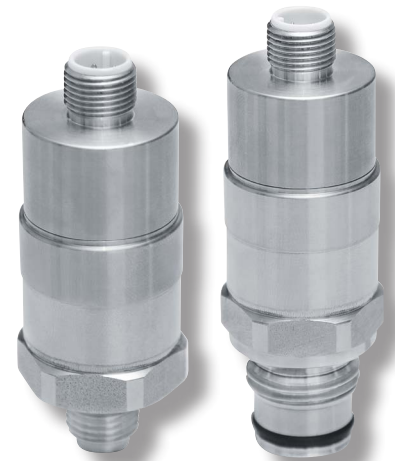




Universal pressure transmitter / pressure switch
for general industrial applications

Technical information TI09.18

In brief



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 400 mbar up to 1000 bar
- Wide variety of process connections
- Metallic front-flush or internal diaphragm
- Process temperature range -40°C to +125°C
- Fully welded robust steel enclosure
- High protection class IP69K/IP67
- Highest accuracy to ≤ 0,15%
- Electronic 4...20mA HART® / 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 cleanliness of the wetted diaphragm to be integrated into the process.

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 HART®, 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 turns 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 factory certifications for drink water suitability.

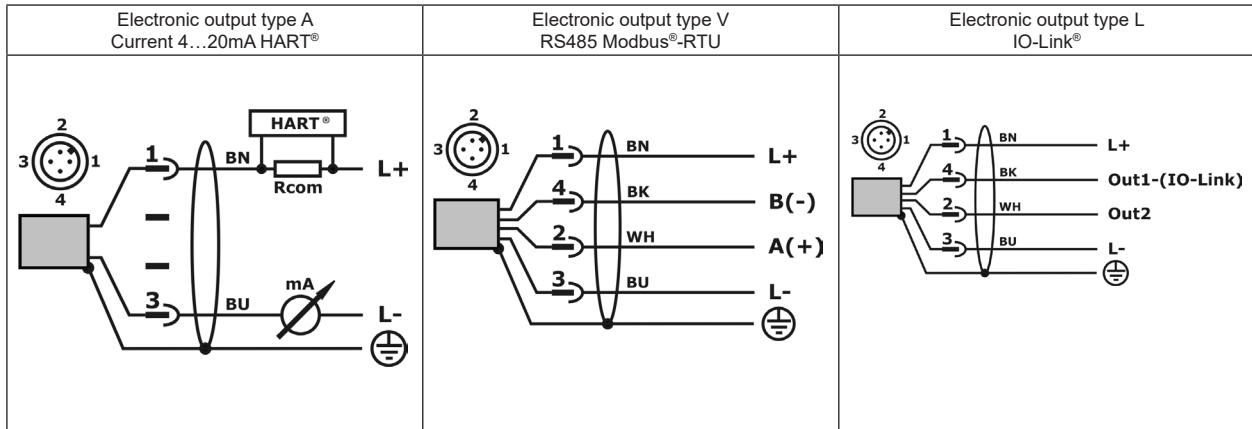
Customer specific special versions can be realized on request, e.g. special designs for the process connection or other process materials.

Technical Data

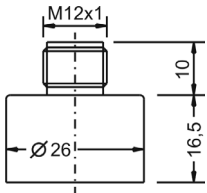
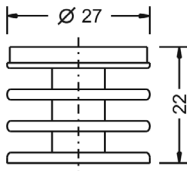
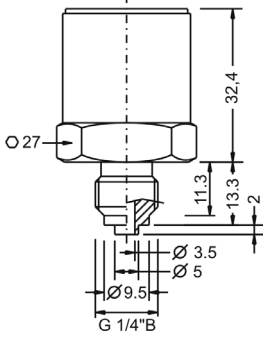
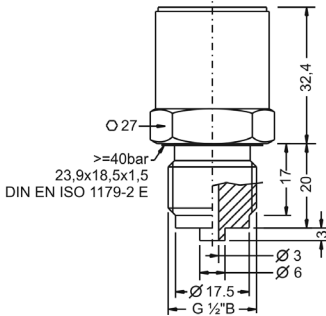
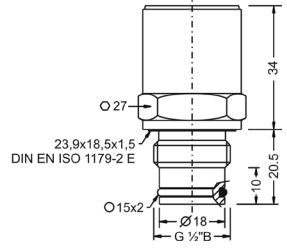
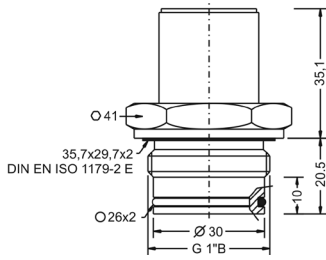
Measuring range										
Nom. pressure PN rel.	[bar]	-1...0	-1...1	0...0,4	0...1	0...4	0...6	0...10	0...16	0...20
Under-/Overload press.	[bar]	-1/5	-1/10	-1/2	-1/5	-1/17	-1/35	-1/35	-1/35	-1/80
Burst pressure	[bar]	6	12	2,4	6	20,5	42	42	42	96
Nom. pressure PN rel.	[bar]	0...40	0...60	0...100	0...160	0...250	0...320	0...400	0...600	0...1000
Under-/Overload press.	[bar]	-1/80	-1/80	-1/200	-1/320	-1/500	-1/800	-1/800	-1/1200	-1/1500
Burst pressure	[bar]	400	400	800	1000	1200	1700*	1700*	2400*	3000
Nom. pressure PN abs.	[bar]	-	-	0...0,4	0...1	0...4	0...6	0...10	0...16	0...20
Overload press.	[bar]	-	-	2	5	17	35	35	35	80
Burst pressure	[bar]	-	-	2,4	6	20,5	42	42	42	96
Nom. pressure PN abs.	[bar]	0...40	0...60	0...100	0...160	0...250	0...320	0...400	0...600	0...1000
Overload press.	[bar]	80	80	200	320	500	800	800	1200	1500
Burst pressure	[bar]	400	400	800	1000	1200	1700*	1700*	2400*	3000
* Process connection type 0 / 5 – front-flush: Burst pressure only valid at sealing with ring gasket below the hexagon, otherwise max. 1500 bar.										
Output type A – Current 4...20mA HART®										
Analogue output 4...20mA	3,9...20,5mA / $\geq 3,8\text{mA} / \leq 22\text{mA} / \text{dI} \leq 1\mu\text{A}$									
Permitted load	$\text{RL} \leq (\text{Us} - 9\text{V}) / 22\text{mA}$									
Time behavior	$\text{T}_{90} \leq 8\text{ms} (\text{t}_d = 0\text{s}) / \text{ton} \leq 0,2\text{s} (\text{t}_d = 0\text{s})$									
Interface	HART®-compliant (7.0) / 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	$\text{T}_{90} \leq 2\text{ms} (\text{t}_d = 0\text{s}) / \text{ton} \leq 0,1\text{s} (\text{t}_d = 0\text{s})$									
Output type L – IO-Link®										
Interface	IO-Link® V1.1 / Com2 (38400 Baud)									
Cycle time	$\geq 2,3\text{ms}$									
Analogue output	0...20mA: $0...20,5\text{mA} / \leq 0,05\text{mA} / \leq 22\text{mA} / \text{dI} \leq 1\mu\text{A}$ 4...20mA: $3,8...20,5\text{mA} / \geq 3,6\text{mA} / \leq 22\text{mA} / \text{dI} \leq 1\mu\text{A}$									
Permitted load	$\text{RL} \leq (\text{Us} - 8\text{V}) / 22\text{mA}$									
Time behavior	$\text{T}_{90} \leq 2\text{ms} (\text{t}_d = 0\text{s}) / \text{ton} \leq 0,1\text{s} (\text{t}_d = 0\text{s})$									
Switch output	2x PP (Push-Pull), switch to +L/-L									
Output	$\text{U}_{\text{out}} \leq 0,2\text{V}, \geq \text{Us} - 2\text{V} / \text{I}_{\text{out}} 0...200\text{mA}$ (current limited $\leq 450\text{mA}$, short circuit protected)									
Time behavior	$\text{T}_{90} \leq 2\text{ms} (\text{t}_d = 0\text{s}) / \text{ton} \leq 0,1\text{s} (\text{t}_d = 0\text{s}) / \text{trise} < 30\mu\text{s}$ ($\text{RL} < 3\text{k}\Omega / \text{I}_{\text{out}} > 4,5\text{mA}$)									
Switch cycles	$\geq 100.000.000$									
Auxiliary power										
Supply voltage Us polarity protected Residual ripple voltage Supply current	Type A – 4...20mA HART®: $9...35\text{VDC} / \leq 2\text{Vpp} / \leq 22\text{mA}$ Type A – 4...20mA HART® Ex: $9...30\text{VDC} / \leq 2\text{Vpp} / \leq 22\text{mA}$ Type V – RS485 Modbus®-RTU: $6...35\text{VDC} / \leq 2\text{Vpp} / \leq 10\text{mA}$ (no load) Type L – IO-Link®: $9...35\text{VDC}$, without IO-Link® / $\leq 2\text{Vpp} / \leq 20\text{mA}$ (no load) Type L – IO-Link®: $18...30\text{VDC}$, with IO-Link® / $\leq 2\text{Vpp} / \leq 20\text{mA}$ (no load)									
Measuring accuracy										
Reference conditions	EN/IEC 60770-1: Characteristic deviation – Limit value adjustment $15...25^\circ\text{C} / 860...1060\text{kPa} / 45...75\%r.F. / \text{ton}240\text{s} / 24\text{VDC} \pm 0,1\text{V}$ / vertical, sensor downside									
Terms	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	$\leq \pm 0,15\% / \pm 0,5\% \text{FSO} (\text{TD}=1)$									
Nonlinearity	$\leq \pm 0,05\% / \pm 0,35\% \text{FSO} (\text{TD}=1)$									
Hysteresis	$\leq \pm 0,1\% \text{FSO} (\text{TD}=1)$									
Reproducibility	$\leq \pm 0,03\% \text{FSO} (\text{TD}=1)$									
Influence of auxiliary power	$\leq \pm 0,002\% \text{FSO/V}$									
Load influence Iout	Type L – IO-Link®: $\leq \pm 0,01\% \text{FSO}/100\text{R}$									
Long term drift	$\leq \pm 0,2\% \text{FSO}/\text{year} (\text{TD}=1)$									
Temperature deviation	Tk Zero+Span (TD=1) $\leq \pm 0,02\% \text{FSO/K} (-20^\circ\text{C}...+85^\circ\text{C})$ $\leq \pm 0,03\% \text{FSO/K} (-40...-20^\circ\text{C} / +85...+125^\circ\text{C})$									
Mounting position	$\leq 0,4\text{mbar}$ Position vertical, sensor topside Process connection type 5 – Thread G1", front-flush ≤ 10 mbar									

Process conditions	
Process temperature	Standard: -40°C...+100°C / ATEX/IECEX: see certificate Extended: -40°C...+125°C / ATEX/IECEX: see certificate Gasket NBR: max. -20°C...+100°C Gasket FPM: max. -25°C...+125°C Gasket EPDM: max. -40°C...+125°C
Pressure cycles	≥ 100 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	Process connection 1/6 EN 837 – ≥ 40bar: Steel 1.4542/630, Steel 1.4534/SI13800 Steel 1.4571/316Ti, NBR, FPM, EPDM
Not process wetted	CrNi-steel, PUR, Acrylic copolymer, FPM Process connection type 0/5 front-flush: Synthetic oil Process connection type 1/6 EN837, ≤ 25bar: Synthetic oil

Electrical connection



Dimensions (mm)

Terminal enclosure		Temperature decoupler Extended temperature range
		
<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 0 Thread G$\frac{1}{2}$"A, front-flush</p> 	<p>Process connection type 5 Thread G1"A, front-flush</p> 	

Order code

PU4S	Type	Standard
M	Measuring system – material diaphragm (process wetted) / sensor type	CrNi-steel / strain gauge
S	Approval	Standard
X		ATEX II 1 G / IECEx Ex ia IIC Ga resp. ATEX II 1 D / IECEx Ex ia IIIC Da (Output type – A)
6	Process connection	Thread ISO 228-1 – G½" B, EN 837 manometer (without process gasket)
1		Thread ISO 228-1 – G½" B, EN 837 manometer (≥ 40 bar without process gasket)
0		Thread ISO 228-1 – G½" B, front-flush, O-ring gasket not for measuring ranges 0...400 mbar / 0...1 bar / -1...0 bar / 0...1000 bar
5		Thread ISO 228-1 – G1" B, front-flush, O-ring gasket for measuring ranges 0...400 mbar / 0...1 bar / -1...0 bar
Y		others
0	Material process gaskets (process wetted)	without / NBR – nitrile-butadiene-rubber
1		FPM – fluorelastomere (e.g. Viton®)
3		EPDM – ethylene-propylene-dienmonomere, FDA-listed
Y		others
V	Material process connection (process wetted)	CrNi-steel
C	Material terminal enclosure	CrNi-steel
03	Measuring range	0...400 mbar
05		0...1 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
25		0...1000 bar, only for process connection type 1, 6 – G½" B, G½" B (EN 837)
16		-1...0 bar
17		-1...+1 bar
YY		Special measuring range
A	Electronic – output	Current 4...20mA, HART®-compliant, 2-wire
V		RS485 Modbus®-RTU, 4-wire
L		IO-Link®, 1x current 0/4...20mA / 2x switch, 4-wire
S	Electronic – function	Standard
0	Process temperature	Standard -40°C...+100°C
1		Extended -40°C...+125°C, temperature decoupler
R	Pressure type	Gauge pressure
A		Absolute pressure (≤ 25 bar)
4	Measuring system – accuracy	0,5%
8		Xcellence – 0,15%, linearization protocol
S	Electrical connection	Plug M12x1
-SF	Additional options	LABS-free, silicone-free / paint compatible version
-ML		Measurement point designation / TAG – Laser marking
-KL		Customer label on device – Laser marking
-TN		Type label neutral
-WT		Factory certification – drink water suitability
-KF		Configuration / Preset
-WK		Factory calibration – calibration certificate

Precont® PU4S M V C S S



fill level



water level



pressure



temperature



flow



visualization



signal converter



sensoric



IoT-Solutions



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