Transmitter PM50
with Ceramic Diaphragm

For Pressure- and Level Measurements

Self Monitoring Sensor

High Temperature Version up to +150 °C

Local Parameter Settings

Usable Turn Down 100 : 1

Output Signal Pressure-, or Level - Proportional

Ex Protection ATEX II G1/2

Smart

PROFILE

The pressure transmitter works on thetwo wire principle and features a ceramic measuring cell.

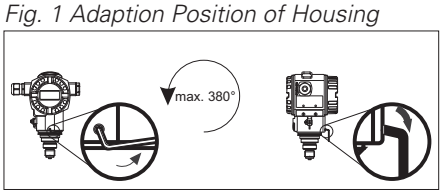
Gauge pressures from 5 mbar[1)] up to 40 bar, and absolute pressures from 20 mbar onwards are converted into a standardised, pressure proportional 4...20 mA signal.

Microprocessor technology ensures reliable and simple operation.

DESCRIPTION

The transmitter comprises the measuring cell and the electronics housing. An ASIC in the sensor module stores all the sensor-specific data.
Pressure applied is sensed capacitively from the deflection of the ceramic diaphragm, which is in direct contact with the process media.
Depending on the application, the process connection has an external (male) or an internal (female =f) tapping.

Fig. 1 Adaption Position of Housing

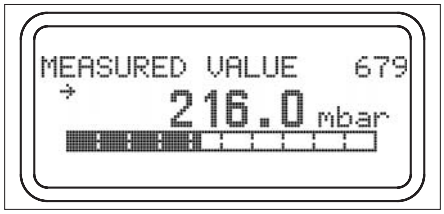


A flush mounted diaphragm also is availble.

No matter what the left/right arrangement of the pressure lines is on site, the position can be matched simply by rotating the housing up to 380°.

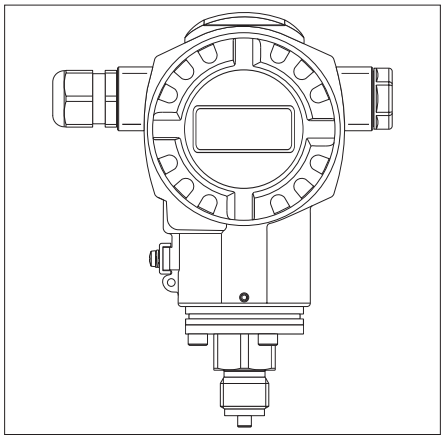
Microprocessor-controlled electronics provide high-precision signal processing and monitoring, from the sensor

Fig. 2 Display



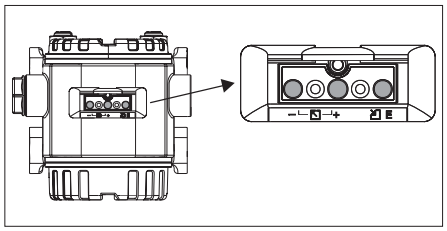
to the signal output. Measuring cell monitoring offers outstanding safety for industrial processes.

Fig. 3 Transmitter with local display



The optional 4-line local display (LCD) reads measuring values, dialog text as error indications and supports the user in every step of set up.

Fig. 4 External Keypad



The operational keys are accessable either from outside or will be found on the electronics.
The external operating keys use the Hall-sensor principle thus leaking holes into the housing are avoided and the electronics remain protected from environmental contamination.

TECHNICAL DATA

INPUT

MEASURING CELLS

Gauge Pressure

Cell	Limits	Smallest Span[1)]	Max. Overload
100 mbar	-0.1/+0,1 bar	10 mbar	4 bar
250 mbar	-0.25/+0,25 bar	17 mbar	5 bar
400 mbar	-0.4/+0,4 bar	27 mbar	8 bar
1 bar	-1 / +1 bar	70 mbar	10 bar
2 bar	-1/ +2 bar	0.15 bar	18 bar
4 bar	-1/ +4 bar	0.3 bar	25 bar
10 bar	-1/+10 bar	0.7 bar	40 bar
40 bar	-1/+40 bar	4 bar	60 bar

[1)] Turn-down 100:1 respectively smaller ranges on request

Viton®: registered trade mark of DuPont Performance Elastomers

Absolute pressure

Cell	Limits	Smallest Span [2]	Max. Overload
100 mbar	0/+0.1 bar	20 mbar	4 bar
250 mbar	0/+0.25 bar	25 mbar	5 bar
400 mbar	0/+0.4 bar	27 mbar	8 bar
1 bar	0/ +1 bar	70 mbar	10 bar
2 bar	0/ +2 bar	0.15 bar	18 bar
4 bar	0/ +4 bar	0,3 bar	25 bar
10 bar	0/+10 bar	0,7 bar	40 bar
40 bar	0/+40 bar	4 bar	60 bar

PROCESS MEDIA

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

MATERIALS

Diaphragm	Al_2O_3
Pressure Port	SS316L (1.4435)
	Alloy C
	Monel
Gasket	FKM (e.g. VITON®)
	EPDM
	Kalrez
	Chemraz
	NBR
	FKM for Oxygen

OUTPUT

SIGNAL

Standard signal 4...20mA
With superimposed HART communication protocol

Resolution: 1µA

Failure signal

Max. Alarm: adjustable from 21 to 23 mA[4]
Min. Alarm: 3.6 mA
Keep Value: last measured value remains continued.

Ripple

≤ ±0.25 % fsd
HART protocol: $U_{pp} \leq 200$ mV (47 Hz ...125 kHz)
and $U_{rms} \leq 2.2$ mV (500 Hz bis 10 kHz)

[1] smallest span with calibration (TD) on reqest
[3] Watch position of link, in position "Test" with Interlock-Diode, minimum supply voltage 11.5 V
[4] Factory setting 22 mA
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Fig. 5 Dimensions Housing [mm]

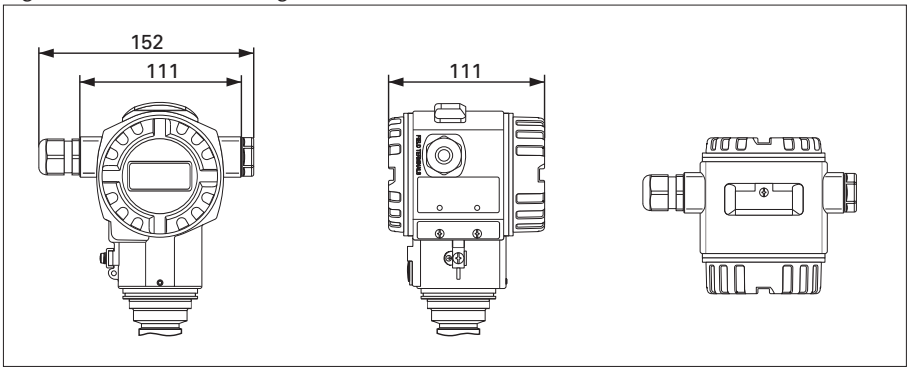
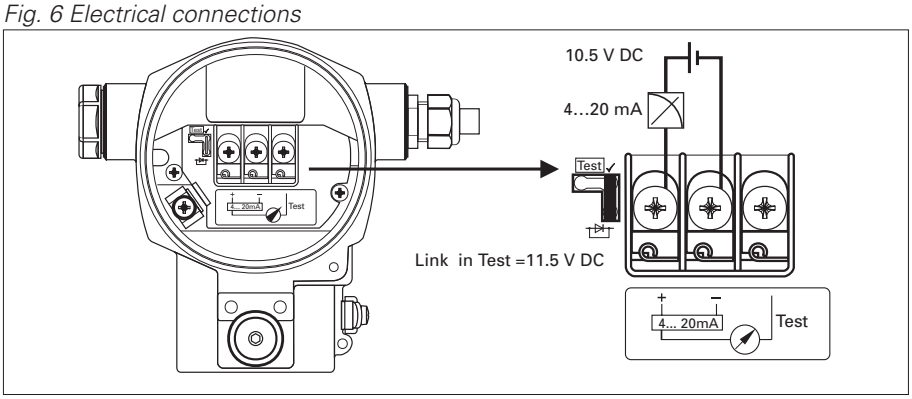


Fig. 6 Electrical connections



CHARACTERISTICS

- Pressure proportional or
- Level proportional

Conformity

Cell	TD 1:1... 10:1	TD > 10:1
100 mbar	± 0.075 %	± 0.075 % x TD
250; 400 mbar	≤ TD 15:1 ±0.075 %	TD > 15:1 ± 0.005 x TD
1; 2; 4; 10 bar	≤ TD 15:1 ±0.075 %	TD > 15:1 ± 0.005 x TD
40 bar	± 0.075 %	± 0.0075 x TD

Referred to set span,
Terminal based methode to IEC 60770 including Conformity, Hysterisis and Nonrepeatability.

Long term stability

Measuring Cell	≥ 1 bar
Per annum	±0.05 %
Referred to nominal span of cell	

MAXIMUM LOAD

$$R_{Load} = \frac{U_{Supply} - 10{,}5[V]}{0{,}023[A]} - R_{Lead}[\Omega]$$

Effect of Load: < 0.1% / 100 Ω

Hint
11.5 V minimum supply voltage if interlock diode is activated for test purpose.
Manual control unit or PC-operation requires 250 Ω communication resistor.

DYNAMIC RESPONSE

Warm-up delay: < 10 s

Idle time, rise time (T_{63})

Idle time	Rise time
90 ms	120 ms

Damping: adjustable by means of local display, Manual Control Unit or SW (PC) 0 ...999 sec.
Factory set to 2 sec

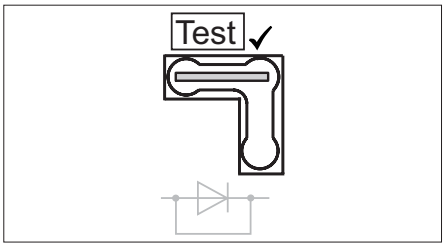
POWER SUPPLY

SUPPLY VOLTAGE

10.5...45 VDC [3]
10.5...30 VDC for EEx[3]

Supply voltage effect: < 0.02 % of 10.5...45 VDC

Fig 7 Link in Testposition



Ripple

No effect for $U_{PP} \leq \pm 5$ %
within the nominal supply range

EXPLOSION PROTECTION

Mode of protection:

ATEX Ⓔx G 1 / 2
EEx ia IIC T3/T6

Certificate of Conformity

KEMA 06ATEX0169

Mounting

Transmitter in Ex-area G1

AMBIENT CONDITIONS

Nominal temperature: -20 ...+85 °C[4)]

For storage: -40 ...+100 °C
(Local display max. +85 °C)

Temperature effects on span start and span

Cells	-10...+60 °C	-40..-10; +60..+85°C
≤ 400 mbar	±(0.088xTD+0.088)%	±(0.14xTD + 0.14)%
≥ 1 bar	±(0.088xTD+0.04)%	±(0.175xTD+ 0.075)%

Referred to set span

Process temperature at measuring cell

-40°C...+125°C / +150 °C[5)],
(see also process gasket respect. Oxygen use)

(+70 °C bei EEx ia IIC T4)

Process Gasket	Temperature Limits
FKM (e.g. VITON®)	-20 ...+125 °C / 150 °C[5)]
EPDM	-20 ...+125 °C
KALREZ	+ 5... +125 °C / 150 °C[5)]
Chemraz	-10... +125 °C / 150 °C[5)]
NBR[6)]	-20... +100°C
FKM for Oxygen	-10 ...+ 60 °C

Relative Humidity: 100% r.H.
Condensation permissible[7)]

Climatic Category

Class 4K4H
to DIN EN 60721-3-4

Vibration effect: *≤ 0.1 %*
(10...60 Hz: 0,15 mm; 60...2000Hz: 2g,
with mounting bracket)

Monting effect

Mounting rotated 180 °: ≤ 0.18 mbar
(Pressure port directed upwards)

4) reduced to +70°C with "High Temperature" version
5) +150 °C for High Temperature version
6) NBR, thermal effect 3 x larger, also total effects
7) Avoid condensation inside the housing
8) Dimension in ( ), High Temperature version

Fig. 8 Dimensions Process Couplings G ½ A, M20 x 1.5 [8)]

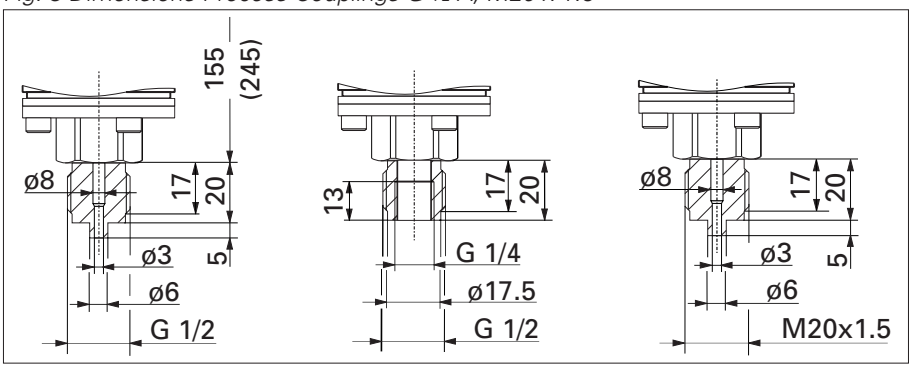


Fig. 9 Dimensions Process Couplings ½ -NPT, 1/4-NPT [8)]

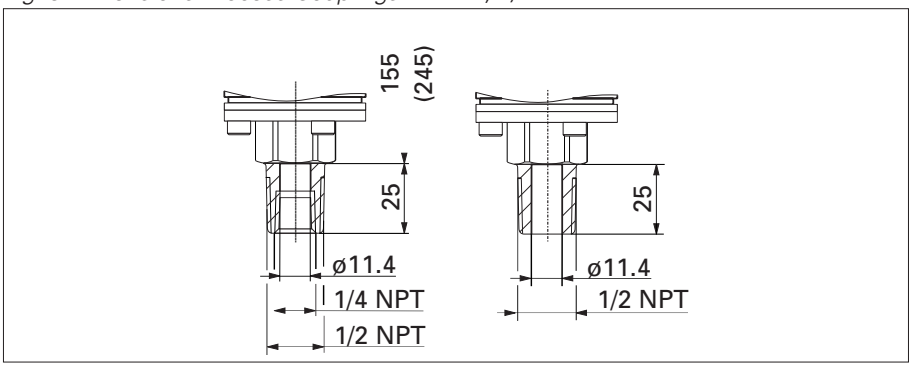
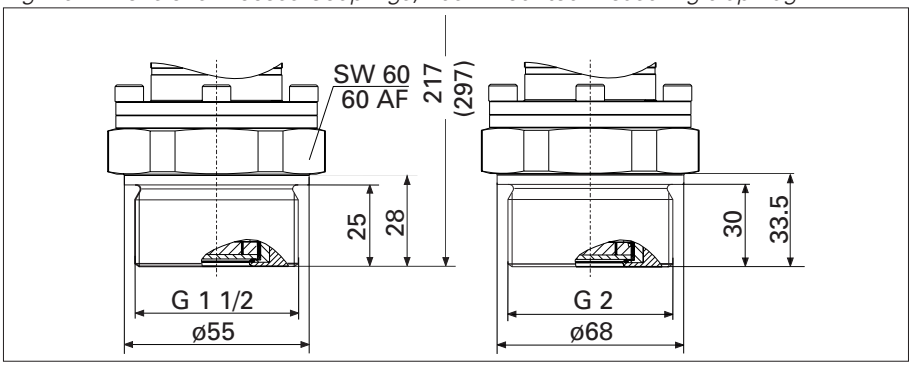


Fig. 10 Dimensions Process Couplings, flush mounted measuring diaphragm [8)]



ELECTROMAGNETIC COMPATIBILITY

Complies with EN 61326
operating resource B
Immunity to EN 61326 NAMUR recommendation NE21
with 30 V/m.

All tests at TD 2:1
effect < 0.5 %

CE-labelled

PRESSURE EQUIPMENT DIRECTIVE

Complies with RL 97/23/EG , article 3(3) and is manufactured to good engineering practice. Applicable for stable gases of group 1, category II

GENERAL

HOUSING ELECTRONICS

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

MODE OF PROTECTION

IP 66 to DIN 40050, NEMA 6P

ELECTRICAL CONNECTIONS

via cable gland to screw terminals for 2.5 mm^2

MOUNTING

Pipe or wall mounting possible by means of mounting bracket
see Order Structure: Options 2 **U**

WEIGHT

Approx. 1.2 kg, depending from process coupling,
HT version approx. 1.6 kg

OPERATIONAL POSITION

Pressure port directing downwards.
(vertical outlet of effective pressure pipe, that means if pressure port shows different, corresponding adjustment of zero necessary)

ACCESSORIES

– Quick-start Manual

Additional Documentation

Operating Instructions
9499-040-79811

Atex Safety instructions
9499-047-12601

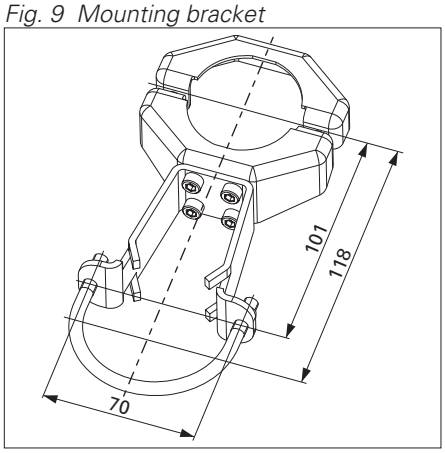
SIL Certifikate
9499-047-xxxx

ADDITIONAL PARTS

Mounting bracket kit

Material: SS, inclusive screws, see ordering structure, Option 2, code **U**

Fig. 9 Mounting bracket



ORDERING STRUCTURE

Options 1
A none
E SIL declaration
T High temperature version
B 3.1 B declaration
3 3.1 Works test certificate
4 3.1 Pressure test certificate

Calibration, unit

Nominal range mbar/ bar	**1**
kPa / Mpa	**2**
mm / m H_2O	**3**
in / ft H_2O	**4**
psi	**6**
Range to specification	**B**
Works cal. certificate, 5 points	**C**

Options 2
A none
E SIL declaration
B 3.1 B certificate
T High temperature version
U Wall / Pipe mounting kit
3 3.1 Works test certificate
4 3.1 Pressure test certificate
5 Helium leak test

Housing, cable entry

Alu, M20 x 1,5 cable gland	**A**
Alu, NPT ½ " thread	**C**

PM50-.....1

Electronic / Display

not EEx	**A**
ATEX II 1 / 2 G	**1**
Without LCD display	**C**
LCD display built-in	**A**

Measuring cell GAUGE **1**
Measuring cell ABSOLUTE **2**

Nominal value	100 mbar	**C**
	250 mbar	**E**
	400 mbar	**F**
	1 bar	**H**
	2 bar	**K**
	4 bar	**M**
	10 bar	**P**
	40 bar	**S**

Gasket
A FKM
B EPDM
D Kalrez
E Chemraz
F NBR
For Oxygen use degreased and free of oil
2 FKM

Process coupling

GA	G½A ISO SS316 L / 1.4435
GB	Alloy C22
GE	G½A / G¼f ISO SS316 L / 1.4435
GF	Alloy C22
GP	M20 x 1,5 EN 837 SS316 L / 1.4435
GQ	Alloy C22
RA	ANSI ½"-NPT m / ¼"-NPT f SS316 L / 1.4435
RB	Alloy C22
RD	ANSI ½"-NPT m SS316 L / 1.4435
RE	Alloy C22
1G	G 1 ½ A ISO, flush diaphragm SS316 L / 1.4435
1H	Alloy C22
1K	G2A ISO, flush diaphragm SS316 L / 1.4435
1L	Alloy C22

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