



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical Datasheet

P-40/P-41

Standard transmitter



- Measuring range from 0 ... 0.25 bar to 0 ... 400 bar, absolute and gauge pressure
- Measurement accuracy $\leq 0.3\%$, (terminal based)
- Output signal e.g. (4 ... 20 mA or 0 ... 10 V) (other signals upon request)
- Stainless steel process-wetted parts
- Flush and manometer connection
- Available in Atex version
- High overload resistance
- Special measuring range upon request
- Stainless steel housing

Endress+Hauser

People for Process Automation

Application

Transmitters from the P-4X series are specially intended for general application in the area of industrial pressure measurement.

The measuring ranges for the P-40 begin at 0... 0.25 bar, and with the P-41 at 0... 1 bar, depending on the flush membrane.

The measuring ranges for both versions are divided according to DIN steps, and end at 0...400 bar. The overload resistance corresponds to four times the measuring range, to a maximum of 600 bar.

The P-4X series transmitters utilize a silicon measuring element, applied with an insulated, thin film, polysilicon resistance strain gauge. This measuring principle features a wide temperature range, low thermal effect and good long term stability.

The low mass and small dimensions of the device guarantee insensitivity to pulsating fluid and vibration. The excellent properties of silicon membranes bring about good reproducibility, minimal hysteresis, as well as high overload resistance of up to four times nominal pressure (max. 600 bar).

Due to the low mass of the silicon membrane, rapid pressure changes can also be detected.

The P-40 transmitter has a connection casing with internal stainless steel separation membrane. The P-41 transmitter has a flush stainless steel membrane, making installation with practically no dead space possible. The silicon membrane lies protected behind the separation membrane. Silicone oil is used as pressure transmission fluid. For temperature effect reduction, the silicon measuring element is connected to a compensation circuit.

For applications with high pressure peaks, the optional installation of mechanical damping is available. Pressure peaks result e.g. from pumps, fast-closing valves, magnetic valves or actuators, especially with incompressible fluids.

The series P-4X transmitters are also available with Ex ib IIC T6 hazardous area protection. Used with an intrinsically safe D.C. power supply, the Ex version can be used in hazardous areas. The P-41 is optionally available for Zone 0.

All transmitters have high interference immunity, also documented by the CE label.

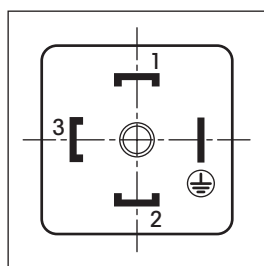
Function

The pressure present at the silicon membrane causes a deviation of the membrane and thereby a resistance change of the resistance strain gauge bridge. This resistance change results in a pressure-proportional change of the bridge output voltage.

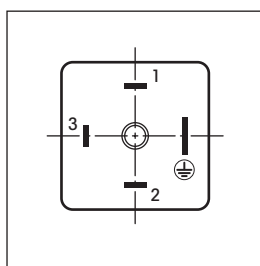
Through the following temperature compensation, temperature influence on the zero point and span is reduced to a minimum.

The preamplifier electronics are powered with a D.C. voltage of 12... 30 V (4-20 mA) or 15... 30 V (0... 10 V) at the terminals.

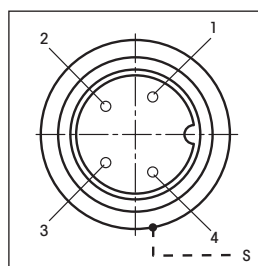
Fig.1: Electrical connection



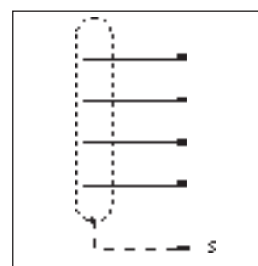
DIN 43 650/A
connector



DIN 43 650/C
connector



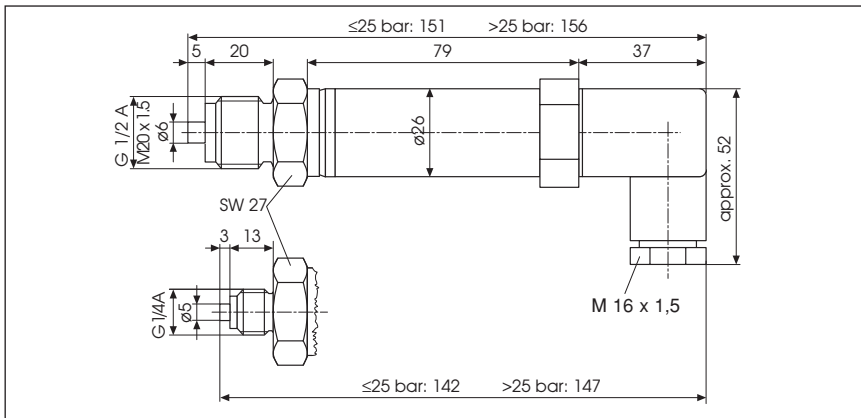
Round
connector



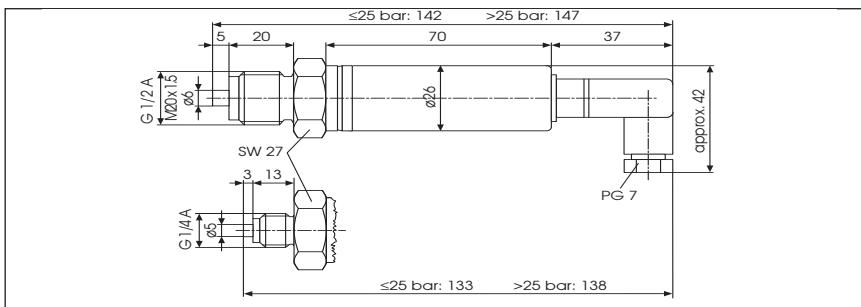
Cable end

| | | DIN 43 650/A connector | DIN 43 650/C connector | Round connector | Cable end |
|-------------------|---|---------------------------|---------------------------|-------------------------------|-------------------------------|
| Two-wire | 1 | Output (+) | Output (+) | (red) output (+) | (red) output (+) |
| | 2 | Output (-) | Output (-) | (black) not connected | (black) not connected |
| | 3 | Not connected | Not connected | (white) output (-) | (white) output (-) |
| | 4 | - | - | (blue) not connected | (blue) not connected |
| | ⊕ | Ground | Ground | (green) ground | (green) ground |
| Three-wire | 1 | Output (+) | Output (+) | (red) output (+) | (red) output (+) |
| | 2 | Supply and Output (-) | Supply and Output (-) | (black) supply (+) | (black) supply (+) |
| | 3 | Supply (+) | Supply (+) | (white) supply and output (-) | (white) supply and output (-) |
| | 4 | - | - | (blue) not connected | (blue) not connected |
| | ⊕ | Ground | Ground | (green) ground | (green) ground |

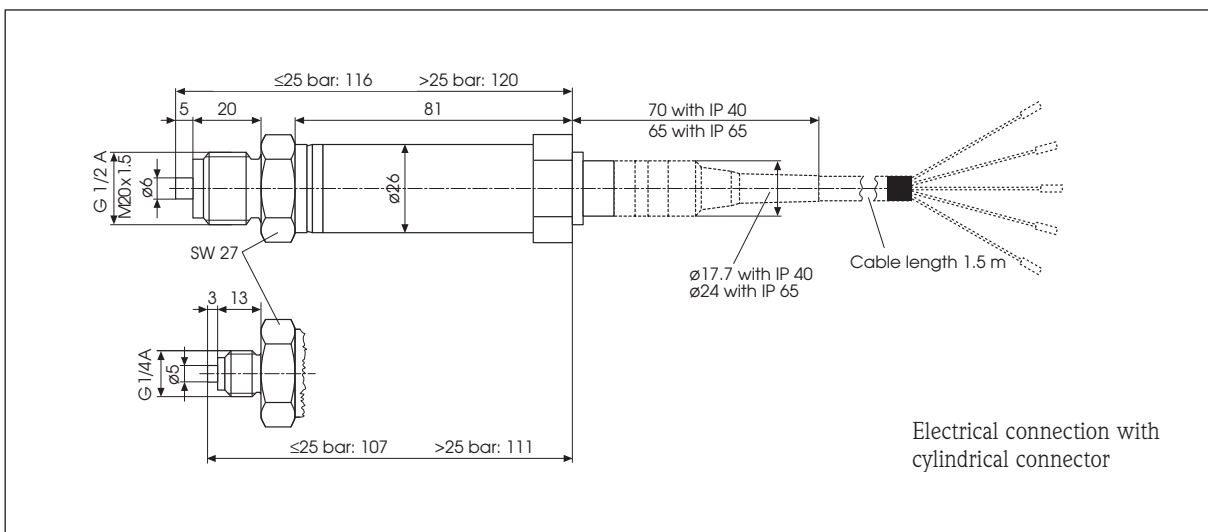
Abb. 2: Dimensions P-40 [mm]



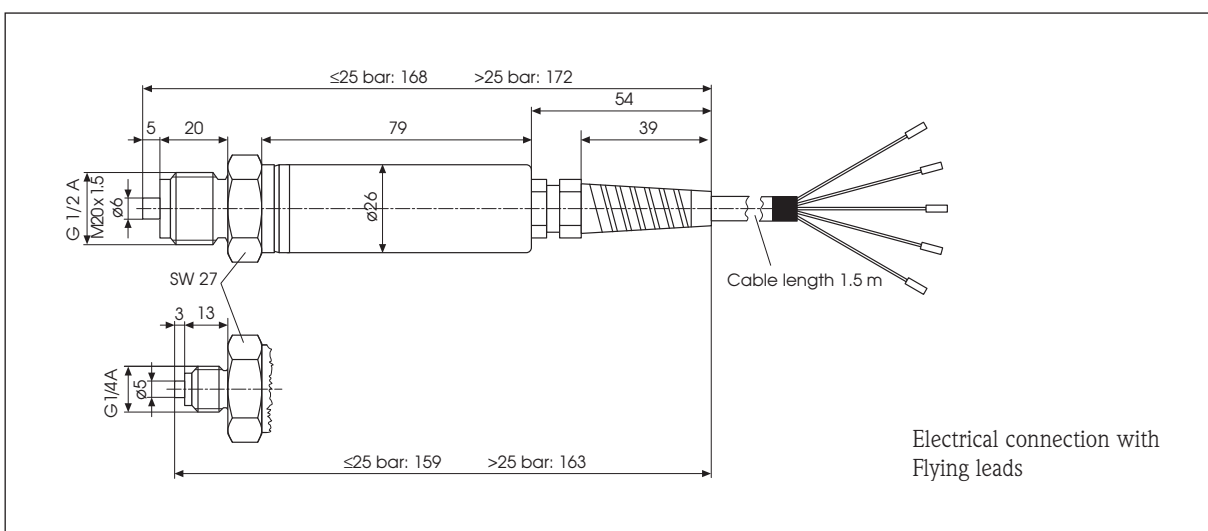
Electrical connection with
DIN 43 650/A



Electrical connection with
DIN 43 650/C

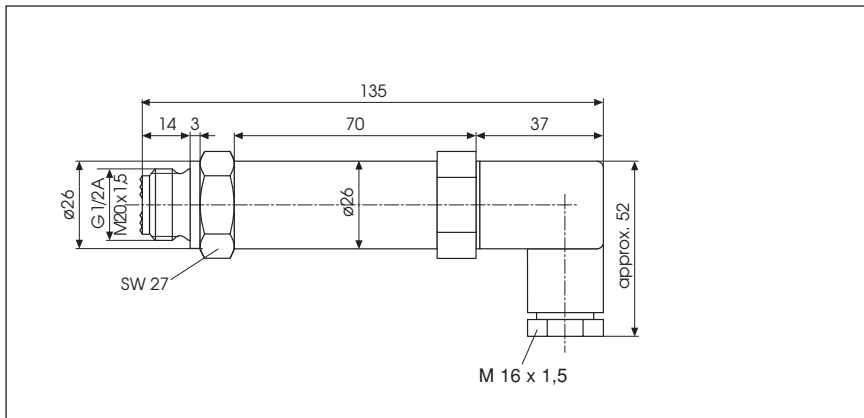


Electrical connection with
cylindrical connector

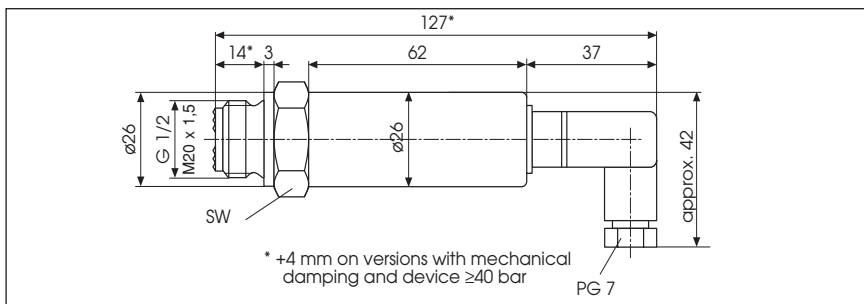


Electrical connection with
Flying leads

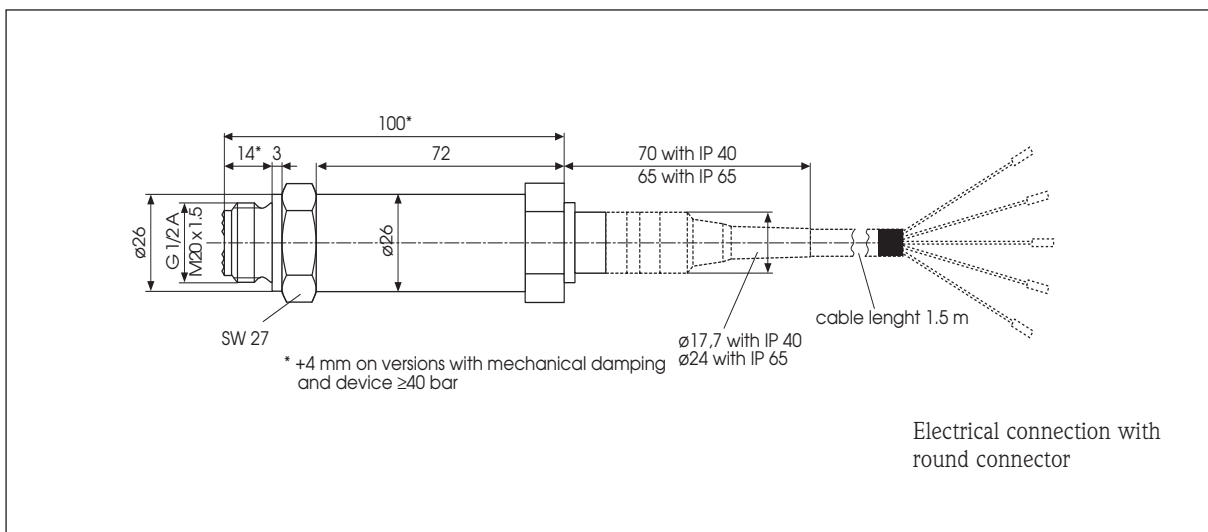
Abb. 3: Dimensions P-41 [mm]



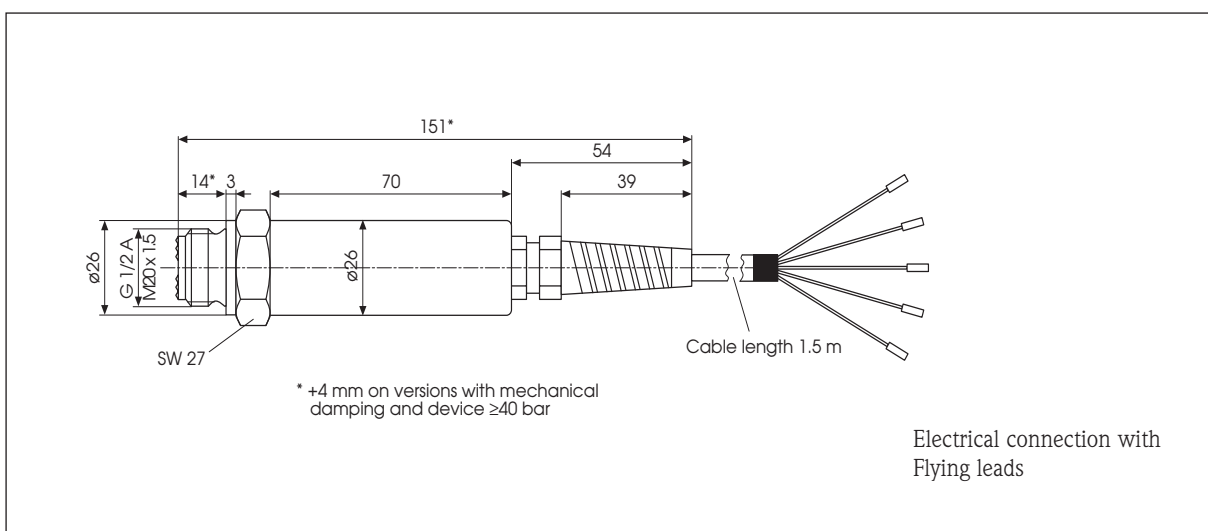
Electrical connection with
DIN 43 650/A



Electrical connection with
DIN 43 650/C



Electrical connection with
round connector



Electrical connection with
Flying leads

Ordering data Transmitter P-40

| Without damping | | Gauge Pressure | Absolute pressure | | | | | |
|------------------------------|------------|--|-------------------|---|--|---|---|---|
| Ranges | | | | | | | | |
| 0 | 0,25 bar | A20 | B20 | | | | | |
| 0 | 0,40 bar | A22 | B22 | | | | | |
| 0 | 0,60 bar | A24 | B24 | | | | | |
| 0 | 1,00 bar | A26 | B26 | | | | | |
| 0 | 1,60 bar | A29 | B29 | | | | | |
| 0 | 2,50 bar | A33 | B33 | | | | | |
| 0 | 4,00 bar | A36 | B36 | | | | | |
| 0 | 6,00 bar | A38 | B38 | | | | | |
| 0 | 10,00 bar | A40 | B40 | | | | | |
| 0 | 16,00 bar | A42 | B42 | | | | | |
| 0 | 25,00 bar | A46 | B46 | | | | | |
| 0 | 40,00 bar | A48 | B48 | | | | | |
| 0 | 60,00 bar | A50 | B50 | | | | | |
| 0 | 100,00 bar | A54 | B54 | | | | | |
| 0 | 160,00 bar | A56 | B56 | | | | | |
| 0 | 250,00 bar | A58 | B58 | | | | | |
| 0 | 320,00 bar | A60 | B60 | | | | | |
| 0 | 400,00 bar | A62 | B62 | | | | | |
| Special ranges ¹⁾ | | A99 | B99 | | | | | |
| | | 1) Other upper range or lower range possible: zero point: ±50% of span span: ±20% of span Measurement limit with vacuum: abs. 10 mbar | | | | | | |
| With damping | | Gauge Pressure | Absolute pressure | | | | | |
| Ranges | | | | | | | | |
| 0 | 6,00 bar | E38 | F38 | | | | | |
| 0 | 10,00 bar | E40 | F40 | | | | | |
| 0 | 16,00 bar | E42 | F42 | | | | | |
| 0 | 25,00 bar | E46 | F46 | | | | | |
| 0 | 40,00 bar | E48 | F48 | | | | | |
| 0 | 60,00 bar | E50 | F50 | | | | | |
| 0 | 100,00 bar | E54 | F54 | | Output signal 4...20 mA, two-wire 4...20 mA, two-wire, Ex-protection 1...6V, three-wire 0...10V, three-wire 0...5V, three-wire | | | |
| 0 | 160,00 bar | E56 | F56 | 0 | | | | |
| 0 | 250,00 bar | E58 | F58 | 1 | | | | |
| 0 | 320,00 bar | E60 | F60 | 2 | | | | |
| 0 | 400,00 bar | E62 | F62 | 3 | | | | |
| Special ranges ¹⁾ | | E99 | F99 | 4 | | | | |
| Process connection | | Gauge Pressure | Absolute pressure | | | Electrical connection 0 DIN 43 650/A connector 2 Round connector (Binder, socket not included) 4 DIN 43 650/C connector 5 Cable outlet incl. 1,5 m cable 9 Cable outlet incl. X m cable | | |
| | | | | | | | | |
| G 1/2 A | 500 | | | | | | | |
| M 20 x 1,5 | 501 | | | | | | | |
| G 1/4 A | 504 | | | | | | | |
| P40 | | | | | | 0 | 0 | 0 |

Accessories

Connector socket, IP 40

with 1.5 m screened cable 4 x 0.14 mm²

Order Nr.

56002393

Connector socket, IP 65

with 1.5 m screened cable 4 x 0.14 mm²

56002394

Ordering data Transmitter P-40

| Without damping | | Gauge pressure | Absolute pressure | | | | |
|--|------------------------------|----------------|-------------------|---|-------------------------------------|---|---|
| Ranges | | | | | | | |
| | 0 1,00 bar | A26 | B26 | | | | |
| | 0 1,60 bar | A29 | B29 | | | | |
| | 0 2,50 bar | A33 | B33 | | | | |
| | 0 4,00 bar | A36 | B36 | | | | |
| | 0 6,00 bar | A38 | B38 | | | | |
| | 0 10,00 bar | A40 | B40 | | | | |
| | 0 16,00 bar | A42 | B42 | | | | |
| | 0 25,00 bar | A46 | B46 | | | | |
| | 0 40,00 bar | A48 | B48 | | | | |
| | 0 60,00 bar | A50 | B50 | | | | |
| | 0 100,00 bar | A54 | B54 | | | | |
| | 0 160,00 bar | A56 | B56 | | | | |
| | 0 250,00 bar | A58 | B58 | | | | |
| | 0 320,00 bar | A60 | B60 | | | | |
| | 0 400,00 bar | A62 | B62 | | | | |
| | Special ranges ¹⁾ | A99 | B99 | | | | |
| <div>1) Other upper range or lower range possible: zero point: ±50% of span span: ±20% of span Measurement limit with vacuum: abs. 10 mbar 2) Metal seal 3) FPM seal 4) Caution! Ex Zone 0 version only approved with mechanical damping</div> | | | | | | | |
| With damping | | Gauge pressure | Absolute pressure | | | | |
| Ranges | | | | | | | |
| | 0 1,00 bar | E26 | F26 | | | | |
| | 0 1,60 bar | E29 | F29 | | | | |
| | 0 2,50 bar | E33 | F33 | | | | |
| | 0 4,00 bar | E36 | F36 | | | | |
| | 0 6,00 bar | E38 | F38 | | | | |
| | 0 10,00 bar | E40 | F40 | | | | |
| | 0 16,00 bar | E42 | F42 | | | | |
| | 0 25,00 bar | E46 | F46 | | | | |
| | 0 40,00 bar | E48 | F48 | | | | |
| | 0 60,00 bar | E50 | F50 | y | Output signal | | |
| | 0 100,00 bar | E54 | F54 | | 4... 20 mA, Ex protection Zone 0 | | |
| | 0 160,00 bar | E56 | F56 | 0 | mechanical damping ⁴⁾ | | |
| | 0 250,00 bar | E58 | F58 | 1 | 4... 20 mA, two-wire | | |
| | 0 320,00 bar | E60 | F60 | 2 | 4... 20 mA, two-wire, Ex protection | | |
| | 0 400,00 bar | E62 | F62 | 3 | 1... 6 V, three-wire | | |
| | Special ranges ¹⁾ | E99 | F 99 | 4 | 0... 10 V, three-wire | | |
| | | | | | 0... 5 V, three-wire | | |
| Process connection | | Gauge pressure | Absolute pressure | | Electrical connection | | |
| | | | | | | | |
| G 1/2 A ²⁾ | 520 | | | | 0 | DIN 43 650/A connection | |
| M 20 x 1,5 ²⁾ | 521 | | | | 2 | Round connector (Binder, socket not included) | |
| G 1/2 A ³⁾ | 522 | | | | 4 | DIN 43 650/C connection | |
| M 20 x 1,5 ³⁾ | 523 | | | | 5 | Cable outlet incl. 1,5 m cable | |
| | | | | | 9 | Cable outlet incl. X m cable | |
| P41 | | | | | | 0 | 0 |
| | | | | | | 0 | |

Accessories

Connector socket, IP 40

with 1.5 m screened cable 4 x 0.14 mm²

Order Nr.

56002393

Connector socket, IP 65

with 1.5 m screened cable 4 x 0.14 mm²

56002394

Technical data

Input

Measuring ranges

Gauge pressure measurement

P-40: 0... 0.25 bar to 0... 400 bar

P-41: 0... 1 bar to 0... 400 bar

Absolute pressure ranges

P-40: 0... 0.25 bar to 0... 400 bar

P-41: 0... 1 bar to 0... 400 bar

Zero point adjustment

only with round connector and DIN

A connector adjustable within $\pm 5\%$ of span

Overload influence

$\leq 0.1\%$ of span

Process fluids: Gases/liquids

Overload limit

4 x range, max. pressure 600 bar (static overload)

Process connection

P-40: G 1/2 A; M 20 X 1.5; G 1/4 A

according to DIN 16 288, form B;

Sealing ring B, DIN 16 258

P-41: G 1/2 A, flush

M 20 X 1.5, flush

Metal seal DIN 3852, form A

A21 X Ø 26 mm, DIN 7603, not included

FPM (Viton) elastomer sealing

according to DIN 3852 Bl.2 included in delivery program

Materials wetted by process

Membrane: 1.4435

(X2 CrNiMo 1810)

Casing: 1.4301 (X5 CrNi 189)

Pressure transmission fluid:

Silicone oil

Output

Output signal

4... 20 mA, two-wire

0... 10 V, three-wire ($0 \approx 20$ mV)

0... 5 V, three-wire ($0 \approx 20$ mV)

1... 6 V, three-wire

Signal type: linear

Deviation

(terminal based)

$\leq 0.3\%$ of span

Load (4 ... 20 mA)

$R_B = (U_S - 12 \text{ V}) / 0.02 \text{ A}$

(with U_S = supply voltage)

Load (0 ... 10 V)

$R_B \geq 5 \text{ k}\Omega$

Load (0 ... 5 V)

$R_B \geq 2 \text{ k}\Omega$

Load (1 ... 6 V)

$R_B \geq 2 \text{ k}\Omega$

Hysteresis: $\leq 0.1\%$ of span

settling time:

approx. 300 ms (current output)

approx. 12 ms (voltage output)

Power supply

for two-wire 4...20 mA

$U_b = 12... 30 \text{ VDC}$

Power supply dependency:
 $\leq 0.2\%$

for three-wire 0...10 V

$U_b = 15... 30 \text{ VDC}$

Power supply dependency:
 $\leq 0.2\%$

for three-wire 0...5 V

$U_b = 12... 30 \text{ VDC}$

Power supply dependency:
 $\leq 0.2\%$

for three-wire 1...6 V

$U_b = 12... 30 \text{ VDC}$

Power supply dependency:
 $\leq 0.2\%$

Explosion protection

Protection type

II 1/2 G resp. II 2 G Ex ib IIC T6 intrinsically safe according to

EN 60079-0:2012, EN 60079-11:2012

and EN 60079-26:2007

EC-TYPE Examination Certificate

PTB 02 ATEX 2062 X

Conditions

No load voltage: $\leq 26 \text{ V}$

Short circuit current: $\leq 100 \text{ mA}$

Power consumption: $\leq 0.8 \text{ W}$

Installation location

Ex device within Zone 1 hazardous area

P-41: Option for Zone 0

Environment conditions

Permitted ambient temperature

$-25 \text{ }^\circ\text{C}... +70 \text{ }^\circ\text{C}$

$-25 \text{ }^\circ\text{C}... +65 \text{ }^\circ\text{C}$ (Ex version)

Permitted process temperature

$-25 \text{ }^\circ\text{C}... +70 \text{ }^\circ\text{C}$

Temperature influence on zero point

typ. $\leq 0.2\%$ /10 K

Temperature influence on span

typ. $\leq 0.2\%$ /10 K

Storage temperature

$-40 \text{ }^\circ\text{C}... +85 \text{ }^\circ\text{C}$

Climatic influence

Climate class 4 Z (with $Z=70 \text{ }^\circ\text{C}$)

according to VDI/VDE 3540

(corresponds to HSC according to DIN 40 040)

Shock and vibration

Shock test Eb: acc. to DIN IEC 68-2-29

Vibration test Fc: acc. to DIN IEC 68-2-6

Electromagnetic compatibility

Electromagnetic compatibility according to all relevant requirements of the EN 61326-series ¹⁾.

For details see declaration of conformity.

The device fulfils the emission limits of class B and the immunity requirements of Table 2 (industrial environment).

The deviation during EMC immunity measurements is $< 2,5 \%$ using unshielded lines / $< 1,5 \%$ using shielded lines.

¹⁾ EN 61326-series:

EMC product family standard for electrical equipment for measurement, control and laboratory use.

General

Materials

Housing: 1.4301 stainless steel

Connector: polyamide

Housing protection type

Connector version

IP 65 according to DIN 40 050

Cable version

IP 68 (1m water depth) according to DIN 40 050

Electrical connection

Instrument connector according to DIN 43 650/A

Instrument connector according to

DIN 43 650/C

Round connector

Cable output

Installation orientation

any

Mounting

Via process connection, depending on version

Mounting torque error

P-40: $\leq 0.2\%$

P-41: typ. 0.3%

Weight

approx. 250 g

Operating instruction

P-40

P-41

OEM Products

Endress+Hauser GmbH+Co.KG
OEM-Products
Hauptstraße 1
79689 Maulburg, Germany

Tel.: +49 76 22 28 21 47
Fax: +49 76 22 28 20 49

E-Mail: sensoren-komponenten@pcm.endress.com
http://www.online.endress.com/oem_pcm/en#

Endress+Hauser 
People for Process Automation