Overview

SITRANS P500 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and which fulfil the most stringent demands of accuracy, long-term stability, speed and lots more.

Extensive functionality allows you to set the pressure transmitter specifically to your own requirements. Despite their many settings options, local set-up is easy. A multi-lingual menu with clear text instructions guides you through the process. There are also help texts available.

The innovative EDD with integrated QuickStart assistance is also quick and easy to configure by computer using the HART protocol.

Extensive diagnostic functions, e.g. min/max pointer for pressure and temperature, or limit value indicator, make sure you always have the process under control. You can also display additional process values such as temperature or static pressure. The simultaneous display of mass, resulting from a volume, is also easy.

The SITRANS P500 pressure transmitters can be configured to measure:

- Differential pressure
- Level
- Volume
- Mass
- Volume flow
- Mass flow

Benefits

- Very fast response time
- High reliability even under extreme chemical and mechanical stress
- For use with aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions which can be used both on site as well as via HART.
- Replacement of measuring cell and electronics without recalibration.
- Extremely high accuracy
- Outstanding values for the long-term stability
- Freely adjustable spans of 1.25 to 1250 mbar (0.5 to 502 inH_2O)
- Superior total performance and conformity error values with no loss of performance up to a turndown of 10 guaranteed.
- Additional integrated sensor for static pressure
- Configuration via local pushbuttons or HART communication
- Short process flanges enable space-saving installation.

Application

The SITRANS P500 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 them suitable for locations with high electromagnetic emissions.

Pressure transmitters with ratings "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitter comes with a CE-declaration of conformity and fulfils the corresponding unified European directives (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".

With newly designed measuring cell, it is possible to work with process temperatures of -40 to 125 °C (-40 to +257 °F)) without having to use a remote seal.

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

The pressure transmitter can be fully configured locally via the three local pushbuttons and remotely via HART communication.

SITRANS P500 - Transmitters for differential pressure, flow and level

Pressure transmitters for differential pressure and flow

- Measured variables:
  - Differential pressure
  - Small positive or negative pressure
  - Flow q ~ √Δp (together with a primary element (see Chapter "Flow Meters"))
- Span (freely adjustable)
  for SITRANS P500 HART: 1.25 to 1250 mbar (0.5 to 502 inH_2O)

Pressure transmitters for level

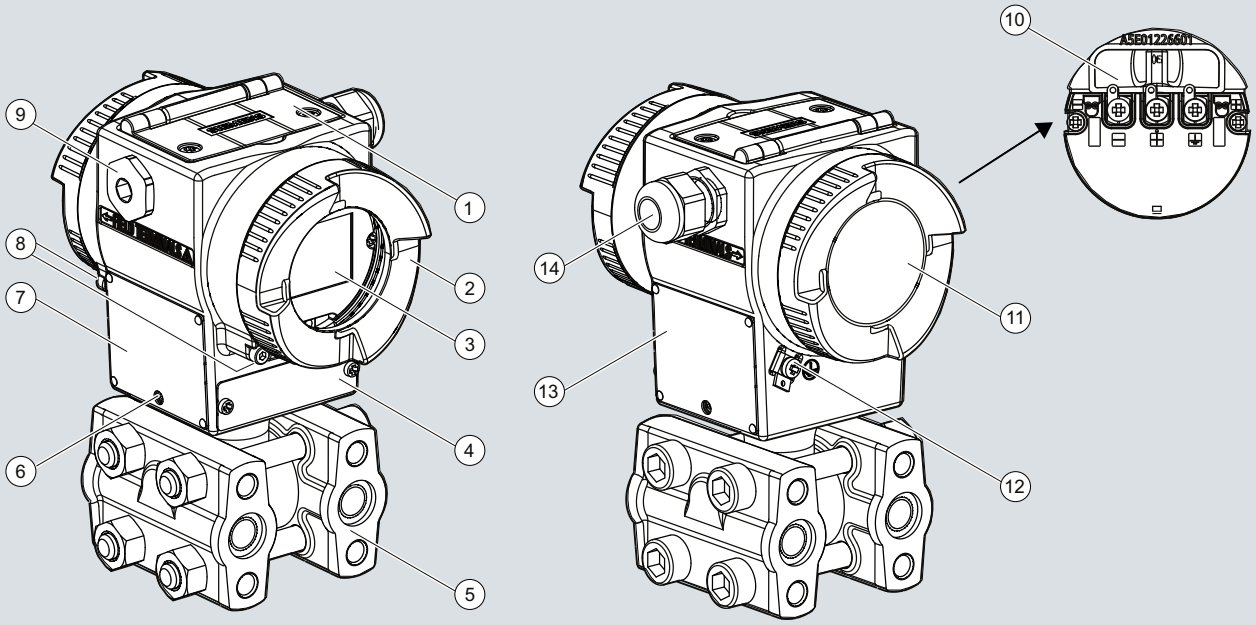
- Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Span (freely adjustable)
  for SITRANS P500: 1.25 to 1250 mbar (0.5 to 502 inH_2O)
- Nominal diameter of the mounting flange
  - DN 50 / PN 40
  - DN 80 / PN 40
  - DN 100/ PN 16, PN 40
  - 2 inch/class 150, class 300
  - 3 inch/class 150, class 300
  - 4 inch/ class 150, class 300
  - customized special version

In the case of level measurements in open vessels, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed vessels, the lower-pressure connection has to be connected to the vessel in order to compensate the static pressure.

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

Design



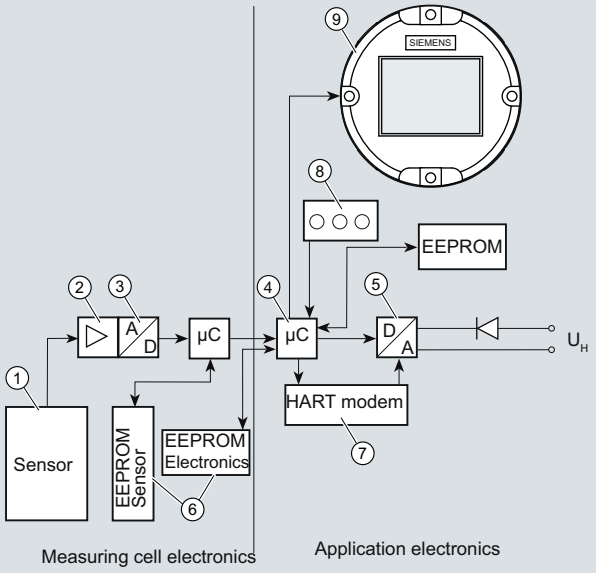
1 Cover for the pushbuttons
2 Cover, optionally with window
3 Display (optional)
4 TAG plate
5 Process flange with process connection
6 Lock screws (on two sides) for the measuring cell
7 Approval plate
8 Safety catch
9 Blanking plug
10 Terminal compartment
11 Cover for terminal compartment
12 PE/ground terminal
13 Nameplate
14 Cable inlet, optionally with cable gland or plug-in connection

View of transmitter

- The electronics housing is made of coated die-cast aluminum.
- The casing has round screwed covers front and back.
- Depending on the design the front cover is fitted with an inspection window. You can read off the measured value directly from the optional digital display through the window.
- The inlet to the terminal compartment is located either on the left or right side. The unused opening in each case is sealed by a blanking plug.
- The PE/ground terminal is on the back of the housing.
- Access to the terminal compartment for auxiliary power and shielding by unscrewing the cover.
- Beneath the electronic housing is the measuring cell with its process flanges at which the process connections are available. The modular design of the pressure transmitter lets you replace the measuring cell, electronics and connection board as required.
- On the top of the housing you can see the screwed cover of the three local pushbuttons of the transmitter.

Function

Operation of electronics with HART communication



1 Sensor of the measuring cell
2 Measuring amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One EEPROM each in the measuring cell and in the electronics
7 HART modem
8 Keys (local operation)
9 Digital display
I_A Output current
U_H Auxiliary power

Function diagram of electronics

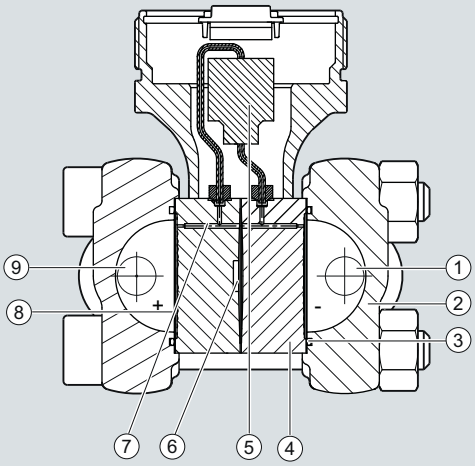
- The input pressure is converted into an electrical signal by the sensor.
- This signal is amplified by the measuring amplifier and digitalized in an analog-to-digital converter.
- The digital signal is analyzed in a microcontroller and corrected according to linearity and thermal characteristics.
- In a digital-to-analog converter it is then converted into the output current of 4 to 20 mA. When connected to supply lines, a diode circuit provides reverse polarity protection.
- The measuring cell-specific data, the electronic data and the parameterization data is held in two EEPROMs. One EEPROM is incorporated into the measuring cell electronics, the other is incorporated into the application electronics.

Operation

- The three local pushbuttons enable you both to navigate and carry out configuration and to visually track messages and process values, provided a digital display is available.
- If you have a device without a digital display, you can carry out zero adjustment using the three local pushbuttons. It is possible to retrofit a display at any time.
- You can also carry out settings by computer via a HART modem.

Mode of operation of the measuring cells

Measuring cell for differential pressure and flow



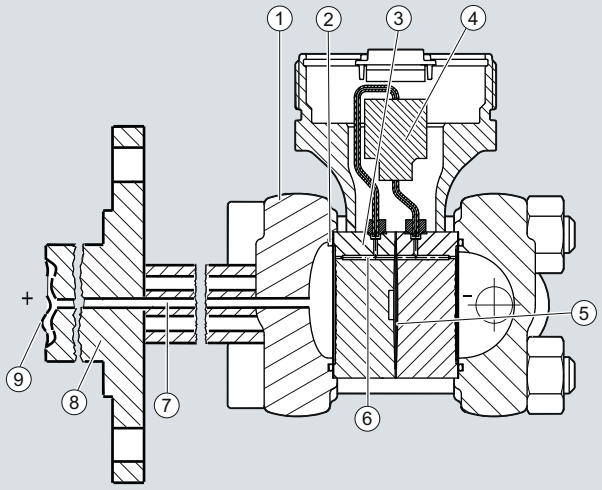
1 Input pressure P-
2 Process flange with process connection
3 O-Ring
4 Measuring cell body
5 Silicon pressure sensor
6 Overload diaphragm
7 Filling liquid
8 Seal diaphragm
9 Input pressure P+

Measuring cell for differential pressure and flow, function diagram

- The differential pressure is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until it makes contact with the body of the measuring cell. This protects the sensor model from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a bridge output voltage proportional to the input pressure.

SITRANS P500 - Transmitters for differential pressure, flow and level

Measuring cell for level



1 Process flange with process connection
2 O-Ring
3 Measuring cell body
4 Silicon pressure sensor
5 Overload diaphragm
6 Filling liquid of the measuring cell
7 Capillary tube with filling liquid of the mounting flange
8 Flange with optional tube
9 Seal diaphragm for mounting flange

Measuring cell for level, function diagram

- The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell via the seal diaphragm on the mounting flange.
- The differential pressure applied to the measuring cell is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until it makes contact with the body of the measuring cell. This protects the silicon pressure sensor from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a differential pressure proportional to the input pressure.

Configuration of SITRANS P500 HART

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

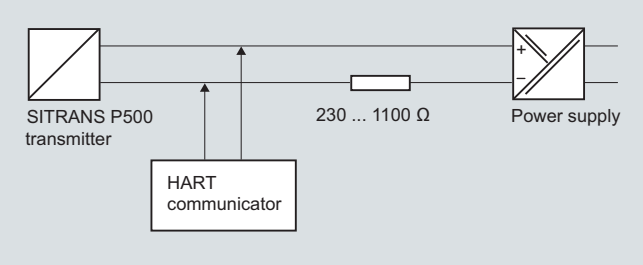
Configuration using the pushbuttons (local operation)

You can configure the transmitter in situ using the three keys provided a display is available. If you have no display, you can only carry out zero adjustment.

It is possible to retrofit a display. See accessories.

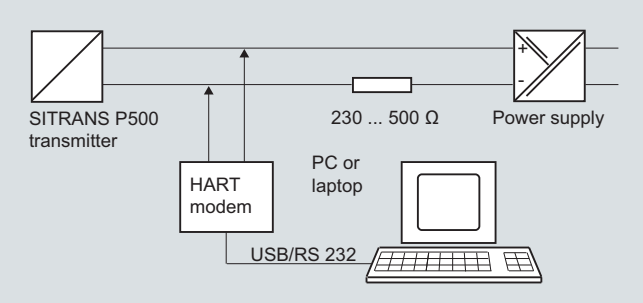
Configuration using HART communication

Parameterization using HART communication is carried out using a HART Communicator or a PC in conjunction with a HART modem.



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

For configuring via PC a HART modem is used which connects the transmitter to the PC.

The signals needed for communication in conformity with the HART 6.0 protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

The necessary device files are available for download on the Internet.

SITRANS P500 configuration options

The transmission offers you full configuring options both via HART as well as in situ provided the optional display is available.

For simple parameterizing we also offer the easy to understand QuickStart function with guided commissioning.

SITRANS P500 diagnostic functions

- Maintenance timer
- Min/Max pointer (both resetable and non-resetable)
  - Pressure (incl. time and temperature stamp)
  - Static pressure (incl. time and temperature stamp)
  - Sensor temperature (incl. time stamp)
  - Electronic temperature (incl. time stamp)
- Limit monitor block
- Diagnostic warning
- Diagnostic alarm
- Simulation functions
- Display of trends and histograms
- Operating hours meter

Physical dimensions available for the SITRANS P500 HART display

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, mmH$_2$O (4 °C), inH$_2$O (4 °C), inH$_2$O (20 °C), mmH$_2$O, mmH$_2$O (4 °C), ftH$_2$O (20 °C), inHg, mmHg, hPA
Level	m, cm, mm, ft, in
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, gallon, Imp. gallon, bushel, barrel, barrel liquid, l; Norm (standard) l; Norm (standard) m^3, Norm (standard) feet^3
Mass	g, kg, t (metric), 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, gallon/s, l/h, milL/d, gallon/d, gallon/h, milgallon/d, Imp.gallon/s, Imp.gallon/m, Imp.gallon/h, Imp.gallon/d, Norm (standard) m^3/h, Norm (standard) l/h, Norm (standard) ft^3/h, Norm (standard) ft^3/m, barrel liquid/s, barrel liquid/m, barrel liquid/h
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/h, g/min, g/s, lb/d, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Technical specifications

Input		
Measured variable	Differential pressure and flow	
Span (infinitely adjustable)	Measuring span	Maximum operating pressure (static pressure)
	1.25 ... 250 mbar (0.5 ... 100.4 inH$_2$O)	160 bar (2320 psi)
	6.25 ... 1250 mbar (2.5 ... 502 inH$_2$O)	
Lower range limit		
• Measuring cell with silicone oil filling	-100% of max. span and/or 30 mbar a (0.44 psi a)	
Upper range limit	100% of max. span	
Start of scale	Between measuring limits (freely adjustable)	
Output		
Output current signal	4 ... 20 mA	
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA	
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA	
• Ripple (without HART communication)	I_{pp} ≤ 0.4 % of max. output current	
• adjustable damping	0... 100 s in steps of 0.1 s, factory-seting: 2 s	
• current transmitter	3.55 ... 23 mA	
• Failure signal	adjustable within limits: • Lower: 3.55 … 3.7 mA (factory setting 3.6 mA • Upper: 21.0 … 23 mA (factory setting 22.8 mA	

Load	
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H : Power supply in V
• With HART communication	
- HART-Communicator	R_B = 230 ... 1100 Ω
- HART modem	R_B = 230 ... 500 Ω
Characteristic curve	Linearly rising, linearly falling, square rooted characteristic rising, bidirectional square rooted characteristic and user-specific
Measuring accuracy	
Reference conditions (in accordance with IEC 60770-1)	• Rising characteristic curve • Start of scale 0 bar • Stainless steel seal diaphragm • Measuring cell with silicone oil filling • Room temperature (25 °C (77 °F))
Total accuracy (Total Performance[1)])	
r: Span ratio (r = max. span / adjusted span)	
Linear characteristic	
• r ≤ 5	≤ 0.09 %
• 5 < r ≤ 10	≤ 0.14 %
Square-rooted characteristic	
• Flow > 50%	
- r ≤ 5	≤ 0.09 %
- 5 < r ≤ 10	≤ 0.14 %
• Flow 25 % … 50 %	
- r ≤ 5	≤ 0.18 %
- 5 < r ≤ 10	≤ 0.28 %
Conformity error at limit setting incl. hysteresis and repeatability	
Linear characteristic	
• r ≤ 10	≤ 0.03 %
• r > 10	≤ (0.003 · r) %
Square-rooted characteristic	
• Flow 50%	
- r ≤ 10	≤ 0.03 %
- r > 10	≤ (0.003 · r) %
• Flow 25 % … 50 %	
- r ≤ 10	≤ 0.06 %
- r > 10	≤ (0.006 · r) %
Influence of ambient temperature per 28 °C (50°F)	≤ (0.01 · r + 0.035) % /28°C (50°F)
Influence of static pressure	
• On the zero point[2)]	≤ 0.007 % per 70 bar
• On the span	≤ 0.03 % per 70 bar
Step response time T_{63} without electrical damping	≤ 88ms
Long-term stability	≤ 0.05 % per 5 years ≤ 0.08 % per 10 years
Influence of power supply	≤ 0.005 %/1 V

SITRANS P500
for differential pressure and flow

Rated conditions	
Mounting position	Any
Ambient conditions	
• Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)	
- Total device	-40 ... +85 °C (-40 ... +185 °F)
- Readable digital display	-20 ... +85 °C (-4 ... +185 °F)
- Storage temperature	-50 ... +90 °C (-58 ... +194 °F)
Climatic class	
• Condensation	Relative humidity 0 … 100 % (condensation permissible)
Degree of protection (to EN 60529)	IP66/IP 68 and NEMA 4X (with corresponding cable gland)
Electromagnetic Compatibility	
• Emitted interference and interference immunity	Acc. to EN 61326 and NAMUR NE 21
Permissible pressures	According to 97/23/EC pressure equipment directive
Temperature of medium	
• Measuring cell with silicone oil filling	-40 ... +125 °C (-40 ... +257 °F)
Design	
Weight (without options)	Approx. 3.3 kg (7.3 lb)
Material of parts in contact with the medium	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L
• Process connection and sealing screw	PN 160: stainless steel, mat.-No. 1.4404/316L
• O-Ring	Standard: Viton (FKM (FPM)) optional: NBR
Material of parts not in contact with media	
Electronics housing	• Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706 • Lacquer on polyurethane base, optional epoxy-based primer • Stainless steel name plates (mat. no. 1.4404/316L)
Process connection screws	Stainless steel, mat. no. 1.4404/316L
Mounting bracket	Steel or stainless steel mat. no. 1.4301
Measuring cell filling	Silicone oil
Process connection	¼-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518
Electrical connection	• Screw terminals • Cable entry via the following screwed glands: - M20 x 1.5 - ½-14 NPT - Han 7D/Han 8D connector - M12 plug
Displays and controls	
Pushbuttons	3 for local programming directly on transmitter
Digital display	• With or without integrated digital display • Cover with or without window

Auxiliary power supply	
Terminal voltage on transmitter	• DC 10.6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V
Certificates and approvals	
Classification according to PED 97/23/EC	
• PN 160 (MWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Explosion protection	
Explosion protection for Europe (to ATEX)	
• Intrinsic safety "i"	PTB 09 ATEX 2004 X
- Marking	Ex II 1/2 G Ex ia/ib IIC T4
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °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:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Explosion-proof "d"	BVS 09 ATEX E 027
- Marking	Ex II 1/2 G Ex d IIC T4/T6
- 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_m = DC 10.5 ... 45 V
• Dust explosion protection for zone 20	PTB 09 ATEX 2004 X
- Marking	Ex II 1 D Ex iaD 20 T 120 °C
- 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:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Dust explosion protection for zone 21/22	BVS 09 ATEX E 027
- Marking	Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia D21
- Connection	To circuits with values: U_m = 10.5 ... 45 V DC; P_{max} = 1.2 W
• Type of protection "n" (zone 2)	PTB 09 ATEX 2004 X
- Marking	Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6
- "nA" connection	U_m = 45 V DC
- "nL, ic" connection	U_i = 45 V
- Effective internal inductance:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF

Explosion protection for USA (to FM)	
Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEx ib IIC T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N U_m = 30 V, I_m = 100 mA, P_i = 750 mW, L_i = 400µH , Ci = 6 nF
• Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- (NI/S) parameters	According to "control drawing": A5E02189134N U_m = 45 V, L_i = 400 µH, C_i = 6 nF,
Explosion protection for Canada (to $_C$CSA$_{US}$)	
Certificate of Compliance	No. 2280963
• Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N U_m = 45 V
• Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F)
- Entity parameters	U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω , L_i = 400 µH, C_i = 6 nF
• Marking (NI/n)	CL I, DIV 2, GP ABCD T4/T6 CL II, III, DIV 2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- NI/nA parameters	According to "control drawing": A5E02189134N U_m = 45 V
- nL parameters	According to "control drawing": A5E02189134N U_i = 45 V, I_i = 100 mA, L_i = 400 µH, C_i = 6 nF

1) The Total Performance is the combination of the errors depending on the: Influence of ambient temperature, Influence of static pressure and Conformity error.

2) For the range code "D" this error must be multiplied by 5. This error can be deleted by making a zero adjustment.

HART communication	
Load with connection of	
• HART communicator	R_B = 230 ... 1100 Ω
• HART modem	R_B = 230 ... 500 Ω
Cable	2 wire shielded: ≤ 3.0 km (1.86 miles), multiwire shielded: ≤ 1.5 km (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics
Software for computer	SIMATIC PDM 6.0

SITRANS P500
for differential pressure and flow

Selection and Ordering data		Order No.
Pressure transmitters for differential pressure and flow, SITRANS P500 HART, PN 160 (MWP 2320 psi)		7MF54 - 0
Enclosure	**Thread for cable gland**	
Die-cast aluminum, dual compartment	M20x1.5	0
Die-cast aluminum, dual compartment	½-14 NPT	1
Output		
4 ... 20 mA, HART		3
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Measuring span		
1.25 ... 250 mbar	(0.5 ... 100.4 inH_2O)	D
6.25 ... 1250 mbar	(2.5 ... 502 inH_2O)	E
Wetted parts materials (stainless steel process flanges)		
Seal diaphragm	Process connection	
stainless steel	stainless steel	A
Process connection		
Female thread ¼-18 NPT		
• Sealing screw opposite process connection		
- Mounting thread 7/16 - 20 UNF according to EN 61518		0
- Mounting thread M10 to DIN 19213		1
• Vent on side of process flange[1)]		
- Mounting thread 7/16 - 20 UNF according to EN 61518		4
- Mounting thread M10 to DIN 19213		5

[1)] Not in conjunction with remote seals

Selection and Ordering data	Order code
Further designs Add "-Z" to Order No. and specify Order Code.	
Attachments	
Mounting bracket made of steel	**A01**
Mounting bracket made of stainless steel	**A02**
Display (Standard: no display, cover closed)	
With digital display and blanking cover	**A10**
With digital display and glass cover	**A11**
Special casing / cover version	
Two coats of lacquer on casing, cover (PU on epoxy)	**A20**
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68)[4]	**A50**
Cable glands made of metal (IP66/68)	**A51**
Cable glands made of stainless steel (IP66/68)	**A52**
M12 connectors without cable socket (IP66/67)[4]	**A60**
M12 connectors complete with cable socket (IP66/67)[4]	**A61**
Han 7D connectors, plastic, straight (with cable socket) (IP65)[4]	**A71**
Han 7D connectors, plastic, angled (with cable socket) (IP65)[4]	**A72**
Han 7D connectors, metal enclosure, straight (with cable socket) (IP65)[4]	**A73**
Han 7D connectors, metal enclosure, angled (with cable socket) (IP65)[4]	**A74**
Han 8D connectors, plastic, straight (with cable socket) (IP65)[4]	**A75**
Han 8D connectors, plastic, angled (with cable socket) (IP65)[4]	**A76**
Han 8D connectors, metal enclosure, straight (with cable socket) (IP65)[4]	**A77**
Han 8D connectors, metal enclosure, angled (with cable socket) (IP65)[4]	**A78**
PG 13.5 adapters[4]	**A82**
Language for labels, leporellos, menu language default [8] (instead of English as standard)	
German	**B10**
French	**B12**
Spanish	**B13**
Italian	**B14**
Chinese	**B15**
Russian	**B16**
Japanese	**B17**
English with units psi/inH_2O	**B21**
Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	**B80**
Certificates (available online for downloading)[1]	
5-point factory calibration according to IEC 60770-2[2]	**C11**
Acceptance test certificate according to EN 10204-3.1[3]	**C12**

Selection and Ordering data	Order code
Further designs Add "-Z" to Order No. and specify Order Code.	
Degree of protection approvals: Ex ia/ib (intrinsic safety)	
Ex ia/ib protection (ATEX) (T4)	**E00**
Ex IS protection (FM) (T4)	**E01**
Ex IS protection ($_C$CSA$_{US}$) (T4)	**E02**
Degree of protection approvals: Ex d (flameproof)	
Ex d explosion-proof (ATEX)(T4/T6)	**E20**
Ex XP explosion-proof and DIP (FM)(T4/T6)	**E21**
Ex XP explosion-proof and DIP ($_C$CSA$_{US}$)(T4/T6)	**E22**
Degree of protection approvals: n/NI	
Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	**E40**
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	**E41**
Zone 2 (nA, nL), Div2 NI ($_C$CSA$_{US}$) (T4/T6)	**E42**
Degree of protection approvals: Dust Zone 20/21/22	
Use in Zone 21/22 (Ex tD) (ATEX)	**E60**
Use in Zone 20/21/22 (Ex iaD) (ATEX)	**E61**
Degree of protection approvals: Combinations	
IS protection and XP and DIP (FM)	**E71**
IS protection and XP and DIP ($_C$CSA$_{US}$)	**E72**
IS protection and XP and DIP (FM/$_C$CSA$_{US}$)	**E73**
Supplementary approvals / degree of protection	
Dual Seal approval[5]	**E85**
Special process connection versions (diff. pressure)	
Side vents for gas measurements[7]	**L32**
Swap process connection: high-pressure side at front	**L33**
Process flanges, O-rings, special material Standard: Viton (FKM (FPM)	
Process connection sealing rings made of NBR	**L63**
Drain/Vent valve (1 set = 2 units)	
2 ventilation valves ¼- 18 NPT, in material of process flanges)	**L80**
Remote seals	
Transmitters with connection of remote seal[6]	**V00**
(For premounted valve manifolds see page 2/25)	

1) Enclosed in print or as CD: see page 2/23.

2) When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

3) When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

4) Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

5) Only in conjunction with FM and/or $_C$CSA$_{US}$

6) Please select a remote seal separately.
Also refer to the information under 2).

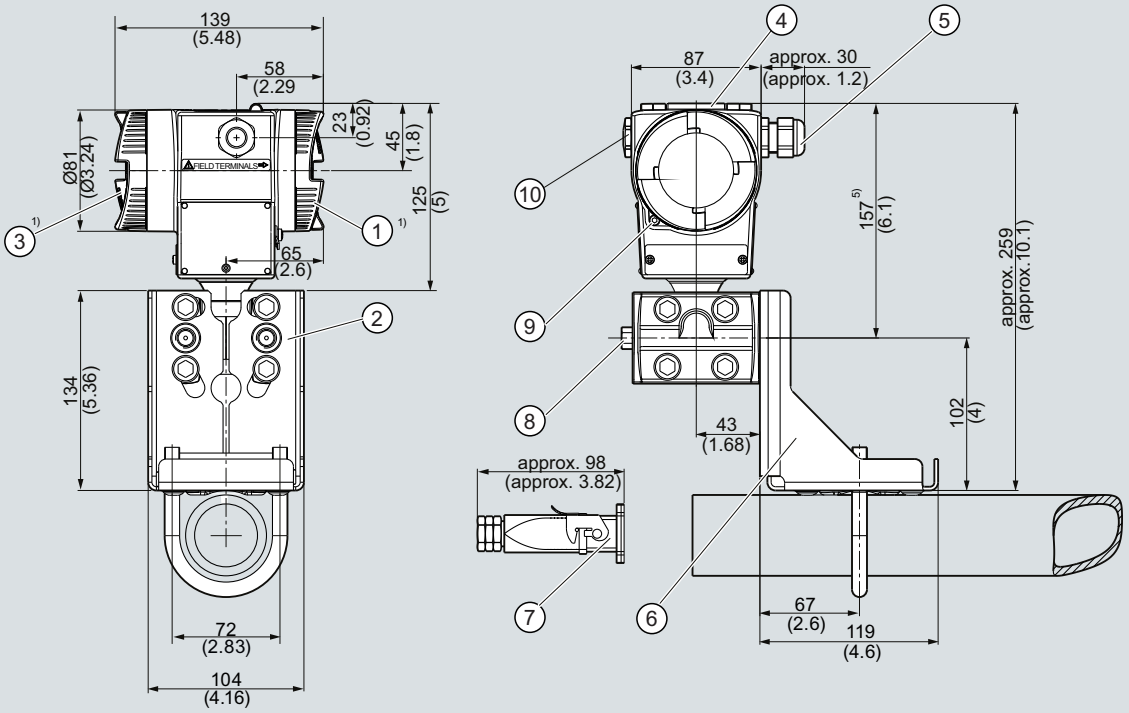
7) Only in conjunction with process connection "Vent on side".

8) For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

SITRANS P500
for differential pressure and flow

Selection and Ordering data	Order code
Additional data Please add "-Z" to Order 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**
Measuring point number and measuring point identifier (only standard ASCII character set) Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15:	**Y15**
Measuring point text (max. 27 char.) Y16:	**Y16**
Entry of HART address (TAG), max. 32 characters Y17:	**Y17**
Setting of pressure indication in pressure units Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ... Note: The following pressure units are selectable: bar, mbar, mm H_2O*), in H_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM, % or mA *) Reference temperature 20 °C	**Y21**
Setting of pressure indication in non-pressure units Specify in plain text: Y22: ... up to ... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	**Y22 +** **Y01 or Y02**
Customer-specific settings	
Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	**Y30**

Dimensional drawings



1 Terminal side
2 Process connection: ¼-18 NPT (EN61518)
3 Electronics side, digital display
4 Protective cover for the pushbuttons
5 Cable entry:
- Screwed gland M20 x 1.5 3)
- Screwed gland ½-14 NPT
- Han 7D/Han 8D connector 2)3)
- M12 connector

6 Mounting bracket (optional)
7 Electrical connection:
- Han 7D/Han 8D connector/socket2)3)

8 Sealing screw (optional: vent valve)
9 Safety catch
10 Blanking plug

1) Allow approx. 20 mm (0.79 inch) additional thread length

2) Not with type of protection "Explosion-proof"
3) Not with type of protection "FM + $_{C}$CSA$_{US}$ [IS + XP]"

SITRANS P pressure transmitter for differential pressure and flow, P500 series, measurements in mm (inch)

2

Technical specifications

Input		
Measured variable	Level	
Span (infinitely adjustable)	Measuring span	Maximum operating pressure
	1.25 ... 250 mbar (0.5 … 100.4 inH_2O)	See "Mounting flange"
	6.25 ... 1250 mbar (2.5 … 502 inH_2O)	
Lower range limit		
• Measuring cell with silicone oil filling	-100 % of max. span and/or 30 mbar a (0.44 psi a)(optional vacuum resistance available)	
Upper range limit	100% of max. span	
Start of scale	Between measuring limits (freely adjustable)	
Output		
Output current signal	4 ... 20 mA	
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA	
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA	
• Ripple (without HART communication)	I_{pp} ≤ 0.4 of max. output current	
• adjustable damping	0... 100 s in steps of 0.1 s, factory setting 2 s	
• current transmitter	3.55 ... 23 mA	
• Failure signal	adjustable within limits: • Lower: 3.55 … 3.7 mA (factory setting 3.6 mA) • Upper: 21.0 … 23 mA (factory setting 22.8 mA)	
Load		
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H : Power supply in V	
• With HART communication		
- HART-Communicator	R_B = 230 ... 1100 Ω	
- HART modem	R_B = 230 ... 500 Ω	
Characteristic curve	Linearly rising or linearly falling and user-specific	
Measuring accuracy		
Reference conditions (in accordance with IEC 60770-1)	• Rising characteristic curve • Start of scale 0 bar • Stainless steel seal diaphragm • Measuring cell with silicone oil filling • Room temperature (25 °C (77 °F))	
Conformity error at limit setting incl. hysteresis and repeatability r: Span ratio (r = max. span / set span)		
• Linear characteristic		
- r ≤ 10	≤ 0.03 %	
- r > 10	≤ (0.003 · r) %	
Long-term stability	≤ 0.05 % per 5 years	
	≤ 0.08 % per 10 years	
Influence of ambient temperature per 28 °C[1)]	≤ (0.01 · r + 0.035) % / 28°C[2)]	
Influence of static pressure		
• On the zero point[2)]	≤ (0.007 · r) % per 70 bar	
• on the span	≤ 0.03 % per 70 bar	
Influence of power supply	≤ 0.005 %/1 V	
Rated conditions		
Mounting position	Defined by flange	
Ambient conditions		
• Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)		
- total device	-40 ... +85 °C (-40 ... +185 °F)	
- Readable digital display	-20 ... +85 °C (-4 ... +185 °F)	
- Storage temperature	-50 ... +90 °C (-58 ... +194 °F)	
Climatic class		
• Condensation	Relative humidity 0 … 100 % (condensation permissible)	
Degree of protection (to EN 60529)	IP66/IP68 and NEMA 4X (with corresponding cable gland)	
Electromagnetic Compatibility		
• Emitted interference and interference immunity	Acc. to EN 61326 and NAMUR NE 21	
Permissible pressures	According to 97/23/EC pressure equipment directive	
Medium temperature of minus side		
• Measuring cell with silicone oil filling	-40 ... +125 °C (-40 ... +257 °F)	
Design		
Weight		
• To EN (pressure transmitter with mounting flange, without tube)	approx. 9.8 … 11.8 kg (21.6… 26.0 (lb)	
• To ASME (pressure transmitter with mounting flange, without tube)	approx. 9.8 … 16.8 kg (21.6 … 37.0 lb)	
Material of parts in contact with the medium		
• High-pressure side		
- Seal diaphragm of mounting flange	Stainless steel , mat. no. 1.4404/316L, Monel 400, W-Nr. 2.4360, Hastelloy B2, mat. no. 2.4617, Hastelloy C276, mat. no. 2.4819, Hastelloy C4,mat. no. 2.4610, Tantal, PTFE, ECTFE	
- Sealing face	Smooth to EN 1092-1, Form b1 and/or ASME B16.5 RF 125 … 250 AA for stainless steel316L, EN1092-1 Form B2 and/or ASME B16.5 RFSF in the case of other materials	
• Sealing material in the process connections		
- For standard applications	PTFE	
- For vacuum application of mounting flange	copper	
• Low-pressure side		
- Seal diaphragm	Stainless steel, mat. no. 1.4404/316L	
- Process connection and sealing screw	• Stainless steel, mat. no. 1.4404/316L	
- O-Ring	Standard: Viton (FKM(FPM)) optional: NBR	

Material of parts not in contact with media	
Electronics housing	• Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706 • Lacquer on polyurethane base, optional epoxy-based primer • Stainless steel serial plate
Process connection screws	Stainless steel
Measuring cell filling	Silicone oil
• Liquid mounting flange	Silicone oil or other material
Process connection	
• High-pressure side	Flange to EN and ASME
• Low-pressure side	¼-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518
Electrical connection	• Screw terminals • Cable entry via the following screwed glands: - M20 x 1.5 - ½-14 NPT - Han 7D/Han 8D connector - M12 plug
Displays and controls	
Push buttons	3; for operation directly on the device
Digital display	• With or without integrated digital display • Cover with or without window
Auxiliary power supply	
Terminal voltage on transmitter	• DC 10,6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V
Certificates and approvals	
Classification according to PED 97/23/EC	
• PN 160 (MWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Explosion protection	
Explosion protection for Europe (to ATEX)	
• Intrinsic safety "i"	PTB 09 ATEX 2004 X
- Marking	Ex II 1/2 G Ex ia/ib IIC T4
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °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:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Explosion-proof "d"	BVS 09 ATEX E 027
- Marking	Ex II 1/2 G Ex d IIC T4/T6
- 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_m = DC 10.5 ... 45 V
• Dust explosion protection for zone 20	PTB 09 ATEX 2004 X
- Marking	Ex II 1 D Ex iaD 20 T 120 °C
- 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:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Dust explosion protection for zone 21/22	BVS 09 ATEX E 027
- Marking	Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia D21
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W
• Type of protection "n" (zone 2)	PTB 09 ATEX 2004 X
- Marking	Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6
- "nA" connection	U_m = 45 V DC
- "nL, ic" connection	U_i = 45 V
- Effective internal inductance	L_i = 400 µH
- Effective inner capacitance	C_i = 6 nF
Explosion protection for USA (to FM)	
Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEX ib IIC T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N U_m = 30 V, I_m = 100 mA, P_i = 750 mW, L_i = 400 µH , C_i = 6 nF
• Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- (NI/S) parameters	According to "control drawing": A5E02189134N U_m = 45 V, L_i = 400 µH, Ci = 6 nF

SITRANS P500 for level

Explosion protection for Canada	
(to $_{C}CSA_{US}$)	
Certificate of Compliance	No. 2280963
• Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N, U_m = 45 V
• Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F)
- Entity parameters	U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω , L_i = 400 µH, C_i = 6 nF
• Marking (NI/n)	CL I, DIV2, GP ABCD T4/T6 CL II, III, DIV2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- NI/nA parameters	According to "control drawing": A5E02189134N, U_m = 45 V
- nL parameters	According to "control drawing": A5E02189134N, U_i = 45 V, I_i = 100 mA, L_i = 400 µH, C_i = 6 nF

1) Only relevant for the pressure transmitter. The temperature error of the remote seal must calculated separately.

2) For the range code "D" this error must be multiplied by 5. This error can be deleted by making a zero adjustment.

HART communication	
Load with connection of	
• HART communicator	R_B = 230 ... 1100 Ω
• HART modem	R_B = 230 ... 500 Ω
Cable	2 wire shielded: ≤ 3.0 km (1.86 miles), multiwire shielded: ≤ 1.5 km (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics
Software for computer	SIMATIC PDM 6.0

Selection and Ordering data		Order No.	Order code
Pressure transmitters for level, SITRANS P500 HART		7MF56 - 0 -	
Enclosure	**Thread for cable gland**		
Die-cast aluminum, dual compartment	M20x1.5	0	
Die-cast aluminum, dual compartment	½-14 NPT	1	
Output			
4 ... 20 mA, HART		3	
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	1	
Measuring span			
1.25 ... 250 mbar	(0.5 ... 100.4 inH_2O)	D	
6.25 ... 1250 mbar	(2.5 ... 502 inH_2O)	E	
Wetted parts of the low-pressure side (stainless steel process flanges)			
Seal diaphragm	Process connection		
stainless steel	stainless steel	A	
Process connection of low-pressure side			
Female thread ¼-18 NPT			
• Sealing screw opposite process connection			
- Mounting thread 7/16 - 20 UNF according to EN 61518		0	
- Mounting thread M10 to DIN 19213		1	
• Vent on side of process flange			
- Mounting thread 7/16 - 20 UNF according to EN 61518		4	
- Mounting thread M10 to DIN 19213		5	
Wetted parts materials (high-pressure side)			
Stainless steel/316L		0	
Hastelloy C276		1	
Monel		2	
Tantalum		3	
PFA coated on steel/316L		4	
PTFE on stainless steel/316L (not in combination with an extension)		6	A
Other version		9	Y N 1 Y
Add order code and plain text: Material: ... ; Extension length: ...			
Process connection on high-pressure side: Extension length			
None			A
50 mm (1.97 inch)			B
100 mm (3.94 inch)			C
150 mm (5.90 inch)			D
200 mm (7.87 inch)			E
Other version: See option "9" for "Wetted parts materials"			
Process connection on high-pressure side: Nominal diameter/Nominal pressure			
DN 50, PN 40[6)]			B
DN 80, PN 40			D
DN 100, PN 16			G
DN 100, PN 40			H
2", class 150[6)]			L
2", class 300[6)]			M
3", class 150			Q
3", class 300			R
4", class 150			T
4", class 300			U
Other version, add Order Code and plain text: Nominal diameter: ... ; Nominal pressure: ...			Z Q 1 Y
Process connection on high-pressure side: Filling liquid			
Silicone oil M5			0
Silicone oil M50			1
High-temperature oil			2
Halocarbon (for oxygen measurement)			3
FDA compliant oil			4
Glycerin/water			5
Other version, add Order Code and plain text: Filling liquid: ...			9 R 1 Y

SITRANS P500 for level

Selection and Ordering data	Order code
Further designs Add "-Z" to Order No. and specify Order Code.	
Display (Standard: no display, cover closed)	
With digital display and blanking cover	**A10**
With digital display and glass cover	**A11**
Special version: cover/casing	
Two coats of lacquer on casing, cover (PU on epoxy)	**A20**
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68)[4]	**A50**
Cable glands made of metal (IP66/68)	**A51**
Cable glands made of stainless steel (IP66/68)	**A52**
M12 connectors without cable socket (IP66/67)[4]	**A60**
M12 connectors, cable socket (IP66/67)[4]	**A61**
Han 7D connectors, plastic, straight (with cable socket) (IP65)[4]	**A71**
Han 7D connectors, plastic, angled (with cable socket) (IP65)[4]	**A72**
Han 7D connectors, metal enclosure, straight (with cable socket) (IP65)[4]	**A73**
Han 7D connectors, metal enclosure, angled (with cable socket) (IP65)[4]	**A74**
Han 8D connectors, plastic, straight (with cable socket) (IP65)[4]	**A75**
Han 8D connectors, plastic, angled (with cable socket) (IP65)[4]	**A76**
Han 8D connectors, metal enclosure, straight (with cable socket) (IP65)[4]	**A77**
Han 8D connectors, metal enclosure, angled (with cable socket) (IP65)[4]	**A78**
PG 13.5 adapters[4]	**A82**
Language for labels, leporellos and menu language default[7] (instead of English as standard)	
German	**B10**
French	**B12**
Spanish	**B13**
Italian	**B14**
Chinese	**B15**
Russian	**B16**
Japanese	**B17**
English with units: psi/inH_2O	**B21**
Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	**B80**
Certificates (available online for downloading)[1]	
5-point factory calibration according to IEC 60770-2[2]	**C11**
Acceptance test certificate according to EN 10204-3.1[3]	**C12**
Degree of protection approvals: Ex ia/ib (intrinsic safety)	
Ex ia/ib protection (ATEX) (T4)	**E00**
Ex IS protection (FM) (T4)	**E01**
Ex IS protection ($_C$CSA$_{US}$) (T4)	**E02**

Selection and Ordering data	Order code
Further designs Add "-Z" to Order No. and specify Order Code.	
Degree of protection approvals: Ex d (flameproof)	
Ex d explosion-proof (ATEX)(T4/T6)	**E20**
Ex XP explosion-proof and DIP (FM)(T4/T6)	**E21**
Ex XP explosion-proof and DIP ($_C$CSA$_{US}$)(T4/T6)	**E22**
Degree of protection approvals: n/NI	
Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	**E40**
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	**E41**
Zone 2 (nA, nL), Div2 NI ($_C$CSA$_{US}$) (T4/T6)	**E42**
Degree of protection approvals: Zone 20/21/22	
Use in Zone 21/22 (Ex tD) (ATEX)	**E60**
Use in Zone 20/21/22 (Ex iaD) (ATEX)	**E61**
Degree of protection approvals: Combinations	
IS protection and XP and DIP (FM)	**E71**
IS protection and XP and DIP ($_C$CSA$_{US}$)	**E72**
IS protection and XP and DIP (FM/$_C$CSA$_{US}$)	**E73**
Supplementary approvals / degree of protection	
Dual Seal approval[5]	**E85**
Special process connection versions (diff. pressure)	
Swap process connection: high-pressure side at front	**L33**
Process flanges, O-rings, special material **Standard: Viton (FKM (FPM))**	
Process connection sealing rings made of NBR	**L63**
Drain/Vent valve (1 set = 2 units)	
2 ventilation valves ¼- 18 NPT, in material of process flange)	**L80**
Vacuum-proof design	
Vacuum service	**V04**
Spark arrester For mounting on zone 0 (including documentation)	**V05**

1) Enclosed in print or as CD: see page 2/23.

2) When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

3) When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

4) Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

5) Only in conjunction with FM and/or $_C$CSA$_{US}$

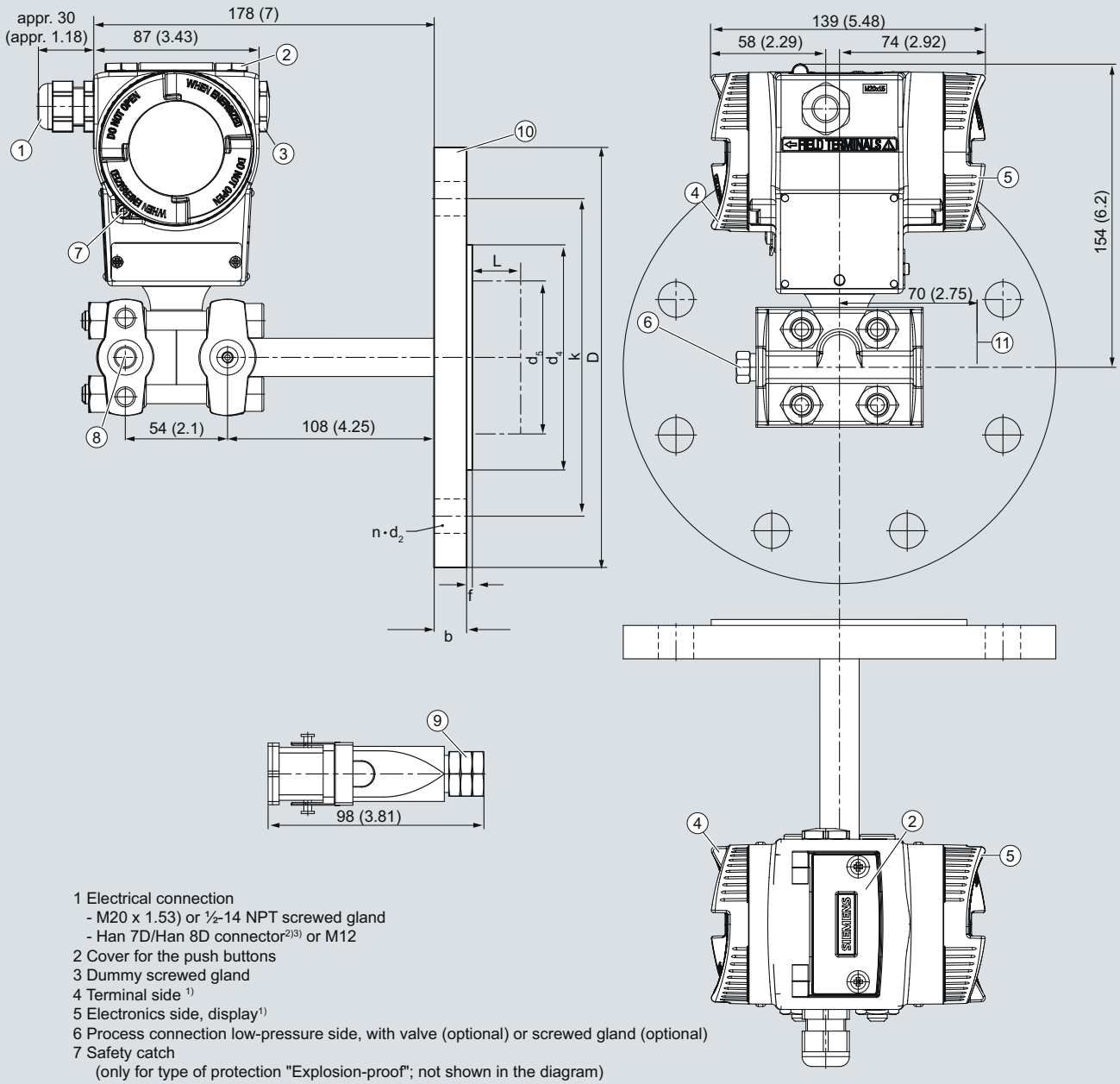
6) Not recommended for Measuring span "D"

7) For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

Selection and ordering data	Order code
Additional data Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
Linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, kPa, MPa, psi	**Y01**
Measuring point number and measuring point identifier (only standard ASCII character set)	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters	**Y15**
Y15:	
Measuring point text (max. 27 char.) Y16:	**Y16**
Entry of HART address (TAG), max. 32 characters Y17:	**Y17**
Setting of pressure indication in pressure units	**Y21**
Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ...	
Note: The following pressure units are selectable: bar, mbar, mm H_2O*), in H_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM, % or mA	
*) Reference temperature 20 °C	
Setting of pressure indication in non-pressure units	**Y22 +**
Specify in plain text:	**Y01**
Y22: ... up to ... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	
Customer-specific settings	
Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	**Y30**

2

Dimensional drawings



1 Electrical connection
- M20 x 1.53) or ½-14 NPT screwed gland
- Han 7D/Han 8D connector[2)3)] or M12

2 Cover for the push buttons
3 Dummy screwed gland
4 Terminal side [1)]
5 Electronics side, display[1)]
6 Process connection low-pressure side, with valve (optional) or screwed gland (optional)
7 Safety catch
(only for type of protection "Explosion-proof"; not shown in the diagram)
8 Process connection: low-pressure side ¼-18NPT (IEC 61518)
9 Electrical connection:
- Han 7D/Han 8D connector/socket[2)3)]

10 Mounting flange according to EN 1092-1 or ASME B16.5
11 Clearance for turning the casing

[1)] Allow approx. 20 mm (0.79 inch) additional thread length
[2)] Not with type of protection "Explosion-proof"
[3)] Not with type of protection "FM + $_{C}CSA_{US}$ [is + XP]"

SITRANS P pressure transmitter for filling level, P500 series, measurements in mm (inch)

Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d	d_2	d_4	d_5	d_M	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm		mm
DN50	PN 40	20	165	61	18	102	48.3	47[2)]	2	125	4	0, 50, 100, 150 or 200
DN 80	PN 40	24	200	90	18	138	76	72[1)]	2	160	8	
DN 100	PN 16	20	220	115	18	158	94	89	2	180	8	
	PN 40	24	235	115	22	162	94	89	2	190	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d_2	d_4	d_5	d_M	f	k	n	L
	lb/sq.in.	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
2 inch	Class 150	0.77 (19.5)	5.91 (150)	0.75(19.0)	3.62(92)	1.9(48.3)	2.32(59.0)	0.079 (2.0)	4.75(120,7)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	Class 300	0.89 (22.7)	6.49(165)	0.75(19.0)	3.62(92)	1.9(48.3)	2.32(59.0)	0.079 (2.0)	5.0(127)	8	
3 inch	Class 150	0.96 (24.3)	7.5 (190.5)	0.75 (19.0)	5 (127)	3.0 (76)	2.83[1)] (72)	0.079 (2.0)	6 (152.4)	4	
	Class 300	1.14 (29.0)	8.27 (210)	0.87 (22.2)	5 (127)	3.0 (76)	2.83[1)] (72)	0.079 (2.0)	6.69 (168.3)	8	
4 inch	Class 150	0.96 (24.3)	9.06 (230)	0.75 (19.0)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.5 (190.5)	8	
	Class 300	1.27 (32.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.88 (200)	8	

Explanations of tables:

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

d_5: Diameter of extension

f: Milling edge

L: Extension length

[1)] 89 mm = 3½ inch with tube length L=0.

[2)] 59 mm with tube length L=0.

SITRANS P500 - Accessories
Supplementary electronics for 4-wire connection

Overview

SITRANS P pressure transmitter with supplementary electronics for 4-wire connection

Direct connection of the supplementary electronics to a SITRANS P pressure transmitter from the P500 series produces a transmitter for four-wire connection.

The supplementary electronics cannot be attached to explosion-protected pressure transmitters. The supplementary electronics is fitted in a light metal housing which is mounted on the left side of the pressure transmitter.

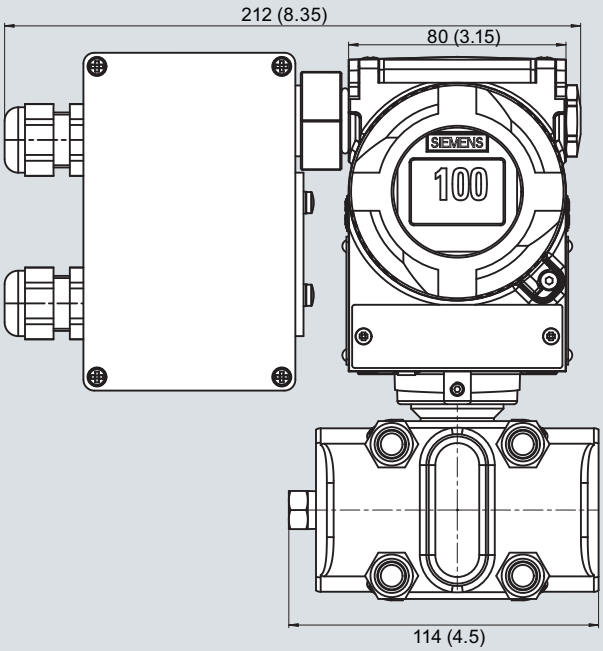
Note on ordering:

The supplementary electronics has to be be ordered through the **supplementary options** of the pressure transmitter in question.

Technical specifications

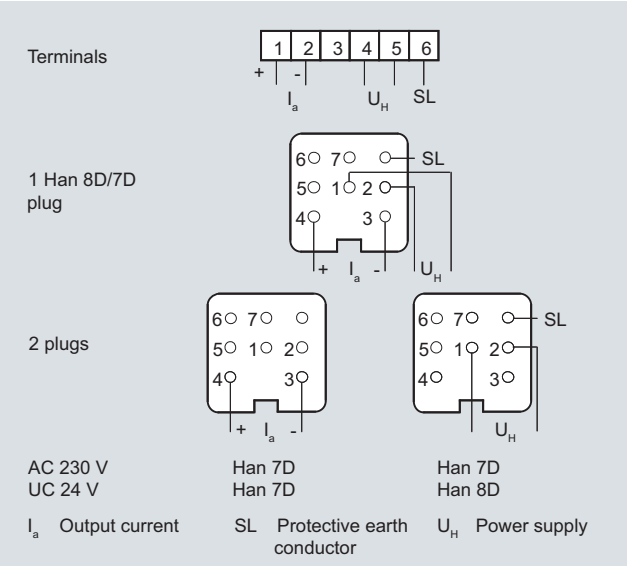
Output	
Output signal	0 ... 20 mA or 4 ... 20 mA
Load	Max. 750 Ω
Voltage measurement	Linear (square-rooting in transmitter if necessary)
Electrical isolation	Between power supply and input/output
Measuring accuracy	
Conformity error (in addition to transmitter)	≤ 0.15 % of set span
Influence of ambient temperature	≤ 0.1 % per 10 K
Power supply effect	≤ 0.1 % per 10 % change in voltage or frequency
Load effect	≤ 0.1 % per 100 % change
Rated conditions	
Ambient temperature	-20 ... +80 °C (-4 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Degree of protection	IP54 to EN 60529
Electromagnetic compatibility (EMC)	EN 50081, EN 50082
Structural design	
Dimensions (W x H x D) in mm (inch)	80 x 120 x 60 (3.15 x 4.72 x 2.36)
Electrical connection	Screw terminals (Pg 13.5 cable inlet) or Han 7D / Han 8D plug
Power supply	
Supply voltage	230 V AC (-10 ... +6 %, 47 ... 63 Hz, approx. 6 VA) or 24 V AC/DC (24 V AC ± 10 %, 47 ... 63 Hz, approx. 3 VA)
Permissible ripple (within the specified limits)	Approx. 2.5 V_{pp}

Dimensional drawings



SITRANS P pressure transmitters with supplementary electronics for four-wire connection, dimension drawing, dimensions in mm (inch)

Schematics



Supplementary electronics for 4-wire connection, connection diagram (the HAN 8D conector is identical to the previous version of the HAN 8U)

Selection and Ordering data		Order code
Supplementary electronics for 4-wire connection Order No. of the transmitter **7MF54..-.....-....** or **7MF56..-.....-....** add **"-Z"** and Order code.		**V** ■■
Power supply	**Electrical connection**	
24 V AC/DC	Terminals; 2 Pg screwed glands, to left	**1**
	2 Han 7D/Han 8U plugs incl. mating connector, to left	**3**
	1 Han 7D plug incl. mating connector, angled	**5**
	Terminals; 1 Pg screwed gland, downwards	**6**
	1 Han 8U plug incl. mating connector, downwards (observe arrangement of plug and differential pressure line)	**9**
230 V AC	Terminals; 2 Pg screwed glands, to left	**7**
	2 Han 7D plugs incl. mating connector, to left	**8**
Output current		
0 ... 20 mA		**0**
4 ... 20 mA		**1**

Selection and Ordering data	Order No.
Accessories	
Instruction Manual German/English	**A5E00322799**

SITRANS P500
Accessories/Spare parts

Selection and ordering data		Order No.
Replacement measuring cells for differential pressure SITRANS P pressure transmitters for differential pressure and flow, P500 HART PN 160 series (MWP 2320 psi)		**7MF5994-** ■■■■**1**
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	**1**
Measuring span		
1.25 ... 250 mbar	(0.5 ... 100.4 inH_2O)	**D**
6.25 ... 1250 mbar	(2.5 ... 502 inH_2O)	**E**
Wetted parts materials (stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
stainless steel	stainless steel	**A**
Process connection		
Female thread ¼-18 NPT		
• Sealing screw opposite process connection		
- Mounting thread $^7/_{16}$-20 UNF to EN 61518		**0**
- Mounting thread M10 to DIN 19213		**1**
• Vent on side of process flange		
- Mounting thread $^7/_{16}$-20 UNF to EN 61518		**4**
- Mounting thread M10 to DIN 19213		**5**
Further designs		Order code
Add "-Z" to Order No. and specify Order Code.		
Acceptance test certificate Acc. to EN 10204-3.1		**C12**
Without process flanges		**K00**
Vent on side for gas measurements[1)]		**L32**
Process flanges, O-rings made of NBR Standard: Viton (FKM (FPM))		**L63**

[1)] Only in conjunction with process connection code 4 or 5.

Selection and Ordering data

		Order No.
Mounting brackets		
For differential pressure transmitters with flange thread M10 (7MF54..-…10 and 7MF54..-…50)		
• made of steel		**7MF5987-1AA**
• made of stainless steel	▶	**7MF5987-1AD**
Mounting brackets		
for differential pressure transmitter with flange thread 7/16-20 UNF (7MF54..-…00 and 7MF54..-…40)		
• made of steel		**7MF5987-1AC**
• made of stainless steel		**7MF5987-1AF**
Cover		
Made of die-cast aluminum, including O-ring		
• without window	F)	**7MF5987-1BE**
• with window	▶	**7MF5987-1BF**
Digital indicator Including mounting material		**7MF5987-1BR**
TAG plate (incl. fastening material)		
without inscription (5 pcs.)		**7MF5987-1CA**
Printed (1 pc.) Data according to Y01 or Y02, Y15 and Y16 (see "SITRANS P transmitters")		**7MF5987-1CB-Z Y..: .....**
Mounting screws		
For TAG plate, grounding and connection terminals and securing and locking screws (30 units)		**7MF5987-1CC**
Sealing plugs for process flange (1 set = 2 units)		
• made of stainless steel		**7MF4997-1CG**
• made of Hastelloy		**7MF4997-1CH**
Vent valve Complete (1 set = 2 units)		
• made of stainless steel	▶	**7MF4997-1CP**
• made of Hastelloy		**7MF4997-1CQ**
Electronics module		
HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)		**7MF5987-1DC**
Connection board (incl. fastening material)		
HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)		**7MF5987-1DM**
O-rings for process flanges made of:		
• Viton (FKM (FPM)) (10 pcs.)	F)	**7MF5987-2DA**
• NBR (Buna N) (10 pcs.)	F)	**7MF5987-2DE**
Push buttons assembly (incl. fastening material)		**7MF5987-2AF**
For replacement of operating keys for on-site operation of the transmitter		
Sealing ring for		
• Process connection		**See catalog FI01, "Fittings"**
• NBR sealing ring for screw cover (10 pcs.)		**7MF4997-2EA**
• NBR sealing ring for interface measuring cell/housing (10 pcs.)		**7MF5987-2EB**

Selection and Ordering data

	Order No.
Operating Instructions[1]	
German	**A5E02344527**
English	**A5E02344528**
French	**A5E02344529**
Italian	**A5E02344530**
Spanish	**A5E02344531**
Compact operating instructions[1]	
English, German, Spanish, French, Italian, Dutch	**A5E02344532**
English, Estonian, Latviaan, Lithuanian, Polish, Romanian	**A5E02307339**
English, Bulgarian, Czech, Finnish, Slovakian, Slovenian	**A5E02307340**
English, Danish, Greek, Portuguese, Swedish, Hungarian	**A5E02307341**
Russian	**A5E02307338**
Brief instructions (Leporello)	
German, English	**A5E02344536**
French, English	**A5E02344537**
Italian, English	**A5E02344538**
Spanish, English	**A5E02344539**
Chinese, English	**A5E02344540**
Russian, English	**A5E02556625**
CD with documentation	
German, English, French, Spanish, Italian	**A5E02344535**
Service Instructions[1] for replacement of electronics, measuring cell and terminal board	
• german	**A5E02822443**
• english	**A5E02344534**
HART modem	
• with RS232 interface ▶D)	**7MF4997-1DA**
• with USB interface ▶D)	**7MF4997-1DB**
Supplementary electronics for 4-wire connection	**A5E00322799**
Certificates (order only via SAP) additional to internet download	
• hard copy (to order)	**A5E03252406**
• on CD (to order)	**A5E03252407**

[1] You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

D) Subject to export regulations AL: 9I999, ECCN: N.

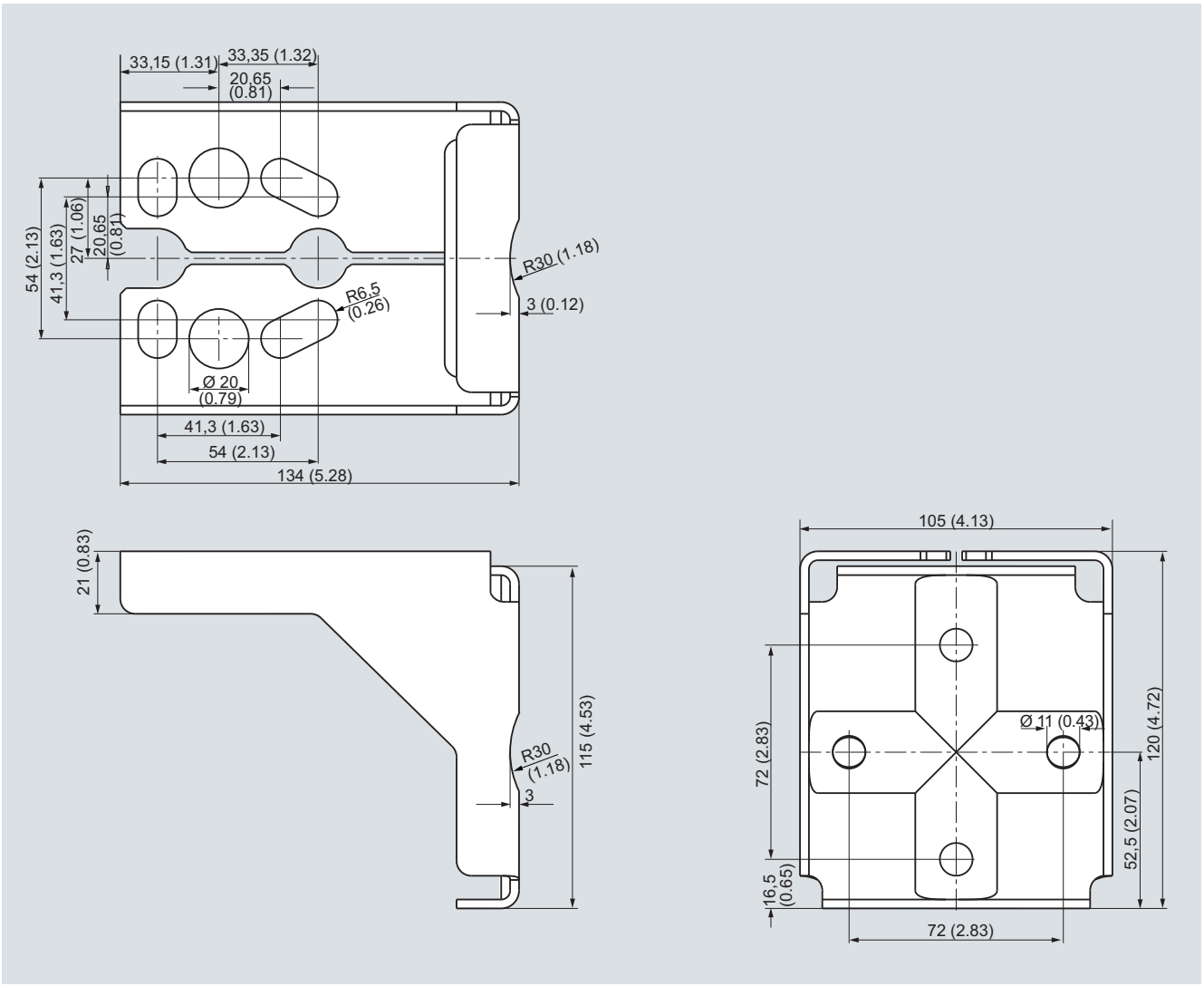
F) Subject to export regulations AL: N, ECCN: EAR99H.

▶ Available ex stock.

For power supply units, see catalog FI01 "Supplementary Components".

2

Dimensional drawings



Mounting bracket for SITRANS P pressure transmitter, P500 series, measurements in mm (inch)
Mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Overview

The SITRANS P500 transmitter can be delivered factory-fitted with the following manifolds:

- Valve manifolds 7MF9411-5BA: Three valve manifold for differential pressure transmitter
- Valve manifolds 7MF9411-5CA: Three valve manifold for differential pressure transmitter

Design

The 7MF9411-5BA and 7MF9411-5CA manifolds are sealed with PTFE sealing rings between the transmitter and the manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar g (87 psi g))and is certified leak-proof with a factory certificate to EN 10204 - 2.2.

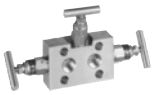
All manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of manifolds", you will receive a mounting bracket for the manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN10204 when choosing the option "Factory mounting of manifolds", a separate certificate is provided for the transmitters and the manifolds respectively.

Selection and ordering Data

Manifold 7MF9411-5BA on SITRANS P pressure transmitter P500 for differential pressure and flow



Add -Z to the Order No. of the transmitter and add order codes	Order Code
SITRANS P500 7MF54..-...	
mounted with gaskets made of PTFE and screws made of	
• chromized steel	**U01**
• stainless steel	**U02**
Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2	
Further designs:	
Delivery includes mounting bracket and mounting clips made of	
• steel	**A01**
• stainless steel	**A02**
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold	**C12**

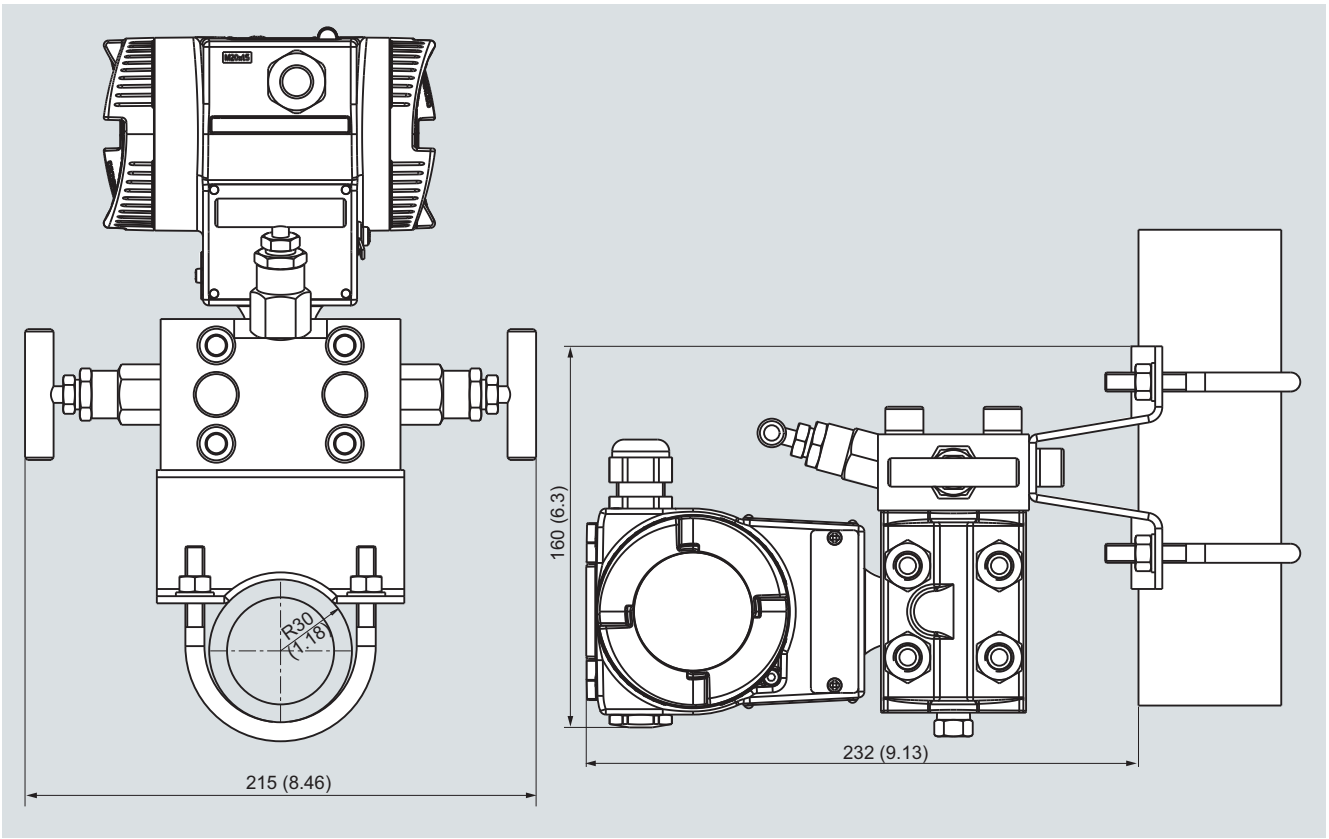
Manifold 7MF9411-5CA on SITRANS P500 pressure transmitter for differential pressure and flow

Add -Z to the Order No. of the transmitter and add order codes	Order Code
SITRANS P500 7MF54..-...	
mounted with gaskets made of PTFE and screws made of	
• chromized steel	**U03**
• stainless steel	**U04**
Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2	
Further designs:	
Delivery includes mounting bracket and mounting clips made of	
• steel	**A01**
• stainless steel	**A02**
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold	**C12**

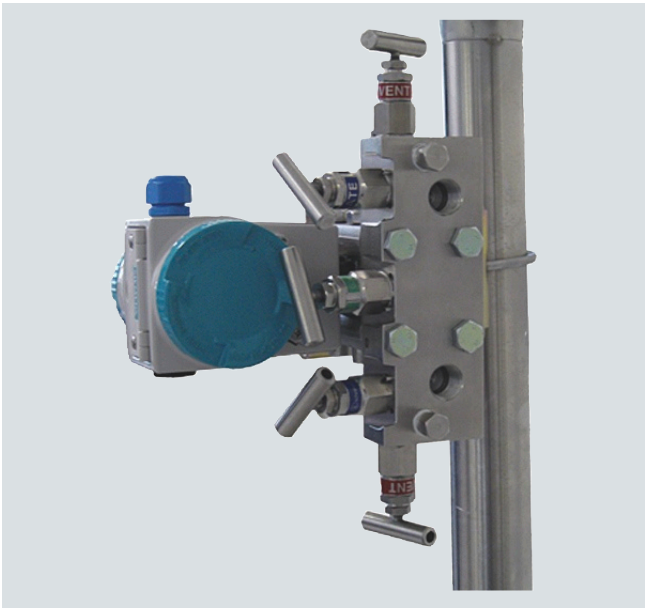
Factory-mounting of manifolds on SITRANS P transmitters

Dimensional drawings

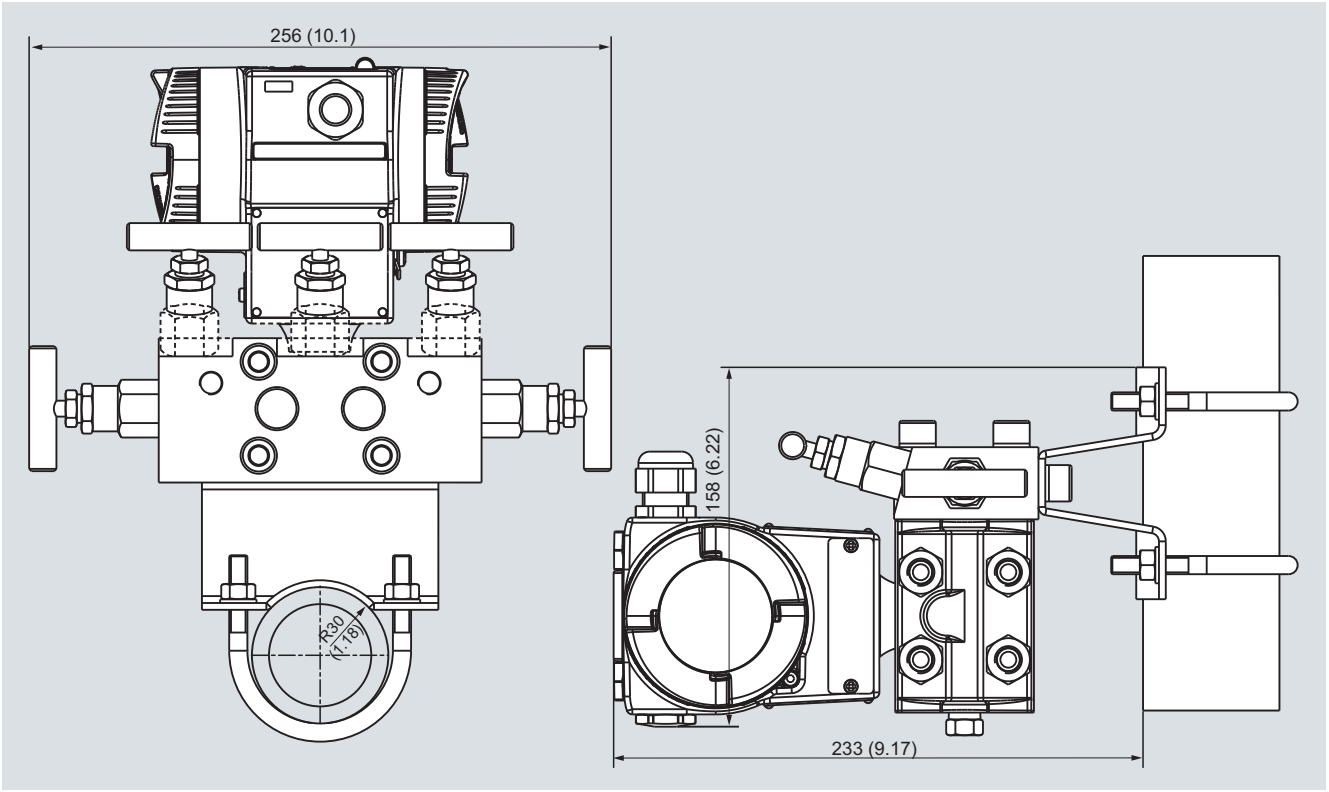
Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

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