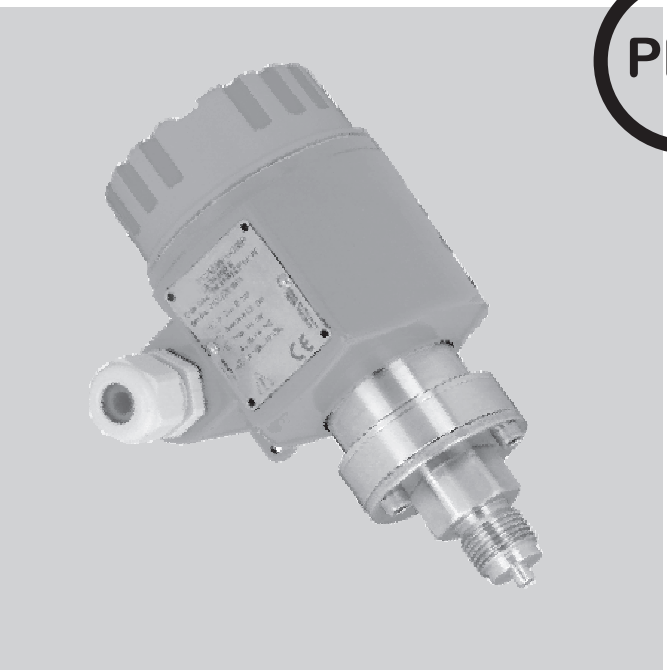


Transmitter PM31

Intelligent Pressure Transmitter with ceramic measuring cell

from 10 mbar up to 40 bar

Self monitoring

Local display and adjustment

Multiple overload

Explosion protection ATEX 100

Analogue, Smart- or BUS-function

PROFILE

The pressure transmitter PM31 measures gauge- and absolute pressure in gases, vapours and liquids and can be used in nearly all areas of process engineering. The transmitter works on the two-wire principle and features a ceramic measuring element. Gauge pressures from 10 mbar up to 40 bar, and absolute pressures from 40 mbar up to 40 bar are converted into a standard pressure proportional 4...20-mA signal. The BUS version uses digital communication for the signal.
The digital version can be equipped with a local display comprising digital display and bargraph whereas the analogue version allows only a bargraph display. The applied technology ensures reliable and simple operation.

DESCRIPTION

The transmitter PM31 comprises the measuring cell, the process coupling and the electronics housing. Connecting terminals are accessible in a separate compartment after opening the lid.
The process medium acts direct onto the ceramic measuring diaphragm. Process couplings are available in various materials.

The analogue-electronic is an economic, fast and simple version of transmitter PM31. Zero and span can be adjusted locally by means of two potentiometers. With dip switches coarse setting of span with a spread of 1:1 up to 10:1 is possible. The required pressure signals must be provided as reference.

The analogue electronics features adjustment of Zero with ± 10 % within the cell limits.

Digital-electronics provides widespread operating and adjustment facilities with the corresponding Smart hand-held terminal or via PC engineering. It realises precise signal processing and monitors the transmitter function from sensor to output function. Local operation is performed by means of push buttons and the pluggable display. The required pressure signals must be provided as reference and will be stored via push button operation.
It also is possible to set inverse signal direction with the smart version.
The transmitter monitoring function generates an alarm if any fault is being detected. The alarm acts onto the analogue output signal and can be set in its function.
Based upon the used measuring cell a turn down of 10:1 is possible.

TECHNICAL DATA

INPUT

Absolute and gauge pressure in gases, vapours, liquids.
Ceramic measuring cell for ranges up to 40 bar.

GAUGE PRESSURE

Type of cell		Measuring limits	Smallest span	Overload
type	[bar]	[bar]	[bar]	[bar]
1C	0.1	0...0.1	0.01	4
1F	0.4	0...0.4	0.04	7
1H	1	0...1	0.1	10
1M	4	0...4	0.4	25
1P	10	0...10	1	40
1S	40	0...40	4	60
5C	± 0.1	-0.1...+0.1	0.02	4
5F	± 0.4	-0.4...+0.4	0.08	7
5H	± 1	-1...+1	0.2	10
5M	- 1...4	-1...+4	0.5	25
5P	-1...10	-1...+10	1.0	40

ABSOLUTE PRESSURE

Type of cell		Measuring limits	Smallest span	Overload
type	[bar]	[bar]	[bar]	[bar]
2F	0.4	0...0.4	0.04	7
2H	1	0...1	0.1	10
2M	4	0...4	0.4	25
2P	10	0...10	1	40
2S	40	0...40	4	60

Minimum pressure

For cell 0,1 bar: up to 0,7 bar abs
For all other cells: resistant to 0 bar abs

PROCESS MEDIA

Gases, vapours, liquids, aggressiv or corrosive with suitable materials

Fig.: 1 Versions

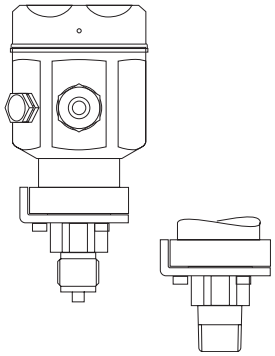
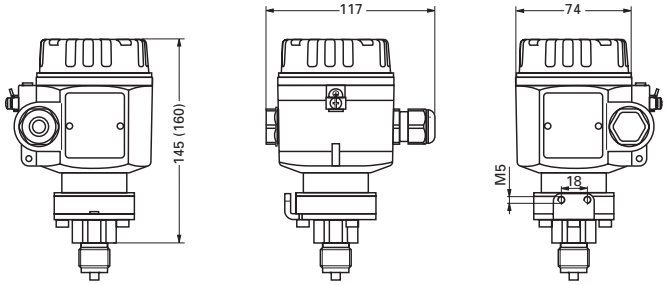


Fig.: 2 Dimensions



Masse in Klammern für Anzeiger
Dimension in brackets for display

WETTED MATERIALS

Diaphragm

- Al_2O_3

Gasket

- FKM (e.g. Viton®)
  FKM degreased
- FKM for Oxygen
- EPDM
  NBR
- Kalrez
- Chemraz

Process coupling

- Stainless Steel SS 316 L (1.4435)
- Hastelloy C 276 (2.4819)

Process conditions

Process temperature: -40.... +100 °C

Gasket	Temperature limit
FKM (e.g. Viton®	- 20 °C
FKM degreased	- 10 °C
FKMfor Oxygen	- 10...+ 60 °C
Chemraz (FFKM)	- 10 °C
NBR	- 20...+80 °C
Kalrez (Compund 4079, FKM)	+ 5 °C
EPDM	- 40 °C

OUTPUT

	Analogue	Smart [1]
Signal	4...20 mA	4...20 mA, with superimposed communication protocol
Signal on alarm	> 20.5 mA or < 3.6 mA settable	settable to > 20.5 mA or < 3.6 mA or HOLD
Ripple		(HART), measured on 500 47...125 Hz U_{PP}=200 mV, Noise: 500 Hz up to 10 kHz U_{RMS} 2.2 mV(on 500)
Characteristic	pressure proportional	
Conformity error incl. hysterisis and reproducibility, (limit point method)	± 0.2 %	
Integration time (settable)	0s, 2 s	0s, 2s, via HART 0...40 s
Rise time	60 ms	220 ms
Response time	180 ms	600 ms
Warm-up time	200 ms	1 s
Long term drift	0.1 % (FS) / year	

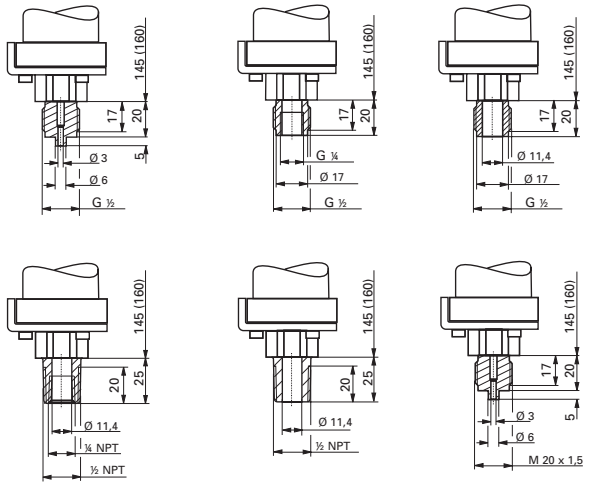
Output BUS: Profibus PA

MAX. LOAD

$$R_{Load} \quad \frac{U_{Supply} \quad 11.5\ V}{0.023\ A} \quad R_{Lead}$$

[1] inverse signal direction possible, specification of span start and end in clear text (-xxx91)
[2] EEx only with "smart" electronics

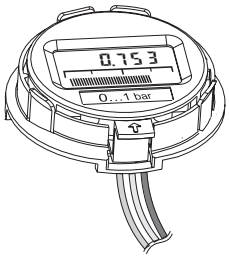
Fig.: 3 Process couplings



DISPLAY

Analogue signal via 28 segment LCD bargraph ≙ 0...100 %; with smart additionally 4 digit 7 segment display.

Fig.: 4 Display modul smart



OPERATION

Analogue	Adjustment of zero and span via DIP switches and two potentiometer direct. Selection of damping.
Smart	Adjustment of zero and span by means of two push buttons direct. Setting of damping. Remote operation via HART protocol
Bus	Adjustment of zero and span by means of two push buttons direct. Setting of address. Remote operation via digital protocol

SUPPLY

DIRECT CURRENT

11.5 ... 45 VDC
11.5 ... 30 VDC with EEx[2]

Ripple of supply voltage

No effect for U_{RMS} ± 5 % within permissible range

Overvoltage category

II to DIN EN 61 010-1

EXPLOSION PROTECTION

Mode: ATEX ⟨Ex⟩, II 1 / 2 G, EEx ia IIC T6[2],

Certificate of conformity

DMT 03 ATEX E016

Mounting

Transmitter in hazarded area G2

Viton® registered trademark of DuPont Performance Elastomers

Fig.: 5 Electrical connection analogue

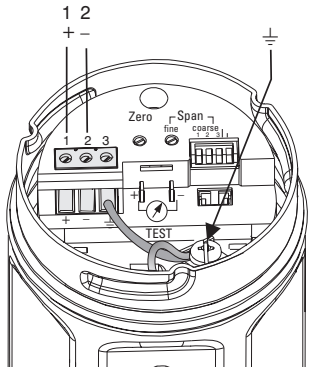
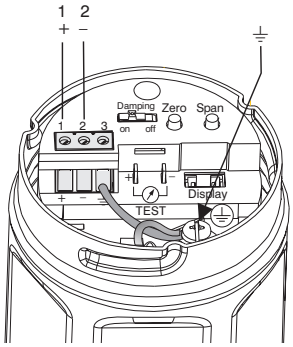


Fig.: 6 Electrical connection digital



WEIGHT approximately 1.6 kg

ACCESSORY

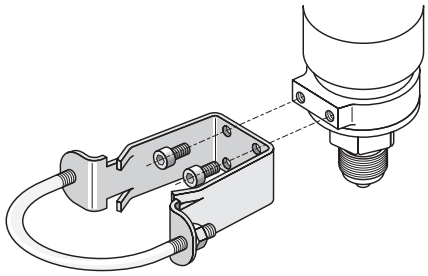
Instructions
Analogue electronics 9499-040-64511
Smart-electronics 9499-040-64311

To be ordered separately
Atex Safety instructions 9499-047-10801

ADDITIONAL ACCESSORIES

Bracket for wall or pipe mounting
Material stainles steel AISI 304
9404-290-01021

Fig.: 8 Mounting bracket



ENVIRONMENTAL CONDITIONS

PERMISSIBLE TEMPERATURES

For operation: - 40...+ 85 °C
For storage: - 40....+100 °C (with display +85 °C)

Temperature effect T_K*) for span start and span

Analogue		Smart	
-10...+60°C	-40...10 < > +60...85°C	-10...+60 °C	-40...10 < > +60...85°C
± 0.15 % /10 K	± 0.2 % / 10 K	± 0.08 % /10 K	± 0.1 % / 10 K

(Referred to nominal value of cell)
*) But not exceeding error due to thermal effects.

Thermal effect

Referred to set span
X% *TD* 0.3%
(TD = nominal value/set span)

Analogue		Smart	
-10...+60°C	-40...10 < > +60...85°C	-10...+60 °C	-40...10 < > +60...85°C
X = 0.3	X = 0.5	X = 0.2	X = 0.4

Climatic class

4K4H to DIN EN 60721-3

Vibrations

No effects with 4 mm stroke at 5...15 Hz, or
2g at 15...150 Hz, or 1 g at 150...2000 Hz

ELECTROMAGNETIC COMPATIBILITY

Complies with EN 50 081-1 and EN 50 082-2 as also
NAMUR recommendation NE21: effect < 0,5 %

GENERAL

HOUSING

Di-cast aluminum housing (AlSi12) surface chromated with Epoxy coating
Cover seal: Silicon rubber

Type label: SS

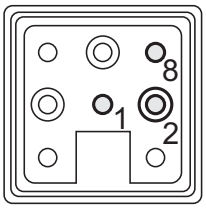
MODE OF PROTECTION

IP 66 / Nema 4 with cable gland
IP 68 / Nema 6P with fixed cable (1m WG for 24 h, respectively 1.8 m WG for 30 minutes)

ELECTRICAL CONNECTION

Screw terminals for 0.5...2.5 mm^2.
selectable via
Cable gland M20 x 1.5
½ NPT for cable conduit
Harting plug HAN 7

Fig.: 7 Connection Harting plug



1 = + (bl)
2 = - (bn)
8 = ⏚ (gn/ye)

or
Fixed cable 5m with reference air feed

Profibus via M12x1 plug.

INSTALLATION CONDITIONS

Orientation as required,
orientation-dependend zero shifts up to 3 mbar can be adjusted.

Fig.: 9 Pipe mounting

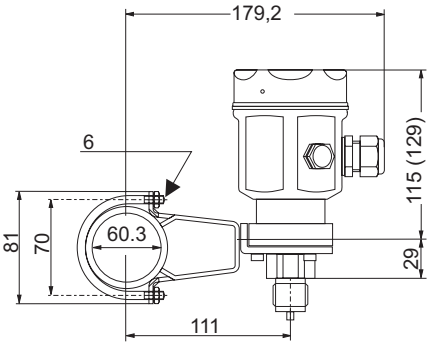
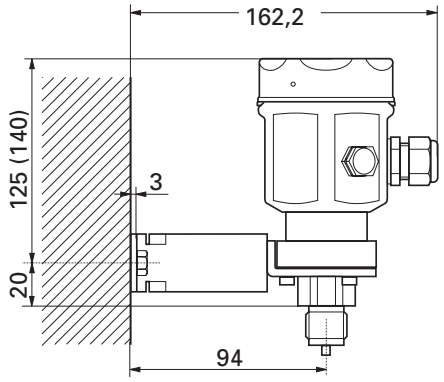
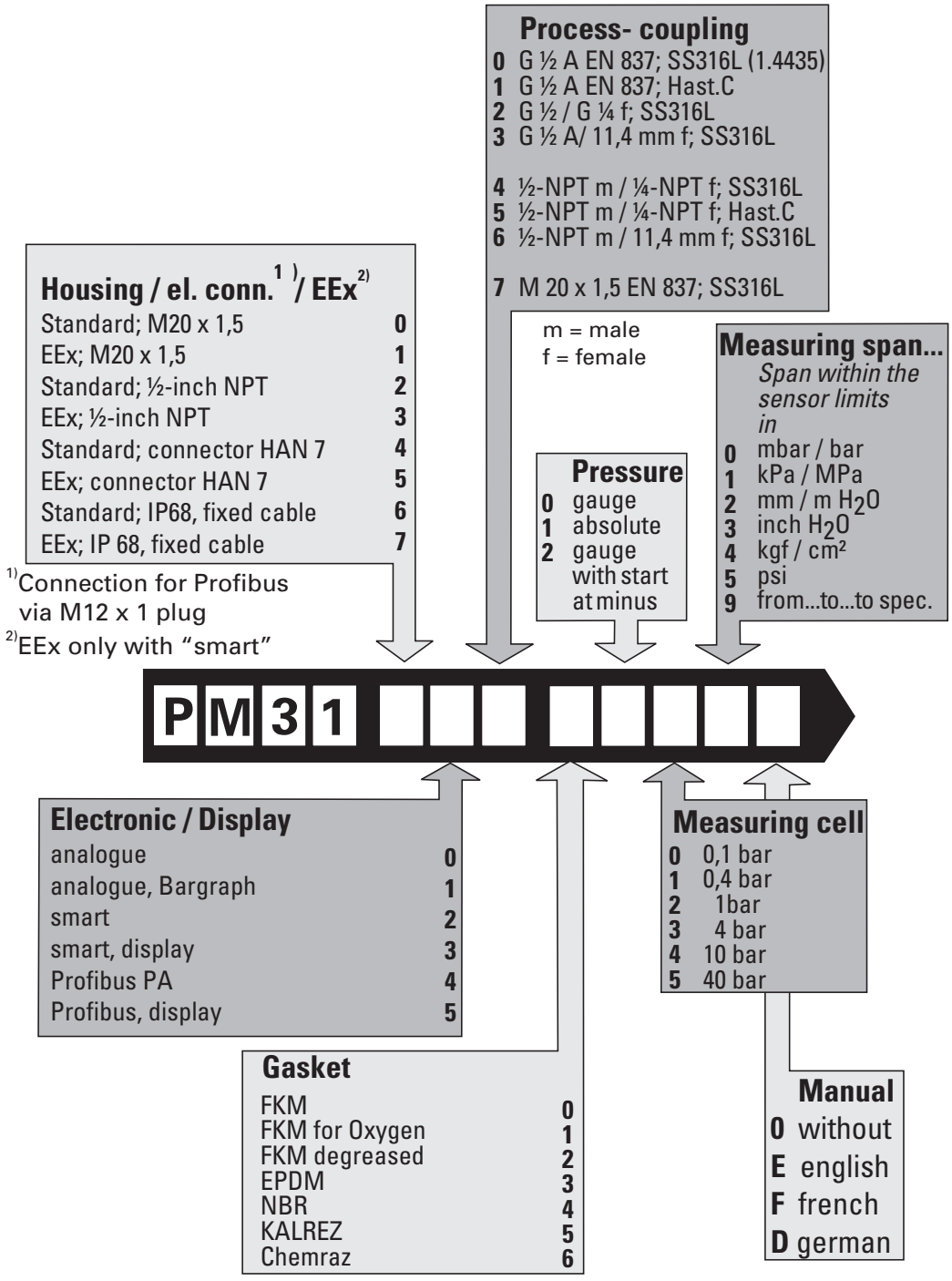


Fig.: 10 Wall mounting



ORDERING STRUCTURE



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