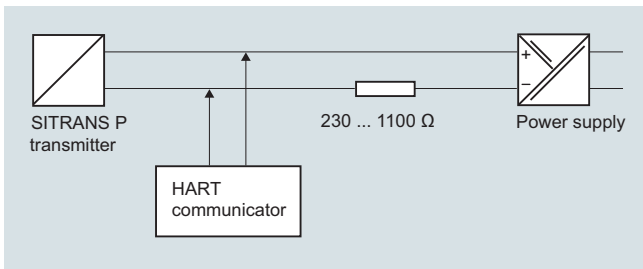
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

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

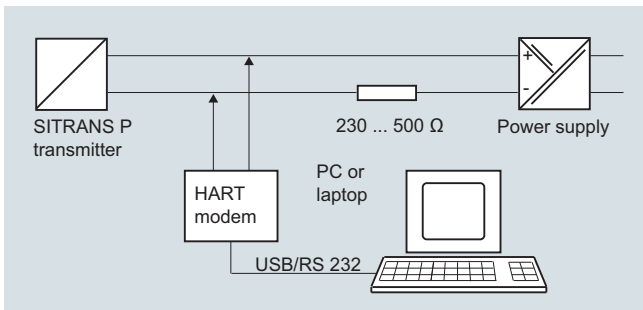
Parameterization using HART communication

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



Communication between a HART communicator and a pressure transmitter

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



HART communication between a PC communicator and a pressure transmitter

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

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

Adjustable parameters on SITRANS P300 with HART communication

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 buttons, write protection	x	x ¹⁾
Type of dimension and actual dimension	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic 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

Table style: Technical specifications 2

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

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

1

SITRANS P300 for gauge and absolute pressure

Parameterization through PROFIBUS PA interface

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

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

Parameterization through FOUNDATION Fieldbus interface

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

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

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

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

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

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

Physical dimensions available for the display

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

Hygiene version

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

Technical specifications

SITRANS P300 for gauge and absolute pressure

Gauge pressure input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

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

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

Lower measuring limit

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

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

30 mbar a/3 kPa a/0.44 psi a

30 mbar a/3 kPa a/0.44 psi a

Upper measuring limit

100 % of max. span

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

Absolute pressure input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Absolute pressure

	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span		Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
8.34 ... 250 mbar a 0.83 ... 25 kPa a 3.35 ... 100 inH ₂ O a 0.13 ... 3.63 psi a		250 mbar a 25 kPa a 100 inH ₂ O a	1.5 bar a 150 kPa a 21.8 psi a	6 bar a 600 kPa a 87 psi a
43.34 ... 1300 mbar a 4.33 ... 130 kPa a 17.42 ... 522.4 inH ₂ O a 0.63 ... 18.86 psi a		1300 mbar a 130 kPa a 525 inH ₂ O	2.6 bar a 260 kPa a 37.7 psi a	10 bar a 1 MPa a 145 psi a
0.17 ... 5 bar a 17 ... 500 kPa a 2.43 ... 72.5 psi a		5000 mbar a 500 kPa a 72.5 psi a	10 bar a 1 MPa a 145 psi a	30 bar a 3 MPa a 435 psi a
1 ... 30 bar a 0.1 ... 3 MPa a 14.6 ... 435 psi a		30 bar a 3 MPa a 435 psi a	45 bar a 4.5 MPa a 653 psi a	100 bar a 10 MPa a 1450 psi a

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

SITRANS P300 for gauge and absolute pressure

Lower measuring limit

• Measuring cell with silicone oil	0 mbar a/0 kPa a /0 psi a
• Measuring cell with inert filling liquid	
- for process temperature $-20\text{ °C} < \vartheta \leq +60\text{ °C}$ ($-4\text{ °F} < \vartheta \leq +140\text{ °F}$)	30 mbar a/3 kPa a/0.44 psi a
- for process temperature $60\text{ °C} < \vartheta \leq +100\text{ °C}$ (max. 85 °C for measuring cell 30 bar) ($140\text{ °F} < \vartheta \leq +212\text{ °F}$ (max. 185 °F for meas. cell 435 psi))	$30\text{ mbar a} + 20\text{ mbar a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $3\text{ kPa a} + 2\text{ kPa a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $0.44\text{ psi a} + 0.29\text{ psi a} \cdot (\vartheta - 140\text{ °F})/\text{°F}$

Upper measuring limit

100 % of max. span
(for oxygen measurement max. 100 bar/10 MPa/1450 psi und 60 °C (140 °F)
ambient temperature/process temperature)

Start of scale value

Between the measuring limits (fully adjustable)

Input of gauge pressure, with front-flush diaphragm

Measured variable

Gauge pressure, front-flush

Span (continuously adjustable) or measuring range,
max. operating pressure and max. test pressure

HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi)
0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
0.63 ... 63 bar 63 ... 6300 kPa 9.1 ... 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi

Lower measuring limit

• Measuring cell with silicone oil filling	100 mbar a/10 kPa a/1.45 psi a
• Measuring cell with inert filling liquid	100 mbar a/10 kPa a/1.45 psi a
• Measuring cell with Neobee	100 mbar a/10 kPa a/1.45 psi a

Upper measuring limit

100% of max. span

Input of absolute pressure, with front-flush diaphragm

Measured variable

Absolute pressure, front-flush

Span (continuously adjustable) or measuring range,
max. operating pressure and max. test pressure

HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
43 ... 1300 mbar a 4.3 ... 130 kPa a 17 ... 525 inH ₂ O a	1300 mbar a 130 kPa a 525 inH ₂ O a	2.6 bar a 260 kPa a 37.7 psi a	10 bar a 1 MPa a 145 psi a
160 ... 5000 mbar a 16 ... 500 kPa a 2.32 ... 72.5 psi a	5000 mbar a 500 kPa a 72.5 psi a	10 bar a 1 MPa a 145 psi a	30 bar a 3 MPa a 435 psi a
1 ... 30 bar a 0.1 ... 3 MPa a 14.5 ... 435 psi a	30 bar a 3 MPa a 435 psi a	45 bar a 4.5 MPa a 653 psi a	100 bar a 10 MPa a 1450 psi a

Depending on the process connection, the span may differ from these values

Lower measuring limit

0 mbar a/0 kPa a/0 psi a

Upper measuring limit

100 % of max. span

Output

Output signal

HART	4 ... 20 mA	PROFIBUS PA/ FOUNDATION Fieldbus	Digital PROFIBUS PA or FOUNDATION Fieldbus signal
------	-------------	----------------------------------	---

Physical bus

-

Protection against polarity reversal

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

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

SITRANS P300 for gauge and absolute pressure**Measuring accuracy for gauge pressure**

Reference conditions	According to IEC 60770-1
	<ul style="list-style-type: none"> Increasing characteristic Start-of-scale value 0 bar/kPa/psi Stainless steel seal diaphragm Measuring cell with silicone oil Room temperature 25 °C (77 °F)
Measuring span ratio r (spread, Turn-Down)	$r = \text{max. measuring span} / \text{set measuring span or nominal pressure range}$
Error in measurement at limit setting incl. hysteresis and reproducibility	
<ul style="list-style-type: none"> Linear characteristic 	
- 250 mbar/25 kPa/3.6 psi	$r \leq 1.25 :$ $\leq 0.075 \%$ $1.25 < r \leq 30 :$ $\leq (0.008 \cdot r + 0.065) \%$
- 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi	$r \leq 5 :$ $\leq 0.075 \%$ $5 < r \leq 100 :$ $\leq (0.005 \cdot r + 0.05) \%$
- 400 bar/40 MPa/5802 psi	$r \leq 3 :$ $\leq 0.075 \%$ $3 < r \leq 10 :$ $\leq (0.0029 \cdot r + 0.071) \%$ $10 < r \leq 100 :$ $\leq (0.005 \cdot r + 0.05) \%$
Influence of ambient temperature (in percent per 28 °C (50 °F))	
<ul style="list-style-type: none"> 250 mbar/25 kPa/3.6 psi 	$\leq (0.16 \cdot r + 0.1) \%$
<ul style="list-style-type: none"> 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi 	$\leq (0.07 \cdot r + 0.08) \%$
Long-term stability (temperature change ± 30 °C (± 54 °F))	
<ul style="list-style-type: none"> 250 mbar/25 kPa/3.6 psi 	$\leq (0.25 \cdot r) \%$ per year
<ul style="list-style-type: none"> 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 	$\leq (0.25 \cdot r) \%$ in 5 years
<ul style="list-style-type: none"> 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi 	$\leq (0.125 \cdot r) \%$ in 5 years
Effect of mounting position	≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination (zero point correction is possible with position error compensation)
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of the rated measuring range

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

SITRANS P300 for gauge and absolute pressure

Measuring accuracy for absolute pressure

Reference conditions

According to IEC 60770-1

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

Measuring span ratio r (spread, Turn-Down)

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

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- $r \leq 10$

$\leq 0.1 \%$

- $10 < r \leq 30$

$\leq 0.2 \%$

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

- 250 mbar a/25 kPa a/3.6 psi a

$\leq (0.15 \cdot r + 0.1) \%$

- 1300 mbar a/130 kPa a/18.8 psi a
5 bar a/500 kPa a/72.5 psi a
30 bar a/3000 kPa a/435 psi a

$\leq (0.08 \cdot r + 0.16) \%$

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

$\leq (0.25 \cdot r) \%$ in 5 years

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

≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination
(zero point correction is possible with position error compensation)

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

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of the rated measuring range

Measuring accuracy for gauge and absolute pressure, with front-flush diaphragm

According to IEC 60770-1

Reference conditions

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

Measuring span ratio r (spread, Turn-Down)

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

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- $r \leq 5$

$\leq 0.075 \%$

- $5 < r \leq 100$

$\leq (0.005 \cdot r + 0.05) \%$

- $r \leq 10$

-

$\leq 0.2 \%$

- $10 < r \leq 30$

-

$\leq 0.4 \%$

Influence of ambient temperature
(as percentage per 28 °C (50 °F))

$\leq (0.08 \cdot r + 0.16) \%$

$\leq (0.16 \cdot r + 0.24) \%$

Effect of process temperature
(in pressure per temperature change)

- Temperature difference between process temperature and ambient temperature

3 mbar/0.3 kPa/0.04 psi per 10 K

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

$(0.25 \cdot r) \%$ in 5 years

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

0.4 mbar/0.04 kPa/0.006 per 10° inclination
(zero point correction is possible with position error compensation)

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

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of the rated measuring range

Gauge pressure, with front-flush diaphragm

Absolute pressure, with front-flush diaphragm

SITRANS P300 for gauge and absolute pressure**Rated conditions**Installation conditions

Ambient temperature

- Measuring cell with silicone oil

- Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)

- Measuring cell with inert liquid

- Display readable

- Storage temperature

Observe the temperature class in areas subject to explosion hazard.

-40 ... +85 °C (-40 ... +185 °F)

-10 ... +85 °C (14 ... +185 °F)

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

-50 ... +85 °C (-58 ... +185 °F)

(for Neobee: -20 ... +85 °C (-4 ... +185 °F))

(for temperature oil: -10 ... +85 °C (14 ... +165 °F))

Climatic class

Condensation

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

Degree of protection

- according to EN 60529

IP65, IP68

- according to NEMA 250

IP65, IP68, Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)

Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Medium conditions

Temperature of medium

- Measuring cell with silicone oil

-40 ... +100 °C (-40 ... +212 °F)

- Measuring cell with silicone oil (FDA-compliant, with flush-mounted diaphragm)

-40 ... +150 °C (-40 ... +302 °F)

- Measuring cell with Neobee oil "Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)

-10 ... +150 °C (-14 ... +302 °F)

- Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)

-40 ... +200 °C (-40 ... +392 °F)

- Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)

-10 ... +200 °C (14 ... +392 °F)

- Measuring cell with inert liquid

-20 ... +100 °C (-4 ... +212 °F)

- Measuring cell with high-temperature oil (only for gauge pressure version with flush-mounted diaphragm)

-10 ... +250 °C (14 ... 482 °F)

Design (standard version)

Weight (without options)

Approx. 800 g (1.8 lb)

Enclosure material

Stainless steel, mat. no. 1.4301/304

Material of parts in contact with the medium

- Connection shank

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

- Oval flange

Stainless steel, mat. no. 1.4404/316L

- Seal diaphragm

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

- Measuring cell filling

- Silicone oil
- Inert filling liquid

Process connection

- G $\frac{1}{2}$ B to EN 837-1
- Female thread $\frac{1}{2}$ -14 NPT
- Oval flange PN 160 (MAWP 2320 psi) with fastening thread:
 - $\frac{7}{16}$ -20 UNF to IEC 61518/DIN EN 61518
 - M10 as per DIN 19213

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

1

SITRANS P300 for gauge and absolute pressure

SITRANS P300 for gauge and absolute pressure

Design (version with front-flush diaphragm)

Weight (without options)	approx. 1 ... 13 kg (2.2 ... 29 lb)
Enclosure material	Stainless steel, mat. no. 1.4301/304
Material of parts in contact with the medium	
• Process connection	Stainless steel, mat. no. 1.4404/316L
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L
• Measuring cell filling	<ul style="list-style-type: none"> • Silicone oil • Inert filling liquid • FDA compliant fill fluid (Neobee oil)
Process connection	<ul style="list-style-type: none"> • Flanges as per EN and ASME • F&B and pharmaceutical flanges
Surface quality touched-by-media	R_a -values $\leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$)/welds $R_a \leq 1.6 \mu\text{m}$ (64 $\mu\text{-inch}$) (Process connections acc. to 3A; R_a -values $\leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$)/welds $R_a \leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$))

Power supply U_H

	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	
Power supply	-	Supplied through bus
Separate power supply	-	Not necessary
Bus voltage		
• Without Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Max. basic current	-	12.5 mA
• Start-up current \leq basic current	-	Yes
• Max. fault current in the event of a fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

SITRANS P300 for gauge and absolute pressure		
Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Classification according to PED 2014/68/EU	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 4, paragraph 3 (sound engineering practice)	
Water, waste water	Pending	
<u>Explosion protection</u>		
Intrinsic safety "i"	PTB 05 ATEX 2048	
<ul style="list-style-type: none"> • Marking • Permissible ambient temperature <ul style="list-style-type: none"> - Temperature class T4 - Temperature class T5 - Temperature class T6 • Connection 	II1/2 G Ex ia IIC/IIB T4/T5/T6 Ga/Gb -40 ... +85 °C (-40 ... +185 °F) -40 ... +70 °C (-40 ... +158 °F) -40 ... +60 °C (-40 ... +140 °F)	To certified intrinsically-safe circuits with peak values: <u>FISCO supply unit:</u> $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ <u>Linear barrier:</u> $U_i = 24 \text{ V}$, $I_i = 250 \text{ mA}$, $P_i = 1.2 \text{ W}$ $C_i = 1.1 \text{ nF}$ $L_i \leq 7 \mu\text{H}$
<ul style="list-style-type: none"> • Effective inner capacitance: • Effective internal inductance: Explosion protection to FM for USA <u>and</u> Canada (cFM _{US})	$C_i = 6 \text{ nF}$ $L_i = 0.4 \text{ mH}$	
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Identification (DIP) or (IS) 	Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
Dust explosion protection for zone 20/21/22	PTB 05 ATEX 2048	
<ul style="list-style-type: none"> • Marking • Permissible ambient temperature <ul style="list-style-type: none"> - Temperature class T4 - Temperature class T5 - Temperature class T6 • Connection 	II 1 D Ex ia IIC T120 °C Da II 1/2 D Ex ia IIC T120 °C Da/Db II 2 D Ex ib IIC T120 °C Db -40 ... +85 °C (-40 ... +185 °F) (in the case of mineral glass windows only -20 ... +85 °C (-4 ... +185 °F)) -40 ... +70 °C (-40 ... +158 °F) (in the case of mineral glass windows only -20 ... +70 °C (-4 ... +158 °F)) -40 ... +60 °C (-40 ... +140 °F) (in the case of mineral glass windows only -20 ... +60 °C (-4 ... +140 °F))	
<ul style="list-style-type: none"> • Effective inner capacitance: • Effective internal inductance: Type of protection Ex nA/nL/ic (Zone 2)	$C_i = 6 \text{ nF}$ $L_i = 0.4 \mu\text{H}$	To certified intrinsically-safe circuits with peak values: $U_i = 24 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ mW}$ $C_i = 5 \text{ nF}$ $L_i = 10 \mu\text{H}$
<ul style="list-style-type: none"> • Marking • Permissible ambient temperature <ul style="list-style-type: none"> - Temperature class T4 - Temperature class T5 - Temperature class T6 • Ex nA/nL connection • Ex ic connection 	PTB 05 ATEX 2048 II 2/3 G Ex ic IIC/IIB T4/T5/T6 Gb/Gc II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc -40 ... +85 °C (-40 ... +185 °F) (in the case of mineral glass windows only -20 ... +85 °C (-4 ... +185 °F)) -40 ... +70 °C (-40 ... +158 °F) (in the case of mineral glass windows only -20 ... +70 °C (-4 ... +158 °F)) -40 ... +60 °C (-40 ... +140 °F) (in the case of mineral glass windows only -20 ... +60 °C (-4 ... +140 °F))	
<ul style="list-style-type: none"> • Effective inner capacitance: • Effective internal inductance: 	To certified intrinsically-safe circuits with peak values: $U_m = 45 \text{ V}$ $C_i = 6 \text{ nF}$ $L_i = 0.4 \text{ mH}$	To certified intrinsically-safe circuits with peak values: $U_m = 32 \text{ V}$ $C_i = 5 \text{ nF}$ $L_i = 20 \mu\text{H}$

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

HART Communication

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

PROFIBUS PA communication

Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting Address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0.1 or 2 (totalizer mode and reset function for dosing)
• Internal preprocessing	
Device profile	PROFIBUS PA Profile for Pro- cess Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure function	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication

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

Pressure Measurement

Pressure transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

Selection and Ordering data		Article No.	Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure , single-chamber measuring housing, rating plate inscription in English			SITRANS P300 pressure transmitters for relative and absolute pressure , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7 MF 8 0 2 3 -	4 ... 20 mA/HART		7 MF 8 0 2 3 -
PROFIBUS PA		7 MF 8 0 2 4 -	PROFIBUS PA		7 MF 8 0 2 4 -
FOUNDATION Fieldbus (FF)		7 MF 8 0 2 5 -	FOUNDATION Fieldbus (FF)		7 MF 8 0 2 5 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Measuring cell filling	Measuring cell cleaning		Display		
Silicone oil	normal	1	• Without display, with keys, closed lid		1
Inert liquid	Cleanliness level 2 to DIN 25410	3	• With display and keys, closed lid ¹¹⁾		2
			• With display and keys, lid with polycarbonate disc		4
			• (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) ¹¹⁾		5
			• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with polycarbonate disc ¹¹⁾		6
			• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS and FOUNDATION Fieldbus equipment: pressure units) ¹¹⁾		7
			• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane ¹¹⁾		
Measuring span (min. ... max.)			Power supply units see Chap. 7 "Supplementary Components".		
8.3 ... 250 mbar	(0.12 ... 3.63 psi)	A	A quick-start guide is included in the scope of delivery of the device.		
0.01 ... 1 bar	(0.145 ... 14.5 psi)	B	1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.		
0.04 ... 4 bar	(0.58 ... 58 psi)	C	2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.		
0.16 ... 16 bar	(2.32 ... 232 psi)	D	3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF802-...Y...-... and 7MF4900-1...-B		
0.63 ... 63 bar	(9.14 ... 914 psi)	E	4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.		
1.6 ... 160 bar	(23.2 ... 2320 psi)	F	5) Remote seal for direct mounting only available in combination with process connection 1/2-14 NPT.		
4 ... 400 bar	(58 ... 5802 psi)	G	6) M10 fastening thread: Max. span 160 bar (2320 psi) 7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)		
8.34 ... 250 mbar a	(0.13 ... 3.63 psi a)	Q	7) Only available together with electrical connection option A		
43.34 ... 1300 mbar a	(0.63 ... 18.86 psi a)	S	8) Only available together with electrical connection options B, C or G.		
0.17 ... 5 bar a	(2.43 ... 72.5 psi a)	T	9) Only together with HART electronics.		
1 ... 30 bar a	(14.6 ... 435 psi a)	U	10) Without cable gland.		
			11) Display cannot be turned.		
Wetted parts materials					
Seal diaphragm	Measuring cell				
Stainless steel	Stainless steel	A			
Hastelloy	Stainless steel	B			
Hastelloy	Hastelloy	C			
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" (recommended version) ^{1) 2) 3) 4) 5)}		Y			
Process connection					
• Connection shank G1/2B to EN 837-1		0			
• Female thread 1/2-14 NPT		1			
• Stainless steel oval flange with process connection (Oval flange has no female thread) ⁶⁾					
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2			
- Mounting thread M10 to DIN 19213		3			
- Mounting thread M12 to DIN 19213		4			
• Male thread M20 x 1.5		5			
• Male thread 1/2 -14 NPT		6			
Non-wetted parts materials					
• Stainless steel, deep-drawn and electrolytically polished		4			
Version					
• Standard versions		1			
Explosion protection					
• None		A			
• With ATEX, Type of protection:					
- "Intrinsic safety (Ex ia)"		B			
• Zone 20/21/22 ⁷⁾		C			
• Ex nA/nL (Zone 2) ⁸⁾		E			
• with FM "intrinsic safety" (cFM _{US})		M			
Electrical connection / cable entry					
• Screwed gland M20x1.5 (polyamide) ⁹⁾		A			
• Screwed gland M20x1.5 (metal)		B			
• Screwed gland M20x1.5 (stainless steel)		C			
• Device plug M12 (stainless steel), without cable socket		G			
• Screwed gland 1/2-14 NPT metal thread ¹⁰⁾		H			
• Screwed gland 1/2-14 NPT stainless steel thread		J			

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush membrane , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7 MF 8 1 2 3 -
PROFIBUS PA		7 MF 8 1 2 4 -
FOUNDATION Fieldbus (FF)		7 MF 8 1 2 5 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid		3
FDA compliant fill fluid		
• Neobee oil	normal	4
Measuring span (min. ... max.)		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
43.34 ... 1300 mbar a ¹⁾	(0.63 ... 18.86 psi a ¹⁾)	S
0.17 ... 5 bar a ¹⁾	(2.43 ... 72.5 psi a ¹⁾)	T
1 ... 30 bar a ¹⁾	(14.6 ... 435 psi a ¹⁾)	U
Wetted parts materials		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	A
Hastelloy ²⁾	Stainless steel	B
Process connection		
• Flange version with Order code M., N., R.. or Q.. (see "Further designs")		7
Non-wetted parts materials		
• Stainless steel, deep-drawn and electrolytically polished		4
Version		
• Standard versions		1
Explosion protection		
• None		A
• With ATEX, Type of protection: - "Intrinsic safety (Ex ia)"		B
• Zone 20/21/22 ³⁾		C
• Ex nA/nL (Zone 2) ⁴⁾		E
• with FM "intrinsic safety" (cFM _{US})		M
Electrical connection / cable entry		
• Screwed gland M20x1.5 (polyamide) ⁵⁾		A
• Screwed gland M20x1.5 (metal)		B
• Screwed gland M20x1.5 (stainless steel)		C
• Device plug M12 (stainless steel), without cable socket		G
• Screwed gland ½-14 NPT metal thread ⁶⁾		H
• Screwed gland ½-14 NPT stainless steel thread ⁶⁾		J

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush membrane , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7 MF 8 1 2 3 -
PROFIBUS PA		7 MF 8 1 2 4 -
FOUNDATION Fieldbus (FF)		7 MF 8 1 2 5 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Display		
• Without display, with keys, closed lid		1
• With display and keys, closed lid ⁷⁾		2
• With display and keys, lid with polycarbonate disc (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) ⁷⁾		4
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with polycarbonate disc ⁷⁾		5
• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) ⁷⁾		6
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane ⁷⁾		7
Power supply units see Chap. 7 "Supplementary Components"		
A quick-start guide is included in the scope of delivery of the device.		
¹⁾ Not with temperature decoupler P00, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil. ²⁾ Only available for flanges with options M., N.. and Q.. ³⁾ Only together with electrical connection option A. ⁴⁾ Only available together with electrical connection options B, C or G. ⁵⁾ Only together with HART electronics. ⁶⁾ Without cable gland. ⁷⁾ Display cannot be turned.		

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Pressure transmitter with mounting bracket (2 shackles, 4 nuts, 4 U-plates, 1 angle) made of: made completely of stainless steel, for wall or pipe mounting	A02	✓	✓	✓
Cable socket for device plugs M12 • Stainless steel	A51	✓	✓	✓
Rating plate inscription (instead of English)				
• German	B10	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2¹⁾	C11	✓	✓	✓
Inspection certificate²⁾ Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Degree of protection IP65/IP68 (only for M20x1.5 and ½-14 NPT)	D12	✓	✓	✓
Degree of protection IP6k9k (only for M20x1.5)	D46	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	E22	✓	✓	✓
Export approval Korea	E11	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)	E80	✓	✓	✓
Ex Approval Ex ia/ib NEPSI	E55	✓	✓	✓
Only for SITRANS P300 with front-flush diaphragm (7MF81...-...)				
Flange to EN 1092-1, Form B1				
• DN 25, PN 40 ³⁾	M11	✓	✓	✓
• DN 40, PN 40	M13	✓	✓	✓
• DN 40, PN 100	M23	✓	✓	✓
• DN 50, PN 16	M04	✓	✓	✓
• DN 50, PN 40	M14	✓	✓	✓
• DN 80, PN 16	M06	✓	✓	✓
• DN 80, PN 40	M16	✓	✓	✓
Flanges to ASME B16.5				
• 1", class 150 ⁴⁾	M40	✓	✓	✓
• 1½", class 150	M41	✓	✓	✓
• 2", class 150	M42	✓	✓	✓
• 3", class 150	M43	✓	✓	✓
• 4", class 150	M44	✓	✓	✓
• 1", class 300 ⁴⁾	M45	✓	✓	✓
• 1½", class 300	M46	✓	✓	✓
• 2", class 300	M47	✓	✓	✓
• 3", class 300	M48	✓	✓	✓
• 4", class 300	M49	✓	✓	✓
Threaded connector to DIN 3852-2, form A, thread to ISO 228				
• G ¾"-A, front-flush ⁴⁾	R01	✓	✓	✓
• G 1"-A, front-flush ⁴⁾	R02	✓	✓	✓
• G 2"-A, front-flush	R04	✓	✓	✓
Tank connection⁵⁾ Sealing is included in delivery				
• TG 52/50, PN 40	R10	✓	✓	✓
• TG 52/150, PN 40	R11	✓	✓	✓

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut) • DN 50, PN 25 • DN 80, PN 25	N04 N06	✓ ✓	✓ ✓	✓ ✓
Tri-Clamp connection according DIN 32676/ISO 2852 3A compliant ⁶⁾				
• DN 50/2", PN 16	N14	✓	✓	✓
• DN 65/2.5", PN 10	N15	✓	✓	✓
• Clamp 2" ISO 2852 PN 16	N22	✓	✓	✓
• Clamp 3" ISO 2852 PN 16	N23	✓	✓	✓
Varivent connection 3A and EHEDG compliant ⁶⁾				
• Type N = 68 for Varivent housing DN 40 ... 125 and 1½" ... 6", PN 40	N28	✓	✓	✓
Temperature decoupler up to 200 °C⁷⁾ for front-flush diaphragm version	P00	✓	✓	✓
Sanitary process connection to DRD • DN 50, PN 40	M32	✓	✓	✓
SMS threaded socket				
• 2"	M73	✓	✓	✓
• 2½"	M74	✓	✓	✓
• 3"	M75	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect screw connection 3A and EHEDG compliant ⁶⁾				
• DN 50, PN 16	Q05	✓	✓	✓
• DN 65, PN 16	Q06	✓	✓	✓
• DN 80, PN 16	Q07	✓	✓	✓
• DN 100, PN 16	Q08	✓	✓	✓
• DN 2", PN 16	Q13	✓	✓	✓
• DN 2½", PN 16	Q14	✓	✓	✓
• DN 3", PN 16	Q15	✓	✓	✓
• DN 4", PN 16	Q16	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect S flange connection • DN 2", PN 16	Q72	✓	✓	✓

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

1

Selection and Ordering data	Order code			Selection and Ordering data	Order code				
<i>Further designs</i>		HART	PA	FF	<i>Additional data</i>		HART	PA	FF
Add "-Z" to Article No. and specify Order code.					Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Aseptic threaded socket to DIN 11864-1 Form A 3A compliant ⁶⁾					Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ⁸⁾	
• DN 50, PN 25	N33	✓	✓	✓	Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
• DN 65, PN 25	N34	✓	✓	✓	Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
• DN 80, PN 25	N35	✓	✓	✓	Entry of HART TAG Max. 8 characters, specify in plain text: Y17:	Y17	✓		
• DN 100, PN 25	N36	✓	✓	✓	Setting of the display in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ¹⁾ , inH ₂ O ¹⁾ , ftH ₂ O ¹⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %) ref. temperature 20 °C	Y21	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A 3A compliant ⁶⁾					Setting of the display in non-pressure units⁹⁾ Specify in plain text: Y22: up to l, m ³ , m, USg, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
• DN 50, PN 16	N43	✓	✓	✓	Preset bus address (possible between 1 ... 126) Specify in plain text: Y25:	Y25		✓	✓
• DN 65, PN 16	N44	✓	✓	✓					
• DN 80, PN 16	N45	✓	✓	✓					
• DN 100, PN 16	N46	✓	✓	✓					
Aseptic flange with groove to DIN 11864-2 Form A 3A compliant ⁶⁾									
• DN 50, PN 16	N43 + P11	✓	✓	✓					
• DN 65, PN 16	N44 + P11	✓	✓	✓					
• DN 80, PN 16	N45 + P11	✓	✓	✓					
• DN 100, PN 16	N46 + P11	✓	✓	✓					
Aseptic clamp with groove to DIN 11864-3 Form A 3A compliant ⁶⁾									
• DN 50, PN 25	N53	✓	✓	✓					
• DN 65, PN 25	N54	✓	✓	✓					
• DN 80, PN 16	N55	✓	✓	✓					
• DN 100, PN 16	N56	✓	✓	✓					

Factory mounting of valve manifolds, see accessories.

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

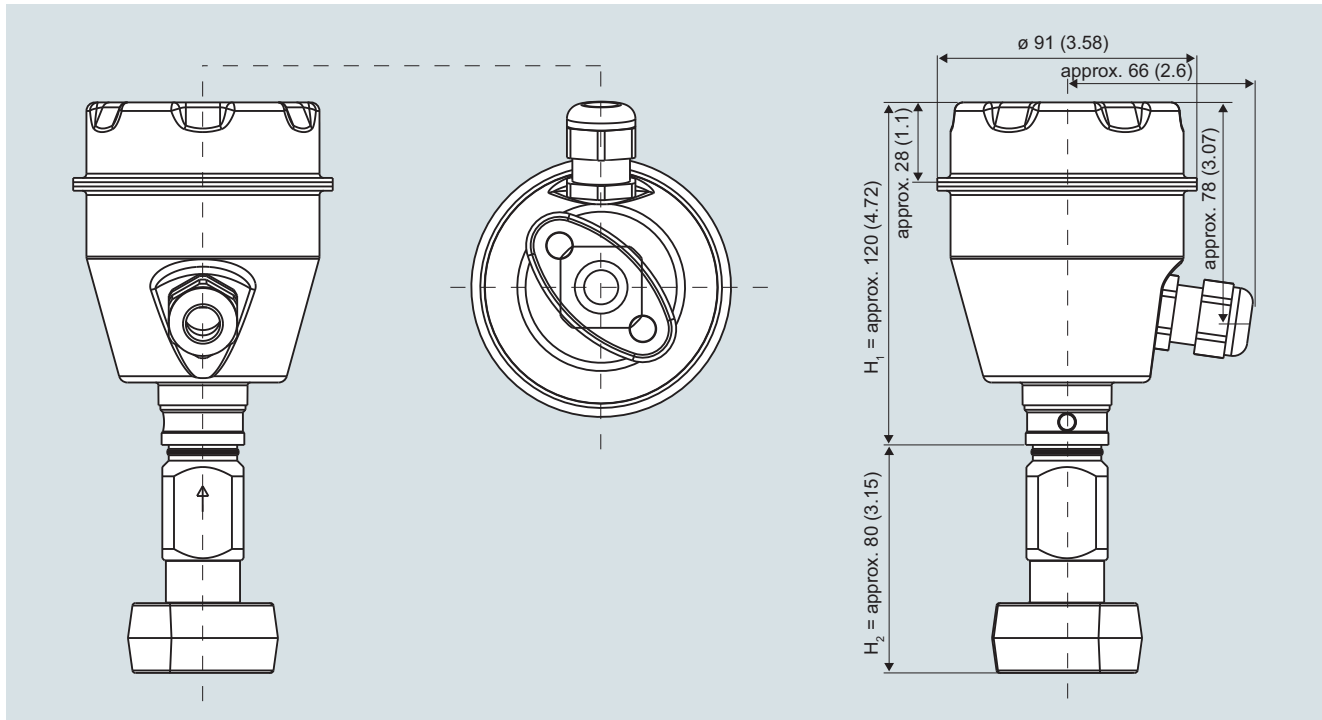
✓ = available

Ordering example

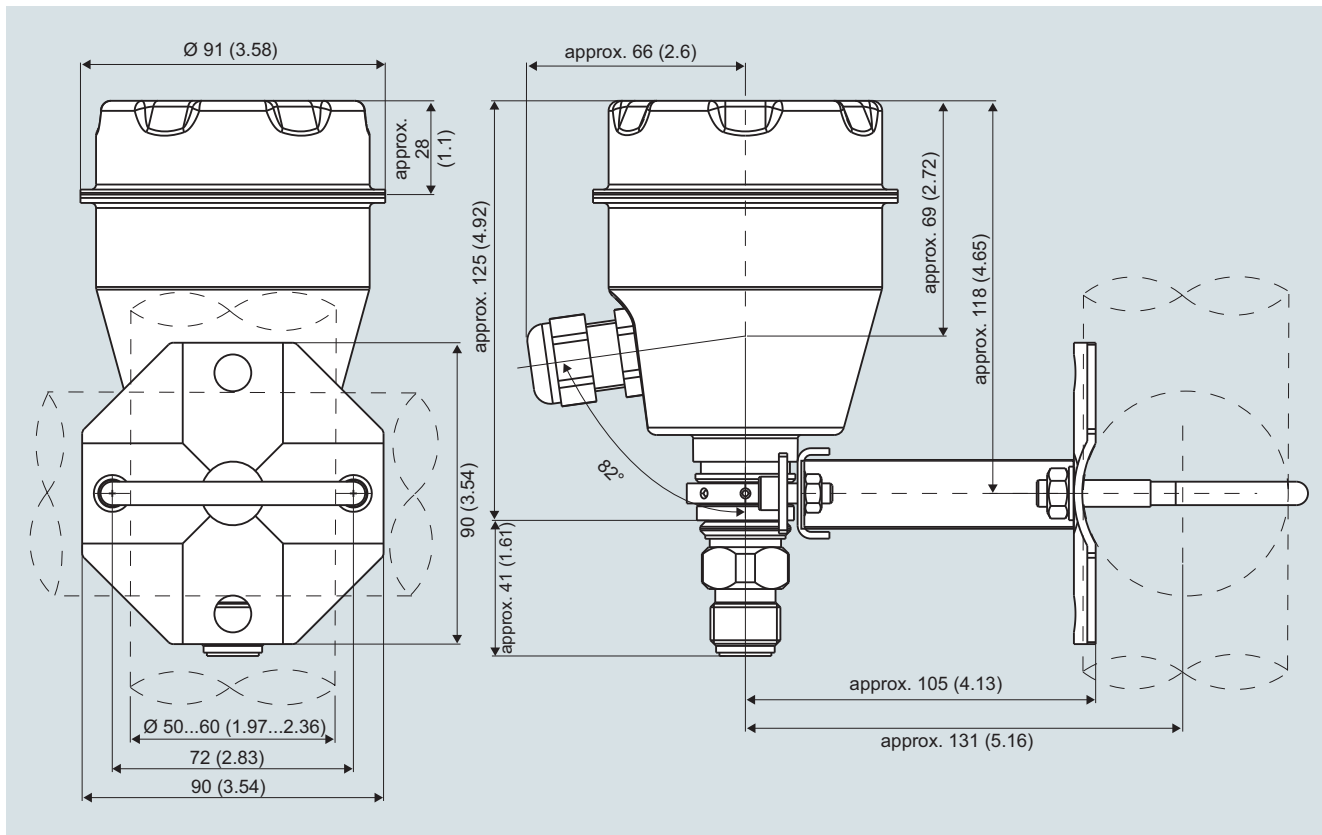
Item line: 7MF8023-1DB24-1AB7-Z
B line: A02 + Y01 + Y21
C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)
C line: Y21: bar (psi)

- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- Special seal in Viton included in the scope of delivery (FKM; temperature range -20 ... +200 °C (-4 ... +392 °F))
- Cannot be combined with Order code P00. Can only be ordered with silicone oil measuring cell filling.
- The weldable socket can be ordered under accessories.
- 3A compliance ensured only when 3A compliant sealing rings are used.
- Conformity according to 3A and EHEDG. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).
- Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
- Preset values can only be changed over SIMATIC PDM.

Dimensional drawings



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

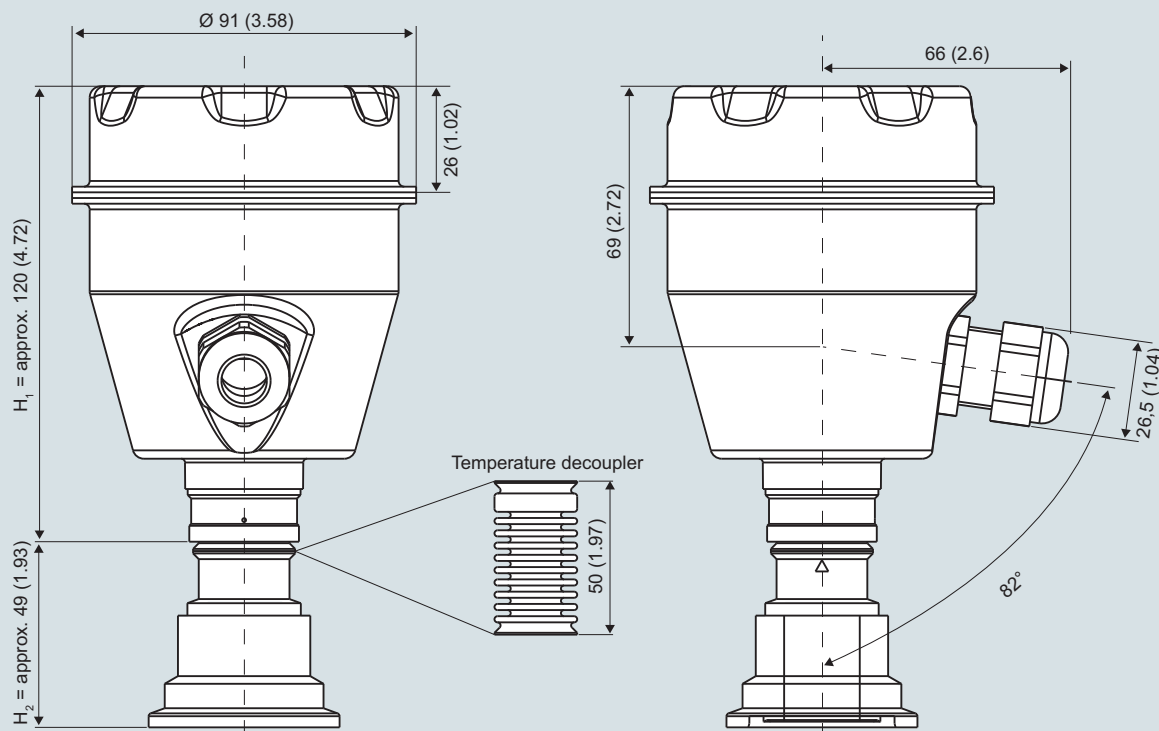


SITRANS P300, process connection M20 x 1.5, with mounted mounting bracket, dimensions in mm (inch)

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure



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

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

H_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.

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

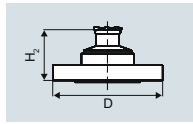
SITRANS P300 for gauge and absolute pressure

1

Flanges according to EN and ASME

Flange according to EN

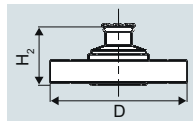
EN 1092-1



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

Flanges according to ASME

ASME B16.5

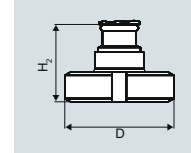


Order code	DN	PN	ØD	H ₂
M40	1"	150	110 mm (4.3")	Approx. 52 mm (2")
M41	1½"	150	130 mm (5.1")	
M42	2"	150	150 mm (5.9")	
M43	3"	150	190 mm (7.5")	
M44	4"	150	230 mm (9.1")	
M46	1½"	300	155 mm (6.1")	
M47	2"	300	165 mm (6.5")	
M48	3"	300	210 mm (8.1")	
M49	4"	300	255 mm (10.0")	

NuG and pharmaceutical connections

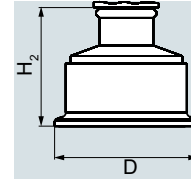
Connections to DIN

DIN 11851 (milk pipe union with slotted union nut)



Order code	DN	PN	ØD	H ₂
N04	50	25	92 mm (3.6")	Approx. 52 mm (2")
N06	80	25	127 mm (5.0")	

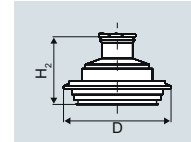
Tri-Clamp nach DIN 32676



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

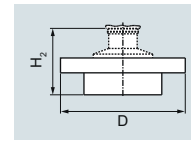
Other connections

Varivent connection



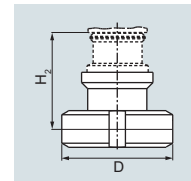
Order code	DN	PN	ØD	H ₂
N28	40 ... 125	40	84 mm (3.3")	Approx. 52 mm (2")

Sanitary process connection to DRD



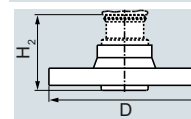
Order code	DN	PN	ØD	H ₂
M32	50	40	105 mm (4.1")	Approx. 52 mm (2")

Sanitary process screw connection to NEUMO Bio-Connect



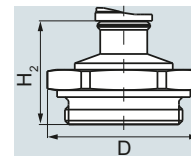
Order code	DN	PN	ØD	H ₂
Q05	50	16	82 mm (3.2")	Approx. 52 mm (2")
Q06	65	16	105 mm (4.1")	
Q07	80	16	115 mm (4.5")	
Q08	100	16	145 mm (5.7")	
Q13	2"	16	82 mm (3.2")	
Q14	2½"	16	105 mm (4.1")	
Q15	3"	16	105 mm (4.1")	
Q16	4"	16	145 mm (5.7")	

Sanitary process connection to NEUMO Bio-Connect S flange connection



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

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



Order code	DN	PN	ØD	H ₂
R01	¾"	60	37 mm (1.5")	Approx. 45 mm (1.8")
R02	1"	60	48 mm (1.9")	Approx. 47 mm (1.9")
R04	2"	60	78 mm (3.1")	Approx. 52 mm (2")

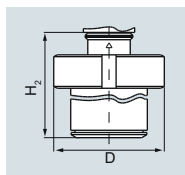
Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

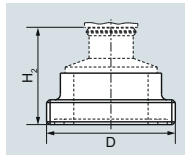
1

Tank connection TG 52/50 and TG52/150



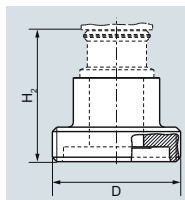
Order code	DN	PN	∅D	H ₂
R10	25	40	63 mm (2.5")	Approx. 63 mm (2.5")
R11	25	40	63 mm (2.5")	Approx. 170 mm (6.7")

SMS threaded socket



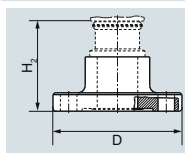
Order code	DN	PN	∅D	H ₂
M73	2"	25	70 x 1/6 mm	Approx. 52 mm (2")
M74	2½"	25	85 x 1/6 mm	
M75	3"	25	98 x 1/6 mm	

Aseptic threaded socket to DIN 11864-1 Form A



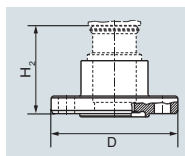
Order code	DN	PN	∅D	H ₂
N33	50	25	78 x 1/6"	Approx. 52 mm (2")
N34	65	25	95 x 1/6"	
N35	80	25	110 x ¼"	
N36	100	25	130 x ¼"	

Aseptic flange with notch to DIN 11864-2 Form A



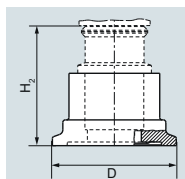
Order code	DN	PN	∅D	H ₂
N43	50	16	94	Approx. 52 mm (2")
N44	65	16	113	
N45	80	16	133	
N46	100	16	159	

Aseptic flange with groove to DIN 11864-2 Form A



Order code	DN	PN	∅D	H ₂
N43 + P11	50	16	94	Approx. 52 mm (2")
N44 + P11	65	16	113	
N45 + P11	80	16	133	
N46 + P11	100	16	159	

Aseptic clamp with groove to DIN 11864-3 Form A



Order code	DN	PN	∅D	H ₂
N53	50	25	77.5	Approx. 52 mm (2")
N54	65	25	91	
N55	80	16	106	
N56	100	16	130	

Pressure Measurement

Pressure transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 Accessories/Spare parts

1

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
<i>Spare parts / Accessories</i>		Documentation	
Mounting bracket and fastening parts kit made of stainless steel	7MF8997-1AA	The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/processinstrumentation/documentation	
Lid without window gasket not included	7MF8997-1BA	Compact operating instructions	
Lid with glass window gasket not included	7MF8997-1BD	• English, German, Spanish, French, Italian, Dutch	A5E03434657
NBR enclosure sealing	7MF8997-1BG	Certificates (order only via SAP) instead of Internet download	
Measuring point label unlabeled	7MF8997-1CA	• hard copy (to order)	A5E03252406
Cable gland • metal • plastic (blue)	7MF8997-1EA 7MF8997-1EB	• on DVD (to order)	A5E03252407
Weldable sockets for PMC connection • PMC Style Standard: Thread 1½" • PMC Style Minibolt: front-flush 1"	7MF4997-2HA 7MF4997-2HB	HART modem with USB interface	7MF4997-1DB
Gaskets for PMC connection (packing unit = 5 units) • PTFE seal for PMC Style Standard: Thread 1½" • Gasket made of Viton for PMC Style Minibolt: front-flush 1"	7MF4997-2HC 7MF4997-2HD	Power supply units see Chap. 7 "Supplementary Components".	
Weldable socket for TG 52/50 and TG 52/150 connection • TG 52/50 connection • TG5 2/150 connection	7MF4997-2HE 7MF4997-2HF		
Seals for TG 52/50 and TG 52/150 made of silicone	7MF4997-2HG		
Seals for flange connection with front-flush diaphragm Material FKM (Viton); temperature range: -20 ... +200 °C (-4 ... +392 °F), 10 units • DN 25, PN 40 (M11) • 1", class 150 (M40)	7MF4997-2HH 7MF4997-2HK		

Pressure Measurement

Pressure transmitters
for food, pharmaceuticals and biotechnology

1

SITRANS P300 - Factory-mounting of valve manifolds on transmitters

Overview

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

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

Design

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

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

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

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

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

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

Selection and Ordering data

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



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P300 7MF802-...1.-...	T03
----------------------------------	------------

With process connection female thread 1/2-14 NPT in-sealed with PTFE sealing tape

Delivery incl. high-pressure test certified by test report to EN 10204-2.2

Further designs:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
--	------------

Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12
---	------------

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



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P300 7MF802-...0.-...	T02
----------------------------------	------------

with process connection collar G1/2 A to EN 837-1 with gasket made of PTFE between valve manifold and transmitter

Alternative sealing material:

- | | |
|-----------------------------------|------------|
| • Soft iron | A70 |
| • Stainless steel, Mat. No. 14571 | A71 |
| • copper | A72 |

Delivery incl. high-pressure test certified by test report to EN 10204-2.2

Further designs:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
--	------------

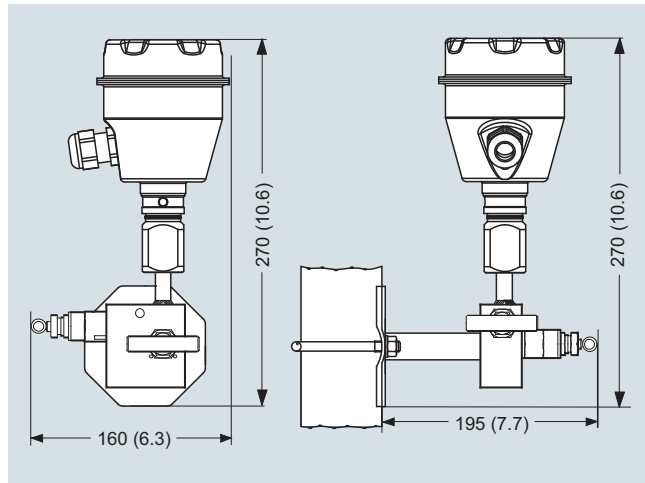
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12
---	------------

Dimensional drawings

Valve manifolds mounted on SITRANS P300



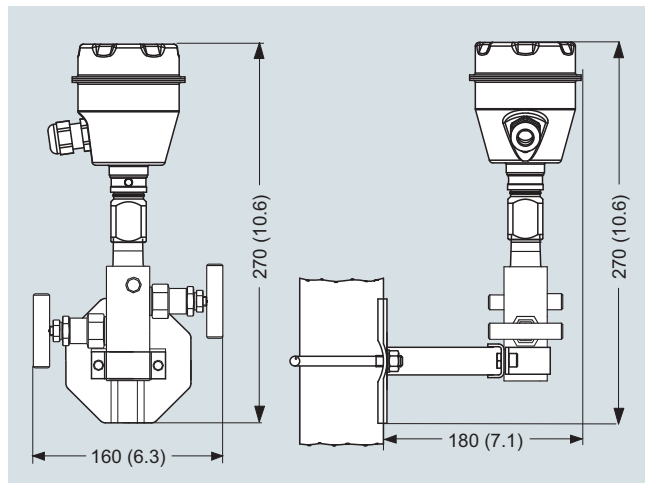
7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters



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



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



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