



Transmitter P40/P41

Pressure transmitter



Absolute- and gauge pressure

Ranges from 250 mbar up to 400 bar

Conformity 0,3% (typical)

Two- and three-wire technology

Local zero- and span adjustment

Flush mounted diaphragm- as manometer coupling

High overload capacity

ATEX approval II G 1 / 2; EEx ib IIC T6

PROFILE

These transmitters are intended for qualified applications in the area of industrial pressure. The lowest measuring range for the P40 is 0...250 mbar, respectively for P41 it is 0...1 bar. Both types (P40/41) are available for gauge as also for absolute pressure measurements. The highest measuring range for both versions is 0...400 bar. Permissible overload is four times the nominal span (max 600 bar).

DESCRIPTION

The linear characteristic with a conformity of typical 0,3 % provides precise measuring results. The sensors low mass enables fast response. Effects of very fast respectively very high pressure peaks caused by e.g. rapid acting shut off valves etc. can be suppressed by selecting a built-in mechanical damping device.

The sensing element consists of a silicon pressure sensor with an isolated thin-film strain gauge. This measuring principle features a wide temperature range, low thermal effects and excellent long term stability. Furthermore, the small dimensions ensure good response to pulsating pressures and vibrating medias and is immune to local vibrations.

The P40 transmitter has a process coupling with an internal sealing diaphragm made of SS. The version P41 features a flush-mounted sealing diaphragm. Silicone oil is used for the pressure transfer to the sensing element. For Oxygen use

and for the automotive industry also inert oil can be selected as filling medium.

Transmitter P41 with mechanical damping do have a mechanical baffle fitted to all ranges ≥ 40 bar as an additional protection.

The amplifier electronics are available in two versions: Two wire technique with 4...20 mA and three-wire technique with 0...10V, 0...5 V or 1...6 V output.

If required the transmitters can be supplied also with conformity certificate for use in explosion hazarded areas. These transmitters are suitable if supplied with a certified power supply for use in group II category 1 respectively 2 to ATEX 100a to EC 94/9.

TECHNICAL DATA

INPUT

Measuring spans

Type	Gauge		Absolute	
	minimum	maximum	minimum	maximum
P40	0...250 mbar	0...400 bar	0...250 mbar	0...400 bar
P41	0...1 bar		0...1 bar	

Overload limit

4 x nominal span, max. 600 bar (static overload)

Overload effect

$\leq 0,1$ % of span

Wetted parts

Diaphragm: SS 316L
(X2CrNiMo 1810) (1.4435)
Coupling: SS 304 (X5 CrNi 189) (1.4301)

With P41/ Elastomer-gasket: FKM

Process media

Gases, vapours and liquids

Process coupling

Type	P40	P41
G ¼ A		-
G ½ A	EN 837 (DIN 16288)	EN 837
M12x1,5		(DIN 3852) FormD

Gaskets/ seals required

- Delivery does not include metallic gaskets.
P40, gasket type B to DIN 16258,
P41, Metal: gasket A21 x 26 mm \varnothing
Select material to application
- Delivery comprises
P41, Elastomere seal: FKM

Filling liquid

Transmitter P40 and P41 commonly are filled with Silicon oil.

OUTPUT

STANDARD SIGNAL

Two-wire technology: 4...20 mA
Three-wire technology: 0...10 V
0... 5 V
1... 6 V

Characteristic: linear

Conformity error

Typical 0,3% of span
 Maximum $\leq 0,5\%$ of span
 (Fixed point adjustment)

Load

Signal	Load
4...20 mA	$R_L [\Omega] = U_S - 12[V] / 0,02 [A]$
0...10 V	$R_L [\Omega] \geq 5 \text{ k}\Omega$
0...5; 1...6 V	$R_L [\Omega] \geq 2 \text{ k}\Omega$

Hysteresis: $\leq 0,1\%$ of span

Settling time*)

approx. 5 ms current signal
 approx. 12 ms voltage signal

Zero- and span adjustment

By means of potentiometer $\pm 5\%$ (only connector type A and circular connector)

POWER SUPPLY

Type	Supply voltage U_S	Effect U_S
Two wire 4...20 mA	12...30 VDC for Ex 12...26 VDC**)	$\leq 0,1\%$
Three wire 0...10 V	15...30 VDC	$\leq 0,1\%$
Three wire 0...5 V 1...6 V	12...30 VDC	$\leq 0,1\%$

Permissible ripple

No effect at $\leq 0,5\%$ with 24 VDC

EXPLOSION PROTECTION

Protection according RL 94/9 CE
 Ex II 1 / 2 G resp. II 2 G; EEx ib IIC T6

CE type test certificate
 PTB {03 ATEX 2203}
 to EN 50 014; EN 50 028; EN 50 284

Mounting

Within hazardous zone 1 respectively
 attached to zone 0 (P41)

AMBIENT CONDITIONS

Permissible ambient temperature

-25...+70 °C, +65 °C for Ex version

Permissible process temperature

-25...+70 °C

Storage temperature

-40 °C...+85 °C

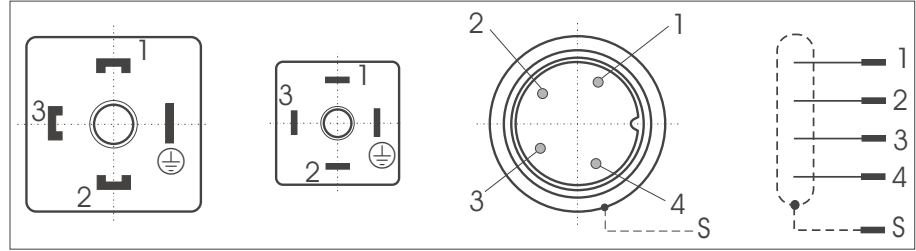
Temperature effect

	Span start	Span
typical	0,2 % / 10 K	0,2 % / 10 K
maximum	0,4 % / 10 K	0,4 % / 10 K
Span $\leq 0,6$ bar	plus 0,1 %/10K	plus 0,1 %/10K

*) other settling times on request, minimum
 approx. 1,5 ms without mechanical, respectively
 5 ms with mechanical damping device.

**) certified power supply required

Fig.1 electrical connections



		Connector to DIN 43650	Cylindrical connector / fixed cable
1	Two-wire	Output +	red Output +
		Output -	black (not connected)
		not connected	white Output -
		-----	blue (not connected)
\oplus		Measuring ground	\triangle S green
1	Three-wire	Output +	red Output +
		Supply & Output -	black Supply +
		Supply +	white Supply & Output -
		-----	blue (not connected)
\oplus		Measuring ground	\triangle S green

Fig. 2 dimensions P40

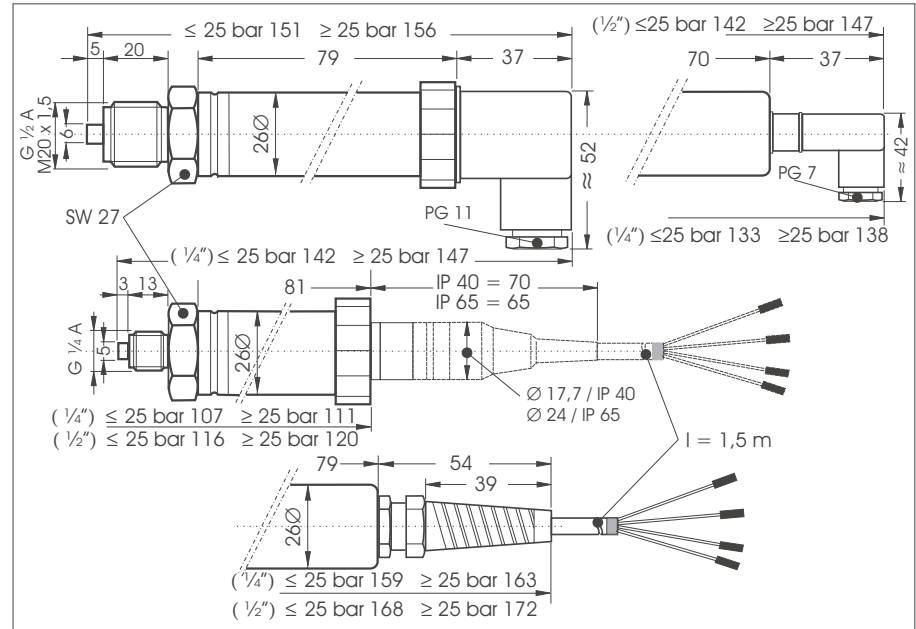
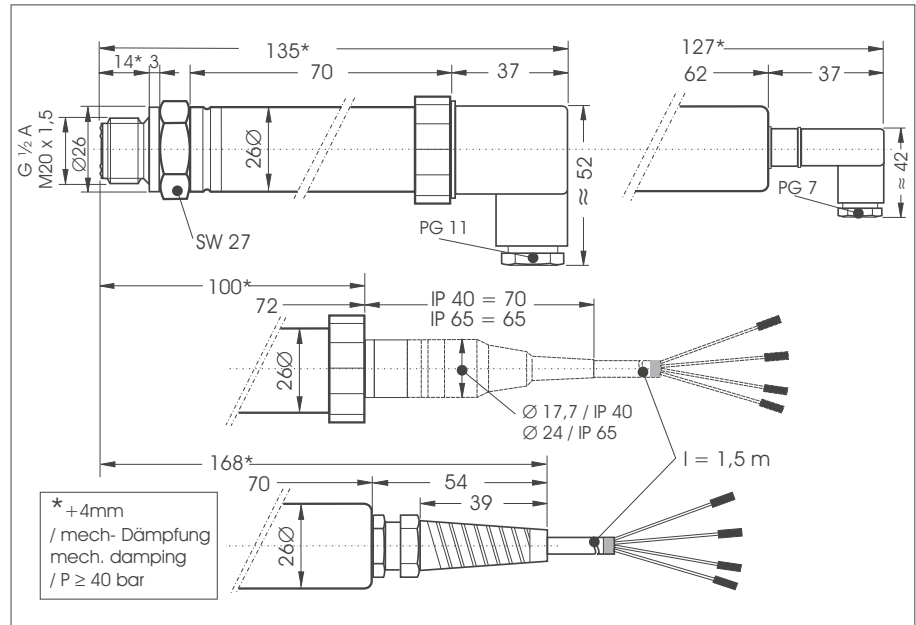


Fig. 3 dimensions P41



Climatic category

4Z (with Z=+70 °C)

ELEKTROMAGNETIC COMPATIBILITY

To EN 50 082
Effect < 1 %
CE labelled

GENERAL

Housing

Stainless steel, SS 304 (1.403)
Plug Polyamide

Housing protection

Version with connector: IP 65 / Nema 4
With fixed cable: IP68 / Nema 6P (1m WC)

Electrical connection

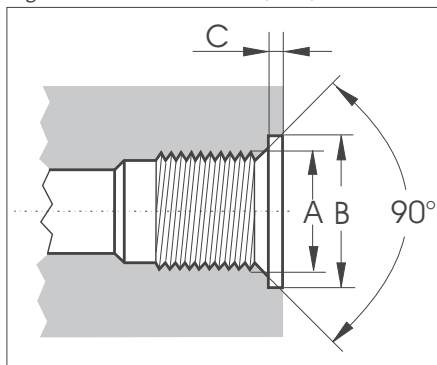
- Angled connector to DIN 43650/A
- Angled connector to DIN 43650/C
- Cyl.conn. type Binder, Series 680
- Fixed cable, 4 x 0,22 mm², screened, with reference capillary

Mounting position: not critical***)

Mounting

- Via process coupling according to version. It must be assured that during mounting in liquid filled pipes/containers the displaced volume freely can escape. For process temperatures above + 70 °C the use of a siphone is recommended.

Fig. 4 bore to DIN 3852 (P41)



Thread	A [mm]	B [mm]	C [mm]
M 20 x 1,5	18,5	26	2
G ½ A	¾ - in	27	2,5

Mounting torque effect

By means of recommended gaskets: ≤ 0,2 %
Nominal torque: 40 Nm

Weight: approximately 0,25 kg

Accessory

Operations 9499-040-50001

Safety instructions for
Ⓔ approved devices 9499-047-10901

***) Effect with span 250 mbar and 90° ≤ 0,3 %

ORDERING STRUCTURE

Ranges	Gauge-pressure	Absolute-pressure
0... 0,25 bar	02	27
0... 0,4 bar	03	28
0... 0,6 bar	04	29
0... 1,0 bar	05	30
0... 1,6 bar	06	31
0... 2,5 bar	07	32
0... 4 bar	08	33
0... 6 bar	09	34
0... 10 bar	10	35
0... 16 bar	11	36
0... 25 bar	12	37
0... 40 bar	13	38
0... 60 bar	14	39
0...100 bar	15	40
0...160 bar	16	41
0...250 bar	17	42
0...320 bar	18	43
0...400 bar	19	44
Special range ¹⁾	23	48

Output signal	
4...20 mA, Two-wire	0
4...20 mA, Ⓔ II 2 G, zone 1	1
1... 6 V Three-wire	2
0...10 V Three-wire	3
0... 5 V Three-wire	4
4... 20 mA, Ⓔ II 1 / 2 G, zone 0 ³⁾	9

Process-coupling P40

(DIN 16 288 Form B)
G ½ A EN 837
M 20 x 1,5 EN 837
G ¼ A EN 837

0
1
2

Process coupling P41, flush diaphragm

G ½ A EN 837; metal seal
M 20 x 1,5 EN 837; metal seal
G ½ A EN 837; FKM seal
M 20 x 1,5 EN 837; FKM seal

5
6
7
8

Electrical connection

Angled connector to DIN 43650/A
Angled connector to DIN 43650/C²⁾
Cylindrical connector (Binder, see accessories)
Fixed cable, 1,5 m length²⁾
Fixed cable, length to specification^{2), 5)}

0
4
2
5
9

Ranges

	Gauge-pressure	Absolute-pressure
0... 1,0 bar	55	80
0... 1,6 bar	56	81
0... 2,5 bar	57	82
0... 4 bar	58	83
0... 6 bar	59	84
0... 10 bar	60	85
0... 16 bar	61	86
0... 25 bar	62	87
0... 40 bar	63	88
0... 60 bar	64	89
0...100 bar	65	90
0...160 bar	66	91
0...250 bar	67	92
0...320 bar	68	93
0...400 bar	69	94
Special range ¹⁾	73	98

Coupling with
built-in
mechanical
damping device⁷⁾
flame trap³⁾

Explanation for footnotes see next page

CYL. CONNECTOR ACCESSORIES

Description	Order-no.
Socket IP 40	
With 1,5 m screened cable, 4 x 0,14 mm ²	4012-151-62841
Socket IP 65	
With 1,5 m screened cable, 4 x 0,14 mm ²	4012-151-62851

¹⁾ Other spans and span starts on request for ranges ≥ 400 mbar

- Span start: - 100 ... + 50 % of corresponding nominal span
- Span: 50 % ... 150 % of corresponding nominal span
- Measuring limit with vacuum: 10 mbar abs

Example 1:

Nominal range 0...0,6 bar gauge, smallest possible span start -0,6 bar (-100%)

Largest span start 0,3 bar (+50 %)

Smallest span: 0,3 bar (50 %)

Largest span: 0,9 bar (150 %).

Thus a measuring range of e.g. -0,6 up to +0,3 barg can be realised.

Example 2:

Nominal range 0...1,6 bar absolute

Smallest span start 0 bar abs (10 mbar)


Largest span start 0,8 bar abs (+50 %)

Smallest span 0,8 bar abs (50 %)

Largest span 2,4 bar abs (150 %)

Thus a measuring range of 0,8 bar abs up to 1,6 bar abs can be realised.

²⁾ No access to potentiometers for span and span start

³⁾  Ex-version zone 0 only possible with range codes 55 up to 98, transmitter type P41 internal mechanical damping / flame trap

⁴⁾ Mechanical damping not effective below 6 bar

⁵⁾ maximum length 15 m

⁶⁾ Measuring ranges 0,25 up to 0,6 bar only with transmitter type P40

⁷⁾ Mechanical Damping:
External, process side, with P40.
Internal (with filling medium) with P41 (flame trap/barrier)

ACCESSORIES

PLUG-ON DISPLAY FOR PRESSURE TRANSMITTERS

- Loop powered.
- Free scalable via push buttons
- Polarity independent connection

TECHNICAL DATA



Input signal: 4...20 mA

Voltage drop: approx. 3 V

Accuracy: $\pm 0,2$ %

Measuring cycle: approx. 3 / sec

Display: LCD, 10 mm

Display span: -1999 bis + 9999

Scaling: free scalable via three internal push buttons

Decimal point: free settable

Filter in 3 steps addible

Temperature effect: approx. 100 ppm

Electrical connection: adaptor plug for connector type A, DIN 43650

Dimensions: with adapter
L x W x D 50,5 x 90 x 39,5 [mm]

Description	Order no
Plug-on display	9404 799 81651



Deutschland

PMA Prozeß- und Maschinen-Automation GmbH
Miramstrasse 87, D-34123 Kassel

Tel./Fax: (0561) 505 - 1307/-1710
E-mail: mailbox@pma-online.de
Internet: <http://www.pma-online.de>

Your local representative