



Transmitter PD61 with metallic isolating diaphragms



For differential pressure- and flow measurement

Self monitoring sensor

Local parameter setting

Usable Turn Down 100 : 1

Output signal differential pressure-, flow-
or level proportional

Operating pressure up to 420 bar

Explosion protection to Atex II G1/2

Smart

GENERAL

The transmitter is suitable for differential pressure as for flow measurements with gases, vapours and liquids.

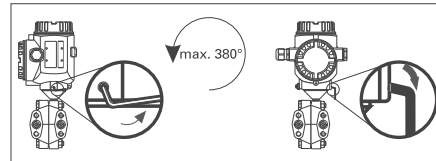
Nominal pressures for the various measuring cell types are PN160 and PN420.

Standard output is a 4...20 mA signal proportional to the applied differential pressure or flow or level.

The microprocessor-controlled electronics works on the two-wire principle. Transmitter PD61 energization is by means of a DC voltage.

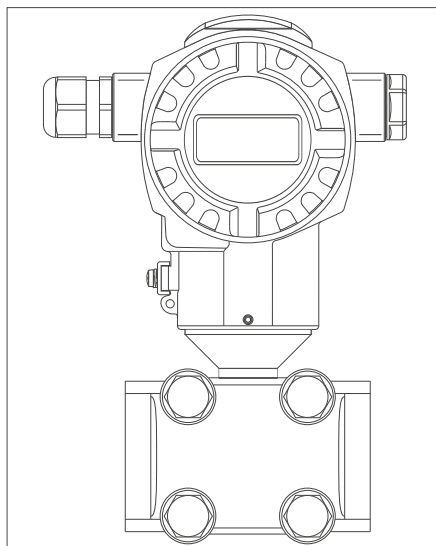
No matter what the left/right arrangement of the „plus“ and „minus“ pressure lines is on site, the position can be matched simply by rotating the housing up to 360°.

Fig. 1 Adaption of housing position



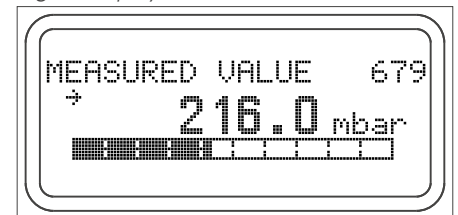
Microprocessor-controlled electronics provide high-precision signal processing and monitoring, from the sensor to the signal output. Measuring cell monitoring offers outstanding safety for industrial processes.

Fig. 2 Transmitter with display



The optional 4-line local display (LCD)

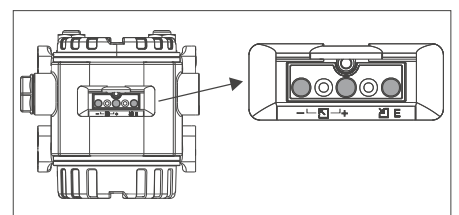
Fig. 3 Display element



reads measuring values, dialog text as error indications and supports the user in every step of set up.

The operational keys are accessible either from outside or will be found on the electronics.

Fig. 4 External operating keys



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

DESCRIPTION

Transmitter PD61 comprises the measuring cell, two process flanges with seals and the electronic housing. Seven measuring cell versions provide spans from 1 to 40,000 mbar¹⁾. Process flanges wetted by the process media, are available in a variety of materials.

Process seals can be made of FKM (e.g. Viton®), PTFE, NBR or Copper.

The pressure medium enters the measuring cell via two 1/4-18NPT 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.

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

Viton®: registered trade mark of DuPont Performance Elastomers

OPERATING PRINCIPLE

Measuring cell

The measuring cell consists of a piezo-resistive 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 is designed as a piezoresistive strain gauge bridge, which can be monitored accordingly. The microprocessor continuously monitors 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 (holding the process value).

TECHNICAL DATA

INPUT

Measuring cells PN 160

Cell type	7B	7C	7D	7F	7H	7L	7M
Nominal span [mbar]	10	30	100	500	3,000	16,000	40,000
Span ²⁾ [mbar]	2...10	3...30	25...100	33...500	200...3,000	1,100...16,000	2,666...40,000
Span start [mbar]	-10...8	-30...25	-100...75	-500...477	-3,000...2,800	-16,000...14,900	40,000... 37,334
Nominal pressure ³⁾	160 bar						
Filling medium	Silicone oil, respectively Halocarbon with Oxygen use						

Measuring cells PN 420

Cell type	8F	8H	8L	8M
Nominal span [mbar]	500	3,000	16,000	40,000
Span ²⁾ [mbar]	33...500	200...3000	1,100...16,000	2,666...40,000
Span start [mbar]	-500...477	-3,000...2,800	-16,000...14,900	40,000... 37,334
Nominal pressure	420 bar			
Filling medium	Silicone oil			

Static Pressure

Max. PN of corresponding cell, depends also from application (e.g. Oxygen and gaskets).

Static Pressure effect

Cell	10 mbar[X]	30 mbar[X]	100 mbar[X]	500 mbar[X]
Zero	± 0.15 % of X/7bar	± 0.35 % of X/70bar	± 0.15 % of X/70bar	± 0.075 % of X/70bar
Span	± 0.035 % of X/7bar	± 0.14 % of X/70bar	± 0.14 % of X/70bar	± 0.14 % of X/70bar

Overload limit: PN

Minimum pressure: 10 mbar abs.

Cell	3 bar[X]	16 bar[X]	40 bar[X]
Zero	± 0.075 % of X/70bar	± 0.075 % of X/70bar	± 0.075 % of X/70bar
Span	± 0.14 % of X/70bar	± 0.14 % of X/70bar	± 0.14 % of X/70bar

PROCESS MEDIA

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

- ²⁾ smallest span (TD) which can be calibrated on request
³⁾ for cell 10; 30 mbar with copper seal
 max. overload one-side 100 bar, both ways 150 bar
⁴⁾ ex works set for 22 mA
⁵⁾ FKM e.g. Viton®

MATERIALS

Process flange	C 22.8 [1.0460]
	SS 316 L [1.4435]
	Alloy C22

OUTPUT

Diaphragm	SS 316 L	Seal	FKM ⁵⁾
	Alloy C22		PTFE
	Monel		NBR
	Tantal		Copper

SIGNAL

Standard signal 4...20mA
 with superimposed HART communication -protocol

Resolution: 1µA

Signal range HART: 3.8...20.5 mA

Failure signal

Max. Alarm: adjustable from 21 to 23 mA⁴⁾

Min. Alarm: 3.6 mA

Keep Value: last measured value remains continued.

Ripple

≤ ±0.25 % fsd

HART protocol: U_{pp} ≤ 200 mV (47 Hz ...125 kHz)

und U_{rms} ≤ 2.2 mV (500 Hz ... 10 kHz)

CHARACTERISTIC

- Proportional to the applied differential pressure or
- proportional to the flow rate, or
- proportional to the level

Conformity

Cell	TD 1:1	TD > 1:1
10 mbar 30 mbar	± 0.15 %	± 0.15 % x TD
100 mbar	≤ TD 4:1 ± 0.075 %	TD > 4:1 ± (0.0012 x TD + 0.027)%
≥ 500 mbar	≤ TD 15:1 ± 0.075 %	TD > 15:1 ± (0.0015 x TD + 0.053)%

Referred to set span,

Terminal based methode to IEC 60770 including Conformity, Hysteresis and Nonrepeatability.

Long term stability

Cell	≥ 500 mbar	≤ 100 mbar
Per annum	± 0.05 %	± 0.18 %
5 years	± 0.125 %	

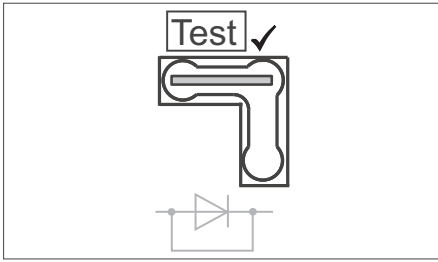
Referred to nominal span of cell

MAXIMUM LOAD

$$R_{Load} = \frac{U_{Supply} - 10.5[V]}{0.023[A]} - R_{Lead} [\Omega]$$

Load effect: < 0.1% per 100 Ω

Fig 5 Link in position "Test"



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})

Damping: adjustable by means of local display, Manual control unit or SW (PC) 0 ...999 sec.

Factory set to 2 sec

Cell	Idle-time	Rise time
10; 30 mbar	45 ms	200 ms
100 mbar		60 ms
500 mbar		45 ms
3 bar		40 ms
16; 40 bar		60 ms

Creep flow cut-off

adjustable

POWER SUPPLY

SUPPLY VOLTAGE

10.5...45 VDC ⁶⁾

10.5...30 VDC for EEx⁶⁾

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

Ripple

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

Fig. 6 Dimensions process flange, top: cell 10, 30 mbar, bottom: ≥100 mbar

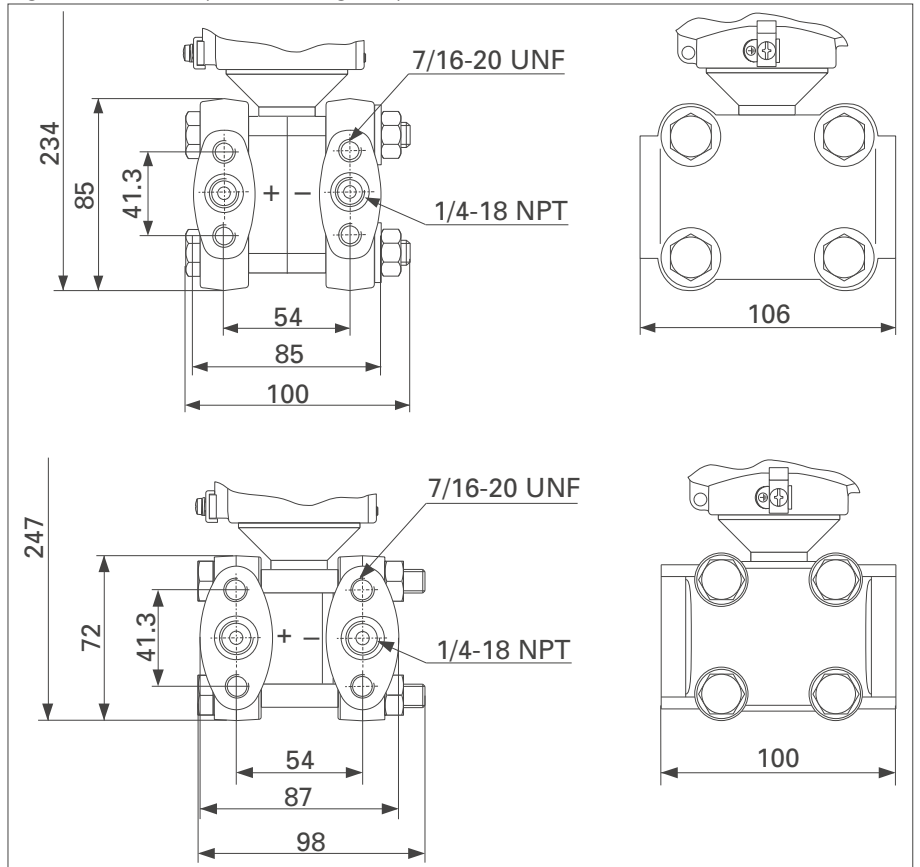


Fig. 7 Dimensions electronic housing

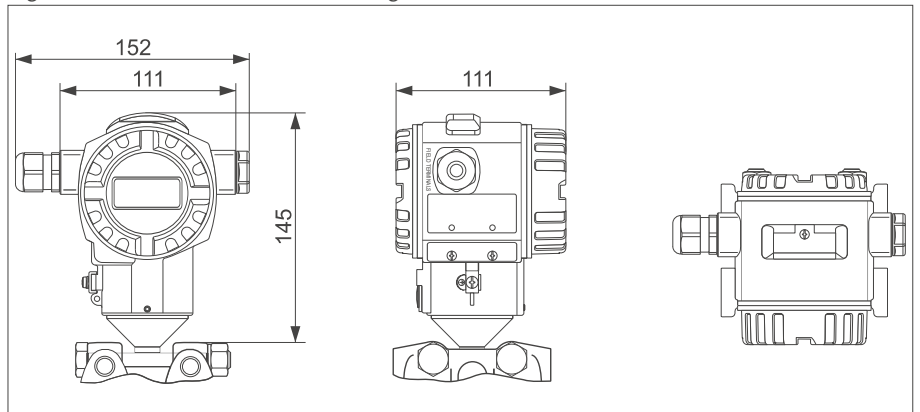
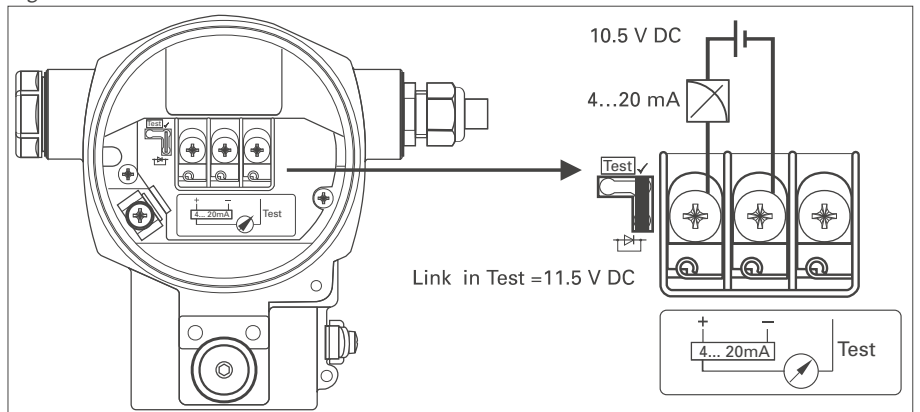


Fig. 8 Electrical connections



⁶⁾ Watch position of link, in position "Test" with Interlock-Diode, minimum supply voltage 11.5 V

EXPLOSION PROTECTION

Mode of protection:

ATEX Ex G 1 / 2
EEx ia IIC T4/T6

Certificate of Conformity

KEMA 06ATEX0169

Mounting

Transmitter in Ex-area G1

ENVIRONMENTAL CONDITIONS

Nominal temperature: -40 ...+85 °C

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

Temperature effects on span start and span

Cell	-10...+60 °C	-40...-10; +60...+85 °C
10;30 mbar	$\pm(0.31 \times \text{TD} + 0.06)\%$	$\pm(0.45 \times \text{TD} + 0.1)\%$
100 mbar	$\pm(0.18 \times \text{TD} + 0.02)\%$	$\pm(0.3 \times \text{TD} + 0.15)\%$
500 mbar; 3 bar	$\pm(0.08 \times \text{TD} + 0.05)\%$	$\pm(0.12 \times \text{TD} + 0.1)\%$
16 bar	$\pm(0.1 \times \text{TD} + 0.1)\%$	$\pm(0.15 \times \text{TD} + 0.2)\%$
40 bar	$\pm(0.25 \times \text{TD} + 0.05)\%$	$\pm(0.37 \times \text{TD} + 0.1)\%$

Process temperature at measuring cell

-40 °C...+85 °C,
(see also process seal resp. Oxygen use)
(+70 °C at EEx ia IIC T4)

Process seal	Temperature limits
FKM (e.g. VITON®)	-20 ...+85 °C
NBR	-20 ...+85 °C
PTFE, GF25	-20 ...+85 °C ⁷⁾
Copper	-40 ...+85 °C ⁷⁾
FKM for Oxygen use	-10 ...+60 °C
Copper / Oxygen use	-20...+60 °C ⁷⁾

Relative humidity: 100% r.H.
Condensation permissible⁸⁾

Climatic category

Class 4K4H
to DIN EN 60721-3-4

Vibration effect: $\leq 0.1\%$
(10...60 Hz: 0.15 mm; 60...2000Hz: 2g,
with mounting bracket)

Mounting effect

Mounting rotated vertical to diaphragm
axis: ≤ 4 mbar

ELECTROMAGNETIC COMPATIBILITY

Complies with EN 61326
operating resource B
Immunity to EN 61326 NAMUR re-
commendation 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 engi-
neering practice. Applicable for stable
gases of group 1, category II.

GENERAL

ELECTRONIC HOUSING

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

HOUSING PROTECTION TYPE

IP 66 to DIN 40050, NEMA 6P

PROCESS COUPLING

1/4-18NPT-f thread, (Centre-to-centre
distance: 54 mm)
Other distances/threads are possible
by means of additional oval flanges
with 1/2-14NPT-f thread

ELECTRICAL CONNECTION

Screw terminals for 2.5 mm² via cable
gland

MOUNTING METHODE

Pipe or wall mounting possible by me-
ans of mounting bracket or valve mani-
fold. Mounting thread oval flange
7/16-20UNF.

WEIGHT

160/420 bar version approx. 5.4 kg
With mouing kit 6.4 kg

OPERATIONAL POSITION

Pressure ports directing to top and
bottom.
(horizontal outlet of effective pressure pipes, that
means pressure ports show to the sides,
corresponding adjustment of zero necessary).

ACCESSORIES

- 2-Venting valves (not for Alloy version)
- Quick start manual

Additional Documentation

Instruction Manual

9499-040-79711

Atex Safety instructions

9499-047-12601

SIL Certificate/Handbook

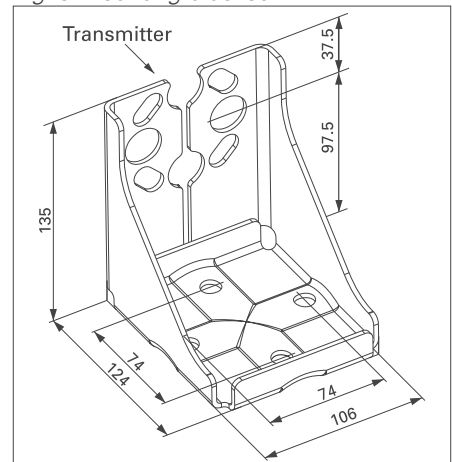
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FITTING

Mounting bracket kit

Material: SS304, inclusive screws, see
ordering structure, Option 2, code **U**

Fig. 9 Mounting bracket



Additional screws

Material SS304, 4 x 7/16-20 UNF, 1 1/2 -in;
(in case mounting bracket has not been or-
dered) see ordering structure, Option 2,
code **R**

Blind stopper

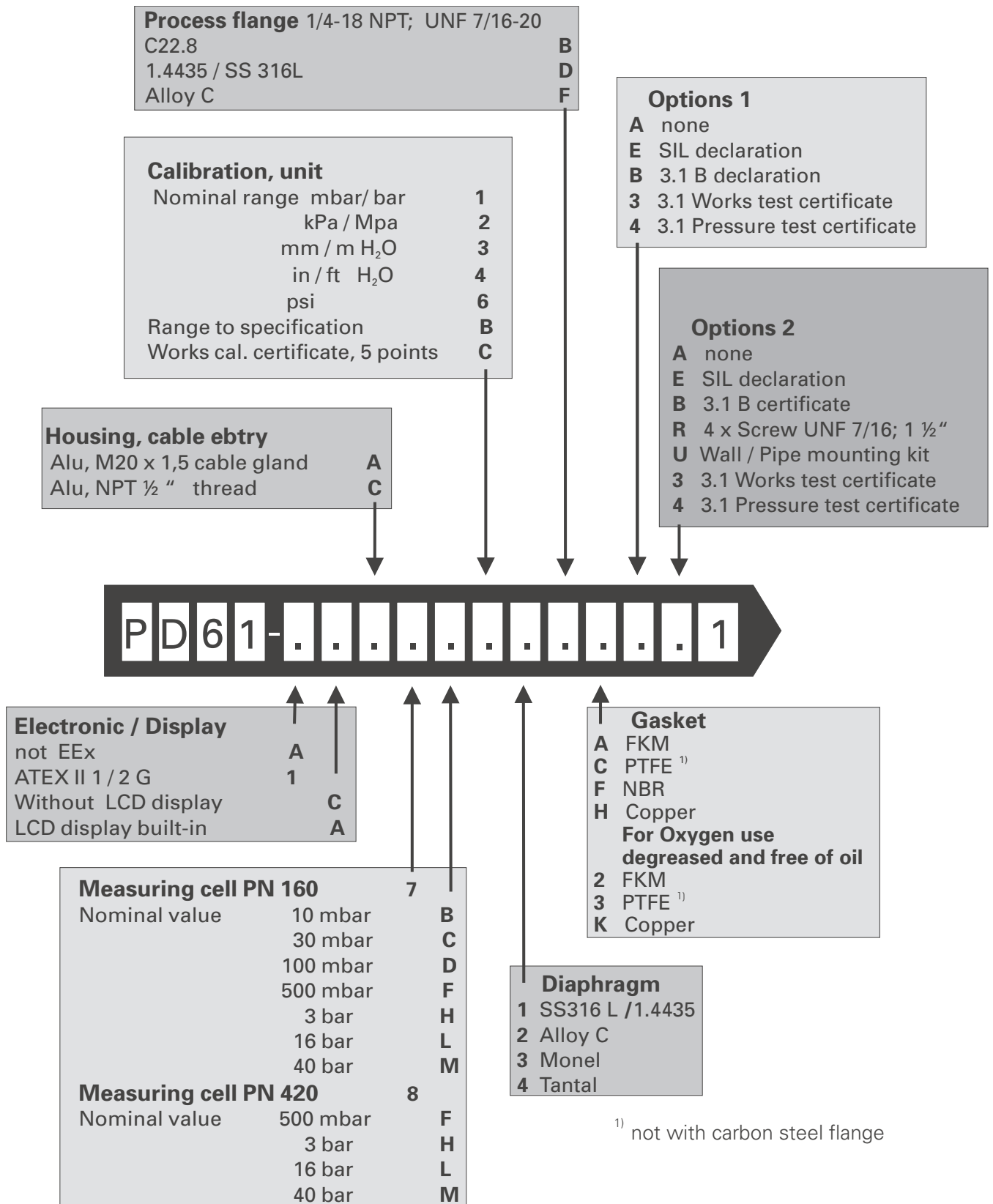
2 units, material SS 316 L (1.4404)

9407-290 00011

⁷⁾ For cells with PN420 lowest applicable
temperature limit is -10 °C

⁸⁾ Avoid condensation inside the housing

ORDER STRUCTURE



**Deutschland**

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