

## Overview



SITRANS P410 pressure transmitters are digital pressure transmitters with a high level of operating convenience. Technically, they are based on the SITRANS P DS III but offer an increased measuring accuracy of 0.04%. This means the SITRANS P 410 is perfectly suited for measuring tasks with increased accuracy requirements. The parameterization is performed using input buttons or via HART or via PROFIBUS PA or FOUNDATION Fieldbus interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very simple, despite the variety of setting options.

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

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

SITRANS P410 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Differential pressure
- Volume flow
- Mass flow

## Benefits

- High quality and service life
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Minimal conformity error
- Good long-term stability
- Wetted parts made of high-grade materials (e.g., stainless steel, Hastelloy)
- Infinitely adjustable spans from 0.01 bar to 160 bar (0.15 psi to 2321 psi) for P410 with HART interface
- Nominal measuring ranges from 1 bar to 160 bar (14.5 psi to 2321 psi) for P410 with PROFIBUS PA and FOUNDATION Fieldbus interface
- High measuring accuracy
- Parameterization over input buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus interface.

## Application

SITRANS P410 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the P410 suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Flameproof enclosure" may be installed in hazardous areas (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 input buttons or programmed externally over HART or over PROFIBUS PA or FOUNDATION Fieldbus interface.

### **Pressure transmitter for gauge pressure**

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

Span (infinitely adjustable)

for P410 with HART: 0.01 bar to 160 bar (0.15 psi to 2321 psi)

Nominal measuring range

for P410 with PROFIBUS PA and FOUNDATION Fieldbus:  
1 bar to 160 bar (14.5 psi to 2321 psi)

### **Pressure transmitters for differential pressure and flow**

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow  $q \sim \sqrt{\Delta p}$  (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable)

for P410 with HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Nominal measuring range

for P410 with PROFIBUS PA and FOUNDATION Fieldbus:  
20 mbar ... 30 bar (0.29 ... 435 psi)

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Technical description

1

#### Design



Front view

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 "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).

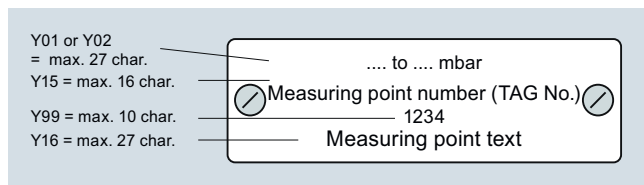
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover 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.

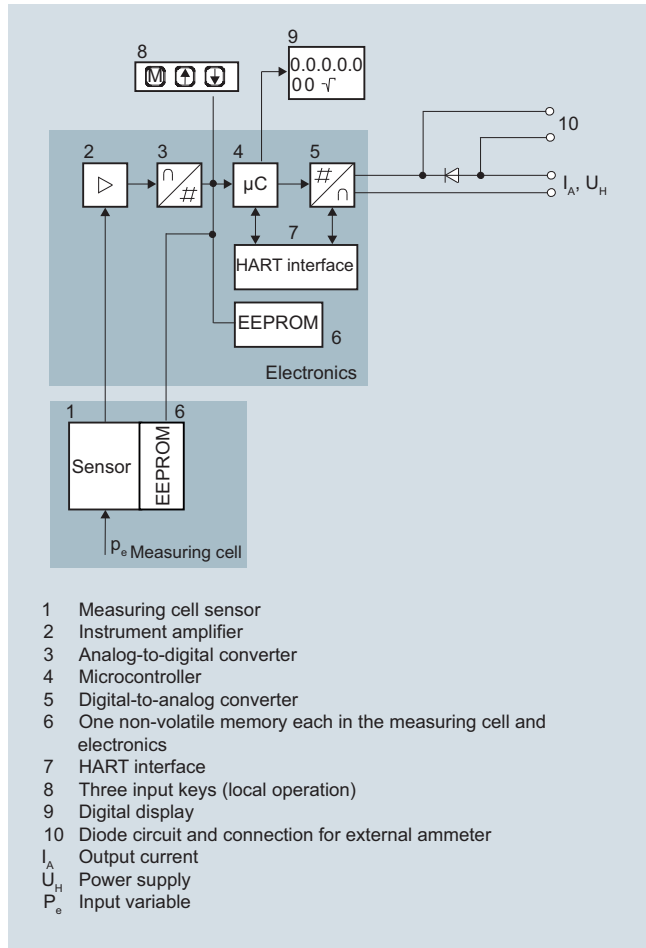
At the top of the housing is a plastic cover (1), which hides the input keys.

#### Example for an attached measuring point label



## Function

## Operation of electronics with HART communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the 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.

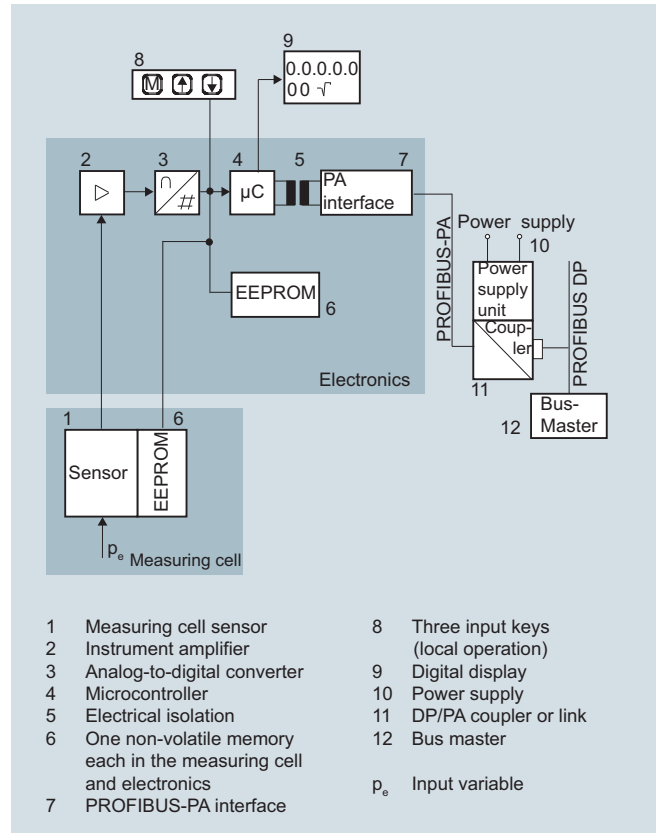
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced 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  $\leq 63$  bar measure the input pressure compared to atmosphere, transmitters with spans  $\geq 160$  bar compared to vacuum.

## Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the 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 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).

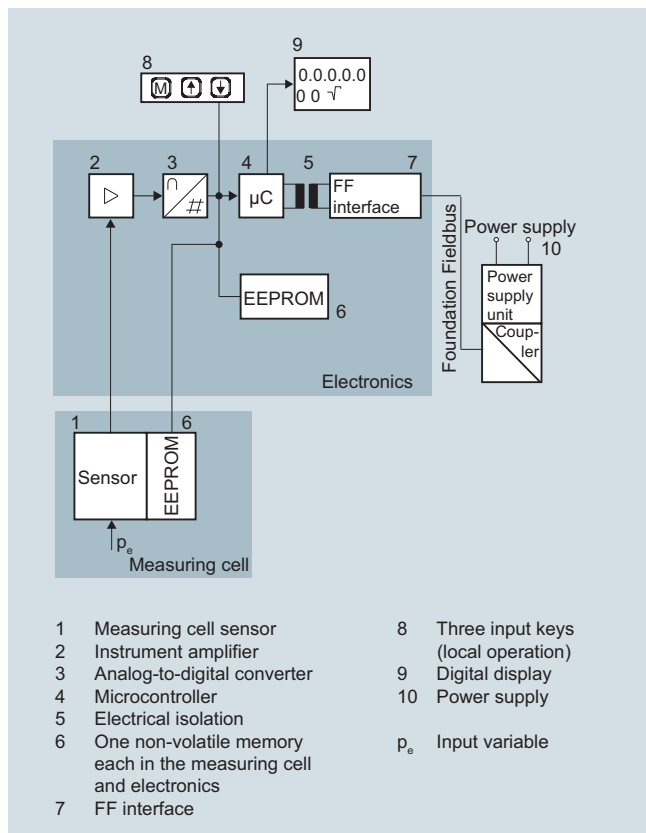
The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Technical description

#### Operation of electronics with FOUNDATION Fieldbus communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") 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).

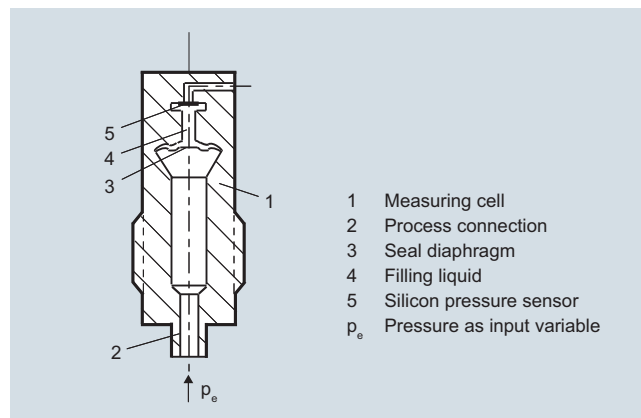
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced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

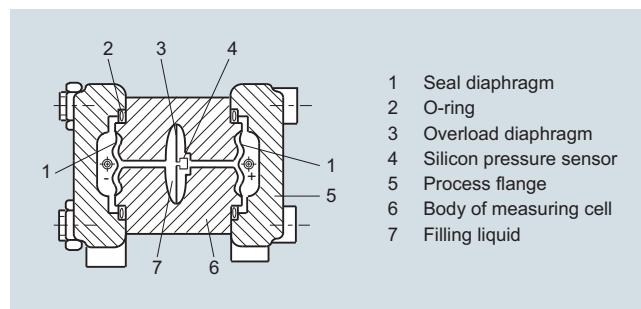
##### Measuring cell for gauge pressure



Measuring cell for gauge pressure, function diagram

The pressure  $p_e$  is applied through the process connection (2, Figure "Measuring cell for gauge pressure, 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 differential pressure.

##### Measuring cell for differential pressure and flow



Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. 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 differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

**Parameterization SITRANS P410**

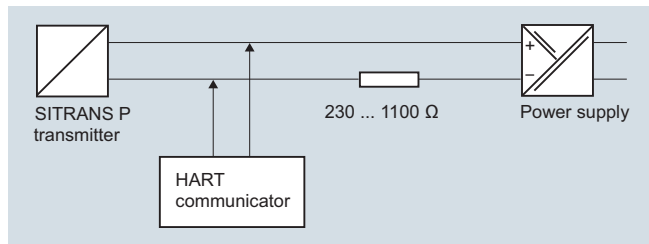
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

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

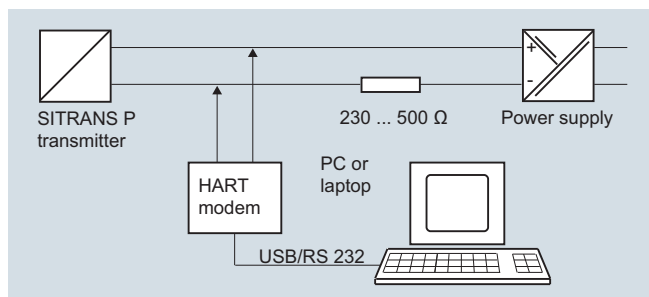
Parameterization using HART

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 parameters, SITRANS P410 with HART

Parameters	Input keys (DS III HART)	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 <sup>1)</sup>
Type of dimension and actual dimension	x	x
Characteristic (linear / square-rooted)	x <sup>2)</sup>	x <sup>2)</sup>
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

<sup>1)</sup> Cancel apart from write protection

<sup>2)</sup> Only differential pressure

Diagnostic functions for SITRANS P410 with HART

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

Available physical units of display for SITRANS P410 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 <sup>2</sup> , kg/cm <sup>2</sup> , inH <sub>2</sub> O, inH <sub>2</sub> O (4 °C), mmH <sub>2</sub> O, ftH <sub>2</sub> O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	m <sup>3</sup> /d, m <sup>3</sup> /h, m <sup>3</sup> /s, l/min, l/s, ft <sup>3</sup> /d, ft <sup>3</sup> /min, ft <sup>3</sup> /s, US gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
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. Through the PROFIBUS the DS III with PROFIBUS PA is connected 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 SITRANS P410 with PROFIBUS PA and FOUNDATION Fieldbus

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
Diagnostics functions		x

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Technical description

Diagnostic functions for SITRANS P410 with PROFIBUS PA and FOUNDATION Fieldbus

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

Physical dimensions available for the display

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

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

1

#### Technical specifications

##### SITRANS P410 for gauge pressure

###### Input

Measured variable

Gauge pressure

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

###### HART

###### PROFIBUS PA/ FOUNDATION Fieldbus

Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
0.63 ... 63 bar 63 ... 6300 kPa 9.1 ... 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi
1.6 ... 160 bar 0.16 ... 16 MPa 23 ... 2321 psi	160 bar 16 MPa 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 2.5 MPa 3626 psi

Lower measuring limit

- Measuring cell with silicone oil filling

30 mbar a/3 kPa a/0.44 psia

Upper measuring limit

100 % of max. span

###### Output

###### HART

###### PROFIBUS PA/FOUNDATION Fieldbus

Output signal

4 ... 20 mA

Digital PROFIBUS PA and FOUNDATION Fieldbus signal

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

3.55 mA, factory preset to 3.84 mA  
23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

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Load

- Without HART

$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$   
 $U_H$ : Power supply in V

-

- With HART

$R_B = 230 \dots 500 \Omega$  (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 (step width 0.1 s)

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

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

#### SITRANS P410 for gauge pressure

<b>Measuring accuracy</b>	Acc. to IEC 60770-1
Reference conditions	<ul style="list-style-type: none"> <li>• Increasing characteristic</li> <li>• Start-of-scale value 0 bar/kPa/psi</li> <li>• Stainless steel seal diaphragm</li> <li>• Silicone oil filling</li> <li>• Room temperature 25 °C (77 °F)</li> </ul>
Measuring span ratio $r$ (spread, Turn-Down)	$r = \text{max. measuring span/set measuring span or nom. pressure range}$
Error in measurement at limit setting incl. hysteresis and reproducibility	
<ul style="list-style-type: none"> <li>• Linear characteristic</li> </ul>	
<ul style="list-style-type: none"> <li>- 1 bar/100 kPa/14.5 psi</li> <li>4 bar/400 kPa/58 psi</li> <li>16 bar/1.6 MPa/232 psi</li> <li>63 bar/6.3 MPa/914 psi</li> <li>160 bar/16 MPa/2321 psi</li> </ul>	$r \leq 5 :$ $\leq 0.04 \%$ $5 < r \leq 100 :$ $\leq (0.004 \cdot r + 0.045) \%$
Influence of ambient temperature (in percent per 28 °C (50 °F))	
<ul style="list-style-type: none"> <li>• 1 bar/100 kPa/14.5 psi</li> <li>• 4 bar/400 kPa/58 psi</li> <li>16 bar/1.6 MPa/232 psi</li> <li>63 bar/6.3 MPa/914 psi</li> <li>160 bar/16 MPa/2321 psi</li> </ul>	$\leq (0.05 \cdot r + 0.1) \%$ $\leq (0.025 \cdot r + 0.125) \%$
Long-term stability (temperature change $\pm 30$ °C ( $\pm 54$ °F))	
<ul style="list-style-type: none"> <li>• 1 bar/100 kPa/14.5 psi</li> <li>4 bar/400 kPa/58 psi</li> <li>• 16 bar/1.6 MPa/232 psi</li> <li>63 bar/6.3 MPa/914 psi</li> <li>160 bar/16 MPa/2321 psi</li> </ul>	$\leq (0.25 \cdot r) \%$ in 5 years $\leq (0.125 \cdot r) \%$ in 5 years
Effect of mounting position	$\leq 0.05$ mbar/0.005 kPa/0.000725 psi per 10° inclination (zero point correction is possible with position error compensation)
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of nominal measuring range



# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

1

SITRANS P410 for gauge pressure		
<b>Rated conditions</b>		
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium		
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F)	
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)	
• In conjunction with dust explosion protection	-20 ... +60 °C (-4 ... +140 °F)	
Ambient conditions		
• Ambient temperature		
- Transmitter	-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	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
<b>Design</b>		
Weight (without options)	Die-cast aluminum: ≈ 2.0 kg (≈ 4.4 lb) Stainless steel precision casting: ≈ 4.6 kg (≈ 10.1 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AISI 12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4602	
• Oval flange	Stainless steel, mat. no. 1.4404/316L	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819	
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))	
Process connection	Connection shank G $\frac{1}{2}$ B to DIN EN 837-1, female thread $\frac{1}{2}$ -14 NPT or oval flange (PN 160 (MAWP 2320 psi)) to DIN 19213 with mounting thread M10 or $\frac{7}{16}$ -20 UNF to IEC 61518/DIN EN 61518	
Material of mounting bracket		
Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated	
Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)	
<b>Power supply <math>U_H</math></b>		
Terminal voltage on transmitter	<b>HART</b> 10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	<b>PROFIBUS PA/ FOUNDATION Fieldbus</b> -
Power supply		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

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

#### SITRANS P410 for gauge pressure

##### Certificates and approvals

Classification according to PED 2014/68/EU

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Explosion protection

- Intrinsic safety "i"

PTB 13 ATEX 2007 X

- Marking

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

- Permissible ambient temperature

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;  
-40 ... +70 °C (-40 ... +158 °F) temperature class T5;  
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection

To certified intrinsically-safe circuits with peak values:  
 $U_i = 30 \text{ V}$ ,  $I_i = 100 \text{ mA}$ ,  
 $P_i = 750 \text{ mW}$ ;  $R_i = 300 \Omega$

FISCO supply unit:

$U_o = 17.5 \text{ V}$ ,  $I_o = 380 \text{ mA}$ ,  $P_o = 5.32 \text{ W}$

Linear barrier:

$U_o = 24 \text{ V}$ ,  $I_o = 174 \text{ mA}$ ,  $P_o = 1 \text{ W}$

- Effective internal inductance/capacitance

$L_i = 0.4 \text{ mH}$ ,  $C_i = 6 \text{ nF}$

$L_i = 7 \mu\text{H}$ ,  $C_i = 1.1 \text{ nF}$

- Explosion-proof "d"

PTB 99 ATEX 1160

- Marking

Ex II 1/2 G Ex d IIC T4/T6 Gb

- Permissible ambient temperature

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;  
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection

To circuits with values:  $U_H = 10.5 \dots 45 \text{ V DC}$

To circuits with values:  $U_H = 9 \dots 32 \text{ V DC}$

- Dust explosion protection for zone 20 (pending)

PTB 01 ATEX 2055

- Marking

Ex II 1 D Ex ta IIIIC T120°C Da  
Ex II 1/2 D Ex ta/tb IIIIC T120°C Da/Db

- Permissible ambient temperature

-40 ... +85 °C (-40 ... +185 °F)

- Max. surface temperature

120 °C (248 °F)

- Connection

To certified intrinsically-safe circuits with peak values:  
 $U_i = 30 \text{ V}$ ,  $I_i = 100 \text{ mA}$ ,  
 $P_i = 750 \text{ mW}$ ,  $R_i = 300 \Omega$

FISCO supply unit:

$U_o = 17.5 \text{ V}$ ,  $I_o = 380 \text{ mA}$ ,  $P_o = 5.32 \text{ W}$

Linear barrier:

$U_o = 24 \text{ V}$ ,  $I_o = 250 \text{ mA}$ ,  $P_o = 1 \text{ W}$

- Effective internal inductance/capacitance

$L_i = 0.4 \text{ mH}$ ,  $C_i = 6 \text{ nF}$

$L_i = 7 \mu\text{H}$ ,  $C_i = 1.1 \text{ nF}$

- Dust explosion protection for zone 21/22 (pending)

PTB 01 ATEX 2055

- Marking

Ex II 2 D Ex tb IIIIC T120°C Db

- Connection

To circuits with values:  
 $U_H = 10.5 \dots 45 \text{ V DC}$ ;  $P_{\text{max}} = 1.2 \text{ W}$

To circuits with values:

$U_H = 9 \dots 32 \text{ V DC}$ ;  $P_{\text{max}} = 1 \text{ W}$

- Type of protection "n" (zone 2)

PTB 13 ATEX 2007 X

- Marking

Ex II 2/3 G Ex nA II T4/T5/T6 Gc  
Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc

- Connection (Ex nA)

$U_m = 45 \text{ V}$

$U_m = 32 \text{ V}$

- Connections (Ex ic)

To circuits with values:  
 $U_i = 45 \text{ V}$

FISCO supply unit ic:

$U_o = 17.5 \text{ V}$ ,  $I_o = 570 \text{ mA}$

Linear barrier:

$U_o = 32 \text{ V}$ ,  $I_o = 132 \text{ mA}$ ,  $P_o = 1 \text{ W}$

- Effective internal inductance/capacitance

$L_i = 0.4 \text{ mH}$ ,  $C_i = 6 \text{ nF}$

$L_i = 7 \mu\text{H}$ ,  $C_i = 1.1 \text{ nF}$

- Explosion protection acc. to FM (pending)

Certificate of Compliance 3008490

- Identification (XP/DIP) or (IS); (NI)

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

- Explosion protection to CSA (pending)

Certificate of Compliance 1153651

- Identification (XP/DIP) or (IS)

CL I, DIV 1, GP ABCD T4...T6; 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

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

1

HART communication		FOUNDATION Fieldbus communication	
HART	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		

# Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

## SITRANS P410 for gauge pressure

1



Selection and Ordering data	Article No.	Order code
<b>Pressure transmitter for gauge pressure, SITRANS P410 with HART</b>	<b>7MF4033-</b>	<b>-Z C41</b>
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
<b>Measuring cell filling</b>		
Silicone oil		
<b>Measuring cell cleaning</b>		
normal	1	
<b>Measuring span (min. ... max.)</b>		
0.01 ... 1 bar (0.15 ... 14.5 psi)	B	
0.04 ... 4 bar (0.58 ... 58 psi)	C	
0.16 ... 16 bar (2.32 ... 232 psi)	D	
0.63 ... 63 bar (9.14 ... 914 psi)	E	
1.6 ... 160 bar (23.2 ... 2320 psi)	F	
<b>Wetted parts materials</b>		
Seal diaphragm		
Process connection		
Stainless steel	A	
Stainless steel	B	
Hastelloy	C	
Hastelloy	Y 1	
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" <b>(recommended version)</b> <sup>1) 2) 3) 4)</sup>	Y 0	
Version for diaphragm seals in conjunction with process connector "G1/2B connection shank" <sup>1) 2) 3) 4)</sup>	Y 0	
<b>Process connection</b>		
• Connection shank G1/2B to EN 837-1	0	
• Female thread 1/2-14 NPT	1	
• Stainless steel oval flange with process connection (Oval flange has no female thread)		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	2	
- Mounting thread M10 to DIN 19213	3	
- Mounting thread M12 to DIN 19213	4	
• Male thread M20 x 1.5	5	
• Male thread 1/2 -14 NPT	6	
<b>Non-wetted parts materials</b>		
• Housing made of die-cast aluminium	0	
• Housing stainless steel precision casting <sup>5)</sup>	3	
<b>Version</b>		
• Standard version, German plate inscription, setting for pressure unit: bar	1	
• International version, English plate inscription, setting for pressure unit: bar	2	
• Chinese version, English plate inscription, setting for pressure unit: Pascal	3	
All versions include DVD with compact operating instructions in various EU languages.		
<b>Explosion protection</b>		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d) <sup>6)</sup>		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d) <sup>7)</sup>		P
- "Ex nA/ic (Zone 2) <sup>8)</sup>		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D) <sup>7)9)</sup> (pending)		R
• FM + CSA intrinsic safe (is) (pending) <sup>10)</sup>		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D <sup>7)9)10)</sup> (pending)		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp) <sup>6)10)</sup> (pending)		NC
<b>Electrical connection / cable entry</b>		
• Screwed gland M20 x1 .5		B
• Screwed gland 1/2-14 NPT		C
• Han 7D plug (plastic housing) incl. mating connector <sup>11)</sup>		D
• M12 connectors (stainless steel) <sup>11)12)</sup>		F

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

1

Selection and Ordering data	Article No.	Order code
<b>Pressure transmitter for gauge pressure, SITRANS P410 with HART</b>	<b>7MF4033-</b>  <b>-</b>  <b>-Z C41</b>	
<b>Display</b>		
• Without display		0
• Without visible display (display concealed, setting: mA)	▶	1
• With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7
▶ Available ex stock		

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

A quick-start guide is included in the scope of delivery of the device.

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-..Y.-... and 7MF4900-1...-B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Han7D plug".
- 6) Without cable gland, with blanking plug
- 7) With enclosed cable gland Ex ia and blanking plug
- 8) Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) Only in connection with Ex approval A, B or E.
- 12) M12 delivered without cable socket

# Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

## SITRANS P410 for gauge pressure





Selection and Ordering data	Article No.	Order code
<b>Pressure transmitter for gauge pressure</b>		
<b>SITRANS P410 with PROFIBUS PA (PA)</b>	7MF4034-	-Z C41
<b>SITRANS P410 with FOUNDATION Fieldbus (FF)</b>	7MF4035-	-Z C41
<a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>		
<b>Measuring cell filling</b> Silicone oil		
<b>Measuring cell cleaning</b> normal		
<b>Nominal measuring range</b>		
1 bar (14.5 psi)	B	
4 bar (58 psi)	C	
16 bar (232 psi)	D	
63 bar (914 psi)	E	
160 bar (2320 psi)	F	
<b>Wetted parts materials</b>		
Seal diaphragm Process connection		
Stainless steel Stainless steel	A	
Hastelloy Stainless steel	B	
Hastelloy Hastelloy	C	
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" <b>(recommended version)</b> <sup>1) 2) 3) 4)</sup>	Y 1	
Version for diaphragm seals in conjunction with process connector "G1/2B connection shank" <sup>1) 2) 3) 4)</sup>	Y 0	
<b>Process connection</b>		
• Connection shank G1/2B to EN 837-1	0	
• Female thread 1/2-14 NPT	1	
• Stainless steel oval flange with process connection (Oval flange has no female thread) <sup>5)</sup>		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	2	
- Mounting thread M10 to DIN 19213	3	
- Mounting thread M12 to DIN 19213	4	
• Male thread M20 x 1.5	5	
• Male thread 1/2 -14 NPT	6	
<b>Non-wetted parts materials</b>		
• Housing made of die-cast aluminium	0	
• Housing stainless steel precision casting	3	
<b>Version</b>		
• Standard version, German label inscription, setting of pressure unit: bar	1	
• International version, English label inscription, setting of pressure unit: psi	2	
• Chinese version, English label inscription, setting of pressure unit: kPa	3	
All versions include DVD with compact operating instructions in various EU languages.		
<b>Explosion protection</b>		
• None	A	
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"	B	
- "Explosion-proof (Ex d)" <sup>6)</sup>	D	
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d) <sup>7)</sup>	P	
- "Ex nA/ic (Zone 2)" <sup>8)</sup>	E	
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" <sup>7) 9)</sup> (not for P410 with FOUNDATION Fieldbus) (pending)	R	
• FM + CSA intrinsic safe (is) (pending) <sup>10)</sup>	F	
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D <sup>7)9)10)</sup> (pending)	S	
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" <sup>6)10)</sup> (pending)	NC	
<b>Electrical connection/cable entry</b>		
• Screwed gland M20 x 1.5	B	
• Screwed gland 1/2-14 NPT	C	
• M12 connectors (stainless steel) <sup>11) 12)</sup>	F	

## Pressure Measurement

### Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 for gauge pressure

1

Selection and Ordering data	Article No.	Order code
<b>Pressure transmitter for gauge pressure</b>		
<b>SITRANS P410 with PROFIBUS PA (PA)</b>	<b>7MF4034-</b>  - 	<b>-Z C41</b>
<b>SITRANS P410 with FOUNDATION Fieldbus (FF)</b>	<b>7MF4035-</b>  - 	<b>-Z C41</b>
<b>Display</b>		
• Without display		<b>0</b>
• Without visible display (display concealed, setting: bar)		<b>1</b>
• With visible display (setting: bar)		<b>6</b>
• with customer-specific display (setting as specified, Order code "Y21" required)		<b>7</b>

A quick-start guide is included in the scope of delivery of the device.

- 1) When the manufacturer's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-...Y.-... and 7MF4900-1...-B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) M10 fastening thread: Max. span 160 bar (2320 psi)  
7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)
- 6) Without cable gland, with blanking plug.
- 7) With enclosed cable gland Ex ia and blanking plug.
- 8) Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) M12 delivered without cable socket.
- 12) Only in connection with Ex approval A, B, E or F.

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

Selection and Ordering data	Order code			Selection and Ordering data	Order code			
<i>Further designs</i> Add "-Z" to Article No. and specify Order code.	HART	PA	FF	<i>Further designs</i> Add "-Z" to Article No. and specify Order code.	HART	PA	FF	
<b>Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:</b>				<b>Use in or on zone 1D/2D</b> (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)	E01	✓	✓	✓
• Steel	A01	✓	✓	<b>CRN approval Canada</b> (Canadian Registration Number)	E22 <sup>3)</sup>	✓	✓	✓
• Stainless steel 304	A02	✓	✓	<b>Dual seal</b>	E24	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	<b>Explosion-proof "Intrinsic safety" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-B..)	E55 <sup>4)</sup>	✓	✓	✓
<b>Plug</b>				<b>Explosion protection "Explosion-proof" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-D..)	E56 <sup>4)</sup>	✓	✓	✓
• Han 7D (metal)	A30	✓		<b>Ex protection "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-E..)	E57 <sup>4)</sup>	✓	✓	✓
• Han 8D (instead of Han 7D)	A31	✓		<b>Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China)</b> (only for transmitter 7MF4...-.....-R..)	E58 <sup>4)</sup>	✓	✓	✓
• Angled	A32	✓		<b>"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)</b> (pending)	E70 <sup>4)</sup>	✓	✓	✓
• Han 8D (metal)	A33	✓		(only for transmitter 7MF4...-.....-[B, D]..-Z + E11)				
<b>Cable sockets for M12 connectors (metal (CuZn))</b>	A50	✓	✓	<b>Ex-protection Ex ia according to EAC Ex (Russia)</b>	E80	✓	✓	✓
<b>Rating plate inscription</b> (instead of German)				<b>Ex-protection Ex d according to EAC Ex (Russia)</b>	E81	✓	✓	✓
• English	B11	✓	✓	<b>Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)</b>	E82	✓	✓	✓
• French	B12	✓	✓	<b>Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)</b>	E83	✓	✓	✓
• Spanish	B13	✓	✓	<b>Two coats of lacquer on casing and cover (PU on epoxy)</b>	G10	✓	✓	✓
• Italian	B14	✓	✓	<b>Transient protector 6 kV (lightning protection)</b>	J01	✓	✓	✓
<b>English rating plate</b> Pressure units in inH <sub>2</sub> O and/or psi	B21	✓	✓	<b>Oval flange NAM (ASTAVA)</b>	J06	✓	✓	✓
<b>Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2<sup>1)</sup></b>	C11	✓	✓	<b>Marine approvals</b>				
<b>Inspection certificate<sup>2)</sup></b> Acc. to EN 10204-3.1	C12	✓	✓	• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓
<b>Factory certificate</b> Acc. to EN 10204-2.2	C14	✓	✓	• Lloyds Register (LR)	S11	✓	✓	✓
<b>Acceptance certificate (EN 10204-3.1)</b> PMI test of parts in contact with medium	C15	✓	✓	• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓
<b>Functional safety (SIL2)</b> (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		• American Bureau of Shipping (ABS)	S14	✓	✓	✓
<b>Functional safety (SIL2/3)</b> Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		• Russian Maritime Register (RMR)	S16	✓	✓	✓
<b>Increased measuring accuracy</b> (mandatory specification for SITRANS P410)	C41	✓	✓	• Korean Register of Shipping (KR)	S17	✓	✓	✓
<b>PED for Russia with initial calibration mark</b>	C99	✓	✓					
<b>Setting of the upper saturation limit of the output signal to 22.0 mA</b>	D05	✓						
<b>Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)</b>	D07	✓	✓					
<b>Degree of protection IP66/IP68</b> (only for M20x1.5 and ½"-14 NPT)	D12	✓	✓					
<b>Supplied with oval flange</b> (1 item), PTFE packing and screws in thread of oval flange	D37	✓	✓					
<b>Capri cable gland 4F CrNi and clamping device (848699 + 810634) included</b>	D59	✓	✓					
<b>TAG plate empty (no inscription)</b>	D61	✓	✓					

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/199).

<sup>1)</sup> When the manufacturer's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

<sup>2)</sup> If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

<sup>3)</sup> Cannot be ordered with remote seal.

<sup>4)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.



## Pressure Measurement

### Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 for gauge pressure

1

Selection and Ordering data	Order code			
<i>Additional data</i>		HART	PA	FF
Please add <b>"-Z"</b> to Article No. and specify Order code(s) and plain text.				
<b>Measuring range to be set</b> Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ <sup>1)</sup>	
<b>Stainless steel tag plate and entry in device variable (measuring point description)</b> Max. 16 characters, specify in plain text: Y15: .....	Y15	✓	✓	✓
<b>Measuring point text (entry in device variable)</b> Max. 27 characters, specify in plain text: Y16: .....	Y16	✓	✓	✓
<b>Entry of HART address (TAG)</b> Max. 8 characters, specify in plain text: Y17: .....	Y17	✓		
<b>Setting of pressure indication in pressure units</b> 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 <sub>2</sub> O <sup>*</sup> , inH <sub>2</sub> O <sup>*</sup> , ftH <sub>2</sub> O <sup>*</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
<b>Setting of pressure indication in non-pressure units<sup>2)</sup></b> Specify in plain text: Y22: ..... up to ..... l/min, m <sup>3</sup> /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		

✓ = available

**Ordering example**

Item line: 7MF4033-1EA00-1AA7-Z C41  
 B line: A01 + Y01 + Y21  
 C line: Y01: 10 ... 20 bar (145 ... 290 psi)  
 C line: Y21: bar (psi)

<sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

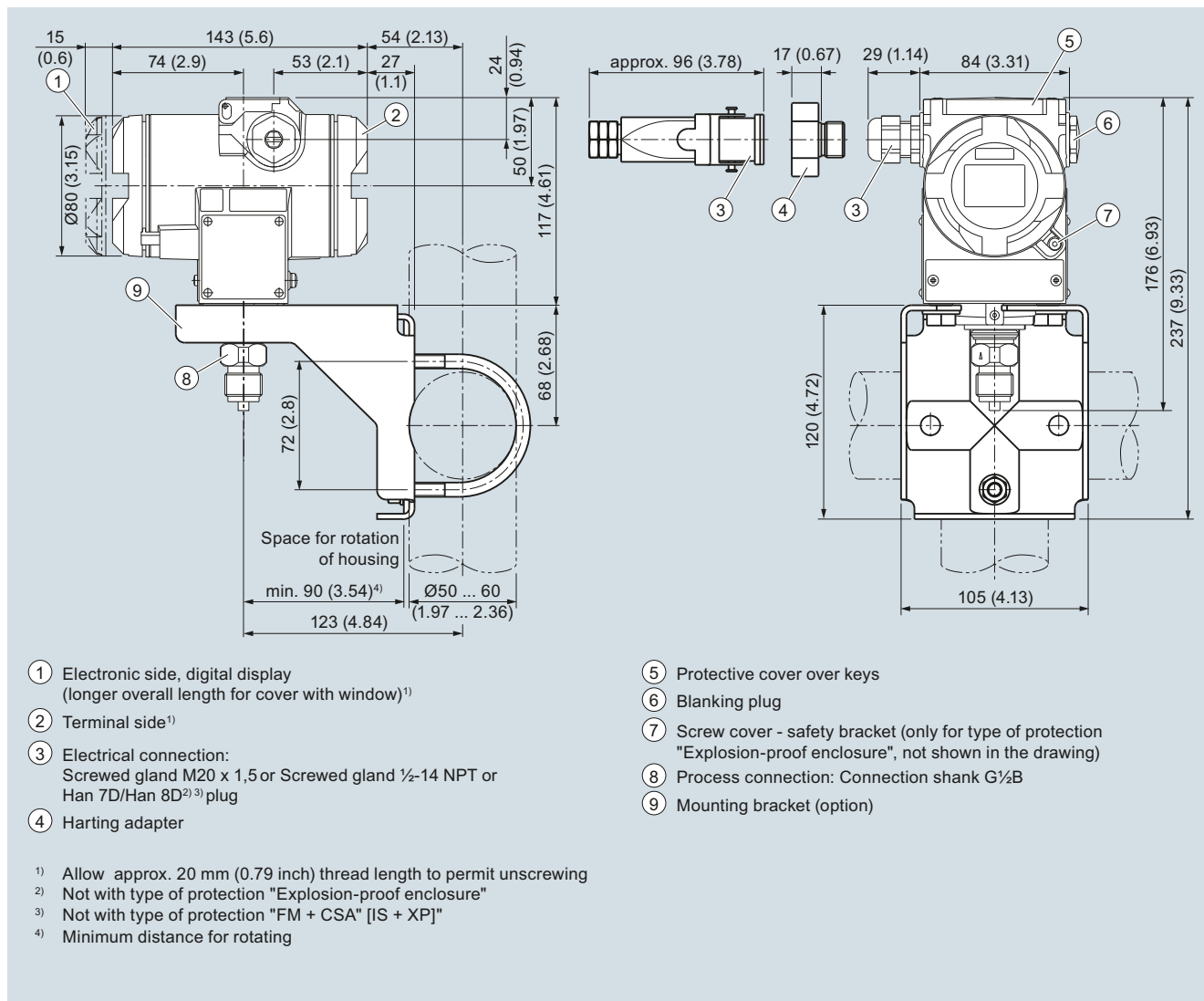
<sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

#### Dimensional drawings



SITRANS P410 pressure transmitters for gauge pressure, dimensions in mm (inch)



## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

#### SITRANS P410 for differential pressure and flow

<b>Measuring accuracy</b>	Acc. to IEC 60770-1
Reference conditions	<ul style="list-style-type: none"> <li>• Increasing characteristic</li> <li>• Start-of-scale value 0 bar/kPa/psi</li> <li>• Stainless steel seal diaphragm</li> <li>• Silicone oil filling</li> <li>• Room temperature 25 °C (77 °F)</li> </ul>
Measuring span ratio $r$ (spread, Turn-Down)	$r = \text{max. measuring span/set measuring span or nom. pressure range}$
Error in measurement at limit setting incl. hysteresis and reproducibility	
<ul style="list-style-type: none"> <li>• Linear characteristic</li> </ul>	
<ul style="list-style-type: none"> <li>- 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kPa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	$r \leq 5 :$ $\leq 0.04 \%$ $5 < r \leq 100 :$ $\leq (0.004 \cdot r + 0.045) \%$
<ul style="list-style-type: none"> <li>• Square-rooted characteristic (flow &gt; 50 %)</li> </ul>	
<ul style="list-style-type: none"> <li>- 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kPa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	$r \leq 5 :$ $\leq 0.04 \%$ $5 < r \leq 100 :$ $\leq (0.004 \cdot r + 0.045) \%$
<ul style="list-style-type: none"> <li>• Square-rooted characteristic (flow &gt; 25 ... 50 %)</li> </ul>	
<ul style="list-style-type: none"> <li>- 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kPa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	$r \leq 5 :$ $\leq 0.08 \%$ $5 < r \leq 100 :$ $\leq (0.008 \cdot r + 0.09) \%$
Influence of ambient temperature (in percent per 28 °C (50 °F))	
<ul style="list-style-type: none"> <li>• 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kPa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	$\leq (0.025 \cdot r + 0.125) \%$
Influence of static pressure	
<ul style="list-style-type: none"> <li>• on the zero point (PKN)</li> </ul>	
<ul style="list-style-type: none"> <li>- 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> </ul>	$\leq (0.1 \cdot r) \%$ per 70 bar (zero-point correction is possible with position error adjustment)
<ul style="list-style-type: none"> <li>- 5 bar/500 kPa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	$\leq (0.2 \cdot r) \%$ per 70 bar (zero-point correction is possible with position error adjustment)
<ul style="list-style-type: none"> <li>• on the span (PKS)</li> </ul>	
<ul style="list-style-type: none"> <li>- 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kPa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	$\leq 0.14 \%$ per 70 bar
Long-term stability (temperature change $\pm 30$ °C ( $\pm 54$ °F))	Static pressure max. 70 bar/7 MPa/1015 psi
<ul style="list-style-type: none"> <li>• 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kPa/72.5 psi</li> </ul>	$\leq (0.125 \cdot r) \%$ in 5 years
<ul style="list-style-type: none"> <li>• 30 bar/3 MPa/435 psi</li> </ul>	$\leq (0.25 \cdot r) \%$ in 5 years
Effect of mounting position (in pressure per change in angle)	$\leq 0.7$ mbar/0.07 kPa/0.028 inH <sub>2</sub> O per 10° inclination (zero-point correction is possible with position error adjustment)
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of nominal measuring range

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

1

#### SITRANS P410 for differential pressure and flow

##### Rated conditions

Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X
Temperature of medium	
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) with 30 bar measuring cell
• In conjunction with dust explosion protection	-20 ... +60 °C (-4 ... +140 °F)
Ambient conditions	
• Ambient temperature	
- Transmitter	-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
• Electromagnetic Compatibility	
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21

##### Design

Weight (without options)	Die-cast aluminum: ≈ 4.5 kg (≈ 9.9 lb) Stainless steel precision casting: ≈ 7.1 kg (≈ 15.6 lb)
Enclosure material	Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408
Wetted parts materials	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
• Process flanges and sealing screw	Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4602
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))
Process connection	Female thread 1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518/DIN EN 61518
Material of mounting bracket	
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)

##### Power supply $U_H$

	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Power supply		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

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

#### SITRANS P410 for differential pressure and flow

Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Classification according to PED 2014/68/EU	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"		
- Marking	PTB 13 ATEX 2007 X	
- Permissible ambient temperature	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Connection	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Effective internal inductance/capacitance	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$ , $I_i = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ ; $R_i = 300 \Omega$	FISCO supply unit: $U_o = 17.5 \text{ V}$ , $I_o = 380 \text{ mA}$ , $P_o = 5.32 \text{ W}$ Linear barrier: $U_o = 24 \text{ V}$ , $I_o = 250 \text{ mA}$ , $P_o = 1.2 \text{ W}$
• Explosion-proof "d"	$L_i = 0.4 \text{ mH}$ , $C_i = 6 \text{ nF}$	
- Marking	PTB 99 ATEX 1160	
- Permissible ambient temperature	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Connection	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$
• Dust explosion protection for zone 20 (pending)	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$	
- Marking	PTB 01 ATEX 2055	
- Permissible ambient temperature	Ex II 1 D Ex ta IIIC T120°C Da	
- Max. surface temperature	Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db	
- Connection	-40 ... +85 °C (-40 ... +185 °F)	
- Effective internal inductance/capacitance	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$ , $I_i = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ , $R_i = 300 \Omega$	FISCO supply unit: $U_o = 17.5 \text{ V}$ , $I_o = 380 \text{ mA}$ , $P_o = 5.32 \text{ W}$ Linear barrier: $U_o = 24 \text{ V}$ , $I_o = 250 \text{ mA}$ , $P_o = 1 \text{ W}$
• Dust explosion protection for zone 21/22 (pending)	$L_i = 0.4 \text{ mH}$ , $C_i = 6 \text{ nF}$	
- Marking	PTB 01 ATEX 2055	
- Connection	Ex II 2 D Ex tb IIIC T120°C Db	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$ ; $P_{\max} = 1 \text{ W}$
• Type of protection "n" (zone 2)	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$ ; $P_{\max} = 1.2 \text{ W}$	
- Marking	PTB 13 ATEX 2007 X	
- Connection (Ex nA)	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gc	
- Connection (Ex ic)	Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Effective internal inductance/capacitance	$U_m = 45 \text{ V}$	$U_m = 32 \text{ V}$
• Explosion protection acc. to FM (pending)	To circuits with values: $U_i = 45 \text{ V}$	FISCO supply unit ic: $U_o = 17.5 \text{ V}$ , $I_o = 570 \text{ mA}$ Linear barrier: $U_o = 32 \text{ V}$ , $I_o = 132 \text{ mA}$ , $P_o = 1 \text{ W}$
- Identification (XP/DIP) or (IS); (NI)	$L_i = 0.4 \text{ mH}$ , $C_i = 6 \text{ nF}$	
• Explosion protection to CSA (pending)	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS)	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	
	Certificate of Compliance 1153651	
	CL I, DIV 1, GP ABCD T4...T6; 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	

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

1

<b>HART communication</b>		<b>FOUNDATION Fieldbus communication</b>	
HART Protocol	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Software for PC	HART Version 5.x SIMATIC PDM	<ul style="list-style-type: none"> <li>• Analog input               <ul style="list-style-type: none"> <li>- Adaptation to customer-specific process variables</li> <li>- Electrical damping, adjustable</li> <li>- Simulation function</li> </ul> </li> <li>- Failure mode</li> <li>- Limit monitoring</li> <li>- Square-rooted characteristic for flow measurement</li> </ul>	Yes, linearly rising or falling characteristic 0 ... 100 s Output/input (can be locked within the device with a bridge) parameterizable (last good value, substitute value, incorrect value) Yes, one upper and lower warning limit and one alarm limit respectively Yes
<b>PROFIBUS PA communication</b>		<ul style="list-style-type: none"> <li>• PID</li> <li>• Physical block</li> </ul>	Standard FOUNDATION Fieldbus function block 1 resource block
Simultaneous communication with master class 2 (max.)	4	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
The address can be set using	Configuration tool or local operation (standard setting address 126)	<ul style="list-style-type: none"> <li>• Pressure transducer block               <ul style="list-style-type: none"> <li>- Can be calibrated by applying two pressures</li> <li>- Monitoring of sensor limits</li> <li>- Simulation function: Measured pressure value, sensor temperature and electronics temperature</li> </ul> </li> </ul>	Yes  Yes  Constant value or over parameterizable ramp function
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 <ul style="list-style-type: none"> <li>- Adaptation to customer-specific process variables</li> <li>- Electrical damping, adjustable</li> <li>- Simulation function</li> <li>- Failure mode</li> </ul>	Yes, linearly rising or falling characteristic 0 ... 100 s Input /Output 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 <ul style="list-style-type: none"> <li>- Can be calibrated by applying two pressures</li> <li>- Monitoring of sensor limits</li> <li>- Specification of a container characteristic with</li> <li>- Square-rooted characteristic for flow measurement</li> <li>- Gradual volume suppression and implementation point of square-root extraction</li> <li>- Simulation function for measured pressure value and sensor temperature</li> </ul>	Yes Yes Max. 30 nodes Yes Parameterizable Constant value or over parameterizable ramp function		

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data		Article No.	Order Code
<b>SITRANS P410 with HART pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)</b>		<b>7MF4433-</b>	<b>-Z C41</b>
<a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>			
<b>Measuring cell filling</b>	<b>Measuring cell cleaning</b>		
Silicone oil	normal	1	
<b>Measuring span (min. ... max.)</b>			
2.5 ... 250 mbar	(1.004 ... 100.4 inH <sub>2</sub> O)	D	
6 ... 600 mbar	(2.409 ... 240.9 inH <sub>2</sub> O)	E	
16 ... 1600 mbar	(6.424 ... 642.4 inH <sub>2</sub> O)	F	
50 ... 5000 mbar	(20.08 ... 2008 inH <sub>2</sub> O)	G	
0.3 ... 30 bar	(4.35 ... 435 psi)	H	
<b>Wetted parts materials</b>			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	B	
Hastelloy	Hastelloy	C	
Version for diaphragm seal <sup>1) 2) 3) 4)</sup>		Y	
<b>Process connection</b>			
Female thread 1/4-18 NPT with flange connection			
<ul style="list-style-type: none"> <li>Sealing screw opposite process connection</li> <li>Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518</li> <li>Mounting thread M10 to DIN 19213 (only for replacement requirement)</li> </ul>		2	
<ul style="list-style-type: none"> <li>Vent on side of process flange<sup>5)</sup></li> <li>Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518</li> <li>Mounting thread M10 to DIN 19213 (only for replacement requirement)</li> </ul>		6	
		4	
<b>Non-wetted parts materials</b>			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting <sup>6)</sup>	3	
<b>Version</b>			
<ul style="list-style-type: none"> <li>Standard version, German plate inscription, setting for pressure unit: bar</li> <li>International version, English plate inscription, setting for pressure unit: bar</li> <li>Chinese version, English plate inscription, setting for pressure unit: Pascal</li> </ul>		1	
All versions include DVD with compact operating instructions in various EU languages.		2	
		3	
<b>Explosion protection</b>			
<ul style="list-style-type: none"> <li>None</li> <li>With ATEX, Type of protection: <ul style="list-style-type: none"> <li>"Intrinsic safety (Ex ia)"</li> <li>"Explosion-proof (Ex d)"<sup>7)</sup></li> <li>"Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)<sup>8)</sup></li> <li>"Ex nA/ic (Zone 2)"<sup>9)</sup></li> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"<sup>8)10)</sup> (pending)</li> </ul> </li> <li>FM + CSA intrinsic safe (is) (pending)<sup>11)</sup></li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D<sup>8)10)11)</sup> (pending)</li> <li>With FM + CSA, Type of protection: <ul style="list-style-type: none"> <li>"Intrinsic Safe and Explosion Proof (is + xp)"<sup>7)11)</sup> (pending)</li> </ul> </li> </ul>		A	
		B	
		D	
		P	
		E	
		R	
		F	
		S	
		NC	


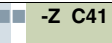


## Pressure Measurement

### Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Article No.	Order Code
<b>SITRANS P410 with HART pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)</b>	<b>7MF4433-</b>  <b>-</b>  <b>-Z C41</b>	
<b>Electrical connection/cable entry</b>		
<ul style="list-style-type: none"> <li>• Screwed gland M20 x 1.5</li> <li>• Screwed gland ½-14 NPT</li> <li>• Han 7D plug (plastic housing) incl. mating connector<sup>12)13)</sup></li> <li>• M12 connectors (stainless steel)<sup>14)15)</sup></li> </ul>		<b>B</b> <b>C</b> <b>D</b> <b>F</b>
<b>Display</b>		
<ul style="list-style-type: none"> <li>• Without display</li> <li>• Without visible display (display concealed, setting: mA)</li> <li>• With visible display (setting: mA)</li> <li>• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)</li> </ul>		<b>0</b> <b>1</b> <b>6</b> <b>7</b>

▶ Available ex stock

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

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443-..Y.-... and 7MF4900-1...-B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- 6) Not in conjunction with Electrical connection "Han7D plug".
- 7) Without cable gland, with blanking plug
- 8) With enclosed cable gland Ex ia and blanking plug
- 9) Configurations with HAN and M12 connectors are only available in Ex ic.
- 10) Only in connection with IP66.
- 11) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 12) Only in connection with Ex approval A, B or E.
- 13) Permissible only for crimp-contact of conductor cross-section 1 mm<sup>2</sup>
- 14) Only in connection with Ex approval A, B, E or F.
- 15) M12 delivered without cable socket.

# Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

## SITRANS P410 for differential pressure and flow





Selection and Ordering data	Article No.	Order code
<b>Pressure transmitters for differential pressure and flow PN 160 (MAWP 2320 psi)</b>		
<b>SITRANS P410 with PROFIBUS PA (PA)</b>	7MF4434-	-Z C41
<b>SITRANS P410 with FOUNDATION Fieldbus (FF)</b>	7MF4435-	-Z C41
<a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>		
<b>Measuring cell filling</b>		
Silicone oil		
<b>Measuring cell cleaning</b>		
normal		
<b>Nominal measuring range</b>		
250 mbar (100.4 inH <sub>2</sub> O)	D	
600 mbar (240.9 inH <sub>2</sub> O)	E	
1600 mbar (642.4 inH <sub>2</sub> O)	F	
5 bar (2008 inH <sub>2</sub> O)	G	
30 bar (435 psi)	H	
<b>Wetted parts materials</b>		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version as diaphragm seal 1) 2) 3) 4)		Y
<b>Process connection</b>		
Female thread 1/4-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		
- Mounting thread M10 to DIN 19213 (only for replacement requirement)	2	
• Venting on side of process flanges 5)		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	6	
- Mounting thread M10 to DIN 19213 (only for replacement requirement)	4	
<b>Non-wetted parts materials</b>		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting	3
<b>Version</b>		
• Standard version, German plate inscription, setting for pressure unit: bar		1
• International version, English plate inscription, setting for pressure unit: bar		2
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3
All versions include DVD with compact operating instructions in various EU languages.		
<b>Explosion protection</b>		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" <sup>6)</sup>		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d) <sup>7)</sup>		P
- "Ex nA/ic (Zone 2)" <sup>8)</sup>		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D) <sup>7) 9)</sup> (not for DS III FF) (pending)		R
• FM + CSA intrinsic safe (is) (pending) <sup>10)</sup>		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D <sup>7)9)10)</sup> (pending)		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp) <sup>8)10)</sup> (pending)		NC
<b>Electrical connection/cable entry</b>		
• Screwed gland M20 x 1.5		B
• Screwed gland 1/2-14 NPT		C
• M12 connectors (stainless steel) <sup>11) 12)</sup>		F

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Article No.	Order code
<b>Pressure transmitters for differential pressure and flow PN 160 (MAWP 2320 psi)</b>		
<b>SITRANS P410 with PROFIBUS PA (PA)</b>	<b>7MF4434-</b>  - 	<b>-Z C41</b>
<b>SITRANS P410 with FOUNDATION Fieldbus (FF)</b>	<b>7MF4435-</b>  - 	<b>-Z C41</b>
<b>Display</b>		
• Without display		0
• Without visible display (display concealed, setting: bar)		1
• With visible display (setting: bar)		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443-...Y... and 7MF4900-1...-B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- 6) Without cable gland, with blanking plug.
- 7) With enclosed cable gland Ex ia and blanking plug.
- 8) Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) Only in connection with Ex approval A, B, E or F.
- 12) M12 delivered without cable socket

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Order code			Selection and Ordering data	Order code		
<i>Further designs</i> Add "-Z" to Article No. and specify Order code.	HART	PA	FF	<i>Further designs</i> Add "-Z" to Article No. and specify Order code.	HART	PA	FF
<b>Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:</b>				<b>Setting of the upper saturation limit of the output signal to 22.0 mA</b>	D05	✓	
• Steel	A01	✓	✓	<b>Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)</b> (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓
• Stainless steel 304	A02	✓	✓	<b>Degree of protection IP66/IP68</b> (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓
• Stainless steel 316L	A03	✓	✓	<b>Supplied with oval flange set</b> (2 items), PTFE packings and screws in thread of process flanges	D37	✓	✓
<b>O-rings for process flanges</b> (instead of FPM (Viton))				<b>Capri cable gland 4F CrNi and clamping device (848699 + 810634) included</b>	D59	✓	✓
• PTFE (Teflon)	A20	✓	✓	<b>TAG plate empty (no inscription)</b>	D61	✓	✓
• FEP (with silicone core, approved for food)	A21	✓	✓	<b>Use in or on zone 1D/2D</b> (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)	E01	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	<b>Dual seal</b>	E24	✓	✓
• NBR (Buna N)	A23	✓	✓	<b>Explosion-proof "Intrinsic safety" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-B..)	E55 <sup>3)</sup>	✓	✓
<b>Plug</b>				<b>Explosion protection "Explosion-proof" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-D..)	E56 <sup>3)</sup>	✓	✓
• Han 7D (metal)	A30	✓		<b>Explosion-proof "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-E..)	E57 <sup>3)</sup>	✓	✓
• Han 8D (instead of Han 7D)	A31	✓		<b>Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-R..)	E58 <sup>3)</sup>	✓	✓
• Angled	A32	✓		<b>"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)</b> (pending) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)	E70 <sup>3)</sup>	✓	✓
• Han 8D (metal)	A33	✓		<b>Ex-protection Ex ia according to EAC Ex (Russia)</b>	E80	✓	✓
<b>Sealing screws (2 units)</b> ¼-18 NPT, with valve in mat. of process flanges	A40	✓	✓	<b>Ex-protection Ex d according to EAC Ex (Russia)</b>	E81	✓	✓
<b>Cable sockets for M12 connectors (metal (CuZn))</b>	A50	✓	✓	<b>Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)</b>	E82	✓	✓
<b>Rating plate inscription</b> (instead of German)				<b>Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)</b>	E83	✓	✓
• English	B11	✓	✓	<b>Two coats of lacquer on casing and cover (PU on epoxy)</b>	G10	✓	✓
• French	B12	✓	✓	<b>Interchanging of process connection side</b>	H01	✓	✓
• Spanish	B13	✓	✓	<b>Vent on side for gas measurements</b>	H02	✓	✓
• Italian	B14	✓	✓	<b>Stainless steel process flanges for vertical differential pressure lines</b> (not together with K01, K02 and K04 <sup>4)</sup> )	H03	✓	✓
<b>English rating plate</b> Pressure units in inH <sub>2</sub> O and/or psi	B21	✓	✓				
<b>Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2<sup>1)</sup></b>	C11	✓	✓				
<b>Inspection certificate<sup>2)</sup> to EN 10204-3.1</b>	C12	✓	✓				
<b>Factory certificate to EN 10204-2.2</b>	C14	✓	✓				
<b>Acceptance certificate (EN 10204-3.1)</b> PMI test of parts in contact with medium	C15	✓	✓				
<b>Functional safety (SIL2)</b> (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓					
<b>Functional safety (SIL2/3)</b> Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓					
<b>Increased measuring accuracy</b> (mandatory specification for SITRANS P410)	C41	✓	✓				
<b>Device passport Russia</b>	C99	✓	✓				

# Pressure Measurement

## Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Order code			
<b>Further designs</b> Add "-Z" to Article No. and specify Order code.		<b>HART</b>	<b>PA</b>	<b>FF</b>
<b>Transient protector 6 kV (lightning protection)</b>	<b>J01</b>	✓	✓	✓
<b>Chambered graphite gasket for process flange</b>	<b>J02</b>	✓	✓	✓
<b>Chambered PTFE graphite gasket</b>	<b>J03</b>	✓	✓	✓
<b>EPDM O-rings for process flange with approval (WRC/WRAS)</b>	<b>J05</b>	✓	✓	✓
<b>Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)<sup>5)</sup></b>	<b>J08</b>	✓	✓	✓
<b>Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)<sup>5)</sup></b>	<b>J09</b>	✓	✓	✓
<b>Marine approvals</b>				
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	<b>S10</b>	✓	✓	✓
• Lloyds Register (LR)	<b>S11</b>	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	<b>S12</b>	✓	✓	✓
• American Bureau of Shipping (ABS)	<b>S14</b>	✓	✓	✓
• Russian Maritime Register (RMR)	<b>S16</b>	✓	✓	✓
• Korean Register of Shipping (KR)	<b>S17</b>	✓	✓	✓
Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/199). ✓ = available				
1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.				
2) If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.				
3) Option does not include ATEX approval, but instead includes only the country-specific approval.				
4) Not suitable for connection of remote seal.				
5) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.				

Selection and Ordering data	Order code			
<b>Additional data</b> Please add "-Z" to Article No. and specify Order code(s) and plain text.		<b>HART</b>	<b>PA</b>	<b>FF</b>
<b>Measuring range to be set</b> Specify in plain text: • in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi • in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	<b>Y01</b> <b>Y02</b>	✓	✓ <sup>1)</sup>	
<b>Stainless steel tag plate and entry in device variable (measuring point description)</b> Max. 16 characters, specify in plain text: Y15: .....	<b>Y15</b>	✓	✓	✓
<b>Measuring point text (entry in device variable)</b> Max. 27 char., specify in plain text: Y16: .....	<b>Y16</b>	✓	✓	✓
<b>Entry of HART address (TAG)</b> Max. 8 char., specify in plain text: Y17: .....	<b>Y17</b>	✓		
<b>Setting of pressure indicator in pressure units</b> 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 <sub>2</sub> O <sup>*</sup> , inH <sub>2</sub> O <sup>*</sup> , ftH <sub>2</sub> O <sup>*</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C	<b>Y21</b>	✓	✓	✓
<b>Setting of pressure indicator in non-pressure units<sup>2)</sup></b> Specify in plain text: Y22: ..... up to ..... l/min, m <sup>3</sup> /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	<b>Y22<sup>3)</sup> + Y01 or Y02</b>	✓		
<b>Preset bus address</b> possible between 1 and 126 Specify in plain text: Y25: .....	<b>Y25</b>		✓	✓
<b>Damping adjustment in seconds (0 ... 100 s)</b>	<b>Y30</b>	✓	✓	✓
Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 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.				
3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")				

# Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

## SITRANS P410 for differential pressure and flow

1



Selection and Ordering data		Article No.	Order code
<b>SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)</b>		7MF4533-	-Z C41
<a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>			
<b>Measuring cell filling</b>	<b>Measuring cell cleaning</b>		
Silicone oil	normal	1	
<b>Measuring span (min. ... max.)</b>			
6 ... 600 mbar	(2.4 ... 240 inH <sub>2</sub> O)	E	
16 ... 1600 mbar	(6.4 ... 642 inH <sub>2</sub> O)	F	
50 ... 5000 mbar	(20 ... 2000 inH <sub>2</sub> O)	G	
0.3 ... 30 bar	(4.35 ... 435 psi)	H	
<b>Wetted parts materials</b>			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	B	
Version for diaphragm seal <sup>1) 2) 3) 4)</sup>		Y	
<b>Process connection</b>			
Female thread 1/4-18 NPT with flange connection			
• Sealing screw opposite process connection			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		3	
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		1	
• Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing)			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		7	
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		5	
<b>Non-wetted parts materials</b>			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting <sup>5)</sup>	3	
<b>Version</b>			
• Standard version, German plate inscription, setting for pressure unit: bar		1	
• International version, English plate inscription, setting for pressure unit: bar		2	
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3	
All versions include DVD with compact operating instructions in various EU languages.			
<b>Explosion protection</b>			
• None			A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"			B
- "Explosion-proof (Ex d)" <sup>6)</sup>			D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d) <sup>7)</sup>			P
- "Ex nA/ic (Zone 2)" <sup>8)</sup>			E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)" <sup>7)9)</sup> (pending)			R
• FM + CSA intrinsic safe (is) (pending) <sup>10)</sup>			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D <sup>7)9)10)</sup> (pending)			S
• With FM + CSA, Type of protection:			
- "Intrinsic safety and explosion-proof (is + xp)" <sup>6)10)</sup> , max PN 360 (pending)			NC
<b>Electrical connection/cable entry</b>			
• Screwed gland M20x1.5			B
• Screwed gland 1/2-14 NPT			C
• Han 7D plug (plastic housing) incl. mating connector <sup>11) 12)</sup>			D
• M12 connectors (stainless steel) <sup>13)14)</sup>			F

## Pressure Measurement

### Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Article No.	Order code
<b>SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)</b>	<b>7MF4533-</b>  <b>-</b>  <b>-Z C41</b>	
<b>Display</b>		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

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

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

- 1) When the manufacturer's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453-..Y.-.... and 7MF4900-1....-B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Han7D plug".
- 6) Without cable gland, with blanking plug
- 7) With enclosed cable gland Ex ia and blanking plug
- 8) Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) Only in connection with Ex approval A, B or E.
- 12) Permissible only for crimp-contact of conductor cross-section 1 mm<sup>2</sup>
- 13) Only in connection with Ex approval A, B, E or F.
- 14) M12 delivered without cable socket.

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data		Article No.	Order Code
<b>Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)</b>			
<b>SITRANS P410 with PROFIBUS PA (PA)</b>		7MF4534-	-Z C41
<b>SITRANS P410 with FOUNDATION Fieldbus (FF)</b>		7MF4535-	-Z C41
<a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>			
<b>Measuring cell filling</b>	<b>Measuring cell cleaning</b>		
Silicone oil	normal	1	
<b>Nominal measuring range</b>			
600 mbar	(240 inH <sub>2</sub> O)	E	
1600 mbar	(642 inH <sub>2</sub> O)	F	
5 bar	(2000 inH <sub>2</sub> O)	G	
30 bar	(435 psi)	H	
<b>Wetted parts materials</b>			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	B	
Version for diaphragm seal 1) 2) 3) 4)		Y	
<b>Process connection</b>			
Female thread 1/4-18 NPT with flange connection			
<ul style="list-style-type: none"> <li>Sealing screw opposite process connection               <ul style="list-style-type: none"> <li>Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518</li> <li>Mounting thread M12 to DIN 19213 (only for replacement requirement)</li> </ul> </li> <li>Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing).               <ul style="list-style-type: none"> <li>Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518</li> <li>Mounting thread M12 to DIN 19213 (only for replacement requirement)</li> </ul> </li> </ul>		3 1 7 5	
<b>Non-wetted parts materials</b>			
Process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting	3	
<b>Version</b>			
<ul style="list-style-type: none"> <li>Standard version, German plate inscription, setting for pressure unit: bar</li> <li>International version, English plate inscription, setting for pressure unit: bar</li> <li>Chinese version, English plate inscription, setting for pressure unit: Pascal</li> </ul> All versions include DVD with compact operating instructions in various EU languages.		1 2 3	
<b>Explosion protection</b>			
<ul style="list-style-type: none"> <li>None</li> <li>With ATEX, Type of protection:               <ul style="list-style-type: none"> <li>"Intrinsic safety (Ex ia)"</li> <li>"Explosion-proof (Ex d)"<sup>5)</sup></li> <li>"Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)<sup>6)</sup></li> <li>"Ex nA/ic (Zone 2)"<sup>7)</sup></li> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"<sup>6)8)</sup> (not for P410 with FOUNDATION Fieldbus) (pending)</li> </ul> </li> <li>FM + CSA intrinsic safe (is) (pending)<sup>9)</sup></li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D<sup>6)7)9)</sup> (pending)</li> <li>With FM + CSA, Type of protection:               <ul style="list-style-type: none"> <li>"Intrinsic safety and explosion-proof (is + xp)"<sup>6)9)</sup>, max PN 360 (pending)</li> </ul> </li> </ul>			A B D P E R F S NC
<b>Electrical connection/cable entry</b>			
<ul style="list-style-type: none"> <li>Screwed gland M20 x 1.5</li> <li>Screwed gland 1/2-14 NPT</li> <li>M12 connectors (stainless steel)<sup>10) 11)</sup></li> </ul>			B C F









## Pressure Measurement

### Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Article No.	Order Code
<b>Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)</b>		
<b>SITRANS P410 with PROFIBUS PA (PA)</b>	<b>7MF4534-</b>  - 	<b>-Z C41</b>
<b>SITRANS P410 with FOUNDATION Fieldbus (FF)</b>	<b>7MF4535-</b>  - 	<b>-Z C41</b>
	<b>1</b>  - 	
<b>Display</b>		
• Without (display hidden)		<b>0</b>
• Without visible display (display concealed, setting: bar)		<b>1</b>
• With visible display (setting: bar)		<b>6</b>
• With customer-specific display (setting as specified, Order code "Y21" required)		<b>7</b>

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453-...Y... and 7MF4900-1...-B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Without cable gland, with blanking plug.
- 6) With enclosed cable gland Ex ia and blanking plug.
- 7) Configurations with HAN and M12 connectors are only available in Ex ic.
- 8) Only in connection with IP66.
- 9) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 10) Only in connection with Ex approval A, B, E or F.
- 11) M12 delivered without cable socket

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Order code			Selection and Ordering data	Order code		
<i>Further designs</i>	HART	PA	FF	<i>Further designs</i>	HART	PA	FF
Add "-Z" to Article No. and specify Order code.				Add "-Z" to Article No. and specify Order code.			
<b>Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:</b>				<b>Use in or on zone 1D/2D</b> (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia)" and IP66)	E01	✓	✓
• Steel	A01	✓	✓	<b>Dual seal</b>	E24	✓	✓
• Stainless steel 304	A02	✓	✓	<b>Explosion-proof "Intrinsic safety" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-B..)	E55 <sup>1)</sup>	✓	✓
• Stainless steel 316L	A03	✓	✓	<b>Ex prot. "Explosion-proof" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-D..)	E56 <sup>1)</sup>	✓	✓
<b>O-rings for process flanges</b> (instead of FPM (Viton))				<b>Explosion-proof "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-E..)	E57 <sup>1)</sup>	✓	✓
• PTFE (Teflon)	A20	✓	✓	<b>Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4...-.....-R..)	E58 <sup>1)</sup>	✓	✓
• FEP (with silicone core, approved for food)	A21	✓	✓	<b>"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)</b> (pending) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)	E70 <sup>1)</sup>	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	<b>Ex-protection Ex ia according to EAC Ex (Russia)</b>	E80	✓	✓
• NBR (Buna N)	A23	✓	✓	<b>Ex-protection Ex d according to EAC Ex (Russia)</b>	E81	✓	✓
<b>Plug</b>				<b>Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)</b>	E82	✓	✓
• Han 7D (metal)	A30	✓		<b>Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)</b>	E83	✓	✓
• Han 8D (instead of Han 7D)	A31	✓		<b>Two coats of lacquer on casing and cover (PU on epoxy)</b>	G10	✓	✓
• Angled	A32	✓		<b>Interchanging of process connection side</b>	H01	✓	✓
• Han 8D (metal)	A33	✓		<b>Vent on side for gas measurements</b>	H02	✓	✓
<b>Sealing screws (2 units)</b> ¼-18 NPT, with valve in mat. of process flanges	A40	✓	✓	<b>Stainless steel process flanges for vertical differential pressure lines</b>	H03	✓	✓
<b>Cable sockets for M12 connection (metal (CuZn))</b>	A50	✓	✓	<b>Transient protector 6 kV (lightning protection)</b>	J01	✓	✓
<b>Rating plate inscription</b> (instead of German)				<b>Chambered graphite gasket for process flange</b>	J02	✓	✓
• English	B11	✓	✓	<b>Chambered PTFE graphite gasket</b>	J03	✓	✓
• French	B12	✓	✓	<b>EPDM O-rings for process flange with approval (WRC/WRAS)</b>	J05	✓	✓
• Spanish	B13	✓	✓	<b>Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)<sup>2)</sup></b>	J08	✓	✓
• Italian	B14	✓	✓	<b>Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)<sup>3)</sup></b>	J09	✓	✓
<b>English rating plate</b> Pressure units in inH <sub>2</sub> O and/or psi	B21	✓	✓	<b>Marine approvals</b>			
<b>Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2</b>	C11	✓	✓	• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓
<b>Inspection certificate</b> Acc. to EN 10204-3.1	C12	✓	✓	• Lloyds Register (LR)	S11	✓	✓
<b>Factory certificate</b> Acc. to EN 10204-2.2	C14	✓	✓	• French marine classification society Bureau Veritas (BV)	S12	✓	✓
<b>Functional safety (SIL2)</b> (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		• American Bureau of Shipping (ABS)	S14	✓	✓
<b>Functional safety (SIL2/3)</b> Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		• Russian Maritime Register (RMR)	S16	✓	✓
<b>Increased measuring accuracy</b> (mandatory specification for SITRANS P410)	C41	✓	✓	• Korean Register of Shipping (KR)	S17	✓	✓
<b>Device passport Russia</b>	C99	✓	✓	Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/199).			
<b>Setting of the upper saturation limit of the output signal to 22.0 mA</b>	D05	✓					
<b>Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)</b> (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓				
<b>Degree of protection IP66/IP68</b> (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓				
<b>Capri cable gland 4F CrNi and clamping device (848699 + 810634) included</b>	D59	✓	✓				
<b>TAG plate empty (no inscription)</b>	D61	✓	✓				

<sup>1)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.

<sup>2)</sup> Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

## Pressure Measurement

### Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 for differential pressure and flow

1

Selection and Ordering data	Order code		
Additional data	HART	PA	FF
Please add <b>"-Z"</b> to Article No. and specify Order code(s) and plain text.			
<b>Measuring range to be set</b> Specify in plain text:			
• in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ <sup>1)</sup>
• in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	Y02	✓	
<b>Stainless steel tag plate and entry in device variable (measuring point description)</b> Max. 16 characters, specify in plain text: Y15: .....	Y15	✓	✓
<b>Measuring point text (entry in device variable)</b> Max. 27 char., specify in plain text: Y16: .....	Y16	✓	✓
<b>Entry of HART address (TAG)</b> Max. 8 char., specify in plain text: Y17: .....	Y17	✓	
<b>Setting of pressure indication in pressure units</b> 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 <sub>2</sub> O <sup>1)</sup> , inH <sub>2</sub> O <sup>1)</sup> , ftH <sub>2</sub> O <sup>1)</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % ) ref. temperature 20 °C	Y21	✓	✓
<b>Setting of pressure indication in non-pressure units<sup>2)</sup></b> Specify in plain text: Y22: ..... up to ..... l/min, m <sup>3</sup> /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y22 + Y01 or Y02	✓	
<b>Preset bus address</b> possible between 1 and 126 Specify in plain text: Y25: .....	Y25		✓
<b>Damping adjustment in seconds (0 ... 100 s)</b>	Y30	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

✓ = available

<sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

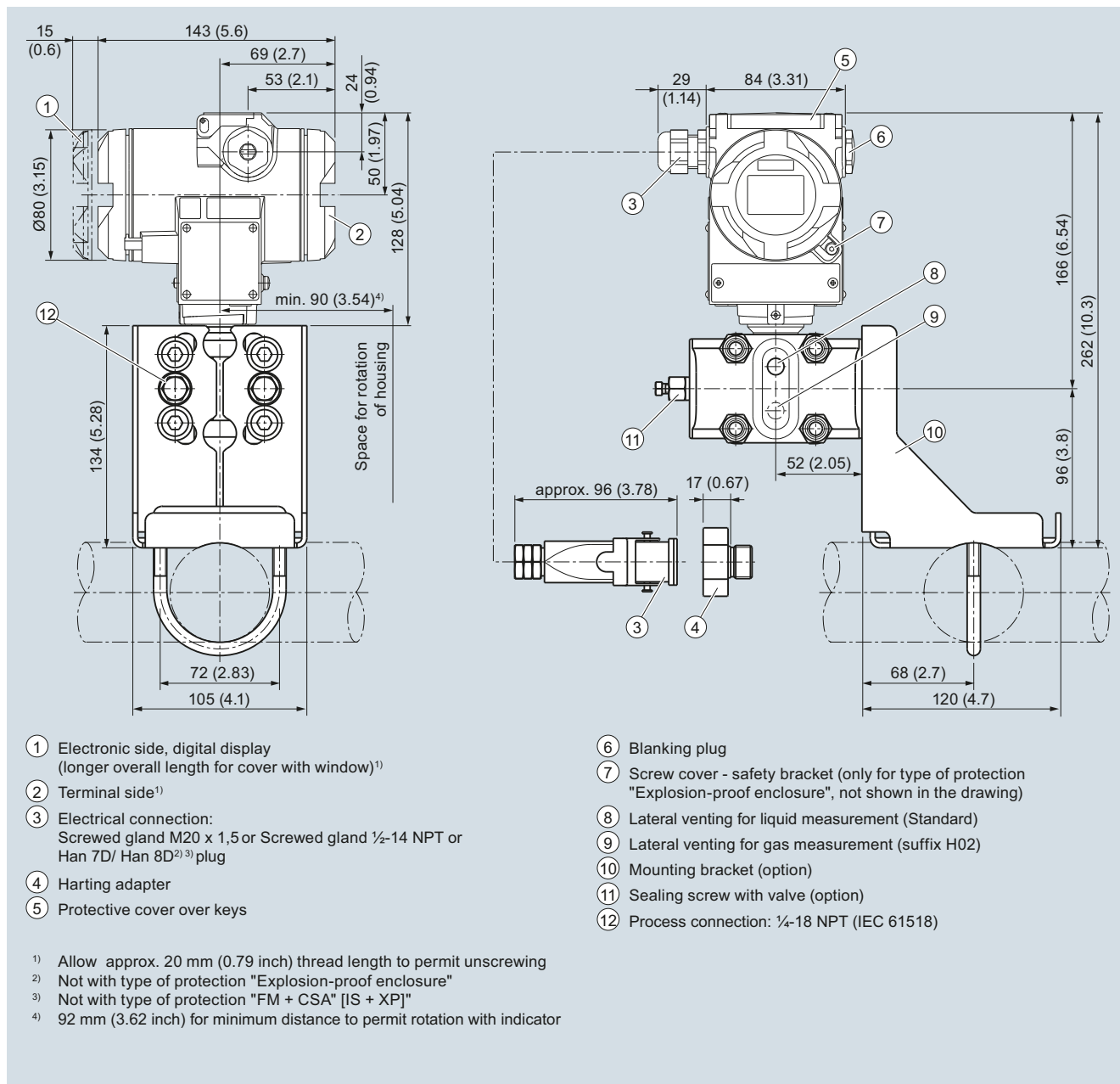
<sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

## Pressure Measurement

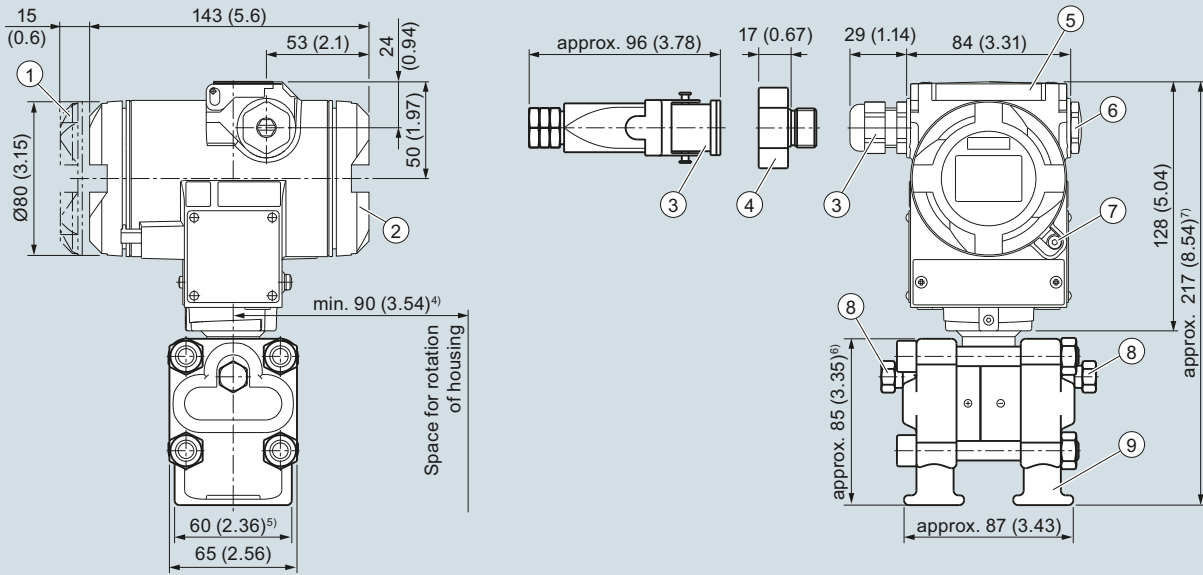
Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

#### Dimensional drawings



SITRANS P410 pressure transmitters for differential pressure and flow, dimensions in mm (inch)



- ① Electronic side, digital display (longer overall length for cover with window)<sup>1)</sup>
- ② Terminal side<sup>1)</sup>
- ③ Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D<sup>2)</sup> plug
- ④ Harting adapter

- ⑤ Protective cover over keys
- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- ⑧ Sealing screw with valve (option)
- ⑨ Process connection: ¼-18 NPT (IEC 61518)

- <sup>1)</sup> Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- <sup>2)</sup> Not with type of protection "Explosion-proof enclosure"
- <sup>3)</sup> Not with type of protection "FM + CSA" [IS + XP]"
- <sup>4)</sup> 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
- <sup>5)</sup> 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- <sup>6)</sup> 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- <sup>7)</sup> 219 mm (8.62 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

SITRANS P410 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P410 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

## Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Accessories/Spare parts

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
<i>Accessories/Spare parts</i>			
<b>Mounting bracket and fastening parts</b> for pressure transmitters SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF403-.....-..C.) <ul style="list-style-type: none"> <li>made of steel</li> <li>made of stainless steel 304/1.4301</li> <li>made of stainless steel 316L/1.4404</li> </ul>	<b>7MF4997-1AB</b> <b>7MF4997-1AH</b> <b>7MF4997-1AP</b>	<b>Mounting screws</b> For measuring point label, grounding and connection terminals or for display (50 units)	<b>7MF4997-1CD</b>
<b>Mounting bracket and fastening parts</b> for pressure transmitters SITRANS P410 with HART, P410 with PROFIBUS PA and P10with FOUNDATION Fieldbus (7MF403-.....-..A., ..B., ..D. and ..F.) <ul style="list-style-type: none"> <li>made of steel</li> <li>made of stainless steel 304/1.4301</li> <li>made of stainless steel 316L/1.4404</li> </ul>	<b>7MF4997-1AC</b> <b>7MF4997-1AJ</b> <b>7MF4997-1AQ</b>	<b>Sealing screws</b> (1 set = 2 units) for process flange <ul style="list-style-type: none"> <li>made of stainless steel</li> <li>made of Hastelloy</li> </ul>	<b>7MF4997-1CG</b> <b>7MF4997-1CH</b>
<b>Mounting and fastening brackets</b> For differential pressure transmitters with flange thread M10 SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF443-....) <ul style="list-style-type: none"> <li>made of steel</li> <li>made of stainless steel 304/1.4301</li> <li>made of stainless steel 316L/1.4404</li> </ul>	<b>7MF4997-1AD</b> <b>7MF4997-1AK</b> <b>7MF4997-1AR</b>	<b>Sealing screws with vent valve</b> Complete (1 set = 2 units) <ul style="list-style-type: none"> <li>made of stainless steel</li> <li>made of Hastelloy</li> </ul>	<b>7MF4997-1CP</b> <b>7MF4997-1CQ</b>
<b>Mounting and fastening brackets</b> For differential pressure transmitters with flange thread M12 SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF453-....) <ul style="list-style-type: none"> <li>made of steel</li> <li>made of stainless steel 304/1.4301</li> <li>made of stainless steel 316L/1.4404</li> </ul>	<b>7MF4997-1AE</b> <b>7MF4997-1AL</b> <b>7MF4997-1AS</b>	<b>Connection board</b> <ul style="list-style-type: none"> <li>for SITRANS P410</li> <li>for SITRANS P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus</li> </ul>	<b>7MF4997-1DN</b> <b>7MF4997-1DP</b>
<b>Mounting and fastening brackets</b> For differential pressure transmitters with flange thread 7/16 -20 UNF SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF443-.... and 7MF453-....) <ul style="list-style-type: none"> <li>made of steel</li> <li>made of stainless steel 304/1.4301</li> <li>made of stainless steel 316L/1.4404</li> </ul>	<b>7MF4997-1AF</b> <b>7MF4997-1AM</b> <b>7MF4997-1AT</b>	<b>O-rings for process flanges made of:</b> <ul style="list-style-type: none"> <li>FPM (Viton)</li> <li>PTFE (Teflon)</li> <li>FEP (with silicone core, approved for food)</li> <li>FFPM (Kalrez, compound 4079)</li> <li>NBR (Buna N)</li> </ul>	<b>7MF4997-2DA</b> <b>7MF4997-2DB</b> <b>7MF4997-2DC</b> <b>7MF4997-2DD</b> <b>7MF4997-2DE</b>
<b>Cover</b> Made of die-cast aluminum, including gasket, for SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus. Compatible for Ex and non-Ex transmitters <ul style="list-style-type: none"> <li>without window</li> <li>with window</li> </ul>	<b>7MF4997-1BB</b> <b>7MF4997-1BE</b>	<b>Sealing ring</b> for process connection <ul style="list-style-type: none"> <li>Available ex stock</li> </ul>	<b>see "Fittings"</b>
<b>Cover</b> Made of stainless steel, including gasket, or SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus. Compatible for Ex and non-Ex transmitters <ul style="list-style-type: none"> <li>without window</li> <li>with window</li> </ul>	<b>7MF4997-1BC</b> <b>7MF4997-1BF</b> <b>7MF4997-1BR</b>		
<b>Digital indicator</b> Including mounting material, for SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus			
<b>Measuring point label</b> <ul style="list-style-type: none"> <li>without inscription (5 units)</li> <li>Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters")</li> </ul>	<b>7MF4997-1CA</b> <b>7MF4997-1CB-Z</b> <b>Y..: .....</b>		

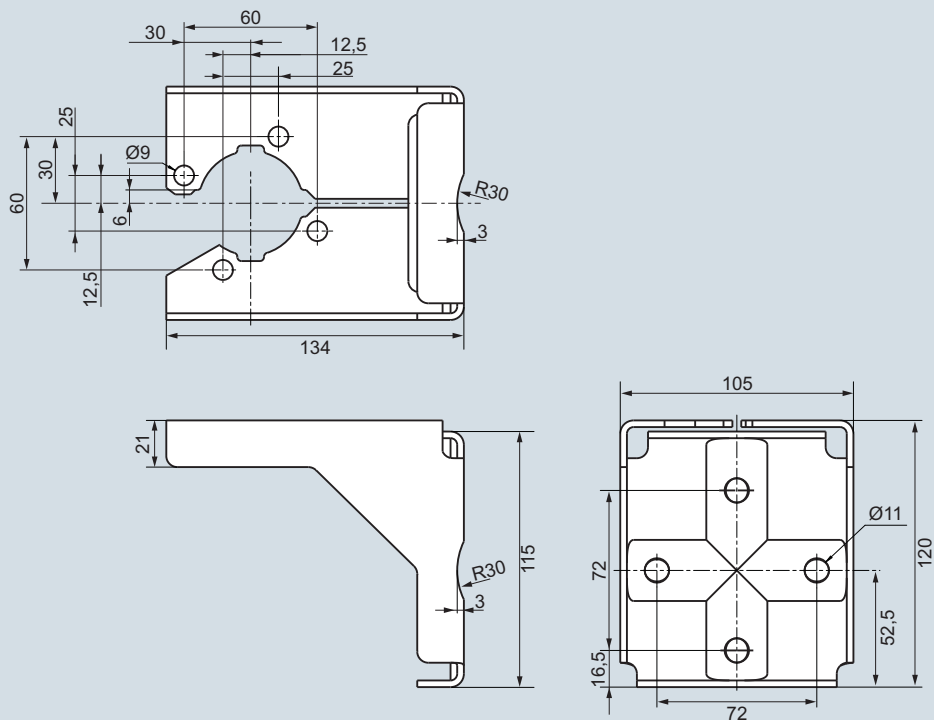
Selection and Ordering data	Article No.
<p><b>Documentation</b></p> <p>The entire documentation is available for download free-of-charge in various languages at: <a href="http://www.siemens.com/processinstrumentation/documentation/documentation">http://www.siemens.com/processinstrumentation/documentation/documentation</a></p> <p>Compact operating instructions SITRANS P DS III/P410</p> <ul style="list-style-type: none"> <li>• English, German, Spanish, French, Italian, Dutch</li> </ul>	<p><b>A5E03434626</b></p>
<p><b>Certificates (order only via SAP)</b> instead of Internet download</p> <ul style="list-style-type: none"> <li>• hard copy (to order)</li> <li>• on DVD (to order)</li> </ul>	<p><b>A5E03252406</b> <b>A5E03252407</b></p>
<p><b>HART modem</b> with USB interface</p>	<p><b>7MF4997-1DB</b></p>
<p>▶ Available ex stock</p> <p>Power supply units see Chap. 7 "Supplementary Components".</p>	

## Pressure Measurement

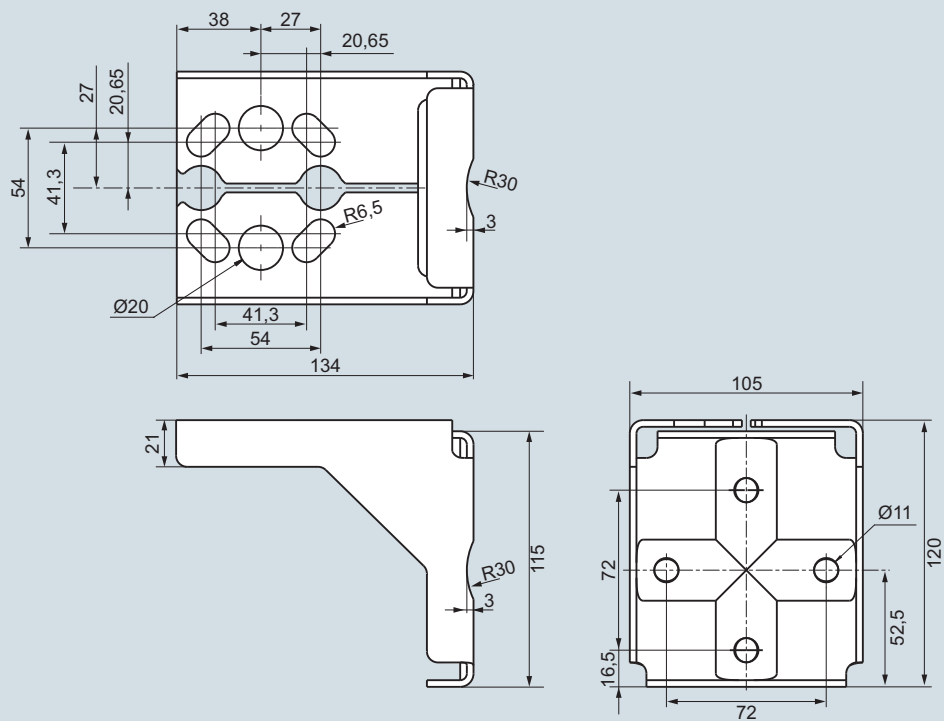
Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Accessories/Spare parts

#### Dimensional drawings



Mounting bracket for SITRANS P410 gauge pressure-transmitters, dimensions in mm  
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P410 differential pressure transmitter, dimensions in mm  
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)