



fill level



water level



pressure



temperature



flow



visualization



signal converter



sensoric



Sensors for your various applications

Pressure measurement

*Pressure sensors - digital & analog
Pressure switches & transmitters
Differential pressure transmitters*





P2-ECO

Description	1
Technical data	2
Dimension drawings	3
Order code	4

P2-PK4SH

Description	5
Technical Data	6
Dimension drawings	7
Order code	8

P2-LTM

Description	9
Technical data	10
Dimension drawings	11
Order code	12

P2-PU4SE

Description	13
Technical Data	14
Dimension drawings	15
Order code	16



Pressure sensor with ceramic measuring cell, 4-20 mA / 0-10 V output, affordable low-cost version

P2-ECO

Description

The pressure transmitters of the series P2-ECO are capable of measuring absolute pressure, gauge pressure and vacuum in gases, vapors, liquids and dusts.

Through the ceramic membrane in conjunction with the process connection in stainless steel, a good resistance against aggressive media is guaranteed.

As outputs Versions with 4-20mA 2-wire and 3-wire 0-10V available. The electrical connection is made via a connector according to DIN 43650 Type A.

The pressure transmitter of this series are suitable for a variety of measurement tasks in the following areas:

- Process engineering
- Process technology
- Environmental technology

Application

- two-wire-technology 4...20mA or three-wire-technology 0...10V
- good resistance by ceramic membrane with stainless steel process connection
- robust device design
- low hysteresis

Benefits

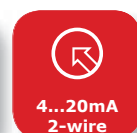
- high *accuracy*
- high overpressure safety
- high vibration resistance



Specials



0...10 V
3-wire



4...20mA
2-wire



up to
60
bar
pressure



**Low
Cost**

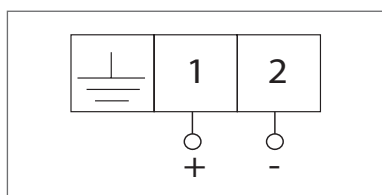
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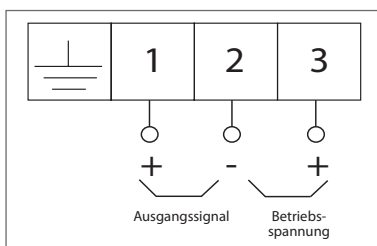
Technical data

Technical data	
Supply voltage	6...30 V DC at 2-wire 4...20mA 15...30 V DC/AC at 3-wire 0...10V
Measuring accuracy	
Characteristic deviation	≤ ±1% FS, hysteresis < 0,5% FS
Temperature deviation	≤ ±0,5% FS / 10 K
Materials	
Membrane: (process wetted)	Ceramic AL ₂ O ₃ 96%
Process connection: (process wetted)	Steel 1.4305
Gaskets: (process wetted)	FPM – fluorelastomere (Viton®)
Device plug:	EN 175-301-803-A (formerly DIN 43650-A): Housing PA Polyamide, contacts tinned, gasket NBR
Umgebungsbedingungen	
Process temperature:	0°C...+85°C
Process pressure:	-1 bar...60 bar
Environmental temperature:	0°C...+60°C
Protection:	Type plug EN 175-301-803 (formerly DIN 43650) IP65 EN/IEC 60529

Connection

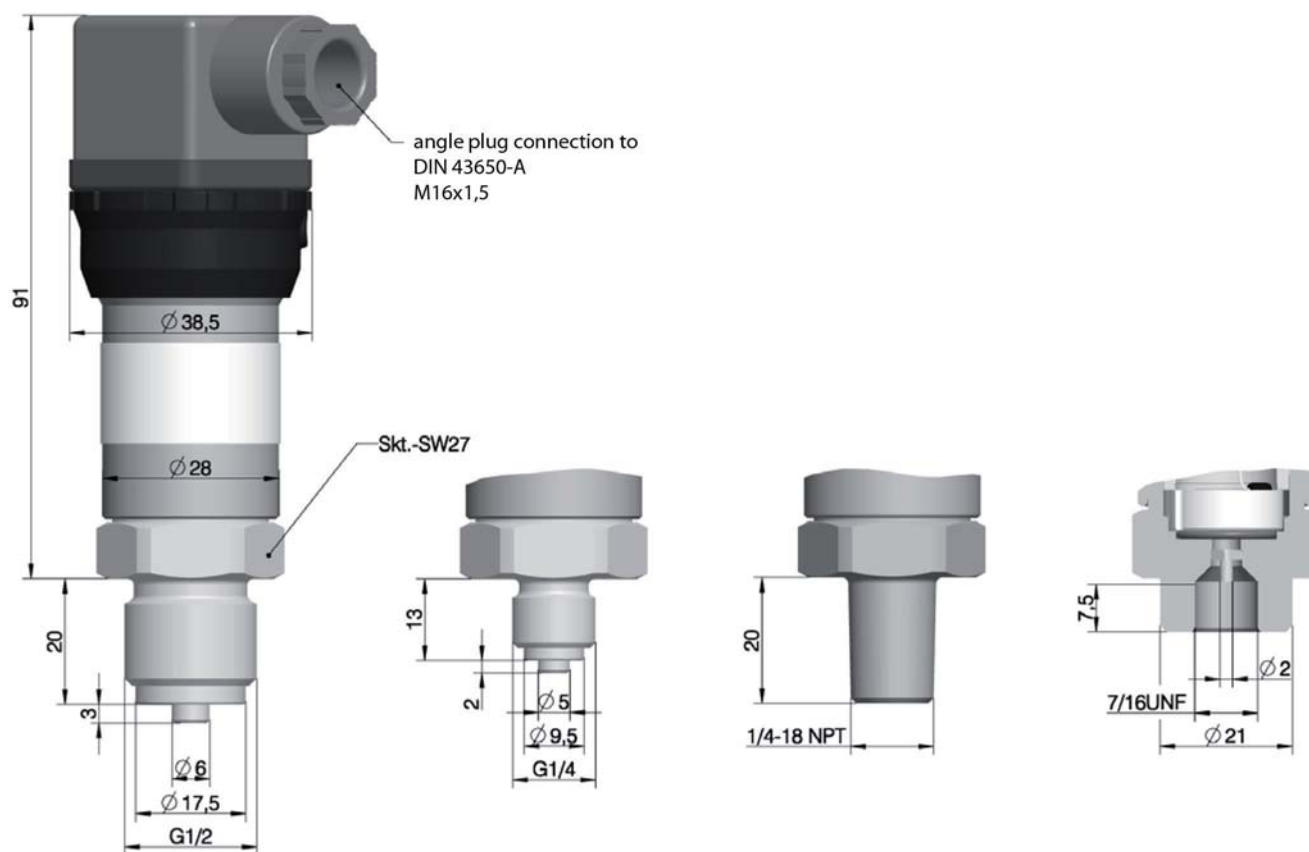


Two-wire



Three-wire Standard

P2-ECO



all dimensions are in mm unless otherwise stated

P2-ECO

Pressure range

01	0...0,6 bar on request	10	40 bar
02	0...1 bar on request	11	60 bar
03	0...1,6 bar	31	-1...0 bar
04	2,5 bar	32	-1...0,6 bar
05	4,0 bar	33	-1...2,5 bar
06	6 bar	34	-1...3 bar
07	10 bar		
08	16 bar		
09	25 bar		

Elektronic-Output

A 4...20 mA

Process connection

12	1/2" external thread DIN EN ISO228-1
14	1/4" external thread DIN EN ISO228-1
21	internal thread 7/16 UNF receptacle for Schrader fitting

Order code

P2-ECO



*Pressure transmitter for general applications
Monitoring of relative pressure in gases, vapors,
liquids and dust*

P2-PK4SH

In brief



Application

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

Your benefits

- *Wide range of applications*
- Miniaturized construction
- Measuring ranges from 1 bar to 600 bar, adjustable
- Wide process temperature range -40°C to $+125^{\circ}\text{C}/+200^{\circ}\text{C}$
- High protection class IP67 / IP69K – fully welded
- Wide environmental temperature range -40°C to $+125^{\circ}\text{C}$
- Metallic internal diaphragm
- High accuracy – characteristic deviation $\leq 0,5\%$ of measuring range
- Integrated evaluation electronic
- Current output 4...20mA
- Adjustability per FSK communication IEC 61158 – CPF9
- Connector plug M12

Description

Due to the miniaturized device construction with small diameter and short length, measuring ranges from 1 bar to 600 bar (gauge, adjustable), process temperatures from -40°C to $+125^{\circ}\text{C}/+200^{\circ}\text{C}$, process material and terminal enclosure CrNi-steel, fully welded and environmental temperatures from -40°C to $+125^{\circ}\text{C}$ as well as the availability of industrial standard process connections like thread ISO 228-1, DIN EN ISO 1179-2 E, thread ISO 228-1, EN 837 manometer – on request or thread ANSI NPT – on request the device is especially suitable for the use for machinery and plant engineering, air-conditioning and refrigeration plant engineering, hydraulic and pneumatic systems, process industry and environmental technology.

The pressure transmitter is suitable for demanding measuring requirements, especially at constricted installation situations and high temperature stress.

Due to its high accuracy and the digital adjustability by a FSK operating, the device can be suited 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 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 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 factory certifications for drink water resp. food suitability.

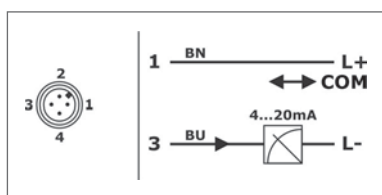
Customer specific special versions can be realized on request, e.g. other process gasket (EPDM, NBR, FFKM, etc.), special designs for the process connection, higher measuring accuracy, lower temperature deviation or other measuring range.



Technical Data

Technical Data	
Supply voltage:	9...35V _{DC} , reverse polarity protected
Supply current:	≤ 22mA
Analogue output 4...20mA	
Operating range:	3,9...21mA, min. 3,8mA, max. 22mA
Permitted load:	≤ (US - 9V) / 22mA
Start-up time:	≤ 0,1s
Communication	FSK modulated current signal IEC 61158 – CPF9 – Rev. 7
Signal	0,5mASS – 1200Hz / 2200Hz
Communication resistor	≥ 250Ω, external
Activity	tO _n ≤ 30s / td ≥ 0,1s
Address	0 (0...15)
Transmission rate	1200 Bit/s
Measuring accuracy	
Characteristic deviation:	≤ ± 0,5% FS
Long term drift:	Process temperature type 0 – Standard -40...+125°C: ≤ ±0,2% FS (1000h/+125°C)
	Process temperature type 1 – Extended -40...+200°C: ≤ ±0,5% FS (1000h/+200°C)
Temperature deviation:	Tk 4) Zero: ≤ ±0,35% FS / 10K Tk 4) Span: ≤ ±0,3% FS / 10K
Materials	
Diaphragm: (process wetted)	Process temperature type 0 – Standard -40...+125°C: Steel 1.4548
	Process temperature type 1 – Extended -40...+200°C: Inconel 718
Process connection: (process wetted)	Steel 1.4404/316L
Terminal enclosure:	CrNi-steel
Electrical connection part	Device plug PUR
Pressure compensation element	Acrylic copolymer
Gaskets	FPM – fluorelastomere (Viton®)
Gaskets: (process wetted)	FPM – fluorelastomere (Viton®)
Environmental conditions	
Environmental temperature Ta:	Process temperature Type 0 – Standard -40...+125°C: Ta = -40°C...+125°C
	Process temperature Type 1 – Extended -40...+200°C: Ta = -40°C...+125°C, Tp = -40...+150°C / Ta = -40°C...+100°C, Tp = +150...+175°C / Ta = -40°C...+85°C, Tp = +175...+200°C
Process temperature Tp:	Process temperature type 0 – Standard: -40°C...+125°C
	Process temperature type 1 – Extended: -40°C...+200°C
Process pressure:	0...1 bar [R] / 0...4 bar [R] / 0...10 bar [R] / 0...40 bar [R] / 0...100 bar [R] / 0...600 bar [R]
Protection:	IP69K/IP67 (EN/IEC 60529)

Electrical connection

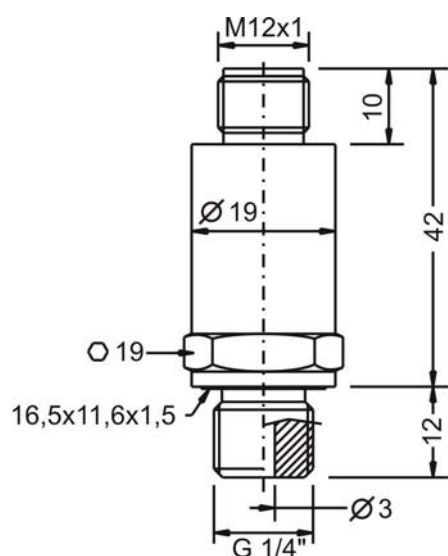


2-wire, current 4...20mA
Conductor color standard connection cable M12 –
A-coded: BN = brown, BU = blue

P2-PK4SH

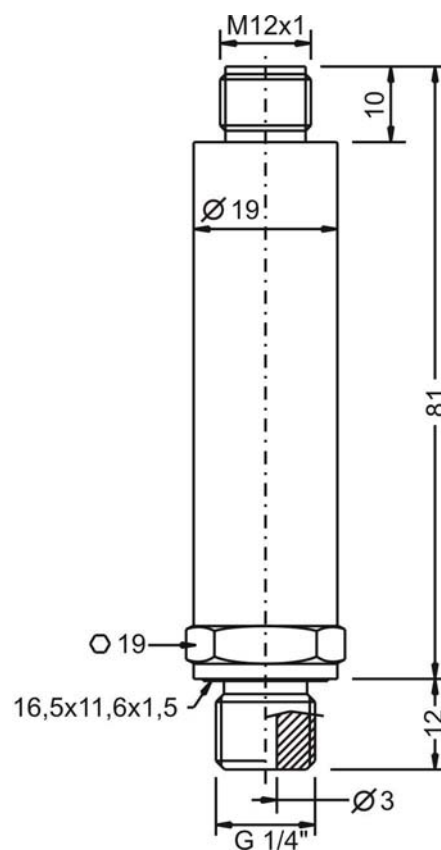
Type 0 – Standard -40...+125°C

Process connection type 3 – Thread ISO 228-1 –
G 1/4" – DIN EN ISO 1179-2 E



Type 1 – Extended -40...+200°C

Process connection type 3 – Thread ISO 228-1 –
G 1/4" – DIN EN ISO 1179-2 E



P2-PK4SH

PK4S

H

S

3

1

V

C

A

S

R

4

S

Type
Standard

Measuring system – material diaphragm (process wetted) / sensor type / accuracy
CrNi-steel / strain gauge

Approval
Standard

Process connection
Thread ISO 228-1 – G¼”B, DIN EN ISO 1179-2 E

Material gaskets (process wetted)
FPM – fluorelastomere (Viton®)

Material process connection (process wetted)
CrNi-steel

Material terminal enclosure
CrNi-steel

Measuring range
05 0...1 bar
08 0...4 bar
10 0...10 bar
13 0...40 bar
19 0...100 bar
24 0...600 bar

Electronic – output
2-wire, current 4...20mA

Electronic – function
Standard

Process temperature
0 Standard –40°C...+100°C
1 Extended –40°C...+200°C, temperature decoupler

Pressure type
Gauge pressure

Measuring system – accuracy
0,5%

Electrical connection
Plug M12x1

Order code

P2-

PK4S

H

S

3

1

V

C

A

S

R

4

S



Pressure transmitter for measurement of relative pressure in gases, vapors, liquids and dust

P2-LTM

Description

The device is an electronic pressure transmitter for continuous measuring of relative pressures in gases, vapors, liquids and dusts within closed container or pipes.

The use of a dry/oil-free thin-film measuring sensor on metallic membrane offers excellent characteristics like high pressure and pressure blow strength, vacuum resistance, high accuracy, good long term stability and a low temperature influence allows the use in nearly all fields of industry.

The certification ATEX II 1G (zone 1) resp. ATEX II 1D (zone 20) in ignition protection type intrinsic safety allows the use in applications with combustible gases or dusts.

For Applications with high process temperatures up to +125°C resp. +200°C appropriate versions are available.

The device is mounted in the wall of the pressure container or of the pipe.

The system pressure is applied to the metallic membrane and causes there a variation of the resistance of the strain gage at the back side of the membrane.

The pressure signal, that is transmitted by the membrane to the sensor is converted into an electrical signal and converted by the integrated evaluation electronic into a current signal 4...20 mA.

Benefits

- Applicable for
 - general industrial applications
 - applications in explosion hazardous areas ATEX II 1G / ATEX II 1D
 - applications with high process temperatures
- Dry/oil-free metallic measuring cell, fully welded membrane
- Measuring ranges
 - 0...1 bar to 0...1000 bar, relative
 - -1...0 bar, -1...+1 bar, relative
- Process temperature range -40°C ... +85°C/+125°C/+200°C
- Protection classification IP67 / IP69K
- Output signal 4...20mA analogue, 2-wire-technology
- Accuracy $\leq \pm 0,5\%$



Specials



certification



fast
response time



no moving
parts



robust



up to
1000
bar
pressure



acid-proof

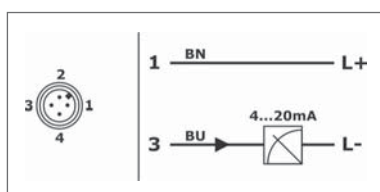
Order Code page |12|



Technical data

Technical Data	
Supply voltage US:	9VDC...36VDC, reverse polarity protected
Output Signal 4...20mA	
Operating range IOut:	3,9mA...21mA, 3,8mA, 22 mA
Signal resolution:	≤ 1μA
Permitted load RL:	≤ ((US - 9V) / 0,022A) Ω
Step response time T90:	≤ 25ms
Measuring accuracy	
Characteristic deviation:	≤ ±0,5% FS
Long term drift:	≤ ±0,1% FS / year (125°C, 1000h)
Temperature deviation:	Compensated temperature range +25...+85°C Tk zero point + span ≤ ±0,01% FS / K (≥ 0°C) Tk zero point + span ≤ ±0,02% FS / K (-40°C...<0°C)
Materials	
Membrane: (process wetted)	Steel 1.4548/630
Process connection: (process wetted)	Steel 1.4571/316Ti
Gaskets: (process wetted)	Profile sealing ring DIN 3869 NBR – nitril-butadien-rubber FPM – fluorelastomere EPDM – ethylene-propylene-dienmonomere
Terminal enclosure:	CrNi-steel
Electrical connection part:	Device plug PA
Pressure compensation element:	PTFE
Environmental conditions	
Ambient temperature:	-40°C...+85°C Limitation ATEX – see technical manual
Process temperature:	-40°C...+85°C Expansion Temperature decoupler 1 □ -40°C...+125°C Temperature decoupler 2 □ -40°C...+200°C Limitation Profile sealing ring DIN 3869 – NBR □ -25°C...+120°C Profile sealing ring DIN 3869 – FPM □ -25°C...+200°C Profile sealing ring DIN 3869 – EPDM □ -40°C...+140°C ATEX – see technical manual
Process pressure:	– 1 bar ...1000 bar
Protection:	IP67/IP69K (EN/IEC 60529)

Connection scheme

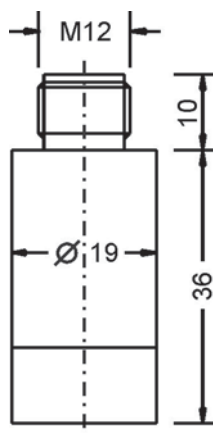


Conductor color standard connection cable M12:
BN = brown, BU = blue

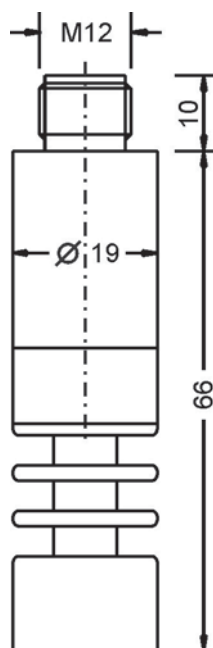
The connection cable is not enclosed in the delivery contents.

P2-LTM

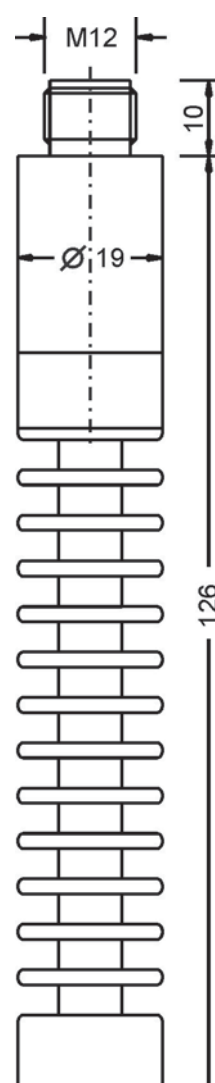
Terminal enclosure
Process temperature type 0 - -40...+85°C



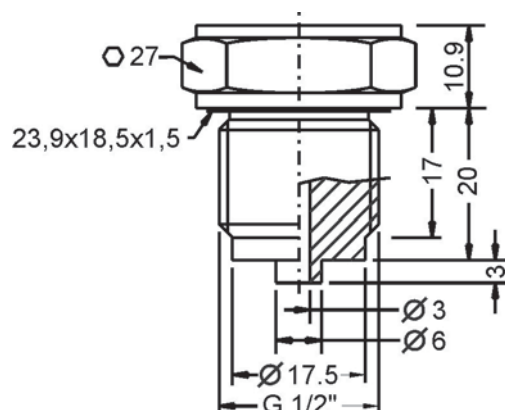
Terminal enclosure
Process temperature type 1 - -40...+125°C



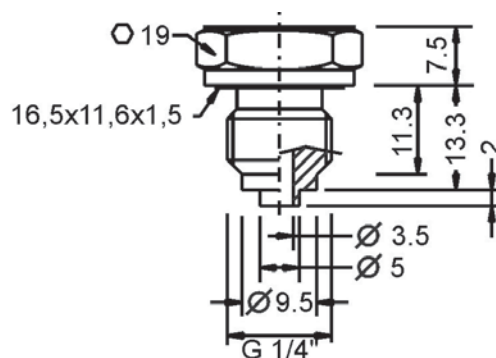
Terminal enclosure
Process temperature type 2 - -40...+200°C



Process connection
Type 1 - G 1/2" ISO 228-1, DIN 837-3



Process connection
Type 6 - G 1/4" ISO 228-1, DIN 837-3



Measuring membrane - material (process wetted)
LTM Metal, strain gage-thin-film – steel 1.4248/630

V	Plug M12
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P2-

V



*Pressure transmitter for general applications
Monitoring of relative pressure in gases, vapors,
liquids and dust*

P2-PU4SE

In brief



Application

- General applications in
 - Machinery and plant engineering
 - Air-conditioning and refrigeration plant engineering
 - Hydraulic and pneumatic systems
 - Process industry
 - Environmental technology

Your benefits

- *Wide range of applications*
- Measuring ranges from 1 bar up to 600 bar
- Wide process temperature range -25°C to +100°C
- High protection class IP69K
- Wide environmental temperature range -25°C to +85°C
- Ceramic internal diaphragm
- High accuracy – characteristic deviation ≤ 0,5% of measuring range
- Integrated evaluation electronic
- Current output 4...20mA: Adjustability per FSK communication IEC 61158 – CPF9
- Digital output and adjustability per RS485 Modbus RTU
- Connector plug M12

Description

Due to the device construction with measuring ranges from 1 bar to 600 bar (gauge, adjustable), process temperatures from -25°C to +100°C, process materials Al₂O₃-ceramic / CrNi-steel as well as the availability of industrial standard process connections like thread ISO 228-1, EN 837 manometer, thread ISO 228-1, DIN EN ISO 1179-2 E or thread metric resp. ANSI NPT the device is especially suitable for the use for machinery and plant engineering, air-conditioning and refrigeration plant engineering, hydraulic and pneumatic systems, process industry or environmental technology.

The pressure transmitter is suitable for cost sensitive as well as demanding measuring requirements.

Due to its high accuracy and the digital adjustability by a FSK operating

unit or by RS485 Modbus RTU, the device can be suited 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, possible.



A LABS-free 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.

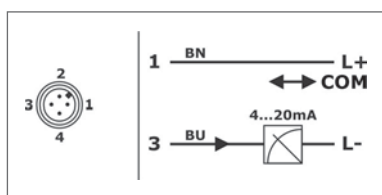
Customer specific special versions can be realized on request, e.g. other connector, other process gasket (EPDM, NBR, FFKM, etc.) or special designs for the process connection.



Technical Data

Technical Data	
Supply voltage:	9...35V _{DC} , reverse polarity protected
Supply current:	≤ 22mA Electronic output type A – 2-wire, current 4...20mA
	≤ 10mA Electronic output type V – 4-wire, RS485 Modbus RTU
RS485 Modbus RTU	
Interface	RS485, bidirectional
Signal	Digital – Modbus RTU
Address	001 (001...247)
Transmission rate	9600 Baud (4800 / 9600 / 19200 / 38400)
Parity	Odd (None / Odd / Even)
Step response time T ₉₀	≤ 5ms (t _d = 0s)
Start-up time t _{on}	≤ 0,1s
Analogue output 4...20mA	
Operating range:	3,9...21mA, min. 3,8mA, max. 22mA
Permitted load:	≤ (U _s - 9V) / 22mA
Start-up time:	≤ 0,1s
Communication	FSK modulated current signal IEC 61158 – CPF9 – Rev. 7
Signal	0,5mA _{SS} – 1200Hz / 2200Hz
Communication resistor	≥ 250Ω, external
Activity	t _{on} ≤ 30s / t _d ≥ 0,1s
Address	0 (0...15)
Transmission rate	1200 Bit/s
Measuring accuracy	
Characteristic deviation:	≤ ± 0,5% FS
Long term drift:	≤ ± 0,2% FS / year not cumulative
Temperature deviation	≤ ±0,5% FS / 10K
Materials	
Diaphragm: (process wetted)	Ceramic aluminum oxide Al ₂ O ₃ – 96%
Process connection: (process wetted)	Steel 1.4404/316L / Steel 1.4571/316Ti
Terminal enclosure:	CrNi-steel
Gaskets: (process wetted)	FPM – fluorelastomere (Viton®)
Environmental conditions	
Environmental temperature:	– 25°C...+85°C
Process temperature:	–40...+100°C (extended –40...+135°C)
Process pressure:	0...1 bar / ≤ 4 bar; 0...4 bar / ≤ 12,5 bar; 0...10 bar / ≤ 25 bar; 0...40 bar / ≤ 125 bar; 0...100 bar / ≤ 200 bar; 0...600 bar / ≤ 800 bar
Protection:	IP69K/IP67 (EN/IEC 60529)

Electrical connection



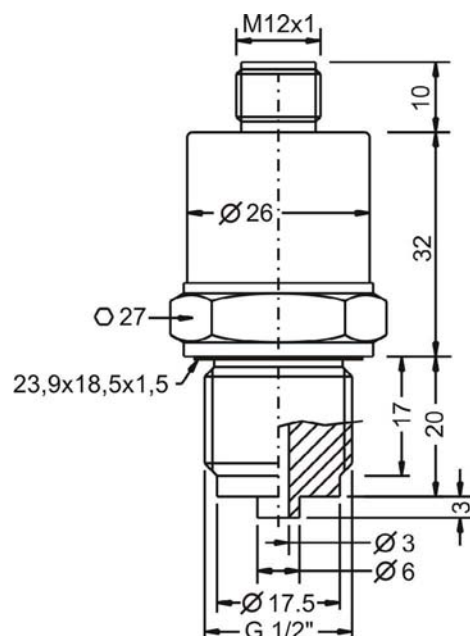
2-wire, current 4...20mA
FSK IEC 61158 CPF9
Conductor color standard connection cable M12 –
A-coded: BN = brown, BU = blue



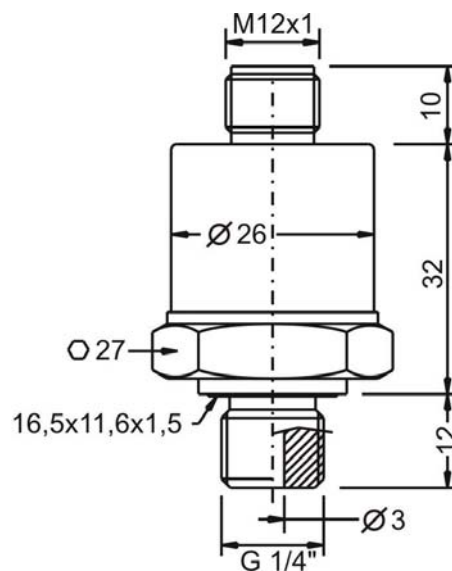
4-wire, RS485 Modbus RTU
Conductor color standard connection cable M12
– A-coded: BN = brown, WH = white, BU = blue,
BK = black

P2-PU4SE

Type 1 – thread ISO 228-1 – G $\frac{1}{2}$ " – EN 837



Type 3 – thread ISO 228-1 – G $\frac{1}{4}$ " –
DIN EN ISO 1179-2 E



P2-PU4SE

Type	Process connection	Measuring range / Burst pressure	Electronic output
PU4SE105A	Type 1 Thread ISO 228-1 – G½" B EN 837 Manometer	0...1 bar / ≤ 4 bar	Type A 2-wire current 4...20mA FSK IEC 61158 CPF9
PU4SE108A		0...4 bar / ≤ 12,5 bar	
PU4SE110A		0...10 bar / ≤ 25 bar	
PU4SE113A		0...40 bar / ≤ 125 bar	
PU4SE119A		0...100 bar / ≤ 200 bar	
PU4SE124A		0...600 bar / ≤ 800 bar	
PU4SE305A	Type 3 Thread ISO 228-1 – G¼" B DIN EN ISO 1179-2 E	0...1 bar / ≤ 4 bar	
PU4SE308A		0...4 bar / ≤ 12,5 bar	
PU4SE310A		0...10 bar / ≤ 25 bar	
PU4SE313A		0...40 bar / ≤ 125 bar	
PU4SE319A		0...100 bar / ≤ 200 bar	
PU4SE324A		0...600 bar / ≤ 800 bar	
PU4SE105V	Type 1 Thread ISO 228-1 – G½" B EN 837 Manometer	0...1 bar / ≤ 4 bar	Type V 4-wire RS485 Modbus RTU
PU4SE108V		0...4 bar / ≤ 12,5 bar	
PU4SE110V		0...10 bar / ≤ 25 bar	
PU4SE113V		0...40 bar / ≤ 125 bar	
PU4SE119V		0...100 bar / ≤ 200 bar	
PU4SE124V		0...600 bar / ≤ 800 bar	
PU4SE305V	Type 3 Thread ISO 228-1 – G¼" B DIN EN ISO 1179-2 E	0...1 bar / ≤ 4 bar	
PU4SE308V		0...4 bar / ≤ 12,5 bar	
PU4SE310V		0...10 bar / ≤ 25 bar	
PU4SE313V		0...40 bar / ≤ 125 bar	
PU4SE319V		0...100 bar / ≤ 200 bar	
PU4SE324V		0...600 bar / ≤ 800 bar	



海茵兰茨 (天津) 工业技术有限公司
地址: 天津市西青区海泰发展五道16号
海泰创新基地 B2-3-602

邮编: 300384
电话: +86 22 2834 3526
传真: +86 22 2834 3576
邮箱: asia@heinlanz.com
网站: www.heinlanz.cn

Hein Lanz GmbH

Elsaesserstrasse 15L,
D-79110 Freiburg im Breisgau,
Germany
Phone +49 (0) 761 3841 3864
Fax +49 (0) 761 3841 3865
info@heinlanz.com
www.heinlanz.de