Overview

SITRANS P310 pressure transmitters are digital pressure transmitters with a high level of operating convenience. With a measurement accuracy of 0.075 %, they complement the SITRANS P DS III and round off the portfolio. The parameterization is performed using input buttons or the HART interface.

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

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

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

SITRANS P310 pressure transmitters are available in various versions for measuring:

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

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Good long-term stability
- Wetted parts made of high-grade materials (stainless steel, Hastelloy)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Measuring accuracy 0.075 %
- Parameterization over input buttons and HART interface

Application

SITRANS P310 pressure transmitters are particularly suited for use in the industrial areas of Energy, Oil & Gas as well as Water/Wastewater. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

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

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

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

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART interface.

Pressure transmitter for gauge pressure

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

Span (infinitely adjustable):
0.01 bar to 700 bar (0.15 psi to 10153 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):
1 mbar ... 30 bar (0.0145 ... 435 psi)

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).

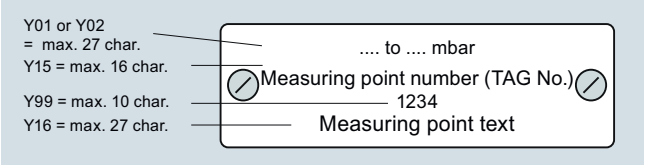
The approval label is located on the opposite side.

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.

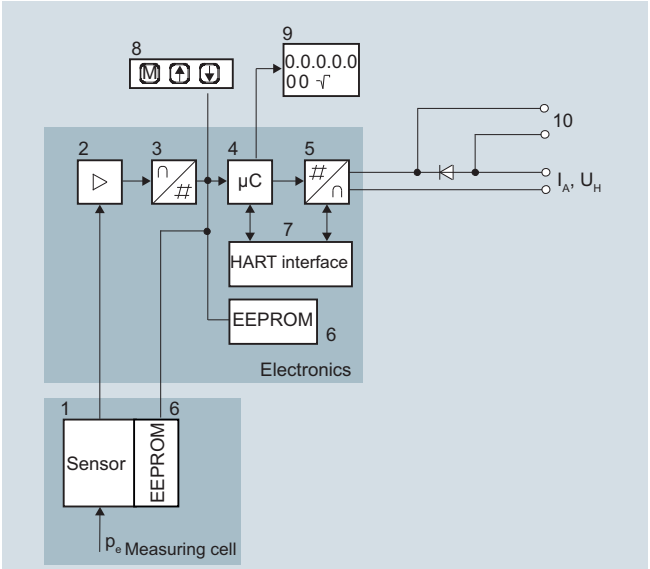
At the top of the housing is a plastic cover (1), which hides the input keys.

Example for an attached measuring point label



Function

Operation of electronics with HART communication



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

Function diagram of electronics

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

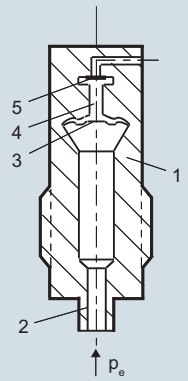
Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar compared to vacuum.

Mode of operation of the measuring cells

Measuring cell for gauge pressure

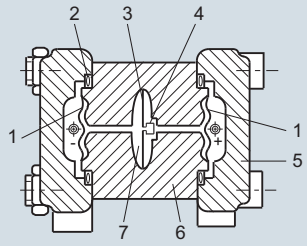


1 Measuring cell
2 Process connection
3 Seal diaphragm
4 Filling liquid
5 Silicon pressure sensor
p_e Pressure as input variable

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 absolute pressure.

Measuring cell for differential pressure and flow



1 Seal diaphragm
2 O-ring
3 Overload diaphragm
4 Silicon pressure sensor
5 Process flange
6 Body of measuring cell
7 Filling liquid

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 P310

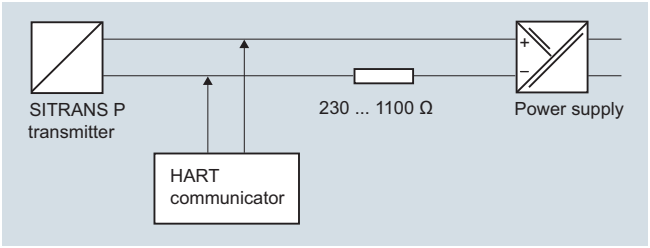
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

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

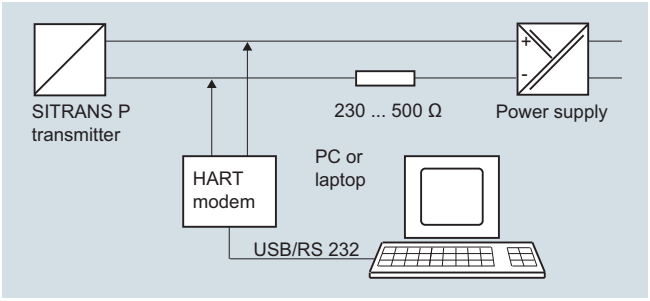
Parameterization using HART

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, DS III 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[1)]
Type of dimension and actual dimension	x	x
Characteristic (linear / square-rooted)	x[2)]	x[2)]
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

1) Cancel apart from write protection
2) Only differential pressure

Available physical units of display for SITRANS P310 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, inH_2O, inH_2O (4 °C), mmH_2O, ftH_2O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	m^3/d, m^3/h, m^3/s, l/min, l/s, ft^3/d, ft^3/min, ft^3/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

Technical specifications

SITRANS P310 for gauge pressure

Input			
Measured variable	Gauge pressure		
Span (fully adjustable), max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	Span	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 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	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
	0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 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	67 bar 6.7MPa 972 psi	100 bar 10 MPa 1450 psi
	1.6 ... 1 bar 0.16 ... 16 MPa 23 ... 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 25 MPa 3626 psi
	4 ... 400 bar 0.4 ... 40 MPa 58 ... 5802 psi	400 bar 40 MPa 5802 psi	600 bar 60 MPa 8700 psi
	7 ... 700 bar 0.7 ... 70 MPa 102 ... 10153 psi	800 bar 80 MPa 11603 psi	800 bar 80 MPa 11603 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		
Start of scale value	Between the measuring limits continuously adjustable		
Output			
Output signal	4 ... 20 mA		
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		
Load			
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.		
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)		

SITRANS P310 for gauge pressure	
Measuring accuracy	Acc. to IEC 60770-1
Reference conditions	• Increasing characteristic • Start-of-scale value 0 bar/kPa/psi • Stainless steel seal diaphragm • Silicone oil filling • Room temperature 25 °C (77 °F)
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span
Error in measurement at limit setting incl. hysteresis and reproducibility	
• Linear characteristic	
- 1 bar/100 kPa/3.6 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi	$r \le 5$: ≤ 0.075 % $5 < r \le 100$: ≤ (0.005 · r + 0.07) %
- 400 bar/40 MPa/5802 psi 700 bar/70 MPa/10152 psi	$r \le 3$: ≤ 0.075 % $3 < r \le 100$: ≤ (0.005 · r + 0.07) %
Influence of ambient temperature (in percent per 28 °C (50 °F))	
• at -40 ... +85 °C (-40 ... 185 °F)	≤ (0.15 · r + 0.25) %
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r) % in 5 years
Effect of mounting position	≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination (zero point correction is possible with position error compensation)
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V
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)
• 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: ≈ 2.0 kg (≈ 4.4 lb) Stainless steel precision casting: ≈ 4.6 kg (≈ 10.1 lb)
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 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
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Measuring cell filling	Silicone oil
Process connection	Connection shank G½B to DIN EN 837-1, female thread ½ -14 NPT or male thread M20 x 1.5
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	
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode

SITRANS P, DS III series 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 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 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 ... 45 V DC
• Dust explosion protection for zone 20 (pending)	PTB 01 ATEX 2055
- Marking	Ex II 1 D Ex ta IIIC T120 °C Da Ex II 1/2 D Ex ta/tb IIIC 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 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF
• Dust explosion protection for zone 21/22 (pending)	PTB 01 ATEX 2055
- Marking	Ex II 2 D Ex tb IIIC T120 °C Db
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 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 V
- Connections (Ex ic)	To circuits with values: U_i = 45 V
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 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
HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM

Selection and Ordering data			Article No.
Pressure transmitter for gauge pressure, SITRANS P310 with HART		↗	7MF2033 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	▶⬟	1
Measuring span (min. ... max.)			
0.01 ... 1 bar	(0.15 ... 14.5 psi)	▶⬟	B
0.04 ... 4 bar	(0.58 ... 58 psi)	▶⬟	C
0.16 ... 16 bar	(2.32 ... 232 psi)	▶⬟	D
0.63 ... 63 bar	(9.14 ... 914 psi)	▶⬟	E
1.6 ... 160 bar	(23.2 ... 2320 psi)	▶⬟	F
4.0 ... 400 bar	(58.0 ... 5802 psi)	▶⬟	G
7.0 ... 700 bar	(102.0 ...10153 psi)		J
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel	▶⬟	A
Hastelloy	Stainless steel		B
Version for diaphragm seals in conjunction with process connector "female thread ½-14 NPT" **(recommended version)** [1) 2) 3) 4)]			Y 1
Version for diaphragm seals in conjunction with process connector "G½B connection shank" [1) 2) 3) 4)]			Y 0
Process connection			
• Connection shank G½B to EN 837-1		▶⬟	0
• Female thread ½-14 NPT		⬟	1
• Male thread M20 x 1.5			5
Non-wetted parts materials			
• Housing made of die-cast aluminium		▶⬟	0
• Housing stainless steel precision casting[5)]			3
Version			
• 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.			
Explosion protection			
• None		⬟	A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"		⬟	B
- "Explosion-proof (Ex d)"[6)]		⬟	D
- "Ex nA/ic (Zone 2)"[7)]		⬟	E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[8) 9)] (pending)		▶⬟	R
• FM + CSA intrinsic safe (is) (pending)[10)]			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D[8)9)10)] (pending)			S
• With FM + CSA, Type of protection:			
- "Intrinsic Safe and Explosion Proof (is + xp)"[6)10)] (pending)		⬟	N C
Electrical connection / cable entry			
• Screwed gland M20 x1 .5		▶⬟	B
• Screwed gland ½-14 NPT		⬟	C
• Han 7D plug (plastic housing) incl. mating connector[11)]			D

Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure, SITRANS P310 with HART		7MF2033 -
Display		
• 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

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 10/11 in the appendix.

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) Configurations with HAN and M12 connectors are only available in Ex ic.

8) With enclosed cable gland Ex ia and blanking plug.

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.

Selection and Ordering data		Order code
Further designs Add "**-Z**" to Article No. and specify Order code.		
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:		
• Steel	⬟	**A01**
• Stainless steel 304	⬟	**A02**
• Stainless steel 316L	⬟	**A03**
Plug		
• Han 7D (metal)		**A30**
• Han 8D (instead of Han 7D)		**A31**
• Angled		**A32**
• Han 8D (metal)		**A33**
Rating plate inscription (instead of German)		
• French	⬟	**B12**
• Spanish	⬟	**B13**
English rating plate Pressure units in inH_20 and/or psi	⬟	**B21**
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2[1)]	⬟	**C11**
Inspection certificate[2)] Acc. to EN 10204-3.1	⬟	**C12**
Factory certificate Acc. to EN 10204-2.2	⬟	**C14**
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium		**C15**
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C20**
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C23**
PED for Russia with initial calibration mark		**C99**
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)		**D07**
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)		**D12**
Cable gland and sealing plug made of metal		**D32**
TAG plate empty (no inscription)		**D61**
Export approval Korea		**E11**
CRN approval Canada (Canadian Registration Number)		**E22**
Dual seal		**E24**
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF2033-.....-.B..)		**E55[3)]**
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF2033-.....-.D..)		**E56[3)]**
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF2033.-.....-.E..)		**E57[3)]**
Ex-protection Ex ia according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-.B..)		**E80**
Ex-protection Ex d according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-.D..)		**E81**
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-.E..)		**E82**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code.	
Transient protector 6 kV (lightning protection)	**J01**
Marine approvals	
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	**S10**
• Lloyds Register (LR)	**S11**
• French marine classification society Bureau Veritas (BV)	**S12**
• American Bureau of Shipping (ABS)	**S14**
• Russian Maritime Register (RMR)	**S16**
• Korean Register of Shipping (KR)	**S17**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 10/11 in the appendix.

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) Option does not include ATEX approval, but instead includes only the country-specific approval.

Selection and Ordering data		Order code
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.		
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	⬟	**Y01**
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	⬟	**Y15**
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	⬟	**Y16**
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	⬟	**Y17**
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm $H_2O^{*)}$, in$H_2O^{*)}$, ft$H_2O^{*)}$, mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	⬟	**Y21**
Setting of pressure indication in non-pressure units[1)] Specify in plain text: Y22: ..... up to ..... l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	⬟	**Y22 + Y01**

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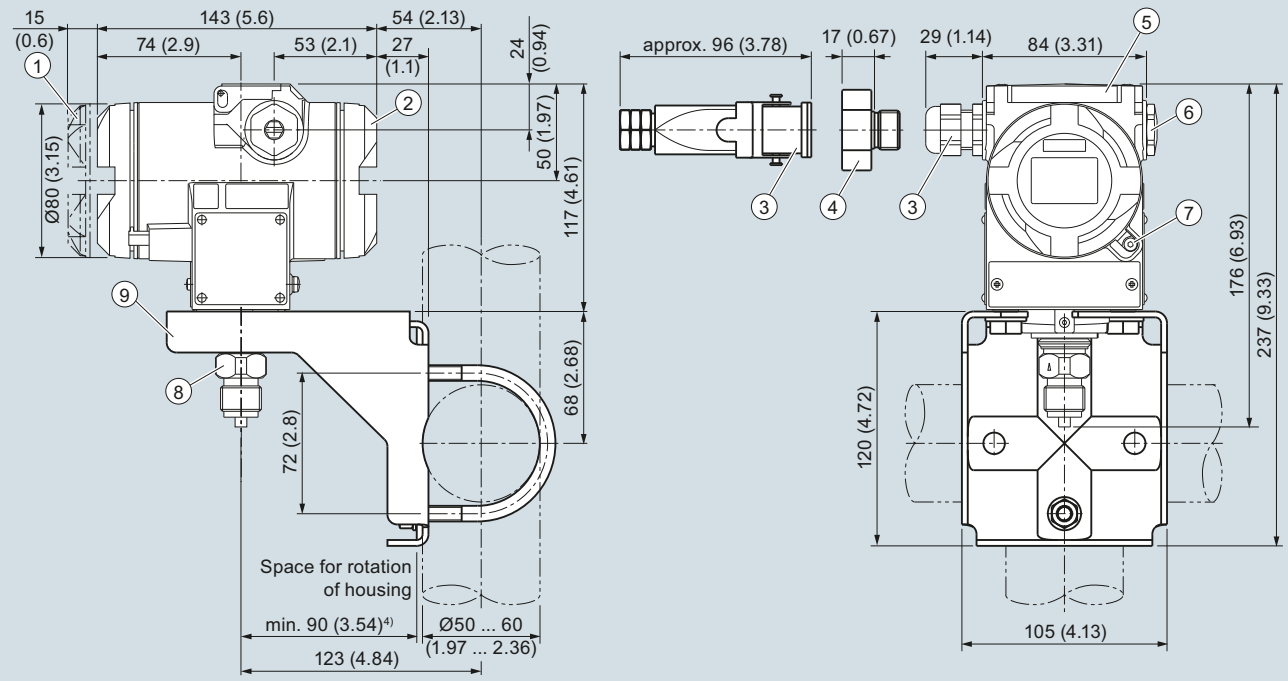
Ordering example

Item line:	7MF2033-1EA00-1AA7-Z
B line:	A01 + Y01 + Y21
C line:	Y01: 10 ... 20 bar (145 ... 290 psi)
C line:	Y21: bar (psi)

1) Preset values can only be changed over SIMATIC PDM.

Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1)]
2. Terminal side[1)]
3. Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/Han 8D[2) 3)] 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. Process connection: Connection shank G½B
9. Mounting bracket (option)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) Minimum distance for rotating

SITRANS P310 pressure transmitters for gauge pressure, dimensions in mm (inch)

Technical specifications

SITRANS P310 for differential pressure and flow		
Input		
Measured variable	Differential pressure and flow	
Span (fully adjustable), max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive)	Span	Max. operating pressure MAWP (PS)
	1 ... 60 mbar 0.1 ... 6 kPa 0.4 ... 24 inH_2O	160 bar 16 MPa 2320 psi
	2.5 ... 250 mbar 0.2 ... 25 kPa 1 ... 100 inH_2O	
	6 ... 600 mbar 0.6 ...60 kPa 2.4 ... 240 inH_2O	
	16 ... 1600 mbar 1.6 ...160 kPa 6.4 ... 642 inH_2O	
	50 ... 5000 mbar 5 ...500 kPa 20 ... 2000 inH_2O	
	0.3 ... 30 bar 0.03 ... 3 MPa 4.35 ... 435 psi	
Lower measuring limit		
• Measuring cell with silicone oil filling	-100 % of max. measuring rage (-33 % for 30 bar/3 MPa/435 psi cell) or 30 mbar a/3 kPa a/0.44 psia	
Upper measuring limit	100 % of max. span	
Start of scale value	Between the measuring limits continuously adjustable	
Output		
Output signal	4 ... 20 mA	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA	
Load		
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)	

SITRANS P310 for differential pressure and flow	
Measuring accuracy	Acc. to IEC 60770-1
Reference conditions (All error data refer always refer to the set span)	• Increasing characteristic • Start-of-scale value 0 bar/kPa/psi • Stainless steel seal diaphragm • Silicone oil filling • Room temperature 25 °C (77 °F)
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span or nom. pressure range
Error in measurement at limit setting incl. hysteresis and reproducibility	
• Linear characteristic	
- 60 mbar/6 kPa/0.87 psi	r ≤ 5 : ≤ 0.075 % 5 < r ≤ 60: ≤ (0.005 · r + 0.07) %
- 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.2 psi 5000 mbar/500 kPa/72.5 psi 30 bar/3000 kPa/435 psi	r ≤ 5 : ≤ 0,075 % 5 < r ≤ 100: ≤ (0,005 · r + 0.07) %
• Square-rooted characteristic (flow > 50 %)	
- 60 mbar/6 kPa/0.87 psi	r ≤ 5 : ≤ 0.075 % 5 < r ≤ 60: ≤ (0.005 · r + 0.07) %
- 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.2 psi 5000 mbar/500 kPa/72.5 psi 30 bar/3000 kPa/435 psi	r ≤ 5 : ≤ 0,075 % 5 < r ≤ 100: ≤ (0.005 · r + 0.07) %
• Square-rooted characteristic (flow > 25 ... 50 %)	
- 60 mbar/6 kPa/0.87 psi	r ≤ 5 : ≤ 0.15 % 5 < r ≤ 60: ≤ (0.01 · r + 0.14) %
- 250 mbar/25 kPa/3.6 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.2 psi 5000 mbar/500 kPa/72.5 psi 30 bar/3000 kPa/435 psi	r ≤ 5 : ≤ 0.15 % 5 < r ≤ 100: ≤ (0.01 · r + 0.14) %
Influence of ambient temperature (in percent per 28 °C (50 °F))	
• at -40 ... +85 °C (-40 ... +185 °F)	≤ (0.15 · r + 0.25) %
Influence of static pressure	
• on the zero point	
- 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi	≤ (0.15 · r) % per 70 bar (zero point correction is possible with position error compensation)
- 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	≤ (0.2 · r) % per 70 bar (zero point correction is possible with position error compensation)
• on the span	≤ 0.14 % per 70 bar/7 MPa/1015 psi
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r) % in 5 years static pressure max. 70 bar/7 MPa/1015 psi
Effect of mounting position (in pressure per change in angle)	≤ 0.7 mbar/0.07 kPa/0001015 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

SITRANS P310 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-AlSi12 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
Process connection	Female thread ¼-18 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	
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode

SITRANS P310 for differential pressure and flow	
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 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 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 ... 45 V DC
• Dust explosion protection for zone 20 (pending)	PTB 01 ATEX 2055
- Marking	Ex II 1 D Ex ta IIIC T120 °C Da Ex II 1/2 D Ex ta/tb IIIC 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 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22 (pending)	PTB 01 ATEX 2055
- Marking	Ex II 2 D Ex tb IIIC T120 °C Db
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc
- Connection (Ex nA)	U_m = 45 V
- Connection (Ex ic)	To circuits with values: U_i = 45 V
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 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
HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for PC	SIMATIC PDM

Selection and Ordering data			Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		↗	7MF2433 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	▶⬟	1
Measuring span (min. ... max.)			
PN 160 (MAWP 2320 psi)			
1 ... 60 mbar	(0.4015 ... 24.09 inH_2O)	▶⬟	C
2.5 ... 250 mbar	(1.004 ... 100.4 inH_2O)	▶⬟	D
6 ... 600 mbar	(2.409 ... 240.9 inH_2O)	▶⬟	E
16 ... 1600 mbar	(6.424 ... 642.4 inH_2O)	▶⬟	F
50 ... 5000 mbar	(20.08 ... 2008 inH_2O)	▶⬟	G
0.3 ... 30 bar	(4.35 ... 435 psi)	▶⬟	H
Wetted parts materials			
(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
Process connection			
Female thread ¼-18 NPT with flange connection			
• Sealing screw opposite process connection			
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518/DIN EN 61518		▶⬟	2
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		⬟	0
• Vent on side of process flange[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
Non-wetted parts materials			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	▶⬟	2
Stainless steel	Stainless steel precision casting[6)]		3
Version			
• 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.			
Explosion protection			
• None		⬟	A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"		⬟	B
- "Explosion-proof (Ex d)"[7)]		⬟	D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[8)]		⬟	P
- "Ex nA/ic (Zone 2)"[9)]		⬟	E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"[8)10)] (pending)		▶⬟	R
• FM + CSA intrinsic safe (is) (pending)[11)]			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)+ Zone 1D/2D[8)10)11)] (pending)			S
• With FM + CSA, Type of protection:			
- "Intrinsic Safe and Explosion Proof (is + xp)"[7)11)] (pending)		⬟	NC

Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		7MF2433 -
Electrical connection/cable entry		
• Screwed gland M20 x 1.5	▶⬟	B
• Screwed gland ½-14 NPT	⬟	C
• Han 7D plug (plastic housing) incl. mating connector[12)13)]		D
Display		
• 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

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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 wiht 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^2

Selection and Ordering data		Order code
Further designs Add "**-Z**" to Article No. and specify Order code.		
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:		
• Steel	⬟	**A01**
• Stainless steel 304	⬟	**A02**
• Stainless steel 316L	⬟	**A03**
O-rings for process flanges (instead of FPM (Viton))		
• PTFE (Teflon)	⬟	**A20**
• FEP (with silicone core, approved for food)		**A21**
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)		**A22**
• NBR (Buna N)		**A23**
plug		
• Han 7D (metal)		**A30**
• Han 8D (instead of Han 7D)		**A31**
• Angled		**A32**
• Han 8D (metal)		**A33**
Sealing screws (2 units) ¼-18 NPT, with valve in mat. of process flanges	⬟	**A40**
Rating plate inscription (instead of German)		
• French	⬟	**B12**
• Spanish	⬟	**B13**
English rating plate Pressure units in inH_2O and/or psi	⬟	**B21**
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2[1]	⬟	**C11**
Inspection certificate[2] to EN 10204-3.1	⬟	**C12**
Factory certificate to EN 10204-2.2	⬟	**C14**
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium		**C15**
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C20**
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C23**
Device passport Russia		**C99**
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)		**D07**
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)		**D12**
Cable gland and sealing plug made of metal		**D32**
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges		**D37**
TAG plate empty (no inscription)		**D61**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code.	
Export approval Korea	**E11**
Dual seal	**E24**
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[3]
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[3]
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[3]
Ex-protection Ex ia according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-.B..)	**E80**
Ex-protection Ex d according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-.D..)	**E81**
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-.E..)	**E82**
Vent on side for gas measurements	**H02**
Stainless steel process flanges for vertical differential pressure lines	**H03**
Transient protector 6 kV (lightning protection)	**J01**
Marine approvals	
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	**S10**
• Lloyds Register (LR)	**S11**
• French marine classification society Bureau Veritas (BV)	**S12**
• American Bureau of Shipping (ABS)	**S14**
• Russian Maritime Register (RMR)	**S16**
• Korean Register of Shipping (KR)	**S17**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 10/11 in the appendix.

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) Options does not include ATEX approval, but instead includes only the country-specific approval.

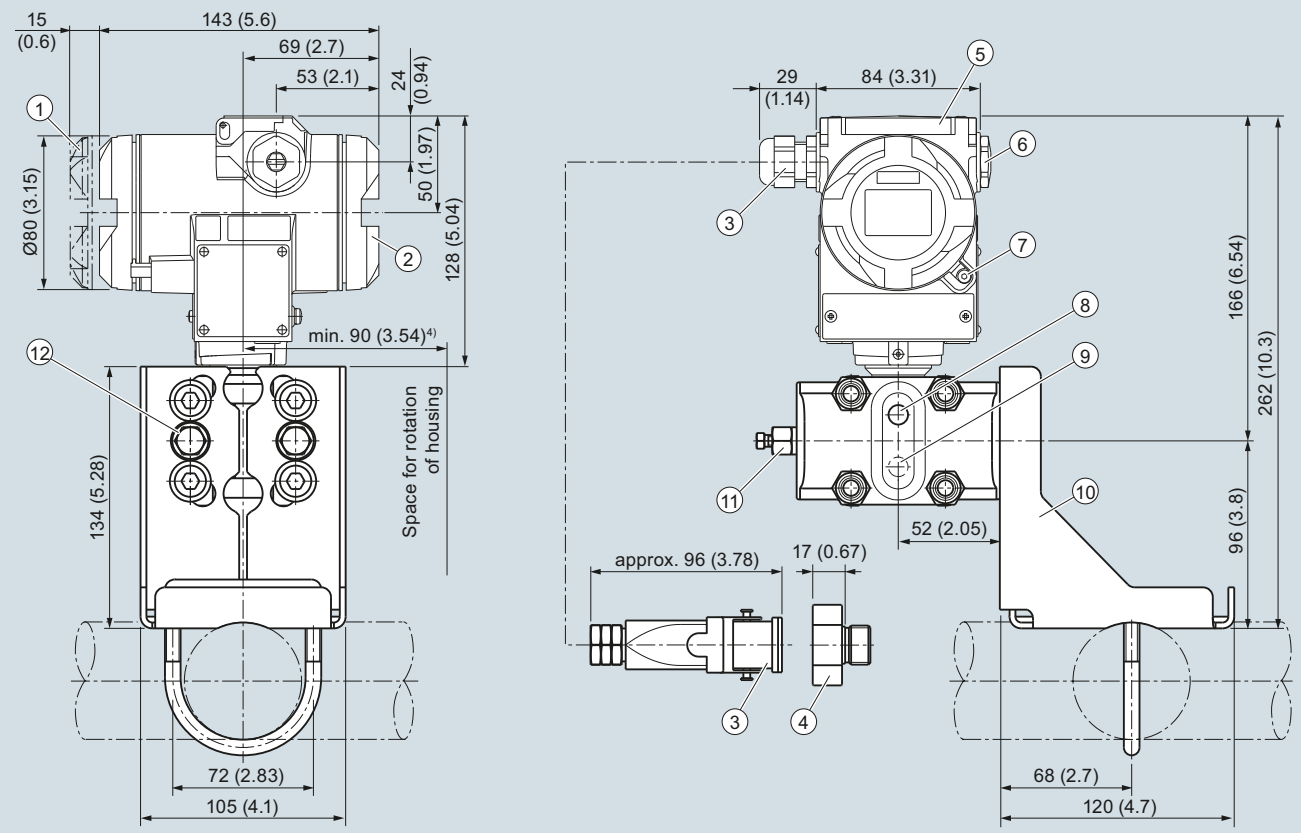
Selection and Ordering data	Order code
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
• in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**
• in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	**Y02**
Stainless steel tag plate and entry in device variable (measuring point description)	**Y15**
Max. 16 characters, specify in plain text: Y15:	
Measuring point text (entry in device variable)	**Y16**
Max. 27 char., specify in plain text: Y16:	
Entry of HART address (TAG)	**Y17**
Max. 8 char., specify in plain text: Y17:	
Setting of pressure indication in pressure units	**Y21**
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ...	
Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % *) ref. temperature 20 °C	
Setting of pressure indication in non-pressure units[1]	**Y22 + Y01** *or* **Y02**
Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 10/11 in the appendix.

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

1) Preset values can only be changed over SIMATIC PDM.

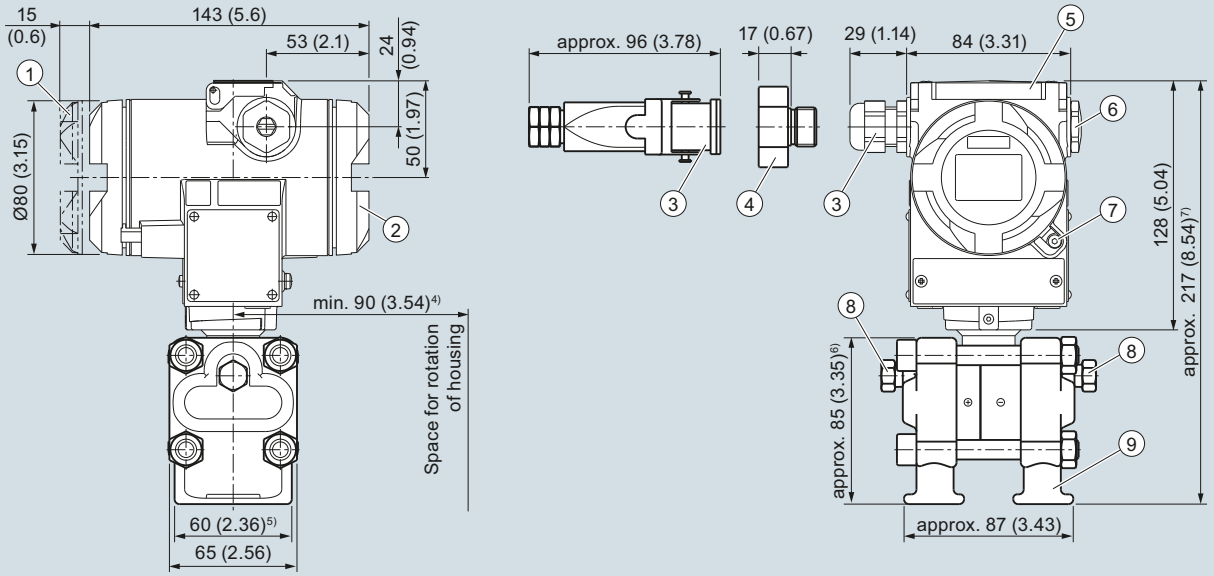
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D[2] [3] 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. Lateral venting for liquid measurement (Standard)
9. Lateral venting for gas measurement (suffix H02)
10. Mounting bracket (option)
11. Sealing screw with valve (option)
12. Process connection: ¼-18 NPT (IEC 61518)

[1] Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
[2] Not with type of protection "Explosion-proof enclosure"
[3] Not with type of protection "FM + CSA" [IS + XP]"
[4] 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P310 pressure transmitters for differential pressure and flow, dimensions in mm (inch)



1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D[2][3] 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)

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

SITRANS P310 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03" , dimensional drawing, dimensions in mm (inch)

SITRANS P310 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Selection and Ordering data		Article No.
Spare parts/Accessories		
Mounting bracket and fastening parts for pressure transmitters SITRANS P310 (7MF2033-.....-..C.)		
• made of steel		**7MF4997-1AB**
• made of stainless steel 304/1.4301		**7MF4997-1AH**
• made of stainless steel 316L/1.4404		**7MF4997-1AP**
Mounting bracket and fastening parts for pressure transmitters SITRANS P310 (7MF2033-.....-..A., -..B., ..D. and ..F.)		
• made of steel		**7MF4997-1AC**
• made of stainless steel 304/1.4301	▶	**7MF4997-1AJ**
• made of stainless steel 316L/1.4404		**7MF4997-1AQ**
Mounting and fastening brackets For differential pressure transmitters with flange thread M10 SITRANS P310 (7MF2433-...)		
• made of steel		**7MF4997-1AD**
• made of stainless steel 304/1.4301	▶	**7MF4997-1AK**
• made of stainless steel 316L/1.4404		**7MF4997-1AR**
Mounting and fastening brackets For differential pressure transmitters with flange thread 7/16 -20 UNF SITRANS P310(7MF2533-...)		
• made of steel		**7MF4997-1AF**
• made of stainless steel 304/1.4301		**7MF4997-1AM**
• made of stainless steel 316L/1.4404		**7MF4997-1AT**
Cover Made of die-cast aluminum, including gasket. Compatible for Ex and non-Ex transmitters		
• without window		**7MF4997-1BB**
• with window	▶	**7MF4997-1BE**
Cover Made of stainless steel, including gasket. Compatible for Ex and non-Ex transmitters		
• without window		**7MF4997-1BC**
• with window		**7MF4997-1BF**
Digital indicator Including mounting material		**7MF4997-1BR**
Measuring point label		
• without inscription (5 units)		**7MF4997-1CA**
• Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters")		**7MF4997-1CB-Z Y..: .....**
Mounting screws For measuring point label, grounding and connection terminals or for display (50 units)		**7MF4997-1CD**
Sealing screws (1 set = 2 units) for process flange		
• made of stainless steel		**7MF4997-1CG**
• made of Hastelloy		**7MF4997-1CH**
Sealing screws with vent valve Complete (1 set = 2 units)		
• made of stainless steel	▶	**7MF4997-1CP**
• made of Hastelloy		**7MF4997-1CQ**
O-rings for process flanges made of:		
• FPM (Viton)		**7MF4997-2DA**
• PTFE (Teflon)		**7MF4997-2DB**
• FEP (with silicone core, approved for food)		**7MF4997-2DC**
• FFPM (Kalrez, compound 4079)		**7MF4997-2DD**
• NBR (Buna N)		**7MF4997-2DE**
Sealing ring for process connection		**see "Fittings"**

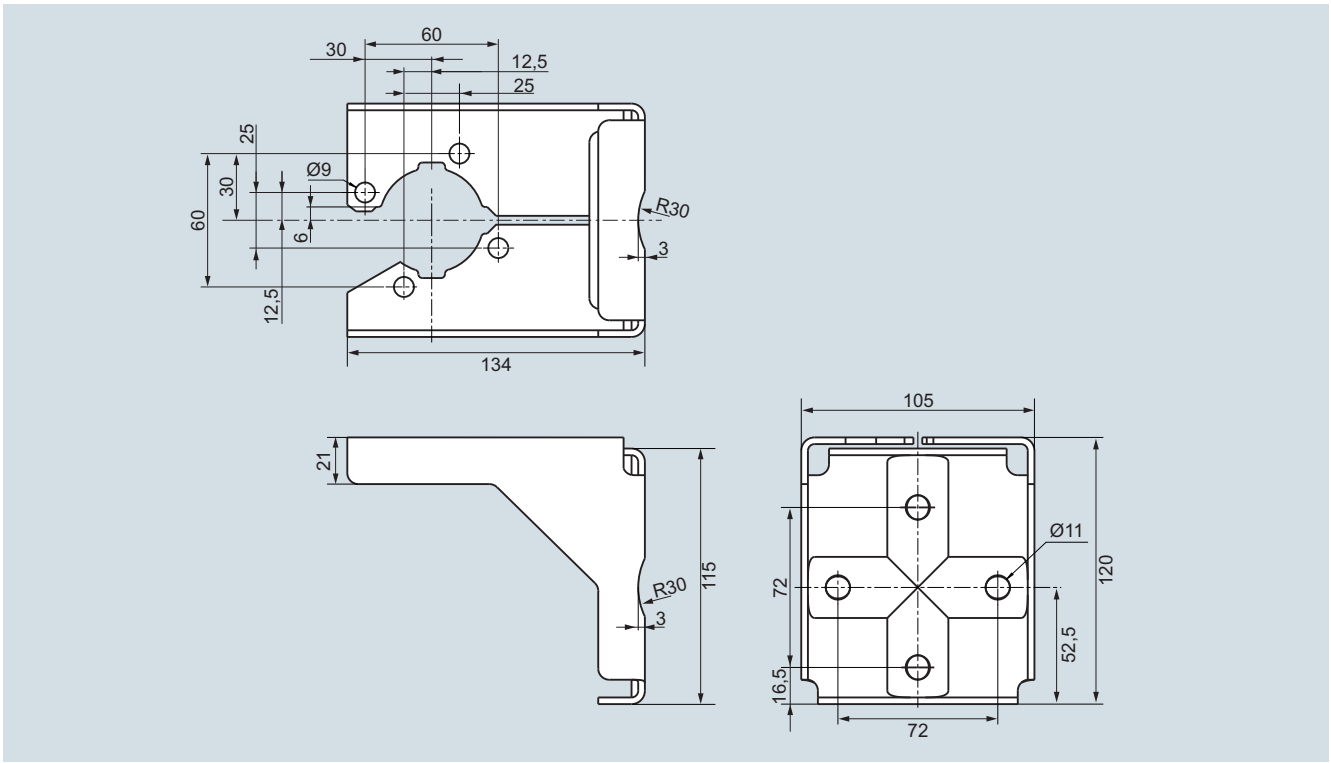
▶ Available ex stock

Selection and Ordering data		Article No.
Documentation The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/processinstrumentation/documentation		**A5E35603949**
Certificates (order only via SAP) instead of Internet download		
• hard copy (to order)		**A5E03252406**
• on DVD (to order)		**A5E03252407**
HART modem with USB interface	▶	**7MF4997-1DB**

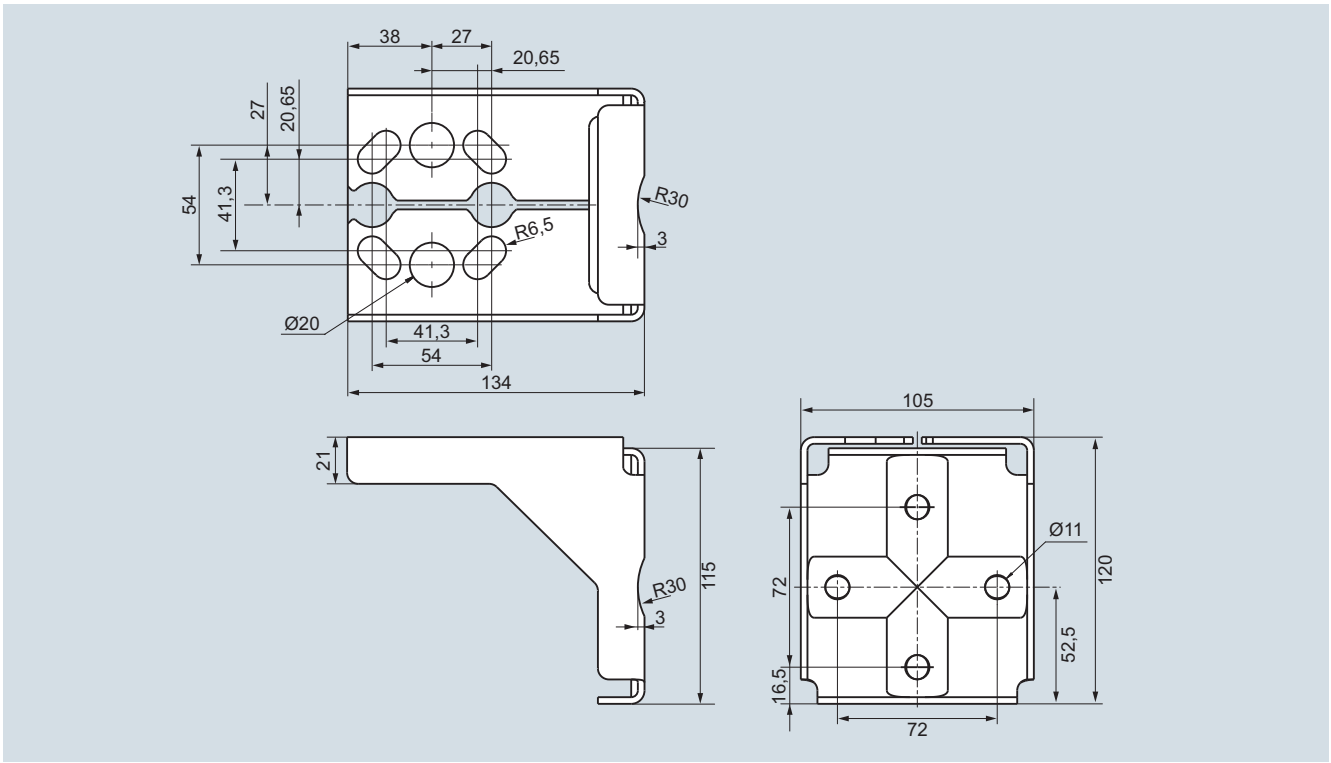
▶ Available ex stock

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

Dimensional drawings



Mounting bracket for SITRANS P310 gauge and absolute 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 P310 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)