



SITRANS P transmitters for pressure, absolute pressure, diff. pressure, flow, level

DS III series

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Fig. 1/20 SITRANS P transmitters, DS III series for pressure, absolute pressure, differential pressure, flow and level, with visible digital display

Application

Various versions of the SITRANS P transmitter, DS III series, are available with a two-wire circuit. The output signal is a load-independent direct current of 4 to 20 mA linearly proportional to the input pressure.

Transmitters conforming to the type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or zone 0. The transmitters are provided with an EU prototype test certificate and comply with the corresponding harmonized European standards of the ATEX.

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

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

The transmitters can be programmed locally using three input keys or externally via HART. The following table describes the fundamental parameters. Further parameters for special applications are accessible via HART.

Physical dimensions available for the display

Dimension group	Physical dimension
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, hPa, 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, inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, in ³ , ft ³ , yd ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Volume flow	m ³ /s, m ³ /h, m ³ /d, l/s, l/min, ft ³ /s, ft ³ /min, ft ³ /d, US gallon/s, US gallon/min
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/min, t/h, t/d, lb/s, lb/min, lb/h, lb/d, STon/min, STon/h, STon/d, LTon/h, LTon/d
Total mass flow	kg, g, t, oz, lb, STon, LTon
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Elements for parameterization of transmitter

Parameterization using	Input keys	HART communication
Start-of-scale value	●	●
Full-scale value	●	●
Electric damping	●	●
Start-of-scale value without application of a pressure ("Blind setting")	●	●
Full-scale value without application of a pressure ("Blind setting")	●	●
Zero adjustment (correction of position)	●	●
Current transmitter	●	●
Fault current	●	●
Disabling of keys, write protection	●	● ¹⁾
Type of dimension and actual dimension	●	●
Characteristic (linear, square-rooted)	● ²⁾	● ²⁾
Input of characteristic		●
Freely-programmable LCD		●
Diagnostics		●
<ul style="list-style-type: none"> • Event counter • Slave pointer • Maintenance timer • Simulation functions • Display of zero correction • Limit transmitter • Saturation alarm 		●

¹⁾ Cancel apart from write protection

²⁾ Only differential pressure

● Possible



Transmitter for pressure

This type of transmitter measures the pressure of corrosive and non-corrosive gases, vapors and liquids. Spans are possible from 0.01 to 400 bar (0.145 to 5802 psi).

Maximum working pressure for pressure transmitters

Span	Maximum working pressure
0.01 to 1 bar (0.15 to 14.5 psi)	6 bar (87 psi)
0.04 to 4 bar (0.58 to 58 psi)	10 bar (145 psi)
0.16 to 16 bar (2.32 to 232 psi)	32 bar (464 psi)
0.6 to 63 bar (9.1 to 914 psi)	100 bar (1450 psi)
1.6 to 160 bar (23.2 to 2320 psi)	250 bar (3626 psi)
4.0 to 400 bar (58.0 to 5802 psi)	500 bar (7252 psi)

Transmitter for absolute pressure

This type of transmitter measures the absolute pressure of corrosive and non-corrosive gases, vapors and liquids.

Two series are available:

- "Pressure" series
- "Differential pressure" series

The "Differential pressure" series has a higher pressure limit for the medium.

Spans are possible from 8.3 mbar to 160 bar (0.12 to 2320 psi).

Maximum working pressure for absolute pressure transmitters from the "Pressure" series (7MF4233)

Span	Maximum working pressure
8.3 to 250 mbar (0.12 to 3.6 psi)	6 bar (87 psi)
43.0 to 1,300 mbar (0.62 to 18.9 psi)	10 bar (145 psi)
160.0 to 5,000 mbar (2.32 to 72.5 psi)	30 bar (435 psi)
1,000.0 to 30,000 mbar (14.5 to 435 psi)	100 bar (1450 psi)

Maximum working pressure for absolute pressure transmitters from the "Differential pressure" series (7MF4333)

Span	Maximum working pressure
8.3 to 250 mbar (0.12 to 3.6 psi)	32 bar (464 psi)
43 to 1,300 mbar (0.62 to 18.9 psi)	32 bar (464 psi)
160 to 5,000 mbar (2.32 to 72.5 psi)	32 bar (464 psi)
1,000 to 30,000 mbar (14.5 to 435 psi)	160 bar (2320 psi)
5,300 to 100,000 mbar (76.9 to 1450 psi)	160 bar (2320 psi)

with M10 and $\frac{7}{16}$ -20 UNF thread in the process flanges

Transmitter for differential pressure and flow

This type of transmitter is used to measure

- the differential pressure
- a small positive or negative pressure
- the flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device)

Spans are possible from 1 mbar to 30 bar (0.0145 to 435 psi).

Maximum working pressure for differential pressure and flow transmitters

Span	Maximum working pressure (nominal pressure)	
	PN (MWP) (7MF4433)	PN (MWP) (7MF4533)
1.0 to 20 mbar (0.0145 to 0.29 psi)	32 bar (464 psi)	-
1.0 to 60 mbar (0.0145 to 0.87 psi)	160 bar (2320 psi)	-
2.5 to 250 mbar (0.036 to 3.63 psi)	160 bar (2320 psi)	420 bar (6092 psi)
6.0 to 600 mbar (0.087 to 8.7 psi)	160 bar (2320 psi)	420 bar (6092 psi)
16.0 to 1,600 mbar (0.23 to 23.3 psi)	160 bar (2320 psi)	420 bar (6092 psi)
50.0 to 5,000 mbar (0.73 to 72.5 psi)	160 bar (2320 psi)	420 bar (6092 psi)
300.0 to 30,000 mbar (4.35 to 435 psi)	160 bar (2320 psi)	420 bar (6092 psi)

Transmitter for level

This type of transmitter with mounting flange measures the level of corrosive and non-corrosive liquids in open or closed containers. Spans are possible between 25 mbar (0.36 psi) and 5 bar (72.5 psi). The nominal mounting flange diameter is DN 80 or DN 100 (3 or 4 inch).

In the case of level measurements in open containers, the low-pressure connection of the measuring cell remains open (measurement with respect to atmosphere), while for measurements in closed containers, this connection must be connected to the container in order to compensate the static pressure.

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

Maximum working pressure for level transmitters

Span	Maximum working pressure (nominal pressure)
25 to 250 mbar (0.36 to 3.63 psi)	See mounting flange on page 1/39
25 to 600 mbar (0.36 to 8.7 psi)	See mounting flange on page 1/39
53 to 1,600 mbar (0.77 to 23.2 psi)	See mounting flange on page 1/39
160 to 5,000 mbar (2.32 to 72.5 psi)	See mounting flange on page 1/39



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Design and mode of operation

The SITRANS P transmitter, DS III series, is immediately ready for operation following installation. The adjustable span corresponds to the data on the rating plate. If a customer-specific setting is made in the factory, the start-of-scale and full-scale values are printed on the rating plate.

If necessary, the parameters can also be changed during commissioning using simple input operations on the transmitter.

Design

The transmitter consists of various components depending on the customer-specific order. The possible versions are listed in the ordering information.

The rating plate (3, Fig. 1/21) with the Order No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover is screwed on at the front and rear. The front cover (6) can be fitted with a viewing pane so that the measured values can be read directly on the digital display. The inlet (4) to the electrical junction box is located either on the left or right side. The unused opening in each case is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical junction box for the power supply and screen is accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (1). This is protected from rotating by a locking screw (8). The modular design of the SITRANS P, DS III series, means that the measuring cell and electronics can be replaced if necessary. The set parameter data are retained.

At the top of the housing is a plastic cover (5). The input keys are located underneath this cover.

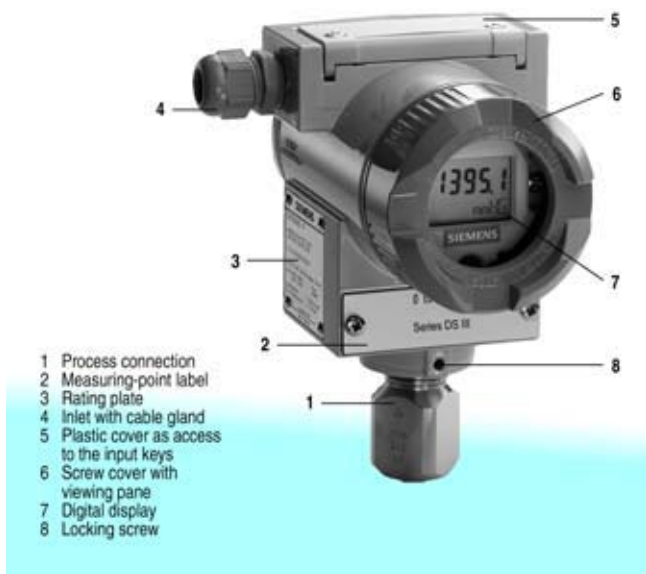


Fig. 1/21 SITRANS P transmitter for pressure, DS III series, front view

Mode of operation

Mode of operation of the electronics

The input variable is converted by the sensor (1, Fig. 1/22) into an electric signal which is amplified by the instrument amplifier (2) and digitized in an analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into the output current of 4 to 20 mA. A diode circuit (10) protects against incorrect polarity. The data specific to the measuring cell, the electronics data, and the parameter data are stored in two non-volatile memories (6). The first memory is coupled to the measuring cell, the second to the electronics. Replacement of the electronics and/or the measuring cell is therefore possible (modular design).

The three input keys (8) can be used to directly parameterize the transmitter at the position of measurement, and also to view results, error messages and operating modes on the digital display (9). The HART modem (7) permits parameterization using a protocol according to the HART specification.

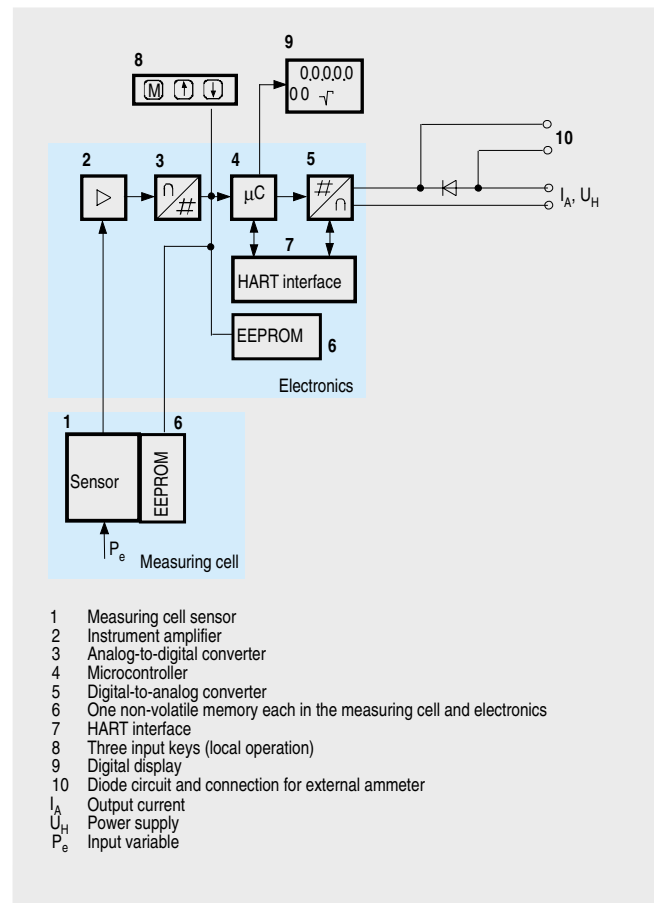


Fig. 1/22 SITRANS P transmitter, DS III series, electronics



SITRANS P transmitter, DS III series, for pressure

The pressure p_e is applied via the process connection (2, Fig. 1/23) to the measuring cell (1). It is transmitted further via the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. The resistance of four piezo-resistors fitted in the diaphragm in a bridge circuit thus changes. This change in resistance results in a bridge output voltage proportional to the input pressure.

The pressure transmitters with spans ≤ 63 bar (≤ 914 psi) measure the input pressure compared to atmospheric, transmitters with spans ≥ 160 (≥ 2320 psi) compared to a vacuum.

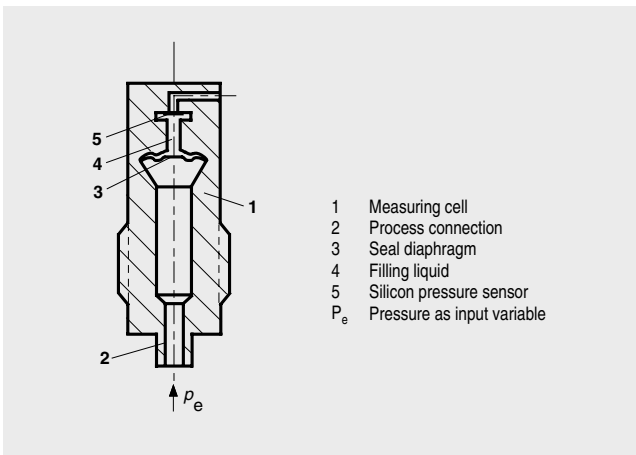


Fig. 1/23 Measuring cell for pressure, functional diagram

SITRANS P transmitter, DS III series, for absolute pressure, from the differential pressure series

The absolute pressure is transmitted via the seal diaphragm (6, Fig. 1/25) and the filling liquid (8) to the silicon pressure sensor (3). If the measuring limits are exceeded, the overload diaphragm (2) is flexed until the seal diaphragm rests on the body of the measuring cell (7), thus protecting the silicon pressure sensor from overloads. The difference in pressure between the input pressure (p_e) and the reference vacuum (1) on the low-pressure side of the measuring cell flexes the measuring diaphragm. The resistance of four piezo-resistors fitted in the diaphragm in a bridge circuit thus changes. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

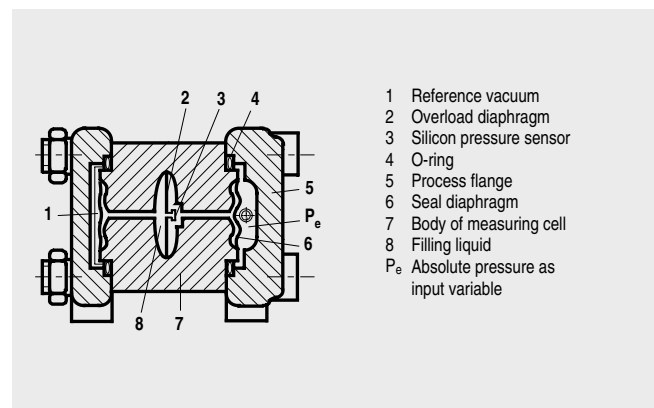


Fig. 1/25 Measuring cell for absolute pressure from differential pressure series, functional diagram

SITRANS P transmitter, DS III series, for absolute pressure, from the pressure series

The absolute pressure is transmitted via the seal diaphragm (3, Fig. 1/24) and the filling liquid (4) to the silicon absolute pressure sensor (5) whose measuring diaphragm is then flexed. The resistance of four piezo-resistors fitted in the diaphragm in a bridge circuit thus changes. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

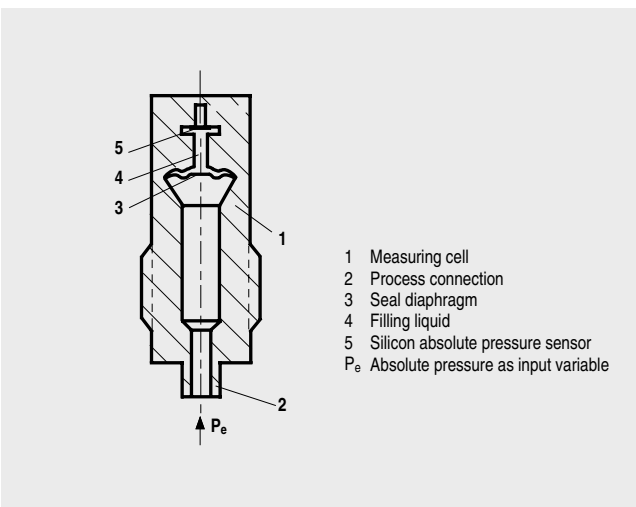


Fig. 1/24 Measuring cell for absolute pressure from the pressure series, functional diagram

SITRANS P transmitter, DS III series, for differential pressure and flow

The differential pressure is transmitted via the seal diagrams (1, Fig. 1/26) and the filling liquid (7) to the silicon pressure sensor (4). If the measuring limits are exceeded, the overload diaphragm (3) is flexed until one of the seal diagrams rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads. The measuring diaphragm is flexed by the applied differential pressure. The resistance of four piezo-resistors fitted in the diaphragm in a bridge circuit thus changes. This change in resistance results in a bridge output voltage proportional to the differential pressure.

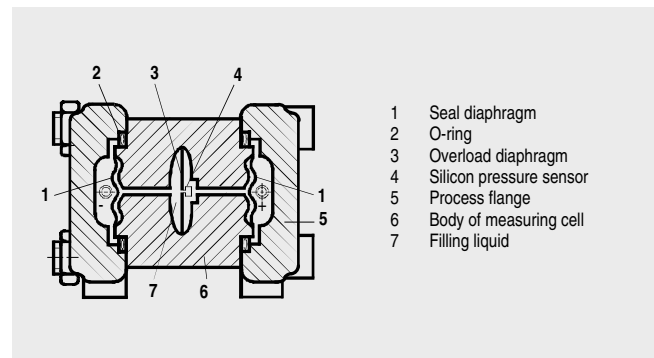


Fig. 1/26 Measuring cell for differential pressure and flow, functional diagram



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SITRANS P transmitter, DS III series, for level

The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell via the seal diaphragm on the mounting flange (2, Fig. 1/27). The differential pressure applied to the measuring cell is transmitted via the seal diaphragm (3) and the filling liquid (9) to the silicon pressure sensor (6). If the measuring limits are exceeded, the overload diaphragm (5) is flexed until the seal diaphragm rests on the measuring cell body (4), thus protecting the silicon pressure sensor from overloading. The measuring diaphragm is flexed by the differential pressure. The resistance of four piezo-resistors fitted in the diaphragm in a bridge circuit thus changes. This change in resistance results in a bridge output voltage proportional to the differential pressure.

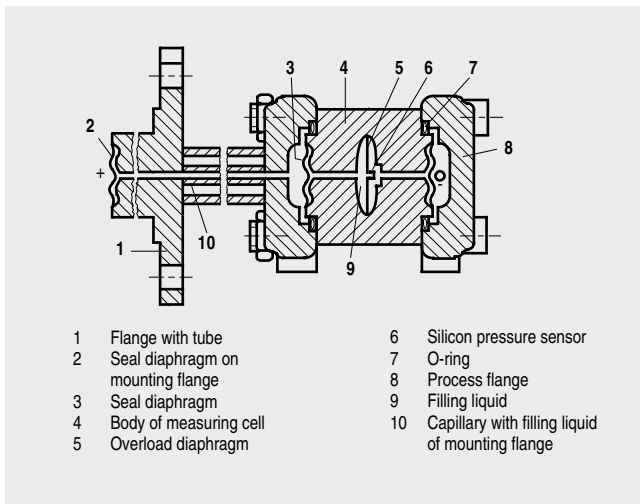


Fig. 1/27 Measuring cell for level, functional diagram

Parameterization

Depending on the version, there are different possibilities for parameterizing the transmitter and for setting or scanning the parameters.

Parameterization using the input keys (local operation)

The input keys can be used to simply set the most important parameters without any additional equipment.

Parameterization using HART communication

When parameterizing with the HART communicator, the connection is made directly to the two-wire system (Fig. 1/28). When parameterizing with a laptop or PC, the connection is made via a HART modem (Fig. 1/29).

The signals required for communication according to the HART protocol 5.x are superimposed on the output current according to frequency shift keying (FSK).

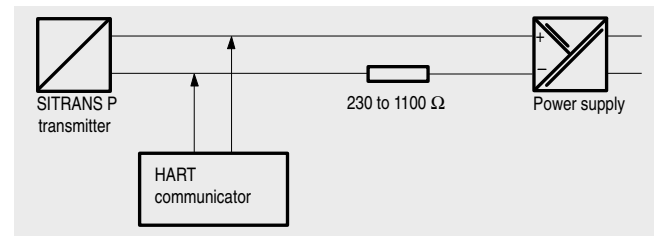


Fig. 1/28 Communication between HART communicator and transmitter

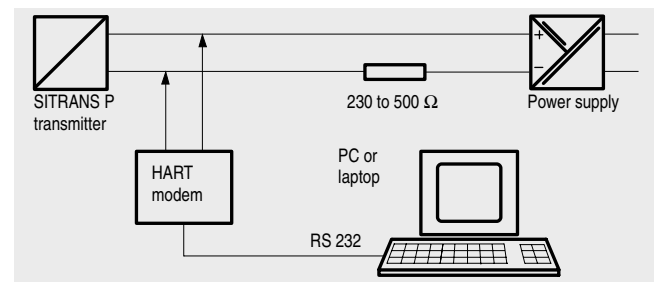


Fig. 1/29 Communication between PC or laptop and transmitter



Technical data

SITRANS P, DS III series, for	Pressure 7MF4033	Absolute pressure		Differential pressure and flow 7MF4433/ 7MF4533	Level 7MF4633
		Pressure trans- mitter series 7MF4233	Diff. pressure transmitter series 7MF4333		
Application			See page 1/20		
Mode of operation			See page 1/22		
Measuring principle			Piezo-resistive		
Input					
Measured variable	Pressure	Absolute pressure		Differential pressure and flow	Level
Measuring range					
• Span (continuously adjustable)	0.01 to 400 bar (0.145 to 5802 psi)	8.3 mbar to 30 bar (0.12 to 435 psi)	8.3 mbar to 160 bar (0.12 to 2320 psi)		25 mbar to 5 bar (0.36 to 72.5 psi)
- Nominal pressure PN 32 (MWP 464 psi)				1 mbar to 20 mbar (0.0145 to 0.29 psi)	
- Nominal pressure PN 160 (MWP 2320 psi)				1 mbar to 30 bar (0.0145 to 435 psi)	
- Nominal pressure PN 420 (MWP 6092 psi)				2.5 mbar to 30 bar (0.036 to 435 psi)	
• Lower measuring limit					
- Measuring cell with silicone oil filling	30 mbar (0.44 psi) (absolute)	0 mbar (0 psi) (absolute)		-100% ¹⁾ of max. span or 30 mbar (0.44 psi) (absolute)	-100% of max. span or 30 mbar (0.44 psi) (abs.) depend- ing on mounting flange
- Measuring cell with inert filling liquid					
For process temperature -20 °C < ϑ ≤ 60 °C (- 4 °F < ϑ ≤ +140 °F)		30 mbar (0.44 psi) (absolute)		-100% ¹⁾ of max. span or 30 mbar (0.44 psi) (absolu- te)	
For process temperature +60 °C < ϑ ≤ 100 °C (max. +85 °C for 30-bar measuring cell) (140 °F < ϑ ≤ 212 °C (max. +185 °F for 435 psi measuring cell))		30 mbar (abs.) + 20 mbar (abs.) · (ϑ - 60 °C)/°C (0.44 psi (abs.) + 0.29 psi (abs.) · (ϑ - 108 °F)/°F)		• -100% ¹⁾ of max. span or • 0 mbar (abs.) + 20 mbar (abs.) x (ϑ - 60 °C)/°C • (0.44 psi (abs.) + 0.29 psi (abs.) · (ϑ - 108 °F)/°F)	
• Upper measuring limit		100% of max. span (max. 160 bar (2320 psi) with oxygen measurement and inert filling liquid)			100% of max. span
• Start-of-scale (continuously adjustable)		Between the measuring limits			
Output					
Output signal		4 to 20 mA			
• Lower limit (continuously adjustable)		3.55 mA, factory-set to 3.84 mA			
• Upper limit (continuously adjustable)		23.0 mA, factory-set to 20.5 mA or optional 22.0 mA			
• Ripple (without HART communication)		$I_{pp} \leq 0.5\%$ of max. output current			
• Electric damping					
- Adjustable time constant (T ₆₃)		0 to 100 s in steps of 0.1 s, factory-set to 0.1 s			
• Current transmitter		Adjustable from 3.55 to 23 mA			
• Signal on alarm		Adjustable from 3.55 to 23 mA			
Load					
• Without HART communication		$R_B \leq (U_H - 10.5 \text{ V}) / 0.023 \text{ A}$ in Ω , U_H : power supply in V			
• With HART communication		$R_B = 230$ to 500Ω (SIMATIC PDM) / 230 to 1100Ω (HART communicator)			
Characteristic		Linear rising or falling or square-rooted, rising			

¹⁾ -33% for 30-bar (435 psi) measuring cell



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SITRANS P, DS III series, for	Pressure 7MF4033	Absolute pressure		Differential pressure and flow 7MF4433/ 7MF4533	Level 7MF4633
		Pressure trans- mitter series 7MF4233	Diff. pressure transmitter series 7MF4333		
Accuracy	Increasing characteristic, start-of-scale value 0 bar (0 psi), stainless steel seal diaphragm (with level: mounting flange without tube), silicone oil filling and room temperature (25 °C (77 °F)) r = max. span/set span = span ratio				
Reference conditions					
Error in measurement with fixed-point setting (including hysteresis and repeatability)					
- Linear characteristic					
r ≤ 10	≤ (0.0029 · r + 0.071)%			≤ 0.15%	
10 < r ≤ 30	≤ (0.0045 · r + 0.071)%			≤ 0.3%	
30 < r ≤ 100	≤ (0.005 · r + 0.05 %)			≤ (0.005 · r + 0.05%)	≤ (0.0075 · r + 0.075%)
- Square-root characteristic					
Flow > 50%				≤ 0.1% at r ≤ 10 ≤ 0.2% at 10 < r ≤ 30	
Flow 25 to 50%				≤ 0.2% at r ≤ 10 ≤ 0.4% at 10 < r ≤ 30	
• Repeatability	Included in error in measurement				
• Hysteresis	Included in error in measurement				
Response time (T ₆₃ , without electric damping)	Approx. 0.2 s	Approx. 0.2 s		Approx. 0.2 s, approx. 0.3 s with 20- and 60-mbar (0.29 and 0.87 psi) measuring cells	Approx. 0.2 s
Long-term drift (change in temperature ±30 °C (±54 °F))	≤ (0.25 · r)% per 5 years	≤ (0.2 · r)% per year		≤ (0.25 · r)% per 5 years, max. static pressure 70 bar (1015 psi)	
- 20-mbar (0.29 psi) measuring cell				≤ (0.2 · r)% per year	
Ambient temperature effect					
• At -10 to +60 °C (14 to 140 °F)	≤ (0.1 · r + 0.2)% ¹⁾				
- 250-mbar (3.63 psi) measuring cell				≤ (0.5 · r + 0.2) ²⁾ %	
- 600-mbar (8.7 psi) measuring cell				≤ (0.3 · r + 0.2) ²⁾ %	
- 1,600- and 5,000-mbar (23.2 and 72.5 psi) measuring cells				≤ (0.25 · r + 0.2) ²⁾ %	
• At -40 to -10 °C and +60 to +85 °C (-40 to +14 °F and 140 to 185 °F)	≤ (0.1 · r + 0.15)% / 10 K ¹⁾ ≤ (0.1 · r + 0.15)% / 18 °F ¹⁾				
- 250-mbar (3.63 psi) measuring cell				≤ (0.25 · r + 0.15) ³⁾ % / 10 K ≤ (0.25 · r + 0.15) ³⁾ % / 18 °F	
- 600-mbar (8.7 psi) measuring cell				≤ (0.15 · r + 0.15) ³⁾ % / 10 K ≤ (0.15 · r + 0.15) ³⁾ % / 18 °F	
- 1,600- and 5,000-mbar (23.2 and 72.5 psi) measuring cells				≤ (0.12 · r + 0.15) ³⁾ % / 10 K ≤ (0.12 · r + 0.15) ³⁾ % / 18 °F	
Influence of static pressure					
• On start-of-scale				≤ (0.15 · r)% per 100 bar (1450 psi)	
- 20-mbar (0.29 psi) measuring cell				≤ (0.15 · r)% per 32 bar (464 psi)	
- 250-mbar (3.63 psi) measuring cell				≤ (0.3 · r)% per nominal pressure (PN (MWP))	
- 600-mbar (8.7 psi) measuring cell				≤ (0.15 · r)% per nominal pressure (PN (MWP))	
- 1,600- and 5,000-mbar (23.2 and 72.5 psi) measuring cells				≤ (0.1 · r)% per nominal pressure (PN (MWP))	

¹⁾ Twice the value with 20-mbar (0.29 psi) measuring cell.

²⁾ 0.4 instead of 0.2 for 10 < r ≤ 30.

³⁾ Twice the value for 10 < r ≤ 30.



SITRANS P, DS III series, for	Pressure 7MF4033	Absolute pressure		Differential pressure and flow 7MF4433/ 7MF4533	Level 7MF4633
		Pressure transmitter series 7MF4233	Diff. pressure transmitter series 7MF4333		
<ul style="list-style-type: none"> On span 				≤ 0.2% per 100 bar (1450 psi)	≤ (0.1 · r)% per nominal pressure (PN (MWP))
- 20-mbar (0.29 psi) measuring cell				≤ 0.2% per 32 bar (464 psi)	
Influence of mounting position	≤ 0.05 mbar (0.000725 psi) per 10° inclination (can be corrected using zero correction)		≤ 0.7 mbar (0.001015 psi) per 10° inclination (can be corrected using zero correction)		Dependent on filling liquid in mounting flange
Influence of power supply	0.005% per 1 V change in voltage				
Rated operating conditions					
Installation conditions					
<ul style="list-style-type: none"> Installation instructions 	Process connection pointing vertically downwards		Any mounting position		Defined by flange
Ambient conditions					
<ul style="list-style-type: none"> Ambient temperature (observe temperature class in potentially explosive atmospheres) 					
- Measuring cell with silicone oil filling 30-bar (435 psi) measuring cell				-40 to +85 °C (-40 to +185 °F)	
- Measuring cell with inert filling liquid				-40 to +85 °C (-40 to +185 °F) (-20 to +85 °C (-4 to +185 °F) with 7MF4533)	
- Digital display				-20 to +85 °C (-4 to +185 °F)	
<ul style="list-style-type: none"> Ambient temperature limits Storage temperature Climate class 				See ambient temperature	
- Condensation				Permissible	
<ul style="list-style-type: none"> Degree of protection (to EN 60 529) Electromagnetic compatibility 				IP 65	
- Emitted interference				To EN 50 081-1	
- Noise immunity				To EN 50 082-2 and NAMUR NE 21	
Medium conditions					
<ul style="list-style-type: none"> Process temperature 					
- Measuring cell with silicone oil filling 30-bar (435 psi) measuring cell				-40 to +100 °C (-40 to +212 °F)	<i>High-press. side:</i> <ul style="list-style-type: none"> p_{abs} ≥ 1 bar: -40 to +175 °C (-40 to +347 °F) p_{abs} < 1 bar: -40 to +80 °C (-40 to +176 °F) <i>Low-press. side:</i> <ul style="list-style-type: none"> -40 to +100 °C (-40 to +212 °F)
- Measuring cell with inert filling liquid 30-bar (435 psi) measuring cell				-40 to +85 °C (-40 to +185 °F) (-20 to +85 °C (-4 to +185 °F) for 7MF4533)	
- Measuring cell with inert filling liquid 30-bar (435 psi) measuring cell				-20 to +100 °C (-4 to +212 °F)	
- Measuring cell with inert filling liquid 30-bar (435 psi) measuring cell				-20 to +85 °C (-4 to +185 °F)	
<ul style="list-style-type: none"> Process temperature limits Maximum working pressure 				See process temperature	
				See page 1/21	Nominal pressure (PN (MWP))
Design					
Weight (without options)		Approx. 1.5 kg (3.3 lb)		Approx. 4.5 kg (9.9 lb)	
<ul style="list-style-type: none"> To DIN (transmitter with mounting flange, without tube) 					Approx. 11 to 13 kg (24.2 to 28.7 lb)
<ul style="list-style-type: none"> To ANSI (transmitter with mounting flange, without tube) 					Approx. 11 to 18 kg (24.2 to 39.7 lb)
Dimensions		See Fig. 1/38	See Fig. 1/39	See Fig. 1/40	See Fig. 1/44



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SITRANS P, DS III series, for	Pressure 7MF4033	Absolute pressure		Differential pressure and flow 7MF4433/ 7MF4533	Level 7MF4633
		Pressure transmitter series 7MF4233	Diff. pressure transmitter series 7MF4333		
Design (continued)					
Material					
• Wetted parts materials					
- Connection shank	Stainless steel, mat. No. 1.4401 or Hastelloy C4, mat. No. 2.4610				
- Oval flange	Stainless steel, mat. No. 1.4401				
- Seal diaphragm	Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819		Stainless steel, mat. No. 1.4404/316L, Hastelloy C276, mat. No. 2.4819, Monel, mat. No. 2.4360, tantalum or gold		
- Process flanges and sealing screw			Stainless steel, mat. No. 1.4408 up to PN 160 (MWP 2320 psi), mat. No. 1.4571/316Ti for PN 420 (MWP 6092 psi), Hastelloy C4, mat. No. 2.4610 or Monel, mat. No. 2.4360		
- O-ring			FPM (Viton) or as option: PTFE, FEP, FEPM and NBR		
- High-pressure side					
Seal diaphragm of mounting flange					Stainless steel 316L, Monel 400, mat. No. 2.4360, Hastelloy B2, mat. No. 2.4617, Hastelloy C276, mat. No. 2.4819, Hastelloy C4, mat. No. 2.4610, tantalum, PTFE, ECTFE
Sealing face					Smooth to EN 1092-1, Form B1, or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 1092-1, Form B2, or ASME B16.5 RFSF for other materials
- Sealing material in the process flanges					
For standard applications					Viton
For vacuum appl. of mounting flange					Copper
- Low-pressure side					
Seal diaphragm					Stainless steel, mat. No. 1.4404/316L
Process flanges and sealing screw					Stainless steel, mat. No. 1.4408
O-ring					FPM (Viton)
• Non-wetted parts materials					
- Electronics housing	Die-cast aluminium, low in copper, GD-ALSi 12, or stainless steel precision casting, mat no. 1.4408, polyester-based lacquer, stainless steel rating plate				
- Process flange screws	Steel, galvanized and yellow-passivized, or stainless steel				
- Mounting bracket (option)	Steel, galvanized and yellow-passivized, or stainless steel				
Measuring cell filling	Silicone oil or inert filling liquid (max. 160 bar (2320 psi) with oxygen measurement)				Silicone oil
• Filling liquid of mounting flange					Silicone oil or other material
Process connection	Connection shank G $\frac{1}{2}$ A to DIN 16 288, female thread $\frac{1}{2}$ - 14 NPT or oval flange (PN 160 (MWP 2320 psi)) with mounting thread M10 or 7/16-20 UNF		Female thread $\frac{1}{4}$ - 18 NPT and flange connection to DIN 19 213 with mounting thread M10 (M12 for PN 420 (MWP 6092 psi)) or 7/16-20 UNF		
• High-pressure side					Flange to DIN and ANSI
• Low-pressure side					Female thread $\frac{1}{4}$ - 18 NPT and flange connection to DIN 19 213 with mounting thread M10 or 7/16-20 UNF
Electrical connection	Screw terminals, cable inlet via screwed gland Pg 13.5 (adapter), M20 x 1.5 or $\frac{1}{2}$ - 14 NPT, or Han 7D/Han 8U plug				



SITRANS P, DS III series, for	Pressure 7MF4033	Absolute pressure Pressure trans- mitter series 7MF4233	Diff. pressure transmitter series 7MF4333	Differential pres- sure and flow 7MF4433/ 7MF4533	Level 7MF4633
Displays and controls					
Input keys	3 for local programming directly on transmitter				
Digital display	Built-in, cover with window (option)				
Power supply (U_H)					
Terminal voltage on transmitter	DC 10.5 to 45 V and DC 10.5 to 30 V in intrinsically-safe mode				
Ripple	$U_{pp} \leq 0.2 \text{ V}$ (47 to 125 Hz)				
Noise	$U_{rms} \leq 1.2 \text{ mV}$ (0.5 to 10 kHz)				
Certificates and approvals					
Classification according to pressure equipment directive (DGRL 97/23/EC):	<p>7MF4033, 7MF4233, 7MF4333, 7MF4433, 7MF4633 For gases of fluid group 1 and liquids of fluid 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)</p> <p>7MF4533 For gases of fluid group 1 and liquids of fluid group 1; complies with basic safety requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord</p>				
Explosion protection					
• Intrinsic safety "i"	PTB 99 ATEX 2122				
- Identification	II 1/2 G EEx ia IIC/IIB T4 / T5 / T6; EEx ib IIC/IIB T4 / T5 / T6				
- Permissible ambient temperature	-40 to +85 °C (-40 to +185 °F) temperature class T4, +70 °C (158 °F) temperature class T5, +60 °C (140 °F) temperature class T6				
- Connection	To certified intrinsically-safe circuits with maximum values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$				
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$ / $C_i = 6 \text{ nF}$				
• Explosion-proof "d"	PTB 99 ATEX 1160				
- Identification	II 1/2 G EEx d IIC T4 / T6				
- Permissible ambient temperature	-40 to +85 °C (-40 to +185 °F) temperature class T4, +60 °C (140 °F) temperature class T6				
- Connection	To circuits with values: $U_H = \text{DC } 10.5 \text{ to } 45 \text{ V}$				
• Type of protection "n" (zone 2)	TÜV 01 ATEX 1696 X				
- Identification	II 3 G EEx nA L IIC T4 / T5 / T6				
- Permissible ambient temperature	-40 to +85 °C (-40 to +185 °F) temperature class T4, +70 °C (158 °F) temperature class T5, +60 °C (140 °F) temperature class T6				
- Connection	To circuits with values: $U_H = \text{DC } 10.5 \text{ to } 45 \text{ V}$				
• Explosion protection to FM	Certificate of Compliance 3008490				
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4 to 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				
- Permissible ambient temperature	Ta = T4: -40 to 85 °C (-40 to +185 °F); T5: -40 to 70 °F (-40 to 158 °F); T6: -40 to 60 °C (-40 to 140 °F)				
- Entity parameters	According to control drawing A5E00072770A: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$, $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$				
• Explosion protection to CSA	Certificate of Compliance 1153651				
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4toT6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III				
- Permissible ambient temperature	Ta = T4: -40 to 85 °C (-40 to +185 °F); T5: -40 to 70 °F (-40 to 158 °F); T6: -40 to 60 °C (-40 to 140 °F)				
- Entity parameters	According to control drawing A5E00072770A: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$, $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$				
Communication					
Load when connecting a					
• HART communicator	230 to 1100 Ω				
• HART modem	230 to 500 Ω				
Cable	2-wire screened: $\leq 3.0 \text{ km}$ (1.86 miles), multi-core screened: $\leq 1.5 \text{ km}$ (0.93 miles)				
Protocol	HART, version 5.x				
PC/laptop requirements	IBM-compatible, main memory > 32 Mbyte, hard disk > 70 Mbyte, RS 232 interface, VGA graphics				
Software for PC/laptop	Windows 95 / 98 / NT 4.0 and SIMATIC PDM				



1

Ordering data

SITRANS P transmitter for pressure, two-wire system, DS III series

Meas. cell filling	Meas. cell cleaning
Silicone oil Inert liquid ³⁾	Normal Grease-free

Span

0.01 to 1 bar	(0.15 to 14.5 psi)
0.04 to 4 bar	(0.58 to 58.0 psi)
0.16 to 16 bar	(2.32 to 232 psi)
0.63 to 63 bar	(9.14 to 914 psi)
1.6 to 160 bar	(23.2 to 2320 psi)
4.0 to 400 bar	(58.0 to 5802 psi)

Wetted parts materials

Seal diaphragm	Process connection
Stainless steel	Stainless steel
Hastelloy	Stainless steel
Hastelloy	Hastelloy
Version for remote seal	

Process connection

- Connection shank G $\frac{1}{2}$ A
- Female thread $\frac{1}{2}$ - 14 NPT
- Oval flange made of stainless steel, max. span 160 bar (2320 psi)
 - Mounting thread $\frac{7}{16}$ - 20 UNF
 - Mounting thread M10

Non-wetted parts materials

- Housing made of die-cast aluminium
- Housing stainl. steel precision casting

Design

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

Explosion protection

- Without explosion protection
- With explosion protection (ATEX)
 - Type of protection:
 - "Intrinsic safety" (EEx ia)
 - "Explosion-proof" (EEx d)¹⁾
 - "Intrinsic safety and explosion-proof" (EEx ia and EEx d)¹⁾
 - "n" (zone 2)
- With explosion protection (FM + CSA)
 - intrinsic safe and explosion-proof (is + xp)¹⁾

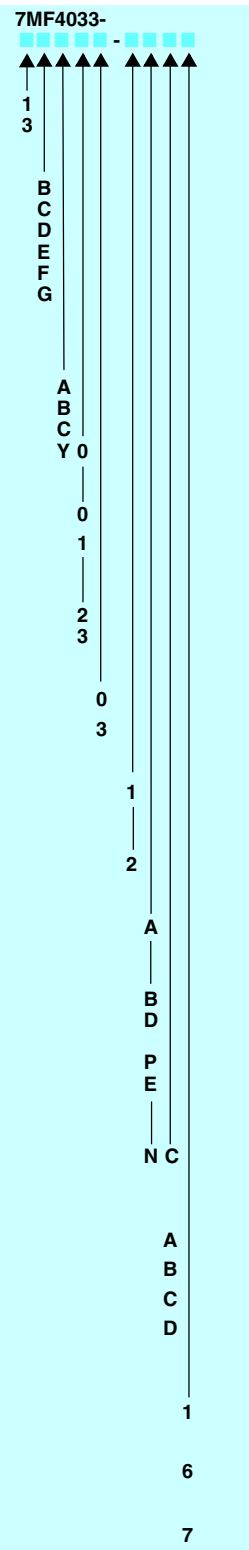
Electrical connection/cable inlet

- Screwed gland Pg 13.5²⁾
- Screwed gland M20 x 1.5
- Screwed gland $\frac{1}{2}$ - 14 NPT
- Han 7D plug²⁾

Indicator

- Without indicator (digital display hidden, setting: mA)
- With indicator (digital display visible, setting: mA)
- With indicator (digital display visible, setting as specified, Order code Y21 or Y22 required)

Order No.



► Available ex stock.

Example for ordering:

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

Ordering data

Further designs

Please add "Z" to Order No. and specify Order code(s).

Transmitter with mounting bracket made of <ul style="list-style-type: none"> • Steel • Stainless steel 	A01 A02
Han 7D plug (metal, gray)	A30
Han 8U plug (instead of Han 7D)	A31
Type plate inscription (instead of German) <ul style="list-style-type: none"> • English • French • Spanish • Italian 	B11 B12 B13 B14
English rating plate, pressure units in inH ₂ O or psi	B21
Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18 and to ISO 8402	C11
Acceptance test certificate B to EN 10 204-3.1.B	C12
Factory certificate to EN 10 204-2.2	C14
Certificate "Functional safety" (SIL)	C20
Setting of upper limit of output signal to 22.0 mA	D05
Sour gas version to NACE (only together with seal diaphragm made of Hastelloy)	D07
IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland and measuring cells \leq 63 bar (\leq 914 psi))	D12
Digital indicator beside control keys (only with transmitter 7MF4033-0-A 6 or 7MF4033-0-A 7-Z, Y21 or Y22 + Y01)	D27
Use in or at zone 1D/2D (only together with basic device with type of protection "Intrinsically-safe")	E01
Use at zone 0 (basic unit EEx ia)	E02
Oxygen application (max. 160 bar (2320 psi) with oxygen measurement and inert filling liquid)	E10

Additional information

Please add "Z" to Order No. and specify Order code(s) and plain text.

Measuring range to be set, specify in plain text: Y01: ... to ... mbar, bar, kPa, MPa, psi, ...	Y01
Measuring-point number/identification (max. 16 characters), specify in plain text: Y15:	Y15
Measuring-point text (max. 27 characters), specify in plain text: Y16:	Y16
Entry of HART address (TAG) (max. 8 characters), specify in plain text: Y17:	Y17
Setting for digital display in pressure units, specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ...	Y21
Note on Y21 The following pressure units can be selected: bar, mbar, mm H ₂ O*, in H ₂ O*, ft H ₂ O*, mm HG, in HG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , mA, Torr, ATM or % (* reference temperature 20 °C)	
Setting for digital display in non-pressure units, specify in plain text: Y22: to l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units (Y01) is essential)	Y22 + Y01

Only the settings for "Y01", "Y21", "Y22" and "D05" can be made in the factory.

Scope of delivery: Transmitter as ordered (Instruction Manual is extra ordering item (see accessories on page 1/66)).

Power supply units: see Section 6.

- 1) Without explosion-proof cable gland.
- 2) Not together with type of protection "Explosion-proof".
- 3) For oxygen application please add Order Code E10.



Ordering data

SITRANS P transmitter for absolute pressure, from pressure transmitter series, two-wire system, DS III series

Meas. cell filling	Meas. cell cleaning
Silicone oil	Normal
Inert liquid ⁴⁾	Grease-free

Span

8.3 to 250 mbar	(0.12 to 3.63 psi)	E)
43 to 1,300 mbar	(0.62 to 18.9 psi)	E)
160 to 5,000 mbar	(2.32 to 72.5 psi)	E)
1 to 30 bar	(14.5 to 435 psi)	

Wetted parts materials

Seal diaphragm	Process connection
Stainless steel	Stainless steel
Hastelloy	Stainless steel
Hastelloy	Hastelloy
Version for remote seal ¹⁾	

Process connection

- Connection shank G¹/₂A
- Female thread 1/2 - 14 NPT
- Oval flange made of stainless steel, max. span 160 bar (2320 psi)
 - Mounting thread 7/16 - 20 UNF
 - Mounting thread M10

Non-wetted parts materials

- Housing made of die-cast aluminium
- Housing stainl. steel precision casting

Design

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

Explosion protection

- Without explosion protection
- With explosion protection (ATEX)
 - Type of protection:
 - "Intrinsic safety" (EEx ia)
 - "Explosion-proof" (EEx d)²⁾
 - "Intrinsic safety and explosion-proof" (EEx ia and EEx d)²⁾
 - "n" (zone 2)
- With explosion protection (FM + CSA)
 - intrinsic safe and explosion-proof (is + xp)²⁾

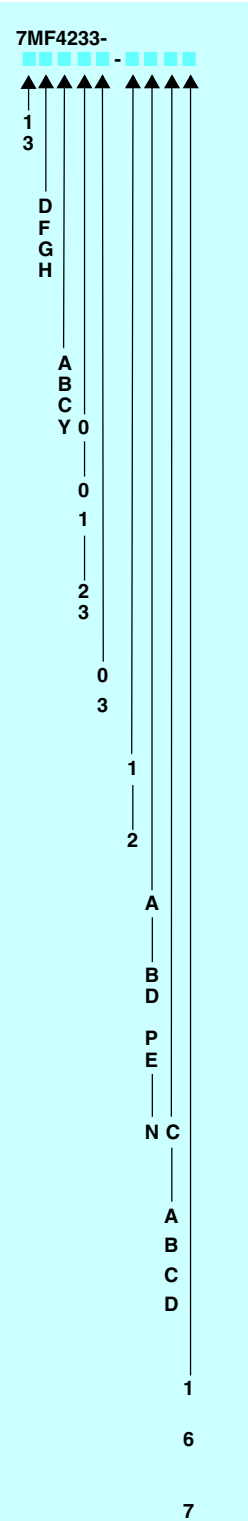
Electrical connection/ cable inlet

- Screwed gland Pg 13.5³⁾
- Screwed gland M20 x 1.5
- Screwed gland 1/2 - 14 NPT
- Han 7D plug³⁾

Indicator

- Without indicator (digital display hidden, setting: mA)
- With indicator (digital display visible, setting: mA)
- With indicator (digital display visible, setting as specified, Order code Y21 or Y22 required)

Order No.



E) Combinations with the versions identified by E) are subject to the export regulations AL: 2B230, ECCN: N.

Ordering data

Order code

Further designs

Please add "Z" to Order No. and specify Order code(s).

Transmitter with mounting bracket made of	
• Steel	A01
• Stainless steel	A02
Han 7D plug (metal, gray)	A30
Han 8U plug (instead of Han 7D)	A31
Type plate inscription (instead of German)	
• English	B11
• French	B12
• Spanish	B13
• Italian	B14
English rating plate, pressure units in inH ₂ O or psi	B21
Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18 and to ISO 8402	C11
Acceptance test certificate B to EN 10 204-3.1.B	C12
Factory certificate to EN 10 204-2.2	C14
Certificate "Functional safety" (SIL)	C20
Setting of upper limit of output signal to 22.0 mA	D05
Sour gas version to NACE (only together with seal diaphragm made of Hastelloy)	D07
IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland)	D12
Digital indicator beside control keys (only with transmitter 7MF4233-0-0-A 6 or 7MF4233-0-0-A 7-Z, Y21 or Y22 + Y01)	D27
Use in or at zone 1D/2D (only together with basic device with type of protection "Intrinsically-safe")	E01
Use at zone 0 (basic unit EEx ia)	E02
Oxygen application (max. 160 bar (2320 psi) with oxygen measurement and inert filling liquid)	E10

Additional information

Please add "Z" to Order No. and specify Order code(s) and plain text.

Measuring range to be set, specify in plain text: Y01: ... to ... mbar, bar, kPa, MPa, psi, ...	Y01
Measuring-point number/identification (max. 16 characters), specify in plain text: Y15:	Y15
Measuring-point text (max. 27 characters), specify in plain text: Y16:	Y16
Entry of HART address (TAG) (max. 8 characters), specify in plain text: Y17:	Y17
Setting for digital display in pressure units, specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ... (see "Additional information" on page 1/27 for pressure dimensions selectable for "Y21")	Y21
Setting for digital display in non-pressure units, specify in plain text: Y22: to l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units (Y01) is essential)	Y22 + Y01

Only the settings for "Y01", "Y21", "Y22" and "D05" can be made in the factory.

Example for ordering: see page 1/30

Scope of delivery: Transmitter as ordered (Instruction Manual is extra ordering item (see accessories on page 1/66)).

Power supply units: see Section 6.

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

²⁾ Without explosion-proof cable gland.

³⁾ Not together with type of protection "Explosion-proof".

⁴⁾ For oxygen application please add Order Code E10.



1

Ordering data

SITRANS P transmitter for absolute pressure, from differential pressure transmitter series, two-wire system, DS III series

Meas. cell filling Meas. cell cleaning

Silicone oil Inert liquid ⁶⁾	Normal Grease-free
--	-----------------------

Span

8.3 to 250 mbar	(0.12 to 3.63 psi)	E)
43 to 1,300 mbar	(0.62 to 18.9 psi)	E)
160 to 5,000 mbar	(2.32 to 72.5 psi)	E)
1.0 to 30 bar	(14.5 to 435 psi)	
5.3 to 100 bar	(76.9 to 1,450 psi)	

Wetted parts materials

Seal diaphragm	Parts of meas. cell	
Stainless steel	Stainless steel	
Hastelloy	Stainless steel	E)
Hastelloy	Hastelloy	E)
Tantalum	Tantalum	
Monel	Monel	
Gold	Gold	
Version for remote seal ¹⁾		

Process connection

- Female thread 1/4 - 18 NPT with flange connection to DIN 19 213
- With sealing screw opposite process connection
 - Mounting thread M10
 - Mounting thread 7/16 - 20 UNF
 - Sealing screw on side of process flanges ²⁾
 - Mounting thread M10
 - Mounting thread 7/16 - 20 UNF

Non-wetted parts materials

Process flange	Electronics housing screws
Stainless steel	Die-cast aluminium
Stainless steel	Stain. steel prec. cast.

Design

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

Explosion protection

- Without explosion protection
- With explosion protection (ATEX)
 - Type of protection:
 - "Intrinsic safety" (Ex ia)
 - "Explosion-proof" (Ex d) ³⁾
 - "Intrinsic safety and explosion-proof" (Ex ia + Ex d) ³⁾
 - "n" (zone 2)
 - With explosion protection (FM + CSA)
 - intrinsic safe and explosion-proof (is + xp) ^{3) 5)}

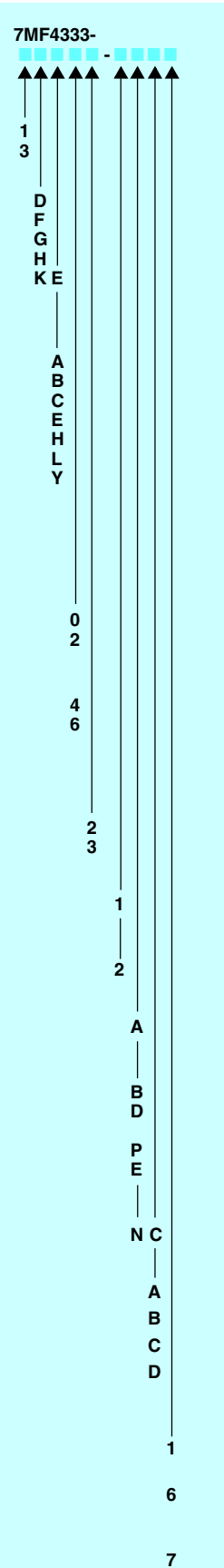
Electrical connection/cable inlet

- Screwed gland Pg 13.5 ⁴⁾
- Screwed gland M20 x 1.5
- Screwed gland 1/2 - 14 NPT
- Han 7D plug ⁴⁾

Indicator

- Without indicator (digital display hidden, setting: mA)
- With Indicator (digital display visible, setting: mA)
- With indicator (digital display visible, setting as specified, Order code Y21 or Y22 required)

Order No.



Ordering data

Order code

Further designs

Please add "Z" to Order No. and specify Order code(s).

Transmitter with mounting bracket made of	A01
• Steel	A02
• Stainless steel	
Instead of FPM (Viton), process flange O-ring made of:	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFKM (Kalrez, Compound 4079)	A22
• NBR (Buna N)	A23
Han 7D plug (metal, gray)	A30
Han 8U plug (instead of Han 7D)	A31
Sealing screws (1/4 - 18 NPT) with valve in material of process flange	A40
Type plate inscription (instead of German)	
• English	B11
• French	B12
• Spanish	B13
• Italian	B14
English rating plate, pressure units in inH ₂ O or psi	B21
Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18 and to ISO 8402	C11
Acceptance test certificate B to EN 10 204-3.1.B	C12
Factory certificate to EN 10 204-2.2	C14
Certificate "Functional safety" (SIL)	C20
Setting of upper limit of output signal to 22.0 mA	D05
Sour gas version to NACE (only together with seal diaphragm made of Hastelloy)	D07
IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland)	D12
Digital indicator beside control keys (only with transmitter 7MF4333- 2-A 6 or 7MF4333- 2-A 7-Z, Y21 or Y22 + Y01)	D27
Use in or at zone 1D/2D (only together with basic device with type of protection "Intrinsically-safe")	E01
Use at zone 0 (basic unit Ex ia)	E02
Oxygen application (max. 160 bar (2320 psi) with oxygen measurement and inert filling liquid)	E10
Interchanging of process connection side	H01
Vent on side for gas measurements	H02
Process flange made of:	
• Hastelloy	K01
• Monel	K02
• Stainless steel with PVDF insert (max. PN 10 (MWP 145 psi), max. temperature of medium 90 °C (194 °F))	K04

E) Combinations with the versions identified by E) are subject to the export regulations AL: 2B230, ECCN: N.
 1) Version 7MF4333-1DY... only up to max. span 200 mbar (2.9 psi).
 2) Not for measuring cells 5.3 to 160 bar (76.9 to 2320 psi).
 3) Without explosion-proof cable gland.
 4) Not together with type of protection "Explosion-proof".
 5) Only together with seal diaphragm made of stainless steel or Hastelloy.
 6) For oxygen application please add Order Code E10.



Ordering data	Order code
Additional information	
Please add "Z" to Order No. and specify Order code(s) and plain text.	
Measuring range to be set, specify in plain text: Y01: ... to ... mbar, bar, kPa, MPa, psi, ...	Y01
Measuring-point number/identification (max. 16 characters), specify in plain text: Y15:	Y15
Measuring-point text (max. 27 characters), specify in plain text: Y16:	Y16
Entry of HART address (TAG) (max. 8 characters), specify in plain text: Y17:	Y17
Setting for digital display in pressure units, specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ... (see "Additional information" on page 1/27 for pressure dimensions selectable for "Y21")	Y21
Setting for digital display in non-pressure units, specify in plain text: Y22: to l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units (Y01) is essential)	Y22 + Y01

Only the settings for "Y01", "Y21", "Y22" and "D05" can be made in the factory.

Example for ordering: see page 1/30.

Power supply units: see Section 6.

Scope of delivery: Transmitter as ordered (Instruction Manual is extra ordering item (see accessories on page 1/66)).



1

Ordering data

SITRANS P transmitter for differential pressure and flow, two-wire system, DS III series, PN 32/160 (MWP 464/2320 psi)

Meas. cell filling	Meas. cell cleaning
Silicone oil Inert liquid ⁶⁾	Normal Grease-free

PN 32 (MWP 464 psi), span	PN 160 (MWP 2320 psi), span
1 to 20 mbar ¹⁾ (0.0145 to 0.29 psi)	1 to 60 mbar (0.0145 to 0.87 psi)
2.5 to 250 mbar (0.036 to 3.63 psi)	2.5 to 250 mbar (0.036 to 3.63 psi)
6 to 600 mbar (0.087 to 8.70 psi)	6 to 600 mbar (0.087 to 8.70 psi)
16 to 1,600 mbar (0.232 to 23.2 psi)	16 to 1,600 mbar (0.232 to 23.2 psi)
50 to 5,000 mbar (0.725 to 72.5 psi)	50 to 5,000 mbar (0.725 to 72.5 psi)
0.3 to 30 bar	0.3 to 30 bar

Wetted parts materials (process flange made of stainless steel)	
Seal diaphragm	Parts of meas. cell
Stainless steel	Stainless steel
Hastelloy	Stainless steel
Hastelloy	Hastelloy
Tantalum ²⁾	Tantalum
Monel ²⁾	Monel
Gold ²⁾	Gold
Version for remote seal	

Process connection	
Female thread 1/4 - 18 NPT with flange connection to DIN 19 213	
• Sealing screw opposite process conn.	
- Mounting thread	M10
- Mounting thread	7/16 - 20 UNF
• Sealing screw on side of process flanges	
- Mounting thread	M10
- Mounting thread	7/16 - 20 UNF

Non-wetted parts materials	
Process flange screws	Electronics housing
Stainless steel	Die-cast aluminium
Stainless steel	Stain. steel prec. cast.

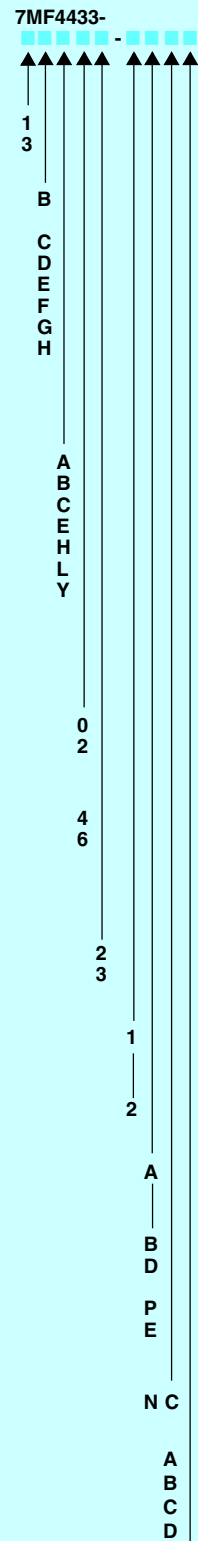
Design	
• Standard version	1
• International version, English label inscriptions, documentation in 5 languages on CD	2

Explosion protection	
• Without explosion protection	A
• With explosion protection (ATEX) Type of protection:	B D
- "Intrinsic safety" (EEx ia)	
- "Explosion-proof" (EEx d) ³⁾	
- "Intrinsic safety and explosion-proof" (EEx ia + EEx d) ³⁾	P
- "n" (zone 2)	E
• With explosion protection (FM + CSA) - intrinsic safe and explosion-proof (is + xp) ^{3) 5)}	N C

Electrical connection/cable inlet	
• Screwed gland Pg 13.5 ⁴⁾	A
• Screwed gland M20 x 1.5	B
• Screwed gland 1/2 - 14 NPT	C
• Han 7D plug ⁴⁾	D

Indicator	
• Without indicator (hidden, setting: mA)	1
• With indicator (digital display visible, setting: mA)	6
• With indicator (digital display visible, setting as specified, Order code Y21 or Y22 required)	7

Order No.



Ordering data

Order code

Further designs	Order code
Please add "Z" to Order No. and specify Order code(s).	
Transmitter with mounting bracket made of	
• Steel	A01
• Stainless steel	A02
Instead of FPM (Viton), process flange O-ring made of:	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFBM (Kalrez, Compound 4079)	A22
• NBR (Buna N)	A23
Han 7D plug (metal, gray)	A30
Han 8U plug (instead of Han 7D)	A31
Sealing screws (1/4 - 18 NPT) with valve in material of process flange	A40
Type plate inscription (instead of German)	
• English	B11
• French	B12
• Spanish	B13
• Italian	B14
English rating plate, pressure units in inH ₂ O or psi	B21
Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18 and to ISO 8402	C11
Acceptance test certificate B to EN 10 204-3.1.B	C12
Factory certificate to EN 10 204-2.2	C14
Certificate "Functional safety" (SIL)	C20
Setting of upper limit of output signal to 22.0 mA	D05
Sour gas version to NACE (only together with seal diaphragm made of Hastelloy)	D07
IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland)	D12
Digital indicator beside control keys (only with transmitter 7MF4433- ■ ■ ■ ■ 2- ■ A ■ 6 or 7MF4433- ■ ■ ■ ■ 2- ■ A ■ 7-Z, Y21 or Y22 + Y01)	D27
Use in or at zone 1D/2D (only together with basic device with type of protection "Intrinsically-safe")	E01
Use at zone 0 (basic unit EEx ia)	E02
TÜV Approval to AD/TRD	E06
Over-filling safety device for flammable and non-flammable liquids (max. PN 32 (MWP 464 psi)) (basic unit EEx ia) nach WHG und VbF	E08
Oxygen application (max. 160 bar (2320 psi) with oxygen measurement and inert filling liquid)	E10
Interchanging of process connection side	H01
Vent on side for gas measurements	H02
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04) ¹⁾	H03
Process flange made of Hastelloy	K01
Process flange made of Monel	K02
Process flange made of stainless steel with PVDF insert (max. PN 10 (MWP 145 psi), max. temperature of medium 90 °C (194 °F))	K04

▶ Available ex stock.

1) Not suitable for connection of remote seal.
 2) Only together with max. spans 250, 1600, 5000 and 30000 mbar (3.63, 23.2, 72.5 and 435 psi).
 3) Without explosion-proof cable gland.
 4) Not together with type of protection "Explosion-proof".
 5) Only together with seal diaphragm made of stainless steel or Hastelloy.
 6) For oxygen application please add Order Code E10.



Ordering data	Order code
Additional information	
Please add "Z" to Order No. and specify Order code(s) and plain text.	
Measuring range to be set, specify in plain text:	
• With linear characteristic:	
Y01: ... to ... mbar, bar, kPa, MPa, psi, ...	Y01
• With square-rooted characteristic:	
Y02: ... to ... mbar, bar, kPa, MPa, psi, ...	Y02
Measuring-point number/identification (max. 16 characters), specify in plain text:	
Y15:	Y15
Measuring-point text (max. 27 characters), specify in plain text:	
Y16:	Y16
Entry of HART address (TAG) (max. 8 characters), specify in plain text:	
Y17:	Y17
Setting for digital display in pressure units, specify in plain text (standard setting: mA):	
Y21: mbar, bar, kPa, MPa, psi, ...	Y21
(see "Additional information" on page 1/27 for pressure dimensions selectable for "Y21")	
Setting for digital display in non-pressure units, specify in plain text:	
Y22: to l/min, m³/h, m, USgpm, ...	Y22¹) +
(specification of measuring range in pressure units (Y01 or Y02) is essential)	Y01 or Y02

Only the settings for "Y01", "Y02", "Y21", "Y22" and "D05" can be made in factory.

Example for ordering: see page 1/30.

Scope of delivery: Transmitter as ordered (Instruction Manual is extra ordering item (see accessories on page 1/66)).

Power supply units: see Section 6.



1

Ordering data

SITRANS P transmitter for differential pressure and flow, two-wire system, DS III series, PN 420 (MWP 6092 psi)

Meas. cell filling	Meas. cell cleaning
Silicone oil	Normal

Span	
2.5 to 250 mbar	(0.036 to 3.63 psi)
6 to 600 mbar	(0.087 to 8.7 psi)
16 to 1,600 mbar	(0.23 to 23.2 psi)
50 to 5,000 mbar	(0.73 to 72.5 psi)
0.3 to 30 bar	(4.35 to 435 psi)

Wetted parts materials (process flange made of stainless steel)	
Seal diaphragm	Parts of meas. cell
Stainless steel	Stainless steel
Hastelloy	Stainless steel
Gold ¹⁾	Gold

Process connection	
Female thread 1/4 - 18 NPT and flange connection to DIN 19213	
• Sealing screw opposite process connection	
- Mounting thread	M12
- Mounting thread	7/16 - 20 UNF
• Sealing screw on side of process flanges	
- Mounting thread	M12
- Mounting thread	7/16 - 20 UNF

Non-wetted parts materials	
Process flange	Electronics housing screws
Stainless steel	Die -cast aluminium
Stainless steel	Stain. steel prec. cast.

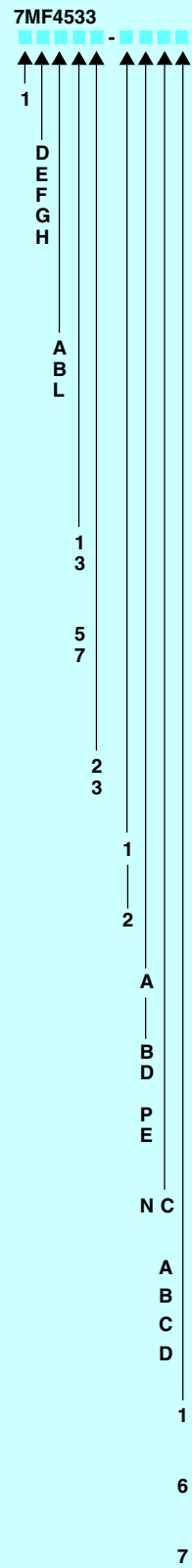
Design	
• Standard version	
• International version, English label inscriptions, documentation in 5 languages on CD	

Explosion protection	
• Without explosion protection	
• With explosion protection (ATEX)	Type of protection:
	- "Intrinsic safety" (Ex ia)
	- "Explosion-proof" (Ex d) ²⁾
	- "Intrinsic safety and explosion-proof" (Ex ia + Ex d) ²⁾
	- "n" (zone 2)
• With explosion protection (FM + CSA)	- intrinsic safe and explosion-proof (is + xp) ^{2) 4)} , max. PN 360

Electrical connection/cable inlet	
• Screwed gland Pg 13.5 ³⁾	
• Screwed gland M20 x 1.5	
• Screwed gland 1/2 - 14 NPT	
• Han 7D plug ³⁾	

Indicator	
• Without indicator (digital display hidden, setting: mA)	1
• With indicator (digital display visible, setting: mA)	6
• With indicator (digital display visible, setting as specified, Order code Y21 or Y22 required)	7

Order No.



Example for ordering: see page 1/30.

Scope of delivery: Transmitter as ordered (Instruction Manual is extra ordering item (see accessories on page 1/66)).

Power supply units: see Section 6.

Ordering data

Order code

Further designs

Please add "Z" to Order No. and specify Order code(s).

Transmitter with mounting bracket made of	
• Steel	A01
• Stainless steel	A02
Instead of FPM (Viton), process flange O-ring made of:	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFKM (Kalrez, Compound 4079)	A22
• NBR (Buna N)	A23
Han 7D plug (metal, gray)	A30
Han 8U plug (instead of Han 7D)	A31
Sealing screw (1/4 - 18 NPT) with valve in material of process flange	A40
Type plate inscription (instead of German)	
• English	B11
• French	B12
• Spanish	B13
• Italian	B14
English rating plate, pressure units in inH ₂ O or psi	B21
Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18 and to ISO 8402	C11
Acceptance test certificate B to EN 10 204-3.1.B	C12
Factory certificate to EN 10 204-2.2	C14
Certificate "Functional safety" (SIL)	C20
Setting of upper limit of output signal to 22.0 mA	D05
Sour gas version to NACE (only together with seal diaphragm made of Hastelloy)	D07
IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland)	D12
Use in or at zone 1D/2D (only together with basic device with type of protection "Intrinsically-safe")	E01
Use at zone 0 (basic unit Ex ia)	E02
Digital indicator beside control keys (only with transmitter 7MF4533-□□□□2-□A□6 or 7MF4533-□□□□2-□A□7-Z, Y21 or Y22 + Y01)	D27
Interchanging of process connection side	H01
Stainless steel process flanges for vertical differential pressure lines	H03

1) Only together with max. spans 250, 1600, 5000 and 30000 mbar (3.63, 23.2, 72.5 and 435 psi) and process flange screws made of stainless steel.

2) Without explosion-proof cable gland.

3) Not together with type of protection "Explosion-proof".

4) Only together with seal diaphragm made of stainless steel or Hastelloy.



Ordering data	Order code
Additional information	
Please add "Z" to Order No. and specify Order code(s) and plain text.	
Measuring range to be set, specify in plain text:	
• With linear characteristic: Y01: ... to ... mbar, bar, kPa, MPa, psi, ...	Y01
• With square-rooted characteristic: Y02: ... to ... mbar, bar, kPa, MPa, psi, ...	Y02
Measuring-point number/identification (max. 16 characters), specify in plain text: Y15:	Y15
Measuring-point text (max. 27 characters), specify in plain text: Y16:	Y16
Entry of HART address (TAG) (max. 8 characters), specify in plain text: Y17:	Y17
Setting for digital display in pressure units, specify in plain text (standard setting: mA): Y21: mbar, bar, kPa, MPa, psi, ... (see "Additional information" on page 1/27 for pressure dimensions selectable for "Y21")	Y21
Setting for digital display in non-pressure units, specify in plain text: Y22: to l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units (Y01 or Y02) is essential)	Y22 + Y01 or Y02

Only the settings for "Y01" or "Y02", "Y21", "Y22" or "D05" can be made in factory.



1

Ordering data

SITRANS P transmitter for level, two-wire system, DS III series

Meas. cell filling Meas. cell cleaning
Silicone oil Normal

Span

25 to 250 mbar (0.36 to 3.63 psi)
25 to 600 mbar (0.36 to 8.7 psi)
53 to 1,600 mbar (0.77 to 23.2 psi)
0.16 to 5.0 bar (2.32 to 72.5 psi)

Process connection of low-pressure side

Female thread 1/4 - 18 NPT and flange connection to DIN 19213 with mounting thread

- M10
- 7/16 - 20 UNF

Non-wetted parts materials

Process flange Electronics housing screws
Stainless steel Die-cast aluminium
Stainless steel Stain. steel prec. cast.

Design

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

Explosion protection

- Without explosion protection
- With explosion protection (ATEX)
Type of protection:
- "Intrinsic safety" (EEx ia)
- "Explosion-proof" (EEx d) ¹⁾
- "Intrinsic safety and explosion-proof" (EEx ia + EEx d) ¹⁾
- "n" (zone 2)
- With explosion protection (FM + CSA)
- intrinsic safe and explosion-proof (is + xp) ^{1) 3)}

Electrical connection/cable inlet

- Screwed gland Pg 13.5 ²⁾
- Screwed gland M20 x 1.5
- Screwed gland 1/2 - 14 NPT
- Han 7D plug ²⁾

Indicator

- Without indicator (digital display hidden, setting: mA) 1
- With indicator (digital display visible, setting: mA) 6
- With indicator (digital display visible, setting as specified, Order code Y21 or Y22 required) 7

Order No.

7MF4633-

Y -

1

D

E

F

G

0

2

2

3

1

2

A

B

D

P

E

NC

A

B

C

D

1

6

7

Ordering note: 1st order item: Transmitter 7MF4633-...
2nd order item: Mounting flange 7MF4912-3-...

Example for ordering:

Item line 1: 7MF4633-1EY20-1AA1-Z
B line: Y01
C line: Y01: 80 to 143 mbar (1.16 to 2.1 psi)
Item line 2: 7MF4912-3GE01

Ordering data

Further designs

Please add "Z" to Order No. and specify Order code(s).

Instead of FPM (Viton), process flange O-ring made of:

- PTFE (Teflon)
- FEP (with silicone core, approved for food)
- FFPM (Kalrez, Compound 4079)
- NBR (Buna N)

Han 7D plug (metal, gray) **A20**
Han 8U plug (instead of Han 7D) **A21**
A22
A23

Sealing screws (1/4 - 18 NPT) with valve in material of process flange **A30**
A31
A40

Type plate inscription (instead of German)

- English
- French
- Spanish
- Italian

English rating plate, pressure units in inH₂O or psi **B11**
B12
B13
B14
B21

Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18 and to ISO 8402 **C11**

Acceptance test certificate B to EN 10 204-3.1.B **C12**

Factory certificate to EN 10 204-2.2 **C14**

Certificate "Functional safety" (SiL) **C20**

Setting of upper limit of output signal to 22.0 mA **D05**

IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland) **D12**

Use in or at zone 1D/2D (only together with basic device with type of protection "Intrinsically-safe") **E01**

Use at zone 0 (basic unit EEx ia) **E02**

Over-filling safety device for flammable and non-flammable liquids (max. PN 32 (MWP 464 psi)) (basic unit EEx ia) to WHG and VbF **E08**

Interchanging of process connection side **H01**

Additional information

Please add "Z" to Order No. and specify Order code(s) and plain text.

Measuring range to be set, specify in plain text:

Y01: ... to ... mbar, bar, kPa, MPa, psi, ... **Y01**

Measuring-point number/identification (max. 16 characters), specify in plain text:
Y15: **Y15**

Measuring-point text (max. 27 characters), specify in plain text:
Y16: **Y16**

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

Setting for digital display in pressure units, specify in plain text (standard setting: mA):
Y21: mbar, bar, kPa, MPa, psi, ... **Y21**

(see "Additional information" on page 1/23 for pressure dimensions selectable for "Y21")

Setting for digital display in non-pressure units, specify in plain text:

Y22: to l/min, m³/h, m, USgpm, ... **Y22⁴⁾ + Y01**
(specification of measuring range in pressure units (**Y01**) is essential)

Only the settings for "Y01", "Y21", "Y22" and "D05" can be made in the factory.

Scope of delivery: Transmitter as ordered (Instruction Manual is extra ordering item (see accessories on page 1/66)).

Power supply units: see Section 6.

¹⁾ Without explosion-proof cable gland.

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

³⁾ Only together with seal diaphragm made of stainless steel or Hastelloy.

⁴⁾ Not together with over-filling safety device for flammable and non-flammable liquids (Order code "E08")



Ordering data

Order No. Order code

Mounting flange

Directly fitted onto SITRANS P transmitter for level, for

DS III series

Flange	Nom. diam.	Nom. press.
Connection	DN 80	PN 40
to EN 1092-1	DN 100 PN 40	PN 16
Connection to	3 inch	class 150 class 300
ASME B16.5	4 inch	class 150 class 300

Other version
Add Order code and plain text:
Nominal diameter: ...; Nom. pressure: ...

Wetted parts materials

- Stainless steel 316L
 - Coated with PFA¹⁾
 - Coated with PTFE¹⁾
 - Coated with ECTFE¹⁾
- Monel 400, mat. No. 2.4360
- Hastelloy B2, mat. No. 2.4617
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C4, mat. No. 2.4610
- Tantalum

Other version
Add Order code and plain text:
Wetted parts materials: ...

Sealing face: see "Technical data"

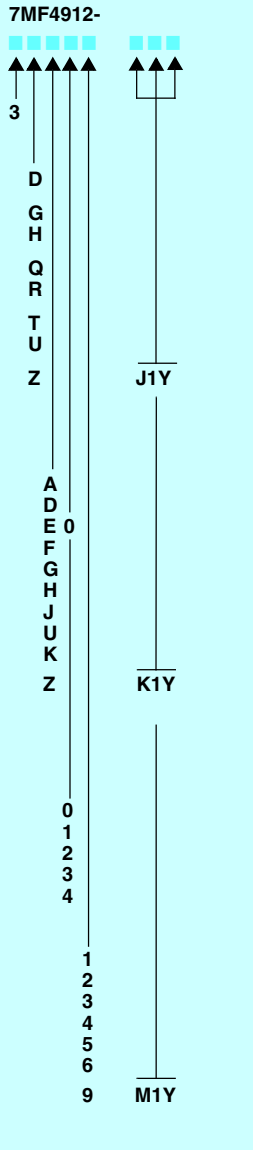
Tube length

- Without tube
- 50 mm (1.97 inch)
- 100 mm (3.94 inch)
- 150 mm (5.90 inch)
- 200 mm (7.87 inch)

Filling liquid

- Silicone oil M5
- Silicone oil M50
- High-temperature oil
- Halocarbon oil (for O₂ measurements)
- Vegetable oil
- Glycerine/water²⁾

Other version
Add Order code and plain text:
Filling liquid:



Order code

Further designs

Please add "Z" to Order No. and specify Order code(s).

With spark arrestor for mounting at zone 0 (including documentation)	A01
Manufacturer's test certificate M (Calibration certificate) to DIN 55 350, Part 18, and to ISO 8402	C11
Acceptance test certificate B to EN 10 204-3.1 B	C12
Vacuum-resistant design (for use in vacuum range)	V04
Calculation of span of associated transmitter (enclose filled-in questionnaire with order)	Y05

Note:
Suffix "Y01" required with transmitter!

¹⁾ For vacuum on request.

²⁾ Not suitable for use in low-pressure range.

Example for ordering: see page 1/38.