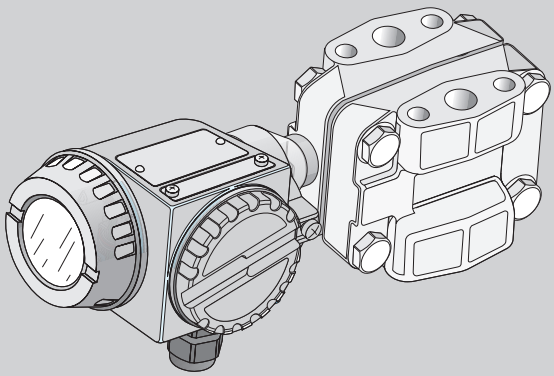


Transmitter PD6
with Silicon Sensor

For differential pressure- und flow measurements

Self-monitoring sensor

Local parameter setting

Usable Turn Down 100:1

Output signal proportional to differential-pressure, flow or level

Nominal pressure up to 420 bar

Ex protection EEx ia IIC

Smart

GENERAL

Transmitter PD6 is suitable for gauge, vacuum or differential pressure as for flow measurements with gases and liquids.
Spans between >1 and 40,000 mbar are available. The nominal pressures for the four measuring cell types are PN140 and PN420.
The output is a standard 4...20 mA signal proportional to the applied differential pressure or flow or level (e.g. in a horizontal cylindrical container).
The microprocessor-controlled electronics work on the two-wire principle. Transmitter energization is by means of a DC voltage.

Intrinsic safe (EEx) versions are available.

DESCRIPTION

Transmitter PD6 comprises the measuring cell, two process flanges with seals. and the electronic housing. Six measuring cell versions provide spans from >1 to 40,000 mbar.

Process flanges wetted by the process media, can be made of:

– Steel

– Stainless steel

Process seals are of Viton or EPDM.

The pressure medium enters the measuring cell via two ¼-18NPT couplings in the process flanges. Centre to centre distance of the couplings is 54 mm, which enables direct mounting of a valve manifold or integral orifice assembly.

No matter what the left/right arrangement of the „plus" and „minus" pressure lines is on site, the position can be matched simply by rotating the transmitter.

Microprocessor-controlled electronics provide high-precision signal processing and monitoring, from the sensor to the signal output. Measuring cell monitoring, which is possible with ceramic sensor technology, offers outstanding safety for industrial processes.

Electronics and terminal compartment are hermetically separated, i.e. with the terminal compartment open, the electronics remain protected from environmental contamination.

All parameter are adjustable by means of four push buttons or with an external hand-held control unit.
Transmitter PD6 can be supplied with a digital indicator. Retrofitting is possible.

Depending on the measuring cell span, a turn-down of 100 : 1 is possible. This means for example, that the 10 mbar cell is adjustable downwards to a span of 1Pa [1)].

OPERATING PRINCIPLE

Measuring cell

The measuring cell consists of a piezoresistive silicone measuring element and a body with two metallic sealing diaphragms. The compartment between the two diaphragms is filled with silicone- or inert oil. Any change in the differential pressure causes a displacement of the sealing diaphragms and is transferred to the sensing element, which in cause changes its bridge balance. This change in balance corresponds to the applied pressure.

Self monitoring

The measuring element on he silicone diaphragm is designed as a piezoresistive strain gauge, which can be monitored accordingly.The microprocessor continuously monitores the corresponding values and provides an alarm signal in case of discrepancy.

- The alarm acts on the analogue output signal and can be set for upscale, downscale or off (keeping the process value).

[1)] increased conformity error

TECHNICAL DATA

INPUT

Measuring cell	4A	4C	4E	4G	4K	4M
Nominal range 0... mbar	10	40	160	1,000	6,000	40,000
Span [mbar]	0.1...10	0.4...40	1.6...160	10...1,000	60...6,000	400...40,000
Span start [mbar]	-10...9	-40...39	-160...158	-1,000...990	-6,000...5,940	-40,000... 39,600
Nominal pressure	PN 140					
Filling medium	Silicone oil*)					

*) Fluorolube for high grade gases

Measuring cell	5G	5K	5M
Nominal range 0... [mbar]	1,000	6,000	40,000
Span [mbar]	10...1,000	60...6,000	400...40,000
Start [mbar]	-1,000...+990	-6,000...+5,940	-40,000... 39,600
Nominal pressure	PN 420		
Filling medium	Silicone oil*		

Static pressure

up to max. PN of corresponding measuring cell

Static pressure effect

With symmetrical load: < 0.2 % at PN for span start and span

Overload limit: PN

Minimum pressure: 10 mbar abs.

PROCESS MEDIA

Liquids and gases (aggressive and corrosive media with suitable material selection).

MATERIALS

Diaphragm

– AISI 316 (no. 1.4401)

Seal

– Viton (FPM)

– NBR (EPDM)

Process flanges

– C.Steel no.1.0460

– AISI 316Ti (no. 1.4571)

Bolts and nuts for process flange

– AISI 316Ti (no. 1.4571)

Blind stopper / Venting valve

– AISI 316 (no. 1.4401) (order separately)

OUTPUT

OUTPUT SIGNAL

Standard signal **4...20 mA**

Output current limiting: 20.5 mA
Lowest value: 3.8 mA (4 mA selectable)
For alarm selectable: 3.6 mA; 21.5 mA; „keep value"

Ripple

≤ ±0.25 % fsd
HART protocol: U_{pp}< 200 mV (47 Hz... 125 kHz)
and U_{rms}< 2.2 mV (500 Hz up to 10 kHz)

CHARACTERISTIC

– Proportional to the applied differential pressure or

– proportional to the flow rate, or

– proportional to the level in a cylindrical tank, or

– proportional to the level free programmable

Conformity error: < 0.1 %
Terminal based for nominal span of cell up to TD 10:1

For TD 100:1 Conformity error

$$= \pm 0{,}1\% \times \frac{0{,}1 \times nominal \circ value}{set \circ span}$$

(Hysterisis and reproducibility included)

Long term drift: 0.1 % / a

MAXIMUM LOAD

$$R_{Load} = \frac{U_{Supply} - 11.5[V]}{0.023[A]} - R_{Lead}[\Omega]$$

Load effect: < 0.01% per 100 Ω

DYNAMIC RESPONSE

Average delay: depending from cell, 0.5 up to 2 s

Rise time: depending from cell and span 0.4 up to 1.6 s

Damping: 0 to 16 s adjustable by switch,
per SW up to 40 s adjustable

CREEP FLOW CUT-OFF

Factory set to 2.25 %, other values adjustable via SW

POWER SUPPLY

SUPPLY VOLTAGE

11.5...45 VDC
11.5...30 VDC for EEx

Supply voltage effect: < 0.1 % between 11.5...45 VDC

Ripple

No effect for $U_{pp} \leq \pm 5$ % with the nominal supply range.

EXPLOSION PROTECTION

Protection type: EEx ia IIC T4/T6

Certificate of conformity

KEMA-No. Ex-97.D.2523X

Installation

Transmitter in zone 1 hazarded area, effective pressure piping zone 0

ENVIRONMENTAL CONDITIONS

TEMPERATURE LIMITS

Nominal temperature: -38 °C...+85 °C

For storage: -40 °C...+100 °C

Temperature effects on span start and span

(incl. media temperature)

< ± 0.02 % / 10 K within -10 °C...+60 °C and
< ± 0.1% / 10 K within -40 to -10 °C and within +60 to 85 °C

Fig. 1 Dimensions

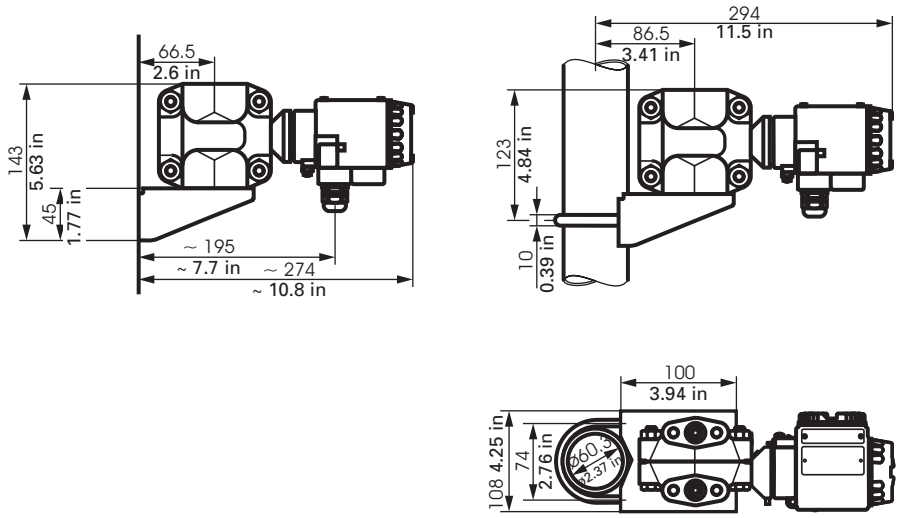
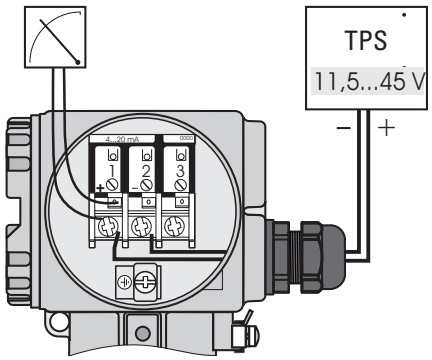


Fig. 2 Electrical connections



Process temperature at measuring cell
-40°C...+85°C, depending on process seal

Prozess seal	lower temperature limit
VITON (FPM)	-20 °C
VITON für Sauerstoff	-10 °C
EPDM (NBR)	-40 °C

(+70 °C with EEx ia IIC T4)

Relative humidity: 100 % r.H.
no condensation

Climatic category to DIN 40 040
class GPC

Vibration effect: < ± 0.1 %
(tested to DIN IEC 68, part 2-6, referred to nominal span of cell typ 6000 mbar)

ELECTROMAGNETIC COMPATIBILITY

Complies with EN 50082-2 and NAMUR with 30 V/m
Tests to IEC 801-1 up to 801-6
Electromagnetic radiation to EN 50081-1
CE-labelled

GENERAL

HOUSING FOR ELECTRONICS

Di-cast aluminium AlSi 12 free of copper, with fully chromated surface, epoxy polyester coated,
O-rings and seals made of NBR

HOUSING PROTECTION TYPE

IP 65 to DIN 40 050

PROCESS COUPLING

¼-18NPT-f thread, (Centre-to-centre distance: to DIN 19213, 54 mm)
Other distances are possible by means of additional oval flanges with ½-14NPT-f thread.

ELECTRICAL CONNECTION

Screw terminals for 2.5 mm^2 via cable gland

WEIGHT

140 bar version approx. 4 kg
420 bar version approx. 6 kg

MOUNTING METHOD

Pipe or wall mounting possible by means of mounting plate or valve manifold.
Versions PN 420 mounting screws M12!

Mounting position

Process flanges vertical
(with mounting bracket 9404-290-01031 on horizontal pipe - horizontal process flanges; therefore horizontal outlet of effective pressure pipes, corresponding adjustment of zero necessary).

ACCESSORIES

Instructions for PD5/6

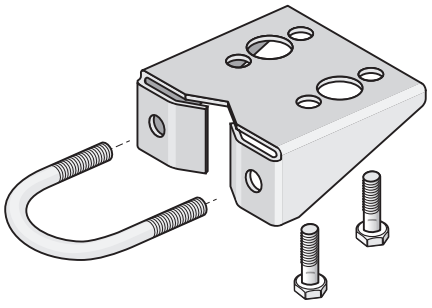
FITTINGS

Universal-mounting kit
For mounting 3-/5 valve manifold
Screws M10, material steel
9404-290-01011

Mounting bracket for wall and pipe mounting
Screws M10 and 7/16-20 UNF
Material stainless steel
9404-290-01031

Mounting bracket for wall- and pipe mounting
Screws M12 (420 bar version)
Material stainless steel
9404-290-01041

Fig. 3 Mounting bracket



Blind stopper
Set of 2 units
Material AISI SS 316 L (no.1.4435)
9407-290-00011

Venting valve,
Set of 2 units
Material AISI SS 316 L (no.1.4435)
9407-290 00021

ORDERING STRUCTURE

9407	231	·	·	·	·	1

Version with HART protocol

no indicator, non EEx	**5**
EEx ia IIC T4/T6	**6**
with LCD display, non EEx	**7**
with LCD display, EEx ia IIC T4/T6	**8**

Process flange: material / gasket

Steel C22.8 / Viton (FPM)	**0**
Stainl. steel 1.4435 / Viton (FPM)	**1**
Stainl. steel 1.4435 / Viton, for Oxygen	**2**
Steel C22.8 / NBR (EPDM)	**3**
Stainl. steel 1.4435 / NBR (EPDM)	**4**

Calibration / Unit

Calibrated from 0...nom. value of cell in mbar/bar, linear	**0**
Calibrated from 0...nom. value of cell in kPa/Mpa, linear	**1**
Calibrated from 0...nom. value of cell in mm H_2O, linear	**2**
Calibrated from 0...nom. value of cell in inch H_2O, linear	**3**
Calibrated from 0...nom. value of cell in kgf/cm^2, linear	**4**
Calibrated from 0...nom. value of cell in psi, linear	**5**
Start, span in clear text, e.g... %, linear/ square root/cylindrical	**9**

Cell, Nominal value

Nominal pressure 140 bar	
10 mbar	**0**
40 mbar	**1**
160 mbar	**2**
1000 mbar	**3**
6000 mbar	**4**
40.000 mbar	**5**
Nominal pressure 420 bar 1*	
1000 mbar	**6**
6000 mbar	**7**
40.000 mbar	**8**

1* fixing screws M12

[1)] Mounting with M12 screws

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