

Precont® PU4SK



Universal pressure transmitter / pressure switch
for general industrial applications

Technical information TI05.24

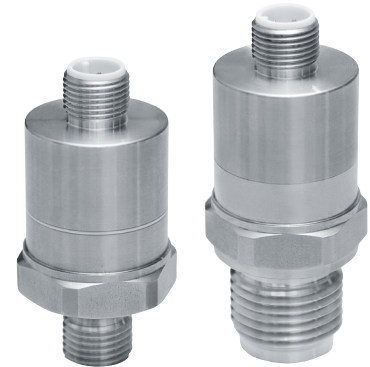


Application

- Machinery and plant engineering
- Air-conditioning and refrigeration plant engineering
- Hydraulic and pneumatic systems
- Process industry
- Environmental technology
- Facility and building automation

Main features

- Measuring ranges from 250 mbar up to 600 bar
- Wide variety of process connections
- Robust ceramic front-flush or internal diaphragm
- Process temperature range -40°C to +135°C
- Fully welded robust steel enclosure
- High protection class IP69K/IP67
- Highest accuracy to $\leq 0,15\%$
- Electronic 4...20mA FSK / RS485 Modbus®-RTU / IO-Link®
- Certification ATEX / IECEx: Ex ia IIC Ga / Ex ia IIIC Da



Description

The device is an electronic pressure transmitter / pressure switch for monitoring, control and continuous measurement of pressures.

A high variety of versions of process connections and electronic types allows the use for a wide range of applications, also for demanding measuring requirements.

The front-flush process connection enables the cleanability of the wetted diaphragm to be integrated into the process, also by SIP cleaning processes.

Low-maintenance and trouble-free pressure measurement is thus also guaranteed in critical applications with viscose or also frequently changing media.

Due to its high accuracy and the digital adjustability by FSK, RS485 Modbus®-RTU or IO-Link® the device can be suited to a wide variety of applications.

The robust design and the high-quality workmanship turn the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration stress or aggressive media.

A captive laser marking of the type label ensures the identifiability throughout the entire lifetime of the device.

Obviously is the optional marking of a measurement point designation resp. TAG, a customer label or of a neutral type label, of course also per laser marking.

A LABS- resp. silicone-free version, a factory calibration with calibration certificate and a customer specific configuration resp. preset is also optionally available like a material test certificate EN10204 3.1 or a factory certificate for drink water suitability.

Customer specific special versions can be realized short-term on request, e.g. special designs for the process connection or other process materials.



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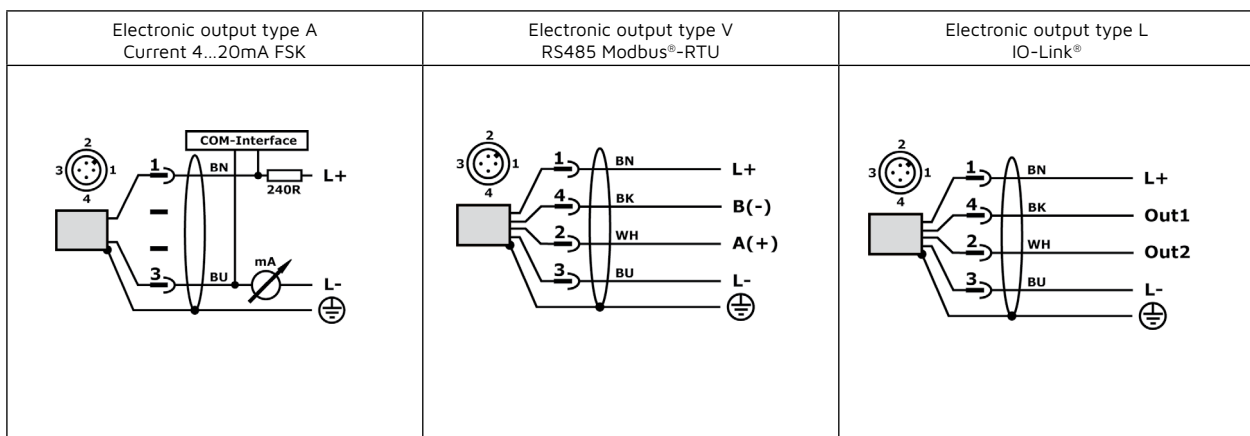
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Technical Data

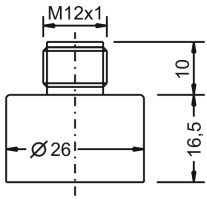
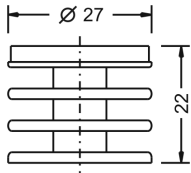
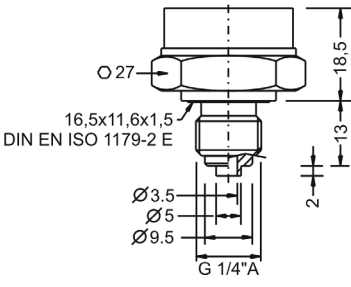
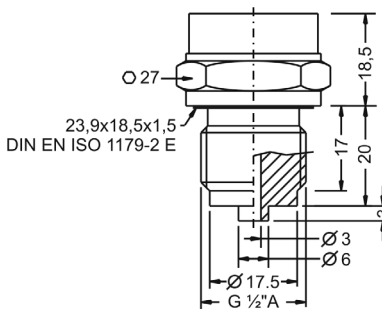
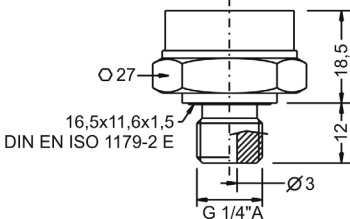
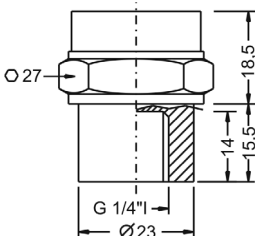
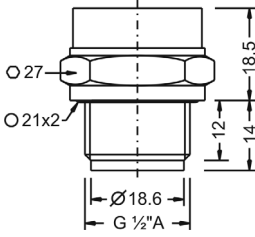
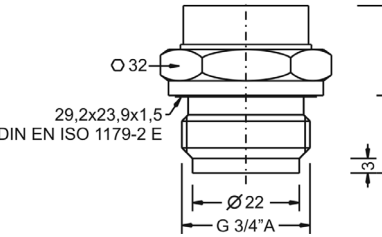
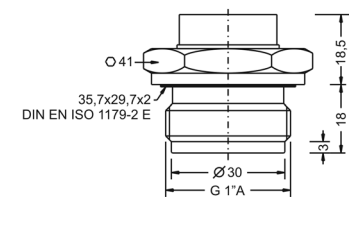
Measuring range										
Nom. pressure PN	[bar]	-1...0	-1...1	0...0,25	0...0,4	0...0,6	0...1	0...1,6	0...2,5	0...4
Under-/Overload press.	[bar]	-1/3	-1/6	-1/0,75	-1/1,2	-1/1,8	-1/3	-1/6	-1/6	-1/15
Burst pressure	[bar]	8	12	2,5	4	6	8	12	12	20
Nom. pressure PN	[bar]	0...6	0...10	0...16	0...25	0...40	0...60	0...100	0...160	0...250
Under-/Overload press.	[bar]	-1/15	-1/20	-1/40	-1/40	-1/100	-1/100	-1/200	-1/400	-1/400
Burst pressure	[bar]	20	40	80	80	200	200	400	800	800
Nom. pressure PN	[bar]	0...320	0...400	0...600	-	-	-	-	-	-
Under-/Overload press.	[bar]	-1/800	-1/800	-1/900	-	-	-	-	-	-
Burst pressure	[bar]	1000	1000	1000	-	-	-	-	-	-
Output type A – Current 4...20mA FSK										
Analogue output 4...20mA		3,9...20,5mA / $\geq 3,8\text{mA}$ / $\leq 22\text{mA}$ / $dI \leq 1\mu\text{A}$								
Permitted load		RL $\leq (U_s - 9V) / 22\text{mA}$								
Time behavior		T90 $\leq 5\text{ms}$ ($t_d = 0\text{s}$) / $t_{on} \leq 0,2\text{s}$ ($t_d = 0\text{s}$)								
Interface		FSK / 1200 Bit/s								
Communication resistor		$\geq 250\Omega$, external								
Output type V – RS485 Modbus®-RTU										
Interface		RS485, bidirectional / Modbus®-RTU / 9600 Baud (4800...38400 Baud)								
Input resistance		112k Ω								
Time behavior		T90 $\leq 2\text{ms}$ ($t_d = 0\text{s}$) / $t_{on} \leq 0,1\text{s}$ ($t_d = 0\text{s}$)								
Output type L – IO-Link®										
Interface		IO-Link® V1.1 / Com2 (38400 Baud)								
Cycle time		$\geq 2,3\text{ms}$								
Analogue output		0...20mA: 0...20,5mA / $\leq 0,05\text{mA}$ / $\leq 22\text{mA}$ / $dI \leq 1\mu\text{A}$ 4...20mA: 3,8...20,5mA / $\geq 3,6\text{mA}$ / $\leq 22\text{mA}$ / $dI \leq 1\mu\text{A}$								
Permitted load		RL $\leq (U_s - 8V) / 22\text{mA}$								
Time behavior		T90 $\leq 2\text{ms}$ ($t_d = 0\text{s}$) / $t_{on} \leq 0,1\text{s}$ ($t_d = 0\text{s}$)								
Switch output		2x PP (Push-Pull), switch to +L/-L								
Output		Uout $\leq 0,2V$, $\geq U_s - 2V$ / Iout 0...200mA (current limited $\leq 450\text{mA}$, short circuit protected)								
Time behavior		T90 $\leq 2\text{ms}$ ($t_d = 0\text{s}$) / $t_{on} \leq 0,1\text{s}$ ($t_d = 0\text{s}$) / trise $< 30\mu\text{s}$ (RL $< 3\text{k}\Omega$ / Iout $> 4,5\text{mA}$)								
Switch cycles		$\geq 100.000.000$								
Auxiliary power										
Supply voltage Us polarity protected Residual ripple voltage Supply current		Type A – 4...20mA FSK: 9...35VDC / $\leq 2V_{pp}$ / $\leq 22\text{mA}$ Type A – 4...20mA FSK Ex: 9...30VDC / $\leq 2V_{pp}$ / $\leq 22\text{mA}$ Type V – RS485 Modbus®-RTU: 6...35VDC / $\leq 2V_{pp}$ / $\leq 10\text{mA}$ (no load) Type L – IO-Link®: 9...35VDC, without IO-Link® / $\leq 2V_{pp}$ / $\leq 20\text{mA}$ (no load) Type L – IO-Link®: 18...30VDC, with IO-Link® / $\leq 2V_{pp}$ / $\leq 20\text{mA}$ (no load)								
Measuring accuracy										
Reference conditions		EN/IEC 60770-1: Characteristic deviation – Limit value adjustment 15...25°C / 860..1060kPa / 45..75%r.F. / $t_{on}240\text{s}$ / 24VDC $\pm 0,1V$ / vertical, sensor downside								
		Characteristic deviation = Nonlinearity + Hysteresis + Reproducibility FSO = Full Scale Output = Nominal measuring range Tk = Temperature coefficient TD (Turn-Down) = FSO / adjusted measuring range Higher deviations possible for special adjustment								
Resolution measuring input		FSO ≥ 16 Bit								
Characteristic deviation		$\leq \pm 0,15\% / \pm 0,5\% \text{FSO}$ (TD=1)								
Nonlinearity+Hysteresis		$\leq \pm 0,05\% / \pm 0,4\% \text{FSO}$ (TD=1)								
Reproducibility		$\leq \pm 0,1\% \text{FSO}$ (TD=1)								
Influence of auxiliary power		$\leq \pm 0,002\% \text{FSO/V}$								
Load influence Iout		Type L – IO-Link®: $\leq \pm 0,01\% \text{FSO}/100R$								
Long term drift		$\leq \pm 0,2\% \text{FSO}/\text{year}$ (TD=1)								
Temperature deviation		Tk Zero+Span (TD=1) $\leq \pm 0,05\% \text{FSO/K}$								
Mounting position		$\leq 0,2\text{mbar}$ Position vertical, sensor topside								

Process conditions	
Process temperature	Standard: -40°C...+100°C / ATEX/IECEX: see certificate Extended: -40°C...+135°C (+140°C - 1h) / ATEX/IECEX: see certificate Gasket FPM: max. -25°C...+140°C Gasket EPDM: max. -40°C...+140°C Gasket FFKM: max. -15°C...+140°C
Pressure cycles	≥ 10 Mio. (1,2xPN)
Environmental conditions	
Environmental temperature	-40°C...+100°C / ATEX/IECEX: see certificate
Protection level	IP69K/IP67 (EN/IEC 60529)
Climatic classification	4K4H (EN/IEC 60721-3-4)
Shock classification	50g [11ms] (EN/IEC 60068-2-27)
Vibration classification	20g [10...2000 Hz] (EN/IEC 60068-2-6)
EM compatibility	Operation device class B / Industrial range (EN/IEC 61326)
Insulation voltage	500Vac
Ignition protection type	ATEX/IECEX: II 1 G Ex ia IIC T1...T6 Ga ATEX/IECEX: II 1 D Ex ia IIIC T80°C...T195°C Da ATEX: II 3 G Ex ec IIC T1...T6 Gc
MTTF	463 years
Tightening torque	≤ 50Nm
Weight	0,2-0,5kg
Materials	
Process wetted	Ceramic Al ₂ O ₃ - 96% (SIP suitable) Steel 1.4404/316L, Steel 1.4571/316Ti, FPM, EPDM
Not process wetted	CrNi-steel, PUR, Acrylic copolymer, FPM

Electrical connection



Dimensions (mm)

<p>Terminal enclosure</p> 		<p>Temperature decoupler Extended temperature range</p> 
<p>Process connection type 6 Thread G$\frac{1}{4}$"A, EN 837</p>	<p>Process connection type 1 Thread G$\frac{1}{2}$"A, EN 837</p>	<p>Process connection type 3 Thread G$\frac{1}{4}$"A, DIN EN ISO 1179-2 E</p>
		
<p>Process connection type 4 Thread G$\frac{1}{4}$"I, inner thread</p>		
		
<p>Process connection type 2 Thread G$\frac{1}{2}$"A, DIN EN ISO 1179-2 E</p>	<p>Process connection type 8 Thread G$\frac{3}{4}$"A, front-flush</p>	<p>Process connection type 5 Thread G1"A, front-flush</p>
		

Order code

Type
PU4S Standard

Measuring system – material diaphragm (process wetted) / sensor type
K Ceramic Al2O3 96% / strain gauge

Approval
S Standard
X ATEX II 1 G / IECEx Ex ia IIC Ga resp. ATEX II 1 D / IECEx Ex ia IIIC Da (Output type – A)

Process connection
6 Thread ISO 228-1 – G¼"A, EN 837 manometer
1 Thread ISO 228-1 – G½"A, EN 837 manometer
3 Thread ISO 228-1 – G¼"A, DIN EN ISO 1179-2 E
4 Thread ISO 228-1 – G¼"I, inner thread
2 Thread ISO 228-1 – G½"A, DIN EN ISO 1179-2 E, inner bore
8 Thread ISO 228-1 – G¾"A, front-flush, ≤ 60 bar
5 Thread ISO 228-1 – G1"A, front-flush, ≤ 1 bar
Y others

Material process gaskets (process wetted)
1 FPM – fluorelastomere (e.g. Viton®)
3 EPDM – ethylene-propylene-dienmonomere, FDA-listed
Y others

Material process connection (process wetted)
V CrNi-steel

Material terminal enclosure
C CrNi-steel

Measuring range
02 0...250 mbar
03 0...400 mbar
04 0...600 mbar
05 0...1 bar
06 0...1,6 bar
07 0...2,5 bar
08 0...4 bar
09 0...6 bar
10 0...10 bar
11 0...16 bar
12 0...25 bar
13 0...40 bar
14 0...60 bar
19 0...100 bar
20 0...160 bar
21 0...250 bar
22 0...320 bar
23 0...400 bar
24 0...600 bar
16 -1...0 bar
17 -1...+1 bar
YY Special measuring range

Electronic – output
A Current 4...20mA, FSK, 2-wire
V RS485 Modbus®-RTU, 4-wire
L IO-Link®, 1x current 0/4...20mA / 2x switch, 4-wire

Electronic – function
S Standard

Process temperature
0 Standard -40°C...+100°C
1 Extended -40°C...+135°C, temperature decoupler

Pressure type
R Gauge pressure
A Absolute pressure, ≥ 1bar ... ≤ 40bar

Measuring system – accuracy
4 0,5%
8 Xcellence – 0,15%, linearization protocol

Electrical connection
S Plug M12x1

Additional options
-SF LABS-free, silicone-free / paint compatible version
-ML Measurement point designation / TAG – Laser marking
-MZ Material test certificate – EN10204 3.1
-WT Factory certification – drink water suitability
-KF Configuration / Preset
-WK Factory calibration – calibration certificate

Precont® PU4S

K

V

C

S

S



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