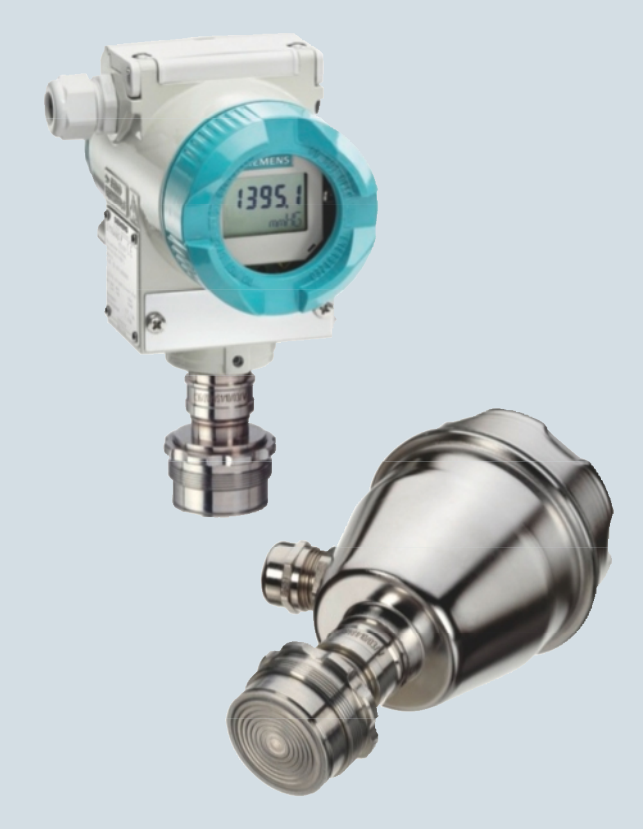
Overview



The SITRANS P300 and DS III pressure transmitters have been fitted with special process connections for the paper industry. With the two process connection threads 1½" and 1" flush at the front, the SITRANS P300 and DS III transmitters can be used for all processes in the paper industry.

SITRANS P300 and SITRANS PDS III series pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

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

Various versions of the pressure transmitters are available for measuring:

- Gauge pressure
- Level
- Mass level
- Volume level

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads, e.g. abrasion.
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of Hastelloy
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for SITRANS P300 with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for SITRANS P300 with PROFIBUS PA interface
- High measuring accuracy
- Parameterization over control keys and HART Communication, or over PROFIBUS PA or FOUNDATION Fieldbus interface (DS III only).

Application

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

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

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

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

The pressure transmitter can be operated locally over 3 control keys or programmed externally over HART or over PROFIBUS-PA or FOUNDATION Fieldbus interface (only DS III).

SITRANS P, DS III series

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus:
1 ... 16 bar (14.5 ... 232 psi)

SITRANS P300

Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

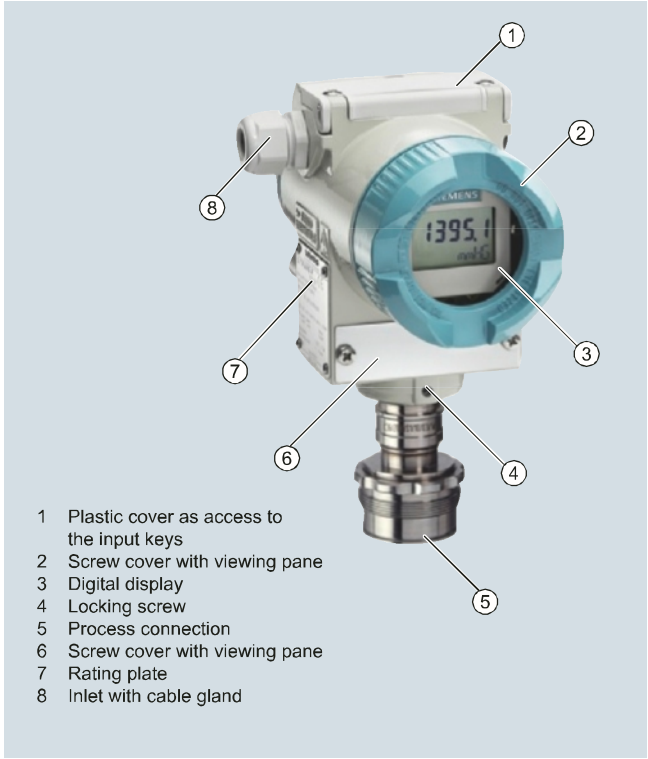
Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus:
1 ... 16 bar (14.5 ... 232 psi)

1

Design

SITRANS P DS III



Device front view, SITRANS P DS III

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Device front view) with the Article 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).

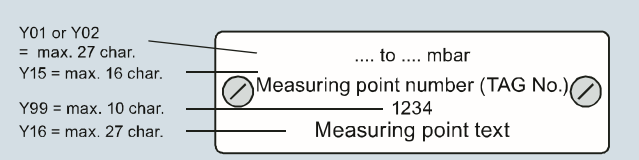
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover is screwed on at the front and rear of the housing. The front cover (2) can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

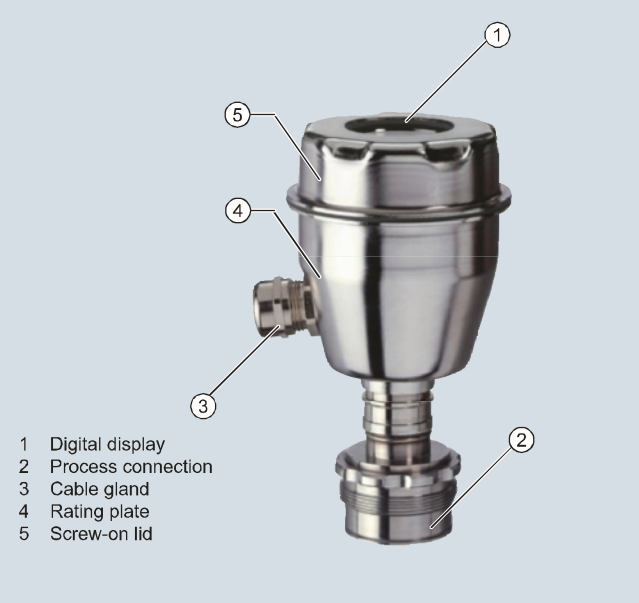
Example for an attached measuring point label



SITRANS P300

The device comprises:

- Electronics
- Housing
- Measuring cell

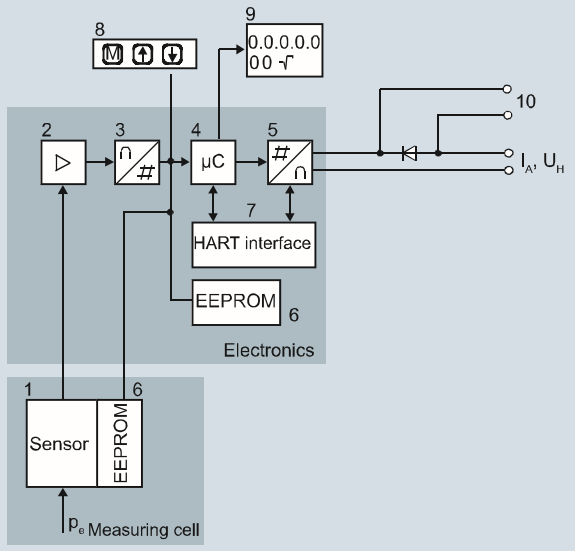


Perspective view of the SITRANS P300

The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power UH and the shield are in the terminal housing. The cable gland is on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

Function

Operation of electronics with HART communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One non-volatile memory each in the measuring cell and electronics
7 HART interface
8 Three input keys (local operation)
9 Digital display
10 Diode circuit and connection for external ammeter
I_A Output current
U_H Power supply
P_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the 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 an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

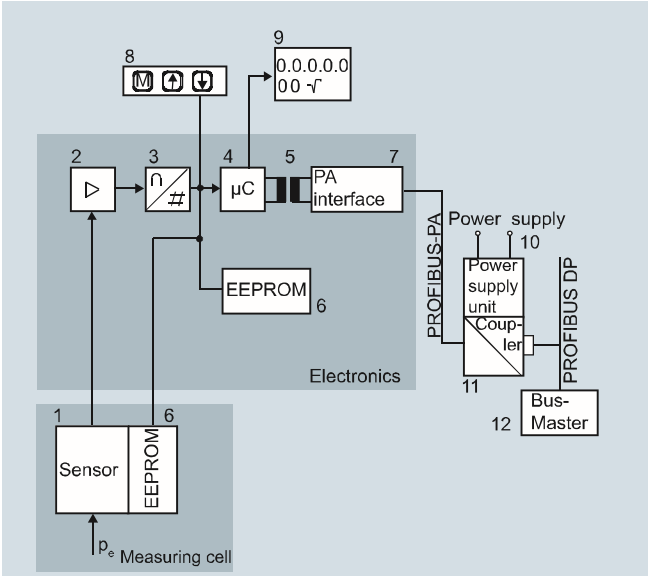
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced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

Using the 3 input keys (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 HART modem (7) permits parameterization using a protocol according to the HART specification.

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

Operation of electronics with PROFIBUS PA communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Electrical isolation
6 One non-volatile memory each in the measuring cell and electronics
7 PROFIBUS-PA interface
8 Three input keys (local operation)
9 Digital display
10 Power supply
11 DP/PA coupler or link
12 Bus master
p_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier(2) and digitized 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 PROFIBUS PA through an electrically isolated PA interface (7).

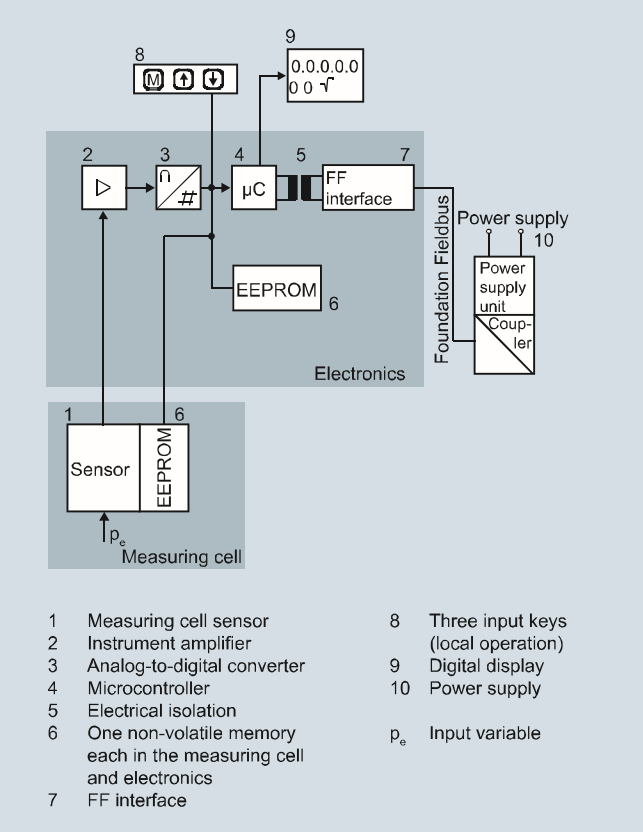
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The first memory is linked with the measuring cell, the second with the electronics. This modular design means that the electronics and the measuring cell can be replaced separately from one another.

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 PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

1

Operation of electronics with FOUNDATION Fieldbus communication



1	Measuring cell sensor	8	Three input keys (local operation)
2	Instrument amplifier	9	Digital display
3	Analog-to-digital converter	10	Power supply
4	Microcontroller		
5	Electrical isolation		
6	One non-volatile memory each in the measuring cell and electronics	p_e	Input variable
7	FF interface		

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized 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).

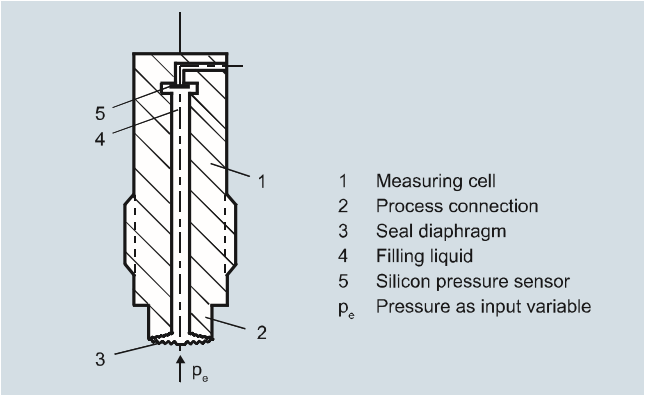
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced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

Measuring cell for gauge pressure with front-flush diaphragm



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

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Parameterization

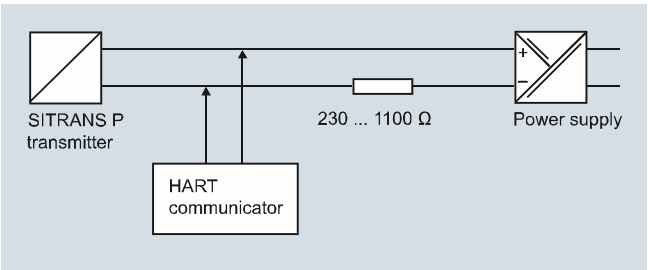
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

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

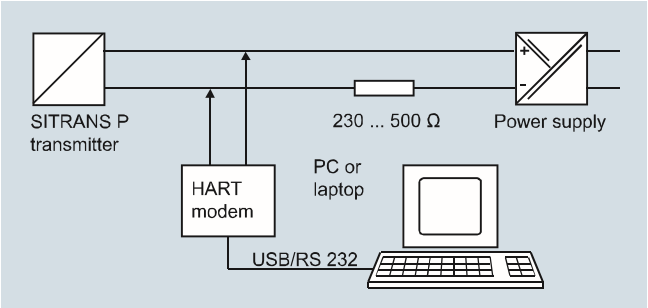
Parameterization using HART

Parameterization using HART 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 parameter DS III with HART and P300 with HART

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
Characteristic (linear)	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

[1)] Cancel apart from write protection

Diagnostic functions for DS III with HART and P300 with HART

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

Available physical units of display for DS III with HART and P300 with HART

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

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the DS III 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 DS III with FOUNDATION Fieldbus 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 DS III with PROFIBUS PA and FOUNDATION Fieldbus, and 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 DS III with PROFIBUS PA and FOUNDATION Fieldbus, and 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, hPa, 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$0 (4 °C), ftH$_2$O, 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
Temperature	K, °C, °F, °R
Miscellaneous	%

Technical specifications

SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Gauge pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.32 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
Lower measuring limit				
• Measuring cell with silicone oil filling	100 mbar a(1.45 psia)			
Upper measuring limit	100% of max. span			
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART communication	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping T_{63} (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)) r: Span ratio (r = max. span / set span)			
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic			≤ 0.075 %	
- r ≤ 10	≤ (0.0029 · r + 0.071) %			
- 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %			
- 30 < r ≤ 100	≤ (0.005 · r + 0.05) %			
Long-term stability (temperature change ± 30 °C (± 54 °F))				
1- to 4-bar measuring cell	≤ (0.25 · r) % per 5 years		≤ 0.25 % per 5 years	
16-bar measuring cell	≤ (0.125 · r) % per 5 years		≤ 0.125 % per 5 years	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.08 · r + 0.1) %[1)]		≤ 0.3 %	
• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ 0.25 %/10 K	
Influence of the medium temperature (only with front-flush diaphragm)				
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (0.04 psi/10 K)			
Influence of mounting position	≤ 0.1 mbar (0.00145 psi) per 10° inclination			
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	

SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Rated conditions		
Degree of protection to IEC 60529	IP65, IP68, NEMA 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)	
Temperature of medium	-40 ... +100 °C (-40 ... +212 °F)	
Ambient conditions		
• Ambient temperature	-20 ... +85 °C (-4 ... +185 °F)	
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Gasket (standard)	PTFE flat gasket	
• O-ring (minibolt)	FPM (Viton) or optionally: FFPM or NBR	
Measuring cell filling	Silicone oil or inert filling liquid	
Process connection (standard)	Flush-mounted, 1½", PMC Standard design	
Process connection (minibolt)	Flush-mounted, 1", minibolt design	
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	

1) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.064 . r + 0.08) %/28 °C (50 °F).

Transmitters for gauge pressure for the paper industry

SITRANS P DS III with PMC connection

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 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	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
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- 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

Selection and Ordering data — Article No.

SITRANS P pressure transmitters for gauge pressure, with PMC connection series DS III with HART — 7MF4133-

Measuring cell filling	**Measuring cell-cleaning**	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
0.01 ... 1 bar[1]	(0.15 ... 14.5 psi)[1]	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.1.6 ... 16 bar	(2.32 ... 232 psi)	D
Wetted parts materials		
Seal diaphragm	Connection shank	
Hastelloy	Stainless steel	B
Process connection		
• PMC Style Standard: Thread 1½"		2
• PMC Style Minibolt: front-flush 1" (not with minimum span: 500 mbar (7.25 psi) - version "B")		3
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection: - "Intrinsic safety (Ex ia)"		B
• Zone 20/21/22[2]		C
• Ex nA/nL (Zone 2)[3]		E
• With FM + CSA, Type of protection: - "Intrinsic Safe (is)" (planned)		M
Electrical connection / cable entry		
• Female thread M20 x 1.5		B
• Female thread ½-14 NPT		C
• M12 connectors (stainless steel)[4]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: mA) ▶		1
• With visible display		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

▶ Available ex stock

Power supply units see Chap. 7 "Supplementary Components".

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

1) Only with "PMC Style Standard"process connection
2) Not in conjunction with electrical connection option A.
3) Only available together with electrical connection options B, C, F or G.
4) M12 delivered without cable socket

Selection and Ordering data — Article No.

SITRANS P pressure transmitter for gauge pressure, with PMC connection

DS III with PROFIBUS PA (PA)		7MF4134-
DS III with FOUNDATION Fieldbus (FF)		7MF4135-
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
Nominal measuring range		
1 bar[1]	(14.5 psi)[1]	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
Wetted parts materials		
Seal diaphragm	Connection shank	
Hastelloy	Stainless steel	B
Process connection[2]		
• PMC Style Standard: Thread 1½"		2
• PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B))		3
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
Electrical connection / cable entry		
• Screwed gland M20x1.5		B
• Screwed gland ½-14 NPT		C
• M12 connectors (stainless steel)[3]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: bar) ▶		1
• With visible display		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

▶ Available ex stock

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

1) Only with "PMC Style Standard"process connection
2) Sealing is included in delivery.
3) M12 delivered without cable socket

Transmitters for gauge pressure for the paper industry

SITRANS P DS III with PMC connection

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Plug				
• Angled	**A32**	✓		
• Han 8D (metal, gray)	**A33**	✓		
M12 cable sockets (metal)	**A50**	✓	✓	✓
Rating plate inscription (instead of German)				
• English	**B11**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
"Functional safety (SIL2)" certificate acc. to IEC 61508	**C20**	✓		
"Functional safety (SIL2/3)" certificate acc. to IEC 61508	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)	**C99**	✓	✓	✓
Output signal can be set to upper limit of 22.0mA	**D05**	✓	✓	✓
Degree of protection IP65/IP68 (only for M20 x 1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
Mounting				
• Weldable sockets for standard 1½" threaded connection	**P01**	✓	✓	✓
• Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	**P02**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Additional data				
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indication 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_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l, m³, m, USg, ... (specification of measuring range in pressure units **"Y01"** is essential, unit with max. 5 characters)	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Max. 8 characters, specify in plain text: Y25:	**Y25**		✓	✓

Only "Y01" and "Y21" can be factory preset

✓ = available

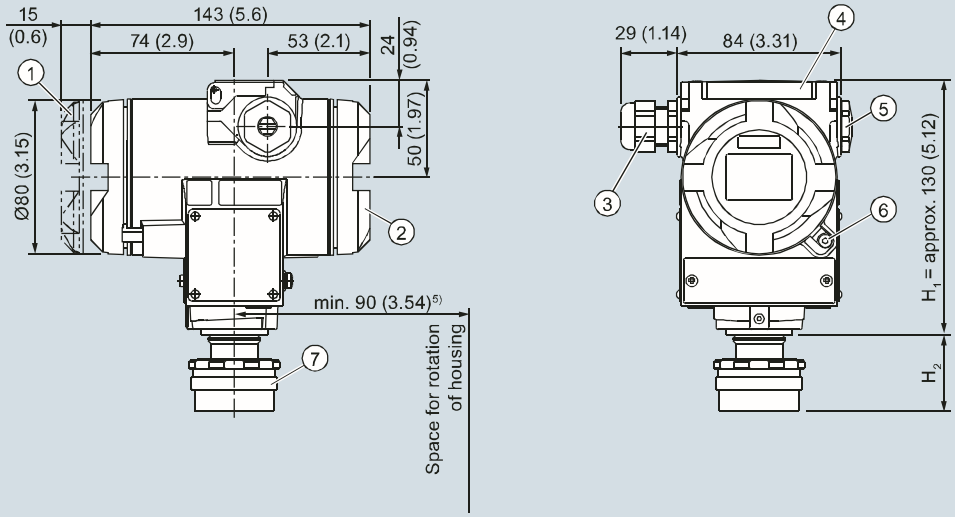
ordering example

Item line:	7MF4133-1DB20-1AB7-Z
B line:	C11 + Y01 + Y21
C line:	Y01: 1 ... 10 bar (14.5 ... 145 psi)
C line:	Y21: bar (psi)

[1] Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

[2] Preset values can only be changed over SIMATIC PDM.

Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland M20 x 1,5 or screwed gland ½-14 NPT or M12 conector
4. Protective cover over keys
5. Blanking plug
6. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
7. Process connection: PMC standard

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) 92 mm (3.6 inch) for minimum distance to permit rotation with indicator

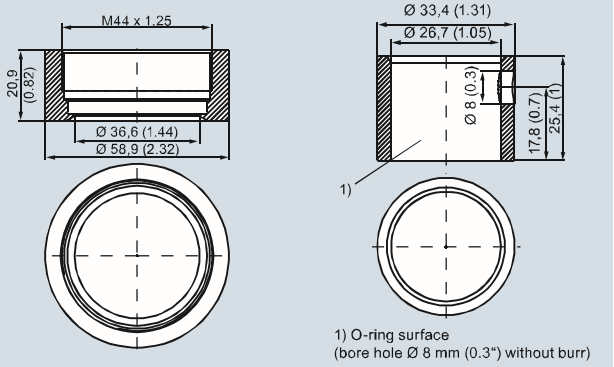
SITRANS P DS III pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P DS III 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 P DS III up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

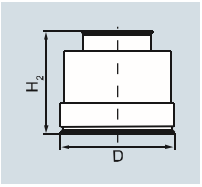
Only the height H_2 is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

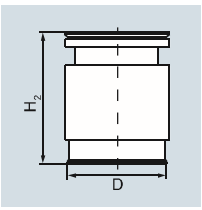
Material: Stainless steel, Mat. No. 1.4404/316L

PMC Style standard



DN	PN	ØD	H_2
		40.9 mm (1.6")	approx. 36.8 mm (1.4")

PMC Style minibolt



DN	PN	ØD	H_2
		26.3 mm (1.0")	approx. 33.1 mm (1.3")

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

Technical specifications

SITRANS P300 for gauge pressure with PMC connection for the paper industry

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Gauge pressure (front-flush)			
Spans (infinitely adjustable) or nominal measuring range and max. pemissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.3 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
	Depending on the process connection, the span may differ from these values		Depending on the process connection, the nominal measuring range may differ from these values	
Lower measuring limit				
• Measuring cell with silicone oil	100 mbar a (1.45 psia)			
Upper measuring limit				
• Measuring cell with silicone oil	100 % of max. span		100 % of the max. nominal measuring range	
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA signal	
Physical bus	-		IEC 61158-2	
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)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data always refer to the set span)	Rising characteristic curve, start-of-scale value 0 bar, stainless steel seal diaphragm, measuring cell with silicone oil, room temperature 25 °C (77 °F), span ratio (r = max. span / set span)			
Error in measurement at limit setting incl. hysteresis and reproducibility				
Linear characteristic			≤ 0.075 %	
• r + 10	≤ (0.0029 · r + 0.071) %			
• 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %			
• 30 < r ≤ 100	≤ (0.005 · r + 0.05) %			
Step response time T_{63}	approx. 2 s			
Long-term stability at ± 30 °C (± 54 °F)	≤ (0.25 · r) %/5 years		≤ 0.25 %/5 years	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.1 · r + 0.2) % [1]		≤ 0.3 %	
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... 14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ 0.25 %/10 K	
Influence of the medium temperature (only with front-flush diaphragm)				
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (1.2 inH_2O/10 K)			
Rated conditions				
Installation conditions				
Ambient temperature	Observe the temperature class in areas subject to explosion hazard.			
• Measuring cell with silicone oil	-40 ... +85 °C (-40 ... +185 °F)			
• Display readable	-30 ... +85 °C (-22 ... +185 °F)			
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)			
Climatic class				
Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics			
Degree of protection acc. to EN 60529	IP65, IP68, NEMA 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			

SITRANS P300 for gauge pressure with PMC connection for the paper industry		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Medium conditions		
Temperature of medium		
• Measuring cell with silicone oil	-40 ... +100 °C (-40 ... +212 °F)	
Design		
Weight (without options)	Approx. 1 kg (2.2 lb)	
Enclosure material	Stainless steel, mat. no. 1.4301/304	
Material of parts in contact with the medium		
• Seal diaphragm	Hastelloy C276, mat. no. 2.4819	
• Measuring cell filling	Silicone oil	
Surface quality touched-by-media	Ra-values ≤ 0.8 µm (32 µ inch)/welds Ra ≤ 1.6 µm (64 µ inch)	
Power supply U_H		
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	Supplied through bus
Separate power supply	-	Not necessary
Bus voltage		
• Without Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Max. basic current	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. fault current in the event of a fault	-	15.5 mA
Fault disconnection electronics (FDE)	-	Available
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
Intrinsic safety "i"	PTB 05 ATEX 2048	
Marking	Ex II 1/2 G Ex ia/ib IIB/IIC T4, T5, T6	
Permissible ambient temperature		
• Temperature class T4	-40 ... +85 °C (-40 ... +185 °F)	
• Temperature class T5	-40 ... +70 °C (-40 ... +158 °F)	
• Temperature class T6	-40 ... +60 °C (-40 ... +140 °F)	
Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	To certified intrinsically-safe circuits with peak values: FISCO supply unit: U_i = 17.5 V, I_i = 380 mA, P_i = 5.32 W Linear barrier: U_i = 24 V, I_i = 250 mA, P_i = 1.2 W
Effective inner capacitance:	C_i = 6 nF	C_i = 1.1 nF
Effective internal inductance:	L_i = 0.4 mH	L_i ≤ 7 µH
Explosion protection to FM for USA and Canada (cFM_{US})		
• Identification (DIP) or (IS); (NI)	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.08 . r + 0.16) % / 28 °C (50 °F).

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool Local operation (standard setting Address 126)
Cyclic data usage	
• Output byte	One measured value: 5 bytes Two measured values: 10 bytes
• Input byte	Register operating mode: 1 bytes Reset function due to metering. 1 bytes
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Linearly rising or falling characteristic
- Electrical damping	0 ... 100 s adjustable
- Simulation function	Input /Output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset and preset Optional direction of counting Simulation function of the register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 31 nodes
- Characteristic curve	Linear
- Simulation function	Available
• Transducer block "Electronic temperature"	
Simulation function	Available

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

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English		
with 4 ... 20 mA / HART		7 M F 8 1 2 3 -
with PROFIBUS PA		7 M F 8 1 2 4 -
with FOUNDATION Fieldbus (FF)		7 M F 8 1 2 5 -
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
Measuring span		
1 bar[1]	(14.5 psi)	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
Wetted parts materials		
Seal diaphragm	Measuring cell	
Hastelloy	Stainless steel	B
Process connection		
• PMC Style Standard: Thread 1½"		2
• PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B))		3
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[2]		C
• Ex nA/nL (Zone 2)[3]		E
• With FM + CSA, Type of protection:		
- "Intrinsic Safe (is)" (planned)		M
Electrical connection/cable entry		
• Screwed gland M20 x .5 (polyamide)[4]		A
• Screwed gland M20 x 1.5 (metal)		B
• Screwed gland M20 x 1.5 (stainless steel)		C
• M12 connectors (without cable socket)		F
• M12 connectors (stainless steel), without cable socket)		G
• ½-14 NPT metal thread[5]		H
• ½-14 NPT stainless steel thread[5]		J

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English	
with 4 ... 20 mA / HART	7 M F 8 1 2 3 -
with PROFIBUS PA	7 M F 8 1 2 4 -
with FOUNDATION Fieldbus (FF)	7 M F 8 1 2 5 -
Display	
• Without display, with keys, closed lid	1
• With display and keys, closed lid [6]	2
• With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)[6]	4
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane[6]	5
• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure unit)[6]	6
• With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass panel[6]	7

Power supply units see Chap. 7 "Supplementary Components".

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

1) Only with "Standard" process connection"
2) Not in conjunction with electrical connection option A.
3) Only available together with electrical connection options B, C, F or G.
4) Only together with HART electronics.
5) Without cable gland.
6) Display cannot be turned.

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Cable socket for M12 plug				
• metal	**A50**		✓	✓
• Stainless steel	**A51**		✓	✓
Rating plate inscription (instead of English)				
• German	**B10**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Set output signal to upper limit of 22.0mA	**D05**	✓	✓	✓
Degree of protection IP65/IP68 (only for M20x1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Mounting				
• Weldable sockets for standard 1½" threaded connection	**P01**	✓	✓	✓
• Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	**P02**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Additional data				
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 char., specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indication 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 $H_2O^{*)}$, $inH_2O^{*)}$, $ftH_2O^{*)}$, mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] 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**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓

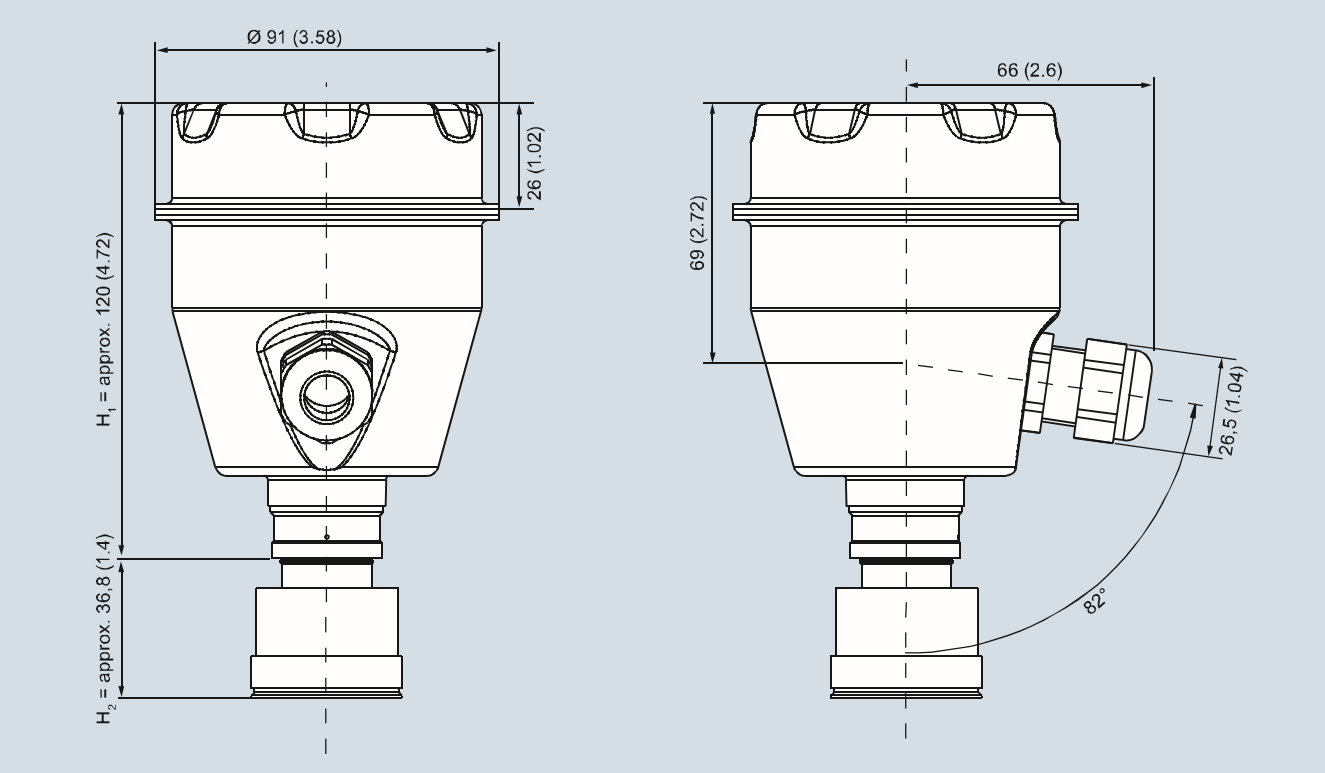
Only "Y01" and "Y21" can be factory preset

✓ = available

[1] Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

[2] Preset values can only be changed over SIMATIC PDM.

Dimensional drawings



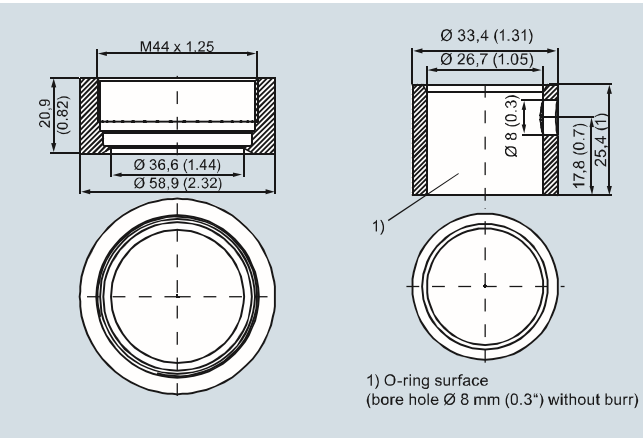
SITRANS P300 pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

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

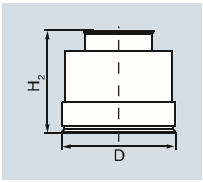
Only the height H_2 is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

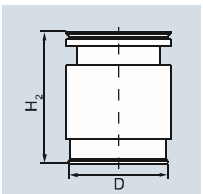
Material: Stainless steel, mat. No. 1.4404 / 316L

PMC Style Standard



DN	PN	ØD	H_2
		40.4 mm (1.6")	Approx. 36.8 mm (1.4")

PMC Style Mini bolt



DN	PN	ØD	H_2
		26.3 mm (1.0")	Approx. 33.1 mm (1.3")