

## Pressure Measurement

### Transmitters for basic requirements

#### SITRANS P200 for gauge and absolute pressure

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#### Overview



The SITRANS P200 pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

- Ceramic measuring cell
- Gauge and absolute measuring ranges 1 to 60 bar (15 to 1000 psi)
- For general applications

#### Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

#### Application

The SITRANS P200 pressure transmitter for gauge and absolute pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

#### Design

##### Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

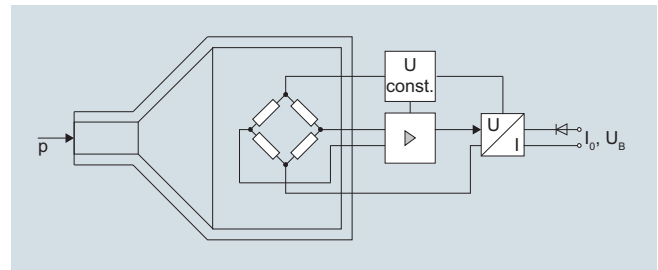
##### Device structure with explosion protection

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#### Function

The pressure transmitter measures the gauge and absolute pressure of liquids and gases as well as the level of liquids.

##### Mode of operation



SITRANS P200 pressure transmitters (7MF1565-...), functional diagram

The ceramic measuring cell has a thin-film resistance bridge to which the operating pressure  $p$  is transmitted through a ceramic diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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#### Technical specifications

<b>Application</b>	Liquids, gases and vapors
<b>Mode of operation</b>	
Measuring principle	Piezo-resistive measuring cell (ceramic diaphragm)
Measured variable	Gauge and absolute pressure
<b>Inputs</b>	
Measuring range	
• Gauge pressure	
- Metric	1 ... 60 bar (15 ... 870 psi)
- US measuring range	15 ... 1000 psi
• Absolute pressure	
- Metric	0.6 ... 16 bar a (10 ... 232 psia)
- US measuring range	10 ... 300 psia
<b>Output</b>	
Current signal	4 ... 20 mA
• Load	$(U_B - 10 \text{ V})/0.02 \text{ A}$
• Auxiliary power $U_B$	DC 7 ... 33 V (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	$\geq 10 \text{ k}\Omega$
• Auxiliary power $U_B$	12 ... 33 V DC
• Power consumption	$< 7 \text{ mA}$ at $10 \text{ k}\Omega$
Characteristic curve	Linear rising
<b>Measuring accuracy</b>	
Error in measurement at limit setting incl. hysteresis and reproducibility	<ul style="list-style-type: none"> <li>• Typical: 0.25 % of full-scale value</li> <li>• Maximum: 0.5 % of full-scale value</li> </ul>
Step response time $T_{99}$	$< 5 \text{ ms}$
Long-term stability	
• Lower range value and measuring span	0.25 % of full-scale value/year
Influence of ambient temperature	
• Lower range value and measuring span	0.25 %/10 K of full-scale value
• Influence of power supply	0.005 %/V
<b>Conditions of use</b>	
Process temperature with gasket made of:	
• FPM (Standard)	-15 ... +125 °C (+5 ... +257 °F)
• Neoprene	-35 ... +100 °C (-31 ... +212 °F)
• Perbunan	-20 ... +100 °C (-4 ... +212 °F)
• EPDM	-40 ... +145 °C (-40 ... +293 °F), usable for drinking water
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Degree of protection (to EN 60529)	<ul style="list-style-type: none"> <li>• IP 65 with connector per EN 175301-803-A</li> <li>• IP 67 with M12 connector</li> <li>• IP 67 with cable</li> <li>• IP 67 with cable quick screw connection</li> </ul>
Electromagnetic compatibility	<ul style="list-style-type: none"> <li>• acc. IEC 61326-1/-2/-3</li> <li>• acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation <math>\leq 1 \%</math></li> </ul>

<b>Design</b>	
Weight	Approx. 0.090 kg (0.198 lb)
Process connections	See dimension drawings
Electrical connections	<ul style="list-style-type: none"> <li>• Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT or Pg 11</li> <li>• M12 connector</li> <li>• 2 or 3-wire (0.5 mm<sup>2</sup>) cable (<math>\varnothing \pm 5.4 \text{ mm}</math>)</li> <li>• Quickon cable quick screw connection</li> </ul>
Wetted parts materials	
• Measuring cell	Al <sub>2</sub> O <sub>3</sub> - 96 %
• Process connection	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Gasket	<ul style="list-style-type: none"> <li>• FPM (Standard)</li> <li>• Neoprene</li> <li>• Perbunan</li> <li>• EPDM</li> </ul>
Non-wetted parts materials	
• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Rack	Plastic
• Cables	PVC
<b>Certificates and approvals</b>	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Lloyd's Register of Shipping (LR)	12/20010
Germanischer Lloyd (GL)	GL19740 11 HH00
American Bureau of Shipping (ABS)	ABS_11_HG 789392_PDA
Bureau Veritas (BV)	BV 271007A0 BV
Det Norske Veritas (DNV)	A 12553
Drinking water approval (ACS)	ACS 11 ACC NY 055
GOST	GOST-R
Underwriters Laboratories (UL)	
• for USA and Canada	UL 20110217 - E34453
• worldwide	IEC UL DK 21845
<b>Explosion protection</b>	
Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically-safe resistive circuits with maximum values:	$U_i \leq 30 \text{ V DC}$ ; $I_i \leq 100 \text{ mA}$ ; $P_i \leq 0.75 \text{ W}$
Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	$L_i = 0 \text{ nH}$ ; $C_i = 0 \text{ nF}$



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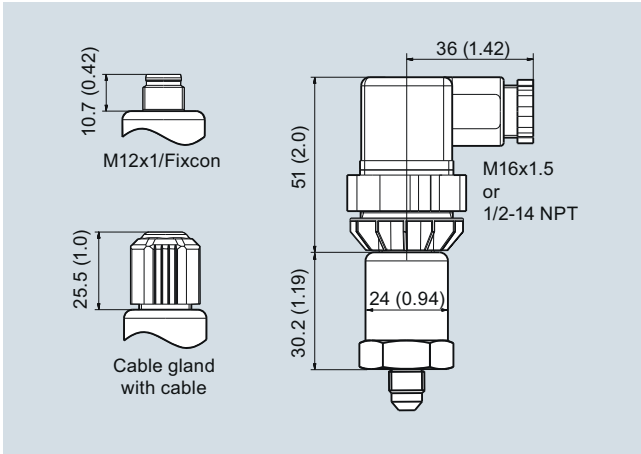
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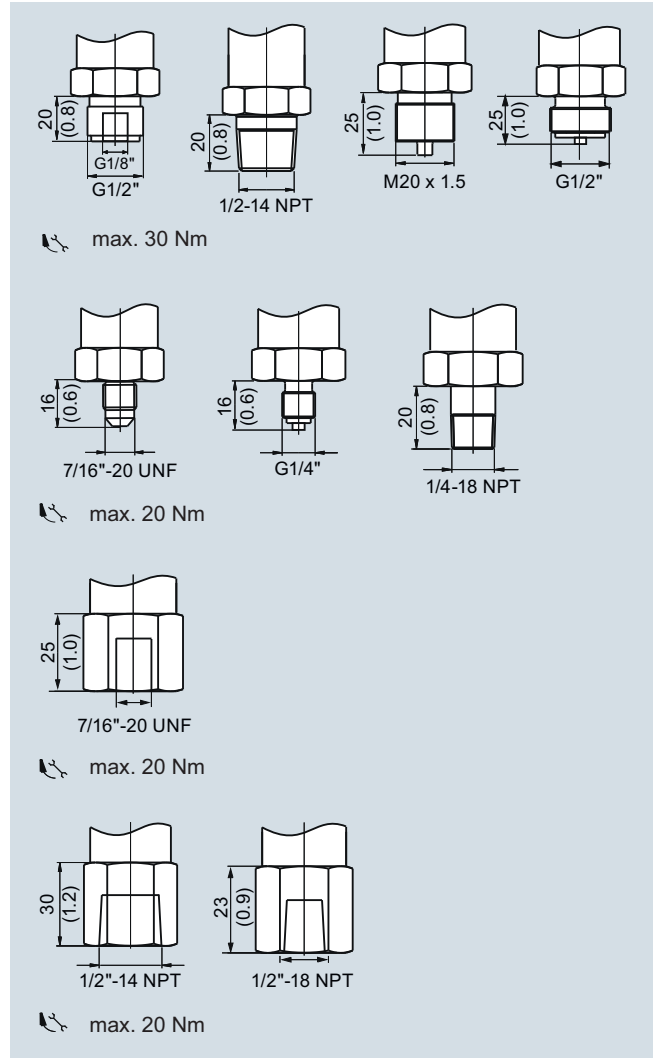
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Selection and ordering data	Article No.	Order code
<b>SITRANS P 200 pressure transmitters for pressure and absolute pressure for general applications</b> Accuracy typ. 0.25 % Wetted parts materials: Ceramic and stainless steel + sealing material Non-wetted parts materials: stainless steel	7MF1565-	
<b>Output signal</b> 4 ... 20 mA; two-wire system; power supply 7 ... 33 V DC (10 ... 30 V DC for ATEX versions) 0 ... 10 V; three-wire system; power supply 12 ... 33 V DC		0 10
<b>Explosion protection (only 4 ... 20 mA)</b> None With explosion protection Ex ia IIC T4		0 1
<b>Electrical connection</b> Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling) Round connector M12 per IEC 61076-2-101 (not for gauge pressure ranges ≤ 16 bar) Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i") Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i") Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling) Fixed mounted cable, length 5 m Special version		1 2 03 04 5 6 07 9 N1Y
<b>Process connection</b> G½" male per EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar) G½" male thread and G1/8" female thread G¼" male per EN 837-1 (¼" BSP male) 7/16"-20 UNF male ¼"-18 NPT male (standard for pressure ranges inH <sub>2</sub> O and psi) ¼"-18 NPT female ½"-14 NPT male ½"-14 NPT female 7/16"-20 UNF female M20x1.5 male Special version		A B C D E F G H J P Z P1Y
<b>Sealing material between sensor and enclosure</b> Viton (FPM, standard) Neoprene (CR) Perbunan (NBR) EPDM Special version		A B C D Z Q1Y
<b>Version</b> Standard version		1
<b>Further designs</b> Supplement the Article No. with "-Z" and add Order code. Manufacturer's test certificate M per IEC 60770-2 (calibration certificate) supplied Oxygen application, oil and grease-free cleaning (only in conjunction with the sealing material Viton between sensor and enclosure and not with explosion protection version)	<b>C11</b> <b>E10</b>	

**Dimensional drawings**



SITRANS P200, electrical connections, dimensions in mm (inch)



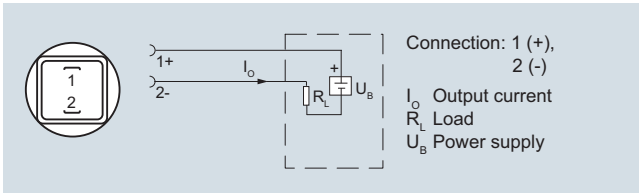
SITRANS P200, process connections, dimensions in mm (inch)

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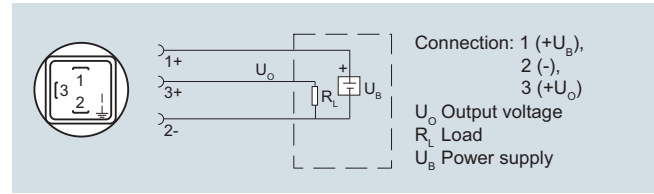
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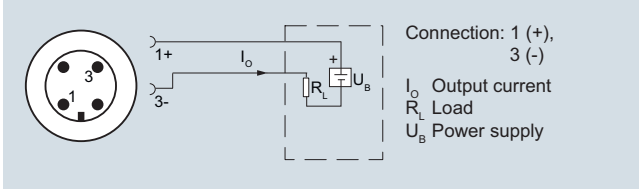
#### Schematics



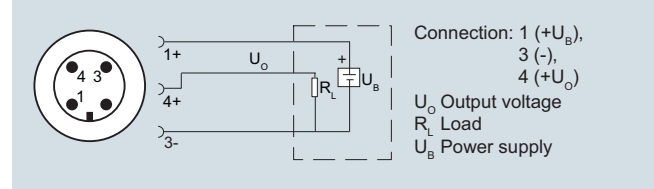
Connection with current output and connector per EN 175301



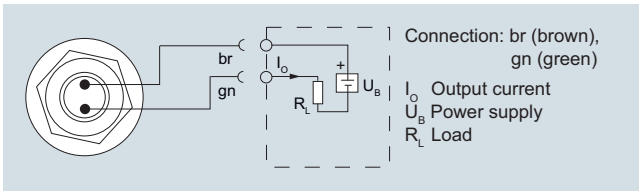
Connection with voltage output and connector per EN 175301



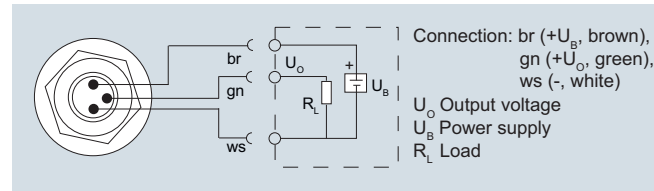
Connection with current output and connector M12x1



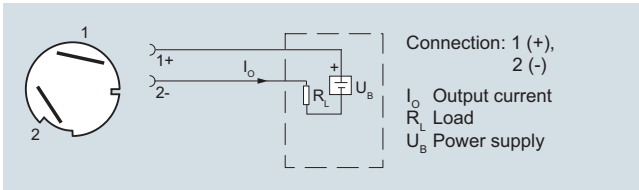
Connection with voltage output and connector M12x1



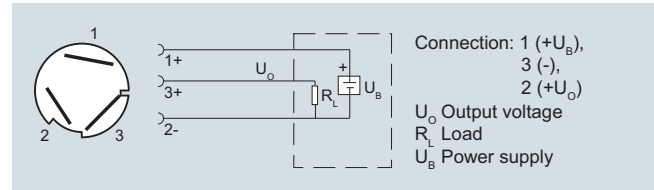
Connection with current output and cable



Connection with voltage output and cable



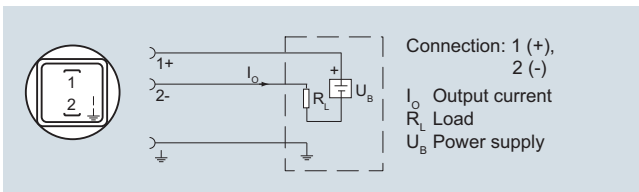
Connection with current output and Quickon cable quick screw connection



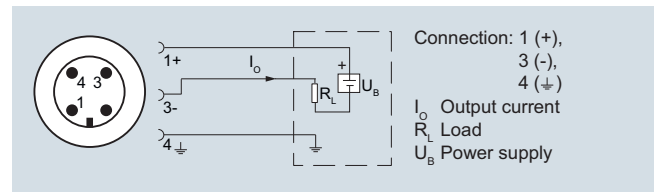
Connection with voltage output and Quickon cable quick screw connection

#### Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)