

## 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)

# Pressure Measurement

Transmitters for gauge pressure for the paper industry

## SITRANS P DS III with PMC connection

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### Technical specifications

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

	HART	PROFIBUS PA and FOUNDATION Fieldbus		
<b>Input</b>		Gauge pressure		
Measured variable				
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	
<b>Output</b>				
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	$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in $\Omega$ , $U_H$ : Power supply in V		-	
• With HART communication	$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100 \Omega$ (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)	
<b>Measuring accuracy</b>		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)			
	Span ratio $r = \text{max. span}/\text{set span}$		Nominal measuring range ratio $r = \text{nominal measuring range}/\text{set measuring range}$	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- $r \leq 10$	$\leq (0.0029 \cdot r + 0.071) \%$		$\leq (0.0029 \cdot r + 0.071) \%$	
- $10 < r \leq 30$	$\leq (0.0045 \cdot r + 0.071) \%$		$\leq (0.0045 \cdot r + 0.071) \%$	
- $30 < r \leq 100$	$\leq (0.005 \cdot r + 0.05) \%$		$\leq (0.005 \cdot r + 0.05) \%$	
Long-term stability (temperature change $\pm 30 \text{ }^\circ\text{C}$ ( $\pm 54 \text{ }^\circ\text{F}$ ))				
1- to 4-bar measuring cell	$\leq (0.25 \cdot r) \%$ per 5 years		$\leq (0.25 \cdot r) \%$ per 5 years	
16-bar measuring cell	$\leq (0.125 \cdot r) \%$ per 5 years		$\leq (0.125 \cdot r) \%$ per 5 years	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	$\leq (0.08 \cdot r + 0.1) \%^{1)}$		$\leq (0.08 \cdot r + 0.1) \%^{1)}$	
• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)	$\leq (0.1 \cdot r + 0.15) \%/10 \text{ K}$		$\leq (0.1 \cdot r + 0.15) \%/10 \text{ K}$	
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 <sub>2</sub> O/10 K)		
Influence of mounting position		$\leq 0.1 \text{ mbar}$ (0.04 inH <sub>2</sub> O g) per 10° inclination		
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	

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SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry		
	HART	PROFIBUS PA and FOUNDATION Fieldbus
<b>Rated conditions</b>		
Degree of protection to IEC 60529		IP66 (optional IP66/IP68), NEMA 4X
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
<b>Design</b>		
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
<b>Power supply <math>U_H</math></b>		
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	Supplied through bus -
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
<b>Certificates and approvals</b>		
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)

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

# Pressure Measurement

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### SITRANS P DS III with PMC connection

HART communication		FOUNDATION Fieldbus communication	
HART communication	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x	• Analog input	Yes, linearly rising or falling characteristic
Software for computer	SIMATIC PDM	- Adaptation to customer-specific process variables	0 ... 100 s
<b>PROFIBUS PA communication</b>		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Simultaneous communication with master class 2 (max.)	4	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Cyclic data usage		- Limit monitoring	Yes
• Output byte	5 (one measured value) or 10 (two measured values)	- Square-rooted characteristic for flow measurement	Standard FOUNDATION Fieldbus function block
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	• PID	1 resource block
Internal preprocessing		• Physical block	1 transducer block Pressure with calibration, 1 transducer block LCD
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	Transducer blocks	
Function blocks	2	• Pressure transducer block	
• Analog input		- Can be calibrated by applying two pressures	Yes
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	- Monitoring of sensor limits	Yes
- Electrical damping, adjustable	0 ... 100 s	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- 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		