Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Cerabar S PMC71, PMP71, PMP75

Process pressure measurement
Pressure transmitter with ceramic and metal sensors
Overload-resistant and function-monitored; Communication via HART, PROFIBUS PA or FOUNDATION Fieldbus

Application

The Cerabar S pressure transmitter is used for the following measuring tasks:
- Absolute pressure and gauge pressure in gases, steams or liquids in all areas of process engineering and process measurement technology
- Level, volume or mass measurement in liquids
- High process temperature
  - without diaphragm seals up to 150°C (302°F)
  - with typical diaphragm seals up to 400°C (752°F)
- High pressure up to 700 bar
- International usage thanks to a wide range of approvals

Your benefits

- Very good reproducibility and long-term stability
- High reference accuracy: up to ±0.075%, as PLATINUM version: ±0.05%
- Turn down 100:1, higher on request
- Used for process pressure monitoring up to SIL3, certified according to IEC 61508 by TÜV SÜD
- HistoROM®/M-DAT memory module
- Function-monitored from the measuring cell to the electronics
- Continuous modularity for differential pressure, hydrostatic and pressure (Deltabar S – Deltapilot S – Cerabar S), e.g.
  - replaceable display
  - universal electronic
- Quick commissioning thanks to quick setup menu
- Easy and safe menu-guided operation on-site, via 4...20 mA with HART, via PROFIBUS PA or via FOUNDATION Fieldbus
- Extensive diagnostic functions
- Device versions in conformity with ASME-BPE

TI383P/00/EN/06.09
No. 71095447

Endress+Hauser
People for Process Automation

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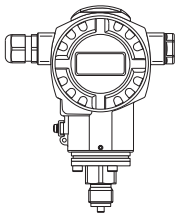
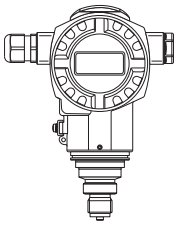
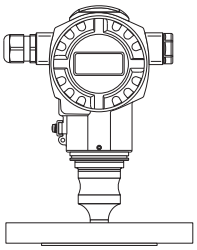
Function and system design

Device selection

Cerabar S – Product family	**PMC71**  P01-PMC71xxx-16-xx-xx-xx-000 **With capacitive measuring cell and ceramic measuring process isolating diaphragm (Ceraphire®)**	**PMP71**  P01-PMP71xxx-16-xx-xx-xx-000 **With piezoresistive measuring cell and metallic welded process isolating diaphragm**	**PMP75**  P01-PMP75xxx-16-xx-xx-xx-000 **With diaphragm seal**
Field of application	– Gauge pressure and absolute pressure – Level		
Process connections	– Diverse thread – DN 32 – DN 80 – ANSI 1 1/2" – 4" – JIS 50 A – 100 A	– Diverse thread – DN 25 – DN 80 – ANSI 1 1/2" – 4" – JIS 25 A – 100 A – Oval flange adapter – Prepared for diaphragm seal mount	– Wide range of diaphragm seals, → see the following section "Overview of diaphragm seal for PMP 75"
Measuring ranges	from –100/0...100 mbar to –1/0...40 bar	from –100/0...100 mbar to –1/0...700 bar	from –400/0...400 mbar to –1/0...400 bar
OPL [1]	max. 60 bar	max. 1050 bar	max. 600 bar
Process temperature range	–25...+125°C/–20...+150°C [2] (–13...+257°F/–4...+302°F)	–40...+125°C (–40...+257°F)	-70...400°C (-94...+752°F)
Ambient temperature range	–40...+85°C (–40...+185°F)	–40...+85°C (–40...+185°F) [3]	–40...+85°C (–40...+185°F)
Ambient temperature range separate housing	–40 to +60°C (–40 to +140°F)		
Reference accuracy	– Up to ±0.075% of the set span – PLATINUM version: up to ±0.05% of the set span		Up to ±0.075% of the set span
Supply voltage	– For non-hazardous areas: 10.5...45 V DC – Ex ia: 10.5...30 V DC		
Output	4...20 mA with superimposed HART protocol, PROFIBUS PA, FOUNDATION Fieldbus		
Options	– PMP71, PMP75: Gold-Rhodium-coated process isolating diaphragm – PMP71, PMP75: NACE-compliant materials – PMC71, PMP71, PMP75: inspection certificate 3.1 – HistoROM®/M-DAT memory module – Separate housing		
Specialities	– Metal-free measurement with PVDF connection – Cleaning of the transmitter for the use in paint shops	– Oil volume-minimised process connections – gas-tight, elastomer-free	– Wide range of diaphragm seals – For high media temperatures – Oil volume-minimised process connections – Completely welded versions

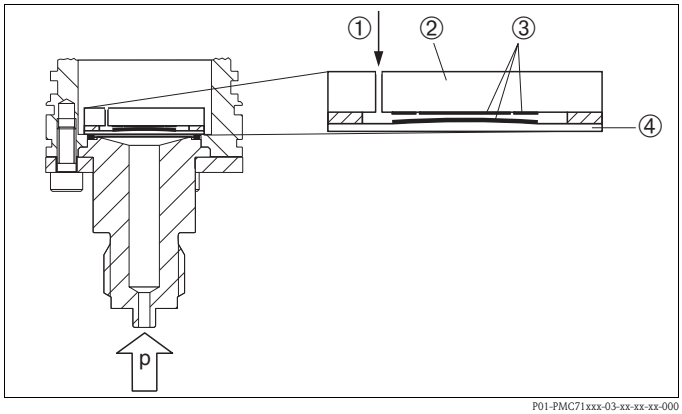
1) OPL = Over pressure limit; dependent on the lowest-rated element, with regard to pressure, of the selected components

2) High temperature version "T" for feature 100 "Additional option 1" or for feature 110 "Additional option 2"

3) lower temperature on request

Measuring principle

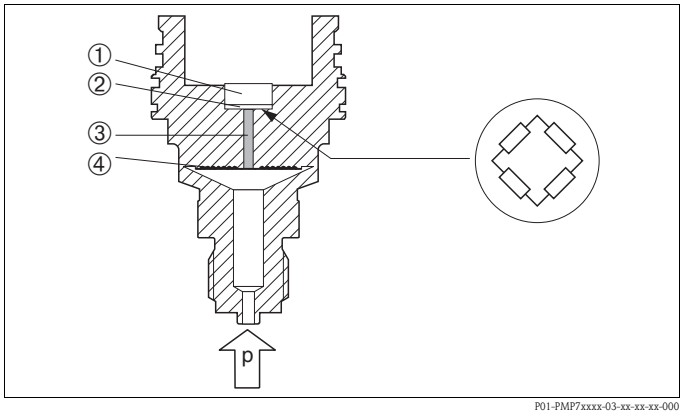
Ceramic process isolating diaphragm used for PMC71 (Ceraphire®)



Ceramic sensor

1 Atmospheric vent (gauge pressure only)
2 Ceramic substrate
3 Electrodes
4 Ceramic process isolating diaphragm

Metallic process isolating diaphragm used for PMP71 and PMP75



Metal sensor

1 Measuring element
2 Wheatstone bridge
3 Channel with fill fluid
4 Metal process isolating diaphragm

Ceramic process isolating diaphragm used for PMC71 (Ceraphire®)

The ceramic sensor is a dry sensor, i.e. the process pressure acts directly on the robust ceramic process isolating diaphragm and deflects it. A pressure-dependent change in capacitance is measured at the electrodes of the ceramic carrier and the process isolating diaphragm. The measuring range is determined by the thickness of the ceramic process isolating diaphragm.

Advantages:
- Guaranteed overload resistance up to 40 times the nominal pressure
- Thanks to highly-pure 99.9% ceramic (Ceraphire®, see also "www.endress.com/ceraphire")
  - extremely high chemical resistance compared to Alloy
  - less relaxation
  - high mechanical stability
- Suitable for vacuums
- Second process barrier (Secondary Containment) for enhanced integrity
- Process temperature up to 150°C (302°F)

Metallic process isolating diaphragm used for PMP71 and PMP75

PMP71

The operating pressure deflects the process isolating diaphragm and a fill fluid transfers the pressure to a resistance measuring bridge (semi-conductor technology). The pressure-dependent change of the bridge output voltage is measured and evaluated.

Advantages:
- Can be used for process pressure up to 700 bar
- High long-term stability
- Guaranteed overload resistance up to 4 times the nominal pressure
- Second process barrier (Secondary Containment) for enhanced integrity
- Significantly less thermal effect compared to diaphragm seal systems

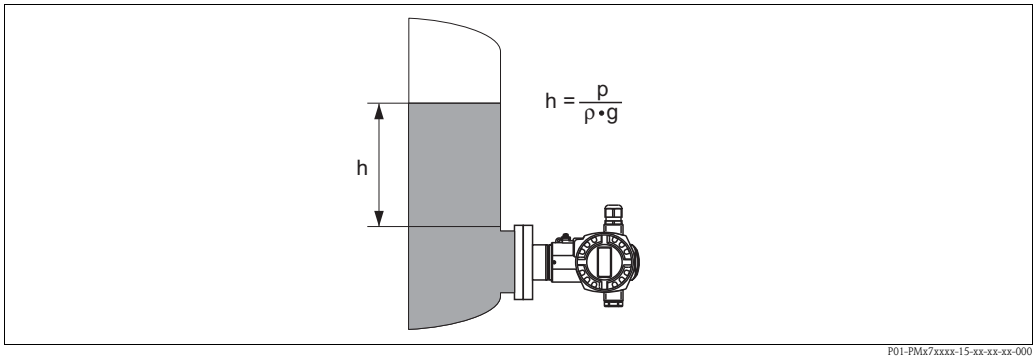
PMP75

The operating pressure acts on the process isolating diaphragm of the diaphragm seal and is transferred to the process isloating diaphragm of the sensor by a diaphragm seal fill fluid. The process isolating diaphragm is deflected and a fill fluid transfers the pressure to a resistance measuring bridge. The pressure-dependent change of the bridge output voltage is measured and evaluated.

Advantages:
- Can be used for process pressure up to 400 bar
- High long-term stability
- Guaranteed overload resistance up to 4 times the nominal pressure
- Second process barrier (Secondary Containment) for enhanced integrity

Level measurement (level, volume and mass)

Design and operation mode



Level measurement with Cerabar S

h *Height (level)*
p *Pressure*
ρ *Density of the medium*
g *Gravitation constant*

Your benefits

- Choice of three level operating modes in the device software
- Volume and mass measurements in any tank shapes by means of a freely programmable characteristic curve
- Choice of diverse level units with automatic unit conversion
- A customised unit can be specified
- Has a wide range of uses, as well
  - in the event of foam formation
  - in tanks with agitators of screen fittings
  - in the event of liquid gases

Communication protocol

- 4...20 mA with HART communication protocol
- PROFIBUS PA
  - The Endress+Hauser devices meet the requirements as per the FISCO model.
  - Due to the low current consumption of 13 mA ± 1 mA
    - up to 7 Cerabar S for Ex ia, CSA IS and FM IS applications
    - up to 27 Cerabar S for all other applications, e.g. in non-hazardous areas, Ex nA, etc.

    can be operated at one bus segment with installation as per FISCO.

  Further information on PROFIBUS PA, such as requirements for bus system components, can be found in the Operating Instructions BA034S "PROFIBUS DP/PA: Guidelines for planning and commissioning" and in the PNO guideline.
- FOUNDATION Fieldbus
  - The Endress+Hauser devices meet the requirements as per the FISCO model.
  - Due to the low current consumption of 15 mA ± 1 mA
    - up to 6 Cerabar S for Ex ia, CSA IS and FM IS applications
    - up to 24 Cerabar S for all other applications, e.g. in non-hazardous areas, Ex nA, etc.

    can be operated at one bus segment with installation as per FISCO.

  Further information on FOUNDATION Fieldbus, such as requirements for bus system components can be found in the Operating Instructions BA013S "FOUNDATION Fieldbus Overview".

Input

Measured variable

Absolute pressure and gauge pressure, from which level (level, volume or mass) is derived

Measuring range

PMC71 – with ceramic process isolating diaphragm (Ceraphire®) for gauge pressure

Nominal value	Measurement limit		Smallest calibratable Span [4]	MWP [1]	OPL [2]	Vacuum resistance	Versions in the order code [3]
	lower (LRL) [bar]	upper (URL) [bar]	[bar]	[bar]	[bar]	[bar_{abs}]	
100 mbar	–0.1	+0.1	0.005	2.7	4	0.7	1C
250 mbar	–0.25	+0.25	0.005	3.3	5	0.5	1E
400 mbar	–0.4	+0.4	0.005	5.3	8	0	1F
1 bar	–1	+1	0.01	6.7	10	0	1H
2 bar	–1	+2	0.02	12	18	0	1K
4 bar	–1	+4	0.04	16.7	25	0	1M
10 bar	–1	+10	0.1	26.7	40	0	1P
40 bar	–1	+40	0.4	40	60	0	1S

PMC71 – with ceramic process isolating diaphragm (Ceraphire®) for absolute pressure

Nominal value	Measurement limit		Smallest calibratable Span [4]	MWP [1]	OPL [2]	Versions in the order code [3]
	lower (LRL) [bar_{abs}]	upper (URL) [bar_{abs}]	[bar]	[bar_{abs}]	[bar_{abs}]	
100 mbar	0	+0.1	0.005	2.7	4	2C
250 mbar	0	+0.25	0.005	3.3	5	2E
400 mbar	0	+0.4	0.005	5.3	8	2F
1 bar	0	+1	0.01	6.7	10	2H
2 bar	0	+2	0.02	12	18	2K
4 bar	0	+4	0.04	16.7	25	2M
10 bar	0	+10	0.1	26.7	40	2P
40 bar	0	+40	0.4	40	60	2S

1) The MWP (maximum working pressure) for the measuring device depends on the weakest element of the components selected with regard to pressure, i.e. the process connection (→ 32 ff) has to taken into consideration in addition to the sensor (→ see Table above). Pay attention to the pressure-temperature dependence also. For the appropriate standards and further information, see → 31, "Pressure specification".
2) OPL: Over Pressure Limit; depends on the weakest link in terms of pressure of the selected components.
3) Versions in the order code → 77 ff, feature 40 "Sensor range; Sensor overload limit (= OPL)"
4) Turn down > 100:1 on request or can be set at the device

PMP71 and PMP75 – with metallic process isolating diaphragm for gauge pressure

Nominal value	Measurement limits		Smallest calibratable Span [5]	MWP [1]	OPL [2]	Vacuum resistance [3]	Versions in the order code [4]
	lower (LRL)	upper (URL)				Silicone oil/ Inert oil	
	[bar]	[bar]	[bar]	[bar_{rel}]	[bar_{rel}]	[bar_{abs}]	
400 mbar	–0.4	+0.4	0.005	4	6	0.01/0.04	1F
1 bar	–1	+1	0.01	6.7	10	0.01/0.04	1H
2 bar	–1	+2	0.02	13.3	20	0.01/0.04	1K
4 bar	–1	+4	0.04	18.7	28	0.01/0.04	1M
10 bar	–1	+10	0.1	26.7	40	0.01/0.04	1P
40 bar	–1	+40	0.4	100	160	0.01/0.04	1S
100 bar	–1	+100	1.0	100	400	0.01/0.04	1U
400 bar	–1	+400	4.0	400	600	0.01/0.04	1W
700 bar [6]	–1	+700	7.0	700	1050	0.01/0.04	1X

PMP71 and PMP75 – with metallic process isolating diaphragm for absolute pressure

Nominal value	Measurement limits		Smallest calibratable Span [5]	MWP [1]	OPL [2]	Vacuum resistance [3]	Versions in the order code [4]
	lower (LRL)	upper (URL)				Silicone oil/ Inert oil	
	[bar_{abs}]	[bar_{abs}]	[bar]	[bar_{abs}]	[bar_{abs}]	[bar_{abs}]	
400 mbar	0	+0.4	0.005	4	6	0.01/0.04	2F
1 bar	0	+1	0.01	6.7	10	0.01/0.04	2H
2 bar	0	+2	0.02	13.3	20	0.01/0.04	2K
4 bar	0	+4	0.04	18.7	28	0.01/0.04	2M
10 bar	0	+10	0.1	26.7	40	0.01/0.04	2P
40 bar	0	+40	0.4	100	160	0.01/0.04	2S
100 bar	0	+100	1.0	100	400	0.01/0.04	2U
400 bar	0	+400	4.0	400	600	0.01/0.04	2W
700 bar [6]	0	+700	7.0	700	1050	0.01/0.04	2X

1) The MWP (maximum working pressure) for the measuring device depends on the weakest element of the components selected with regard to pressure, i.e. the process connection (→ 📄 32 ff) has to taken into consideration in addition to the sensor (→ see Table above). Pay attention to the pressure-temperature dependence also. Pay attention to the pressure-temperature dependence also. For the appropriate standards and further information, → 📄 31, "Pressure specifications".
2) OPL: Over pressure limit (= Sensor overload limit)
3) The vacuum resistance applies to the measuring cell at a reference conditions. The pressure and temperature application limits of the selected filling oil must also be observed for the PMP75. → 📄 69, section "Diaphragm seal filling oils".
4) Versions in the order code → 📄 77 ff, feature 40 "Sensor range; Sensor Overload limit (= OPL)"
5) Turn down > 100:1 on request or can be set at the device
6) PMP71 only, PMP75 on request

Explanation of terms

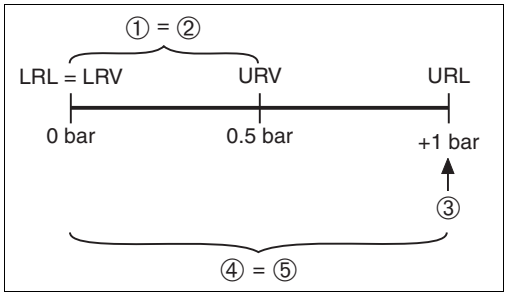
Explanation of terms: Turn down (TD), set span and on zero based span

Case 1:
- \|Lower range value (LRV)\| ≤ \|Upper range value (URV)\|

Example:
- Lower range value (LRV) = 0 bar
- Upper range value (URV) = 0.5 bar
- Nominal value (URL) = 1 bar

Turn down:
- TD = URL / \|URV\| = 2:1

set span:
- URV – LRV = 0.5 bar
  This span is based on the zero point.



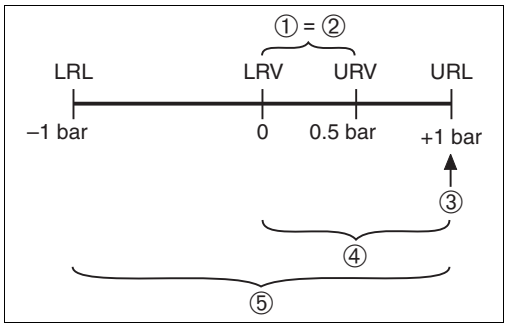
Example: 1 bar measuring cell

Case 2:
- \|Lower range value (LRV)\| ≤ \|Upper range value (URV)\|

Example:
- Lower range value (LRV) = 0 bar
- Upper range value (URV) = 0.5 bar
- Nominal value (URL) = 1 bar

Turn down:
- TD = URL / \|URV\| = 2:1

set span:
- URV – LRV = 0.5 bar
  This span is based on the zero point.



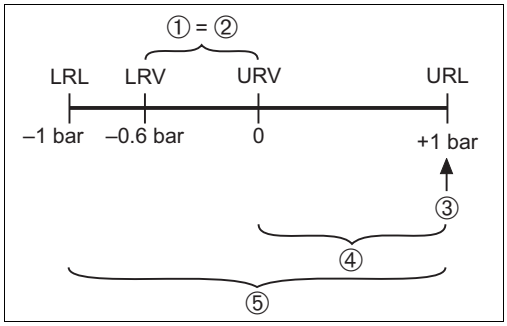
Example: 1 bar measuring cell

Case 3:
- \|Lower range value\| ≥ \|Upper range value\|

Example:
- Lower range value (LRV) = –0.6 bar
- Upper range value (URV) = 0 bar
- Nominal value (URL) = 1 bar

Turn down:
- TD = URL / \|LRV\| = 1.67:1

set span:
- URV – LRV = 0.6 bar
  This span is based on the zero point.



Example: 1 bar measuring cell

1 Set span
2 Zero based span
3 Nominal value ≙ Upper range limit (URL)
4 Nominal measuring range
5 Sensor measuring range
LRL Lower range limit
URL Upper range limit
LRV Lower range value
URV Upper range value

Output

Output signal

- 4...20 mA with superimposed digital communication protocol HART 5.0, 2-wire
- Digital communication signal PROFIBUS PA (Profile 3.0)
  - signal coding: Manchester Bus Powered (MBP); Manchester II
  - data transmission rate: 31.25 KBit/s, voltage mode
- Digital communication signal FOUNDATION Fieldbus, 2-wire
  - signal coding: Manchester Bus Powered (MBP); Manchester II
  - data transmission rate: 31.25 KBit/s, voltage mode

Signal range – 4...20 mA HART

3.8 mA to 20.5 mA

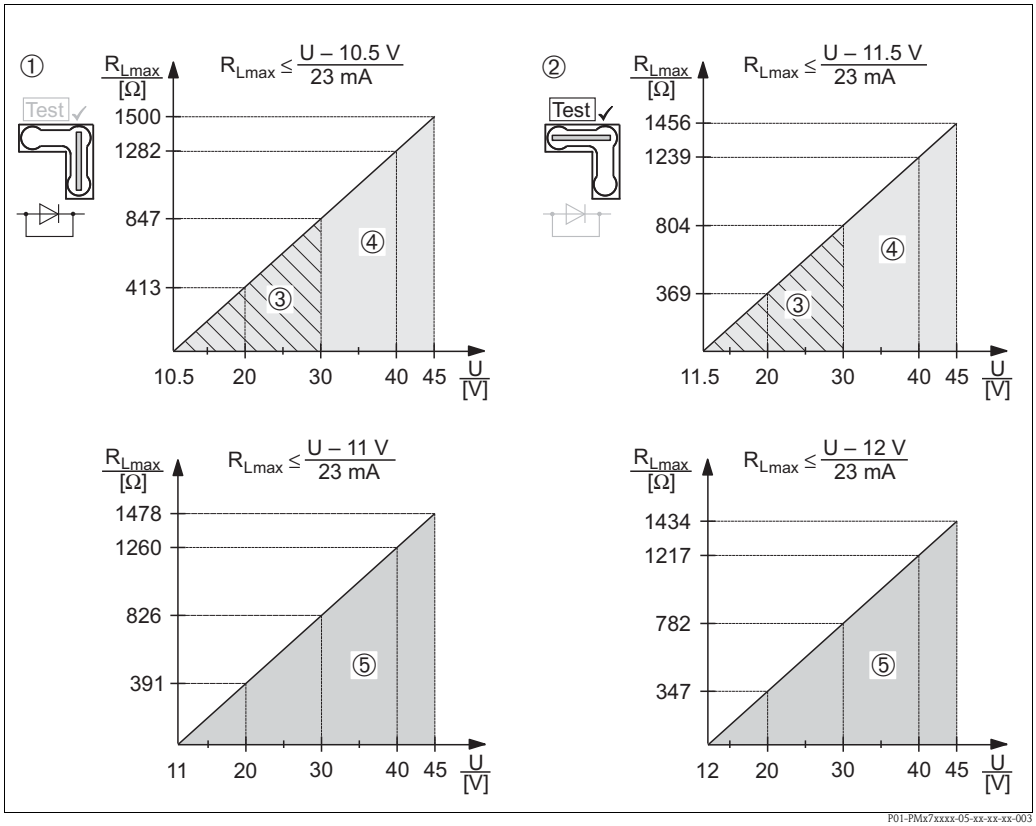
Signal on alarm

As per NAMUR NE 43

- 4...20 mA HART
  Options:
  - Max. alarm*: can be set from 21...23 mA
  - Keep measured value: last measured value is kept
  - Min. alarm: 3.6 mA

  * Factory setting: 22 mA
- PROFIBUS PA: can be set in the Analog Input block,
  options: Last Valid Out Value, Fsafe Value (factory setting), Status bad
- FOUNDATION Fieldbus: can be set in the Analog Input Block,
  options: Last good Value, Fail Safe Value (factory setting), Wrong Value

Load – 4...20 mA HART



Load diagram, observe the position of the jumper and the explosion protection. (→ 🖹 17, section "Taking 4...20 mA test signal" .)

1 Jumper for the 4...20 mA test signal inserted in "Non-test" position
2 Jumper for the 4...20 mA test signal inserted in "Test" position
3 Supply voltage 10.5 (11.5)...30 V DC for 1/2 G, 1 GD, 1/2 GD, FM IS, CSA IS, IECEx ia, NEPSI Ex ia
4 Supply voltage10.5 (11.5)...45 V DC for devices for non-hazardous areas, 1/2 D, 1/3 D, 2 G Ex d, 3 G Ex nA, FM XP, FM DIP, FM NI, CSA XP, CSA Dust-Ex, NEPSI Ex d
5 Supply voltage 11 (12)...45 V DC for PMC71, Ex d[ia], NEPSI Ex d[ia]
R_{Lmax} Maximum load resistance
U Supply voltage

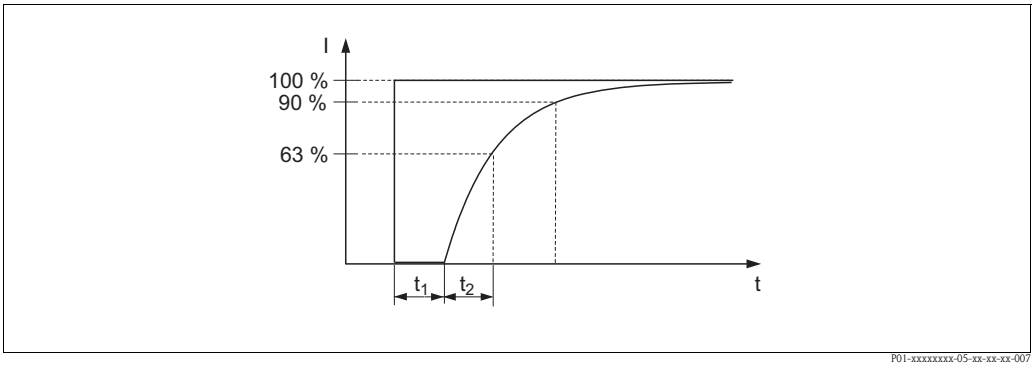
Note!
When operating via a handheld terminal or via PC with an operating program, a minimum communication resistance of 250 Ω must exist within the loop.

Resolution

- Current output: 1 μA
- Display: can be set (factory setting: presentation of the maximum accuracy of the transmitter)

Dynamic behavior current output

Dead time, Time constant (T63)



Presentation of the dead time and the time constant

Type	Dead time t_1	Time constant (T63), t_2
PMC71	90 ms	120 ms
PMP71	45 ms	■ 400 mbar measuring cell: 70 ms ■ measuring cells ≥ 1 bar: 35 ms
PMP75	PMP71 + influence from the diaphragm seal	

Dynamic behavior HART

Dead time, Time constant (T63)

A typical parametrization for the PLC of 3 to 4 values per second results in the following total dead time:

Type	Dead time t_1	Time constant (T63), t_2
PMC71	90 ms	120 ms
PMP71	45 ms	■ 400 mbar measuring cell: 70 ms ■ measuring cells ≥ 1 bar: 35 ms
PMP75	PMP71 + influence from the diaphragm seal	

Reading cycle

- HART commands: on average 3 to 4 per second on average.
  The Cerabar S commands the BURST MODE functionfor cyclic value transmission via the HART communication protocol.

Response time

≤ 250 ms

Cycle time (Update time)

On average 250...330 ms.

Dynamic behavior PROFIBUS PA

Dead time, Time constant (T63)

A typical cyclic parametrization for the PLC of 20 values per second results in the following total dead time:

Type	Dead time t_1	Time constant (T63), t_2
PMC71	340 ms	120 ms
PMP71	295 ms	■ 400 mbar measuring cell: 70 ms ■ measuring cells ≥ 1 bar: 35 ms
PMP75	PMP71 + influence from the diaphragm seal	

Response time

- cyclic: approx. 10 ms per request
- acyclic: < 50 ms

All values are typical values.

Cycle time (Update time)

The cycle time in a bus segment in cyclic data communication depends on the number of devices, on the segment coupler used and on the internal PLC cycle time.

Dynamic behavior FOUNDATION Fieldbus

Dead time, Time constant (T63)

If the macro cycle time (Hostsystem) is set to a typical value of 250 ms, the following total dead time results:

Type	Dead time t_1	Time constant (T63), t_2
PMC71	340 ms	120 ms
PMP71	295 ms	■ 400 mbar measuring cell: 70 ms ■ measuring cells ≥ 1 bar: 35 ms
PMP75	PMP71 + influence from the diaphragm seal	

Reading cycle

- cyclic: up to 5/s, dependent on the number and type of function blocks used in a closed-control loop
- acyclic: 10/s

Response time

- cyclic: < 80 ms
- acyclic: < 40 ms

All values are typical values.

Cycle time (Update time)

250 ms

Damping

A damping affects all outputs (output signal, display).

- Via on-site display, handheld terminal or PC with operating program, continuous from 0...999 s
- Additionally for HART and PROFIBUS PA: via DIP-switch on the electronic insert, switch position "on" = set value and "off"
- Factory setting: 2 s

Data of the FOUNDATION Fieldbus interface

Basic Data

Device Type	1007F (hex)
Device Revision	06 (hex)
DD Revision	01 (hex)
CFF Revision	01 (hex)
ITK Version	5.0
ITK-Certification Driver-No.	IT054600
Link-Master (LAS) cabable	yes
Link Master / Basic Device selectable	yes; Default: Basic Device
Number VCRs	44
Number of Link-Objects in VFD	50

Virtual communication references (VCRs)

Permanent Entries	44
Client VCRs	0
Server VCRs	5
Source VCRs	8
Sink VCRs	0
Subscriber VCRs	12
Publisher VCRs	19

Link Settings

Slot time	4
Min. Inter PDU delay	12
Max. response delay	10

Transducer Blocks

Block	Content	Output values
TRD1 Block	contains all parameters related to the measurement	■ Pressure or level (channel 1) ■ Process temperature (channel 2)
Service Block	contains service information	■ Pressure after damping (channel 3) ■ Pressure drag indicator (channel 4) ■ Counter for max. pressure transgression (channel 5)
Diagnostic Block	contains diagnostic information	Error code via DI channels (channel 0 to 16)
Display Block	contains parameters to configure the local display	no output values

Function Blocks

Block	Content	Number of Function Blocks	Execution time	Functionality
Resource Block	The Resource Block contains all the data that uniquely identifies the field device. It is an electronic version of a nameplate of the device.			enhanced
Analog Input Block 1 Analog Input Block 2	The AI block takes the manufacturer's input data, selected by channel number, and makes it available to other function blocks at its output. Enhancement: digital outputs for process alarms, fail safe mode		45 ms	enhanced
Digital Input Block	This block contains the discrete data of the diagnose block (selectable via a channel number 0 to 16) and provides them for the blocks at the output.		40 ms	standard
Digital Output Block	This block converts the discrete input and thus initiates an action (selectable via a channel number) in the dp flow block or in the service block. Channel 1 resets the counter for max. pressure transgressions..		60 ms	standard
PID Block	The PID block serves as proportional-integral-derivative controller and is used almost universally to do closed-loop-control in the field including cascade and feedforward. Input IN can be indicated on the display. The selection is performed in the display block (DISPLAY_MAIN_LINE_CONTENT).		120 ms	standard
Arithmetic Block	This block is designed to permit simple use of popular measurement math functions. The user does not have to know how to write equations. The math algorithm is selected by name, chosen by the user for the function to be done.		50 ms	standard
Input Selector Block	The input selector block provides selection of up to four inputs and generates an output based on the configured action. This block normally receives its inputs from AI blocks. The block performs maximum, minimum, middle, average and 'first good' signal selection. INPUT IN1 to IN4 can be indicated on the display. The selection is performed in the display block (DISPLAY_MAIN_LINE_CONTENT).		35 ms	standard
Signal Characterizer Block	The signal characterizer block has two sections, each with an output that is a non-linear function of the respective input. The non-linear function is determined by a single look-up table with 21 arbitrary x-y pairs.		30 ms	standard
Integrator Block	The Integrator Function Block integrates a variable as a function of the time or accumulates the counts from a Pulse Input block. The block may be used as a totalizer that counts up until reset or as a batch totalizer that has a setpoint, where the integrated or accumulated value is compared to pre-trip and trip settings, generating discrete signals when these settings are reached.		35 ms	standard
Analog Alarm Block	This block contains all process alarm conditions (working like a comparator) and represents them at the output.		35 ms	standard

Additional Function Block informations:

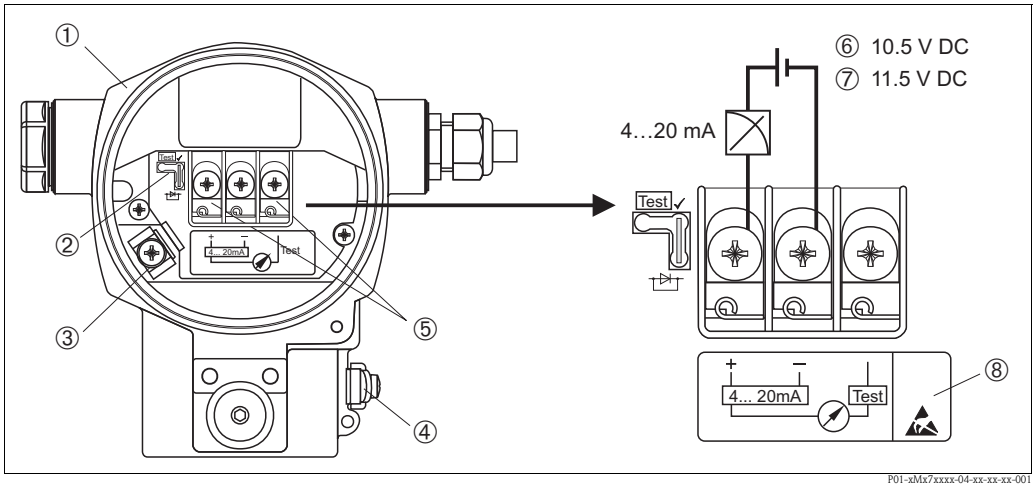
Instantiate Function Block	YES
Number of instantiate blocks	15

Power supply

Electrical connection

Note!
- When using the measuring device in hazardous areas, installation must comply with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings. → 📄 90 ff, sections "Safety Instructions" and "Installation/Control Drawings".
- Devices with integrated overvoltage protection must be earthed. → 📄 29.
- Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.

4...20 mA HART



Electrical connection 4...20 mA HART

1 Housing
2 Jumper for 4...20 mA test signal → 📄 17, section "Taking 4...20 mA test signal".
3 Internal earth terminal
4 External earth terminal
5 4...20 mA test signal between plus and test terminal
6 Minimum supply voltage 10.5 V DC, if the jumper is inserted in accordance with the illustration.
7 Minimum supply voltage 11.5 V DC, if the jumper is inserted in "Test" position.
8 Devices with integrated overvoltage protection are labelled OVP (overvoltage protection) here (→ 📄 29).

PROFIBUS PA

The digital communication signal is transmitted to the bus via a 2-wire connection. The bus also provides the auxiliary energy. For further information on the network structure and grounding and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA034S "Guidelines for planning and commissioning PROFIBUS DP/PA" and the PNO Guideline.

Cable specifications:
- Use a twisted, shielded two-wire cable, preferably cable type A

Note!
For further information on the cable specifications, see Operating Instructions BA034S Guidelines for planning and commissioning PROFIBUS DP/PA", PNO Guideline 2.092 " PROFIBUS PA User and Installation Guideline" and IEC 61158-2 (MBP).

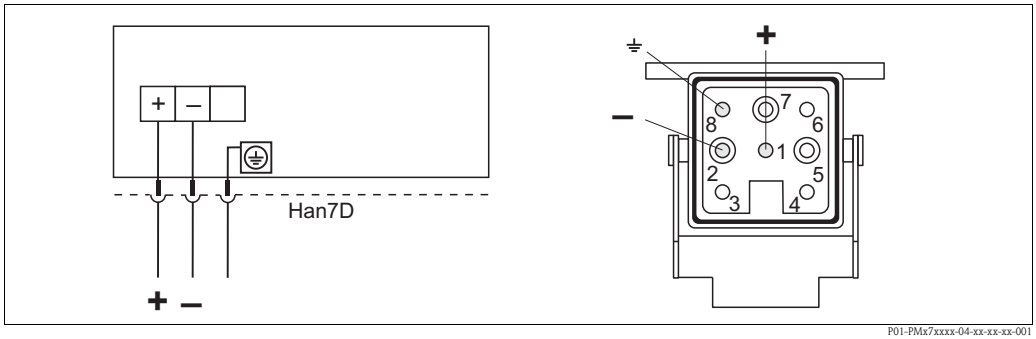
FOUNDATION Fieldbus

The digital communication signal is transmitted to the bus via a 2-wire connection. The bus also provides the auxiliary energy. For further information on the network structure and grounding and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA013S "FOUNDATION Fieldbus Overview" and the FOUNDATION Fieldbus Guideline.

Cable specifications:
- Use a twisted, shielded two-wire cable, preferably cable type A

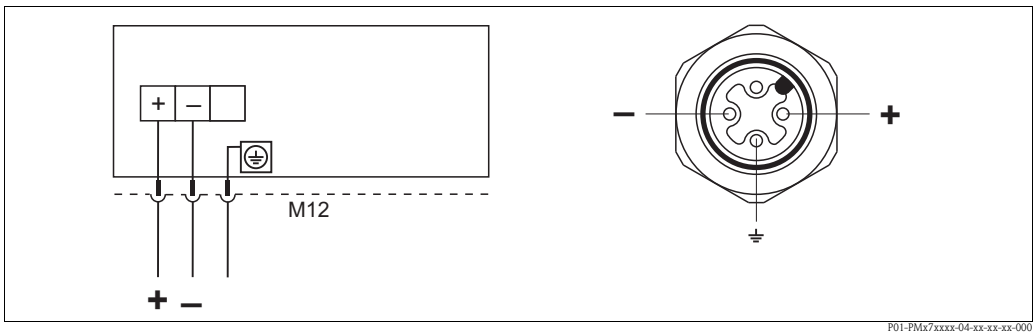
Note!
For further information on the cable specifications, see Operating Instructions BA013S "FOUNDATION Fieldbus Overview", FOUNDATION Fieldbus Guideline and IEC 61158-2 (MBP).

Devices with Harting plug Han7D



Left: electrical connection for devices with Harting plug Han7D
Right: view of the plug connector at the device

Devices with M12 plug



Left: electrical connection for devices with M12 plug
Right: view of the plug at the device

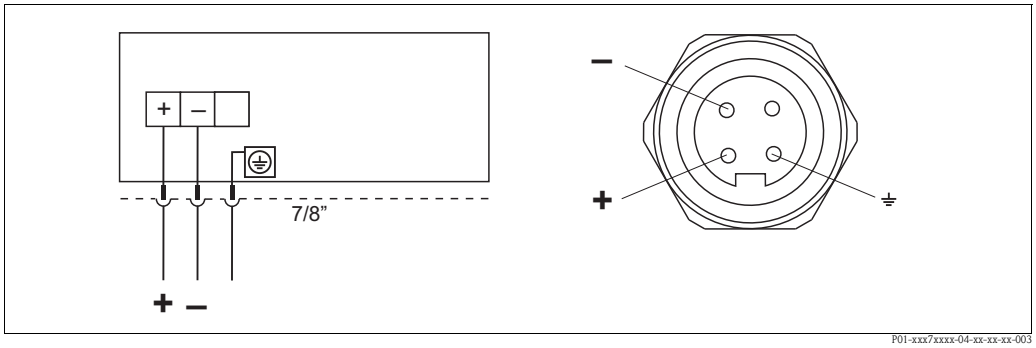
Endress+Hauser offers for devices with M12 plug the following accessories:

Plug-in jack M 12x1, straight
- Material: Body PA; coupling nut CuZn, nickel-plated
- Degree of protection (fully locked): IP67
- Order number: 52006263

Plug-in jack M 12x1, elbowed
- Material: Body PBT/PA; coupling nut GD-Zn, nickel-plated
- Degree of protection (fully locked): IP67
- Order number: 51006327

Cable 4x0.34 mm^2 with M12 socket, elbowed, screw plug, 5 m length
- Material: Body PUR; coupling nut CuSn/Ni; cable PVC
- Degree of protection (fully locked): IP67
- Order number: 52010285

Devices with 7/8" plug



Left: electrical connection for devices with 7/8" plug
Right: view of the plug at the device

Kabel gland

Approval	Typ	Clamping range
Standard, II1/2G Exia, IS	Plastic M20x1.5	5...10 mm
ATEX II1/2D, II1/3D, II1/2GD Exia, II1GD Exia II3G Ex nA	Metal M20x1.5 (Ex e)	7...10.5 mm

Terminals

for wire cross-sections of 0.5 to 2.5 mm^2

Taking 4...20 mA test signal

A 4...20 mA signal may be measured via the positive and test terminal without interrupting the measurement. The minimum supply voltage of the device can be reduced by simply changing the position of the jumper. As a result, operation is also possible with lower voltage sources. Observe the position of the jumper in accordance with the following table.

Jumper position for test signal	Description
	– Taking 4...20 mA test signal via plus and test terminal: possible. (Thus, the output current can be measured without interruption via the diode.) – Delivery status – minimum supply voltage: 11.5 V DC
	– Taking 4...20 mA test signal via plus and test terminal: not possible. – minimum supply voltage: 10.5 V DC

Supply voltage

Note!
- When using the measuring device in hazardous areas, installation must comply with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings.
- All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas.
  → 📄 90 ff sections "Safety Instructions" and "Installation/Control Drawings".

4...20 mA HART

- Version for non-hazardous areas, jumper for 4...20 mA test signal in "Test" position (delivery status): 11.5...45 V DC
- Version for non-hazardous areas, jumper for 4...20 mA test signal in "Non-test" position: 10.5...45 V DC

PROFIBUS PA

- Version for non-hazardous areas: 9...32 V DC

FOUNDATION Fieldbus

- Version for non-hazardous areas: 9...32 V DC

Current consumption

- PROFIBUS PA: 13 mA ± 1 mA, switch-on current corresponds to IEC 61158-2, Clause 21
- FOUNDATION Fieldbus: 15 mA ± 1 mA, switch-on current corresponds to IEC 61158-2, Clause 21

Cable entry

→ 📄 77 ff, feature 30 "Ordering information".

Cable specification

- Endress+Hauser recommends using shielded, twisted-pair two-wire cables.
- Terminals for wire cross-sections 0.5...2.5 mm^2
- Cable external diameter: 5...9 mm

Residual ripple

Without influence on 4...20 mA signal up to ± 5% residual ripple within the permitted voltage range [according to HART hardware specification HCF_SPEC-54 (DIN IEC 60381-1)]

Influence of power supply

≤ 0.0006% of URL/1 V

Performance characteristics – general

Reference operating conditions

- As per IEC 60770
- Ambient temperature T_U = constant, in the range of: +21...+33°C (+69.8...+91.4°F)
- Humidity φ = constant, in the range of: 5...80 % r.H
- Ambient pressure p_U = constant, in the range of: 860...1060 mbar
- Position of the measuring cell: constant, in the range of: ±1°
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Zero based span
- Process isolating diaphragm material PMC71: Al_2O_3 (Aluminium oxide ceramic)
- Process isolating diaphragm material PMP71 and PMP75: AISI 316L/1.4435
- Filling oil PMP71 and PMP75: silicone oil
- Supply voltage: 24 V DC ± 3 V DC
- Load with HART: 250 Ω

Uncertainty of measurement for small absolute pressure ranges

The smallest extended uncertainty of measurement that can be returned by our standards is:
- 0.4% of the set span in the range of 1...30 mbar and
- 1% of the set span in the range < 1 mbar.

Long-term stability

PMC71/PMP71/PMP75:
- For measuring ranges ≥ 1 bar: ± 0.05 % of URL/year

PMC71:
- 100 mbar ... 40 bar: ±0.2 % of URL/10 years
- 100 mbar ... 40 bar (absolute pressure sensor): ±0.3 % of URL/10 years

PMP71 gauge pressure sensors:

	1 year	5 years	10 year
Measuring range [bar]	**% of URL**		
1	±0.020	±0.080	±0.180
10	±0.025	±0.050	±0.075
40	±0.025	±0.075	±0.100
100	±0.050	±0.150	±0.200
400	–	–	1

Influence of the installation position

- PMC71 [1]: ≤ 0.18 mbar
- PMP71 [1, 2]
  - Process connections thread G 1 A, G 1 1/2, G 2, 1 1/2 MNPT, 2 MNPT, M44x1.25, EN/DIN, ANSI and JIS flanges: ≤ 10 mbar
  - Process connections thread: G 1/2, 1/2 MNPT, JIS G 1/2, JIS R 1/2, M20x1.5: ≤ 4 mbar

1) Device rotated 180°, process connection pointing upwards.
2) This value is doubled for devices with inert oil.

Note!
Position-dependent zero shift can be corrected. → 🖹 24, section "General installation instructions" and → 🖹 74 ff section "Installation instructions".

Performance characteristics – ceramic process isolating diaphragm

Reference accuracy – PMC71

The reference accuracy comprises the non-linearity according to limit point setting, hysteresis and non-reproducibility as per IEC 60770. The data refer to the calibrated span.

Measuring cell	Gauge pressure sensor	Absolute pressure sensor
	% of the set span	
100 mbar	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD	■ TD 1:1 to TD 5:1 = ±0.075 ■ TD > 5:1 = ±0.015 x TD
250 mbar	■ TD 1:1 to TD 15:1 = ±0.075 ■ TD > 15:1 = ±0.005 x TD	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD
400 mbar, 1 bar, 2 bar, 4 bar, 10 bar	■ TD 1:1 to TD 15:1 = ±0.075 ■ TD > 15:1 = ±0.005 x TD	■ TD 1:1 to TD 15:1 = ±0.075 ■ TD > 15:1 = ±0.005 x TD
40 bar	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD
Platinum version: 1 bar, 2 bar, 4 bar, 10 bar	■ TD 1:1 = ±0.05	■ TD 1:1 = ±0.05

Total performance – PMC71

The "Total performance" specification comprises the non-linearity including hysteresis, non-reproducibility as well as the thermal change of the zero point.

Measuring cell	PMC71	PMC71 High temperature version
	% of URL	
100 mbar, 250 mbar, 400 mbar	±0.2	±0.46
1 bar, 2bar, 4 bar, 10 bar, 40 bar	±0.15	±0.46
All specifications apply to the temperature range –10...+60°C (+14...+140°F).		

Total Error - PMC71

The total error comprises the long-term stability and the total performance:

Measuring cell	PMC71	PMC71 High temperature version
	% of URL/year	
100 mbar, 250 mbar, 400 mbar	±0.25	±0.51
1 bar, 2bar, 4 bar, 10 bar, 40 bar	±0.2	±0.51

Warm-up period – PMC71

- 4...20 mA HART : < 10 s
- PROFIBUS PA: 6 s
- FOUNDATION Fieldbus: 50 s

Thermal change of the zero output and the output span – PMC71

PMC71

Measuring cell	–10...+60 °C (+14...+140 °F)	–20...–10 °C, +60...+125 °C (–4...+14°F, +140...+257°F)
	% of the set span	
100 mbar, 250 mbar, 400 mbar	±(0.088 x TD + 0.088)	±(0.138 x TD + 0.138)
1 bar, 2bar, 4 bar, 10 bar, 40 bar	±(0.088 x TD + 0.04)	±(0.175 x TD + 0.075)

PMC71 High temperature version

Measuring cell	–10...+60 °C (+14...+140 °F)	–20...–10 °C, +60...+150 °C (–4...+14°F, +140...+302°F)
	% of the set span	
100 mbar, 250 mbar, 400 mbar	±(0.088 x TD + 0.088)	—
1 bar, 2bar, 4 bar, 10 bar, 40 bar	±(0.088 x TD + 0.04)	±(0.50 x TD)
100 mbar (Absolute pressure sensor)	—	±(1.25 x TD)
250 mbar, 400 mbar, 1 bar, 2 bar, 4 bar, 10 bar (Absolutdrucksensor)	—	±(0.75 x TD)
40 bar (Absolute pressure sensor)	—	±(0.50 x TD)

Performance characteristics – metallic process isolating diaphragm

Reference accuracy – PMP71, PMP75

The reference accuracy comprises the non-linearity according to limit point setting, hysteresis and non-reproducibility as per IEC 60770. The data refer to the calibrated span.

Measuring cell	Sensor	without capillary (PMP71 and PMP75)	with capillary (only PMP75)
		% of the set span	
400 mbar	Gauge pressure/ Absolute pressure	■ TD 1:1 = ±0.15 ■ TD > 1:1 = ±0.15 x TD	■ TD 1:1 = ±0.15 ■ TD > 1:1 = ±0.15 x TD
1 bar	Gauge pressure/ Absolute pressure	■ TD 1:1 to TD 2.5:1 = ±0.075 ■ TD > 2.5:1 = ±0.03 x TD	■ TD 1:1 to TD 2.5:1 = ±0.1 ■ TD > 2.5:1 = ±0.04 x TD
2 bar	Gauge pressure	■ TD 1:1 to TD 5:1 = ±0.075 ■ TD > 5:1 = ±0.015 x TD	■ TD 1:1 to TD 2.5:1 = ±0.1 ■ TD > 2.5:1 = ±0.04 x TD
2 bar	Absolute pressure	■ TD 1:1 to TD 5:1 = ±0.075 ■ TD > 5:1 = ±0.015 x TD	■ TD 1:1 to TD 5:1 = ±0.075 ■ TD > 5:1 = ±0.015 x TD
4 bar	Gauge pressure/ Absolute pressure	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD
10 bar, 40 bar	Gauge pressure/ Absolute pressure	■ TD 1:1 to TD 15:1 = ±0.075 ■ TD > 15:1 = ±0.005 x TD	■ TD 1:1 to TD 15:1 = ±0.075 ■ TD > 15:1 = ±0.005 x TD
100 bar	Gauge pressure/ Absolute pressure	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD	■ TD 1:1 to TD 10:1 = ±0.075 ■ TD > 10:1 = ±0.0075 x TD
400 bar	Gauge pressure/ Absolute pressure	■ TD 1:1 to TD 5:1 = ±0.15 ■ TD > 5:1 = ±0.03 x TD	■ TD 1:1 to TD 5:1 = ±0.15 ■ TD > 5:1 = ±0.03 x TD
700 bar (only PMP71)	Absolute pressure	■ TD 1:1 to TD 5:1 = ±0.15 ■ TD > 5:1 = ±0.03 x TD	—
Platinum version [1] 1 bar, 2 bar, 4 bar, 10 bar, 40 bar, 100 bar	Gauge pressure/ Absolute pressure	■ TD 1:1 = ±0.05	—

1) Platinum version not for flush-mounted process connections G 1/2 and M20.

Total performance – PMP71

The "Total performance" specification comprises the non-linearity including hysteresis, non-reproducibility as well as the thermal change of the zero point.

Measuring cell	PMP71	PMP71 with Gold-Rhodium-coated process isolating diaphragm
	% of URL	
400 mbar	±0.25	±1.25
1 bar	±0.15	±0.75
2 bar	±0.15	±0.45
4 bar	±0.15	±0.3
10 bar, 40 bar	±0.15	±0.15
100 bar	±0.25	±0.25
400 bar	±0.3	±0.3
700 bar	±0.3	±0.3
All specifications apply to the temperature range –10...+60°C (+14...+140°F).		

Total Error - PMP71

The total error comprises the long-term stability and the total performance:

Measuring cell	% of URL/year
400 mbar	■ ±0.3
1 bar, 2 bar, 4 bar, 10 bar, 40 bar	■ ±0.2
100 bar	■ ±0.3
400 bar	■ ±0.35
700 bar	■ ±0.35

Warm-up period – PMP71, PMP75

- 4...20 mA HART : < 10 s
- PROFIBUS PA: 6 s
- FOUNDATION Fieldbus: 50 s

Thermal change of the zero output and the output span – PMP71 and PMP75

PMP71 and PMP75 (basic device)

Measuring cell	–10...+60 °C (+14...+140°F)	–40...–10 °C, +60...+85 °C (–40...+14°F, +140...+185°F)
	% of the set span	
400 mbar	±(0.2 x TD + 0.015)	±(0.4 x TD + 0.03)
1 bar, 2 bar, 4 bar, 10 bar, 40 bar	±(0.1 x TD + 0.01)	±(0.4 x TD + 0.02)
100 bar	±(0.2 x TD + 0.015)	±(0.4 x TD + 0.03)
400 bar	±(0.35 x TD + 0.02)	±(0.7 x TD + 0.04)
700 bar	±(0.35 x TD + 0.02)	±(0.7 x TD + 0.04)

Note!
When using a PMP75, the influence from the respective diaphragm seal must be taken into account.
(→ 🖹 68 ff "Planning instructions, diaphragm seal systems" and → 🖹 47 ff "Process connections PMP75 (with metallic process isolating diaphragm)").

Operating conditions (installation)

General installation instructions

- For PMP75: → 📄 74, "Installation instructions" section.
- The position-dependent zero shift can be corrected directly at the device via operating key, for devices with external operation even in hazardous areas. Diaphragm seals also shift the zero point, depending on the installation position.
  (→ 📄 74 ff, section "Installation instructions").
- The housing of the Cerabar S can be rotated up to 380°. → 📄 27, section "Turn the housing".
- Endress+Hauser offers a mounting bracket for installing on pipes or walls. → 📄 25, section "Wall and pipe-mounting".

Installation instructions for devices without diaphragm seal – PMC71 and PMP71

Cerabar S transmitters without diaphragm seal are mounted as per the norms for a manometer (DIN EN 837-2). We recommend the use of shut-off devices and siphons. The orientation depends on the measuring application.

Pressure measurement in gases

- Mount Cerabar S with shut-off device above the tapping point so that condensate can flow into the process.

Pressure measurement in steams

- Mount Cerabar S with siphon above the tapping point.
  The siphon reduces the temperature to almost ambient temperature.
- Fill the siphon with fluid before commissioning.

Pressure measurement in liquids

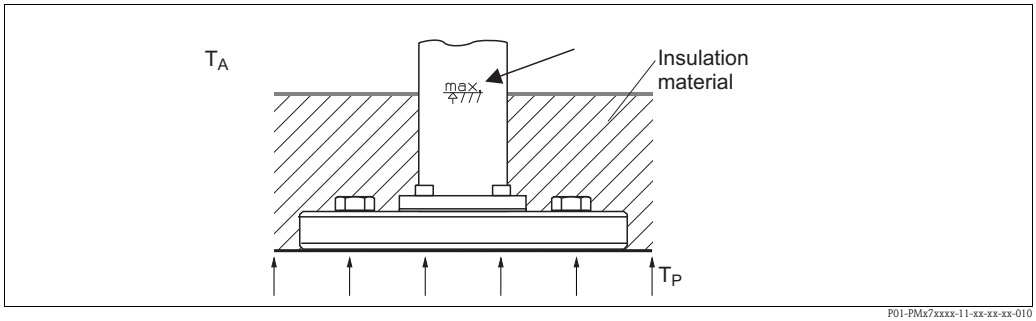
- Mount Cerabar S with shut-off device below or at the same level as the tapping point.

Level measurement

- Mount Cerabar S below the lowest measuring point.
- Do not mount the device at the following positions:
  In the fill flow, in the tank outlet or at a point in the container which could be affected by pressure pulses from an agitator or a pump.
- The calibration and functional test can be carried out more easily if you mount the device after a shut-off device.

Heat insulation – PMC71 high temperature version and PMP75

The PMC71 high temperature version and the PMP75 must only be insulated up to a certain height. The maximum permitted insulation height is labelled on the devices and applies to an insulation material with a heat conductivity ≤ 0.04 W/(m x K) and to the maximum permitted ambient and process temperature (→ see table below). The data were determined under the most critical application "quiescent air".

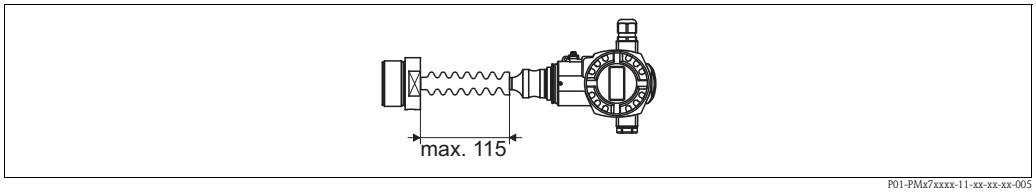


Maximum insulation height, here e.g. PMC71 with flange

	PMC71 high temperature version	**PMP75**
Ambient temperature (T_A)	≤ 70°C (158°F)	≤ 70°C (158°F)
Process temperature (T_P)	≤ 150°C (302°F)	max. 350°C (662°F), depending on the diaphragm seal filling oil used (→ 📄 69)

Mounting with temperature isolator

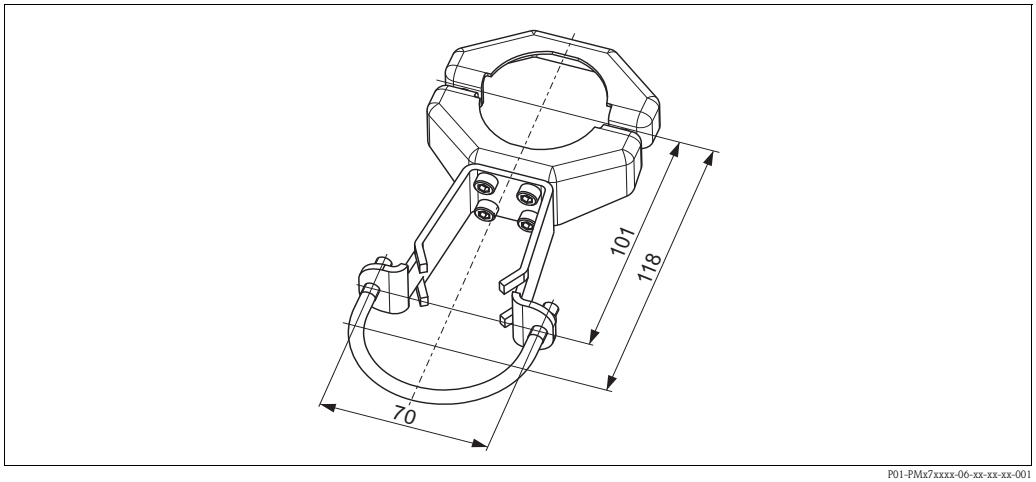
Endress+Hauser recommends the use of temperature isolators in the event of constant extreme fluid temperatures which lead to the maximum permissible ambient temperature of +85°C (+185°F) being exceeded. Depending on the filling oil used, Cerabar S devices with temperature isolators can be used for maximum temperatures of up to 260°C (+500°F). → For the temperature application limits of filling oils, → 🖹 69, "Diaphragm seal filling oil" section.
To minimise the influence of rising heat, Endress+Hauser recommends the device be mounted horizontally or with the housing pointing downwards.
The additional installation height also brings about a zero point shift of maximum 21 mbar due to the hydrostatic columns in the temperature isolator. The position-dependent zero shift can be corrected.



PMP75 with temperature isolator

Wall and pipe-mounting

Endress+Hauser offers a mounting bracket for installing the device on pipes or walls. → 🖹 77 ff, feature 110, "Additional options 2".



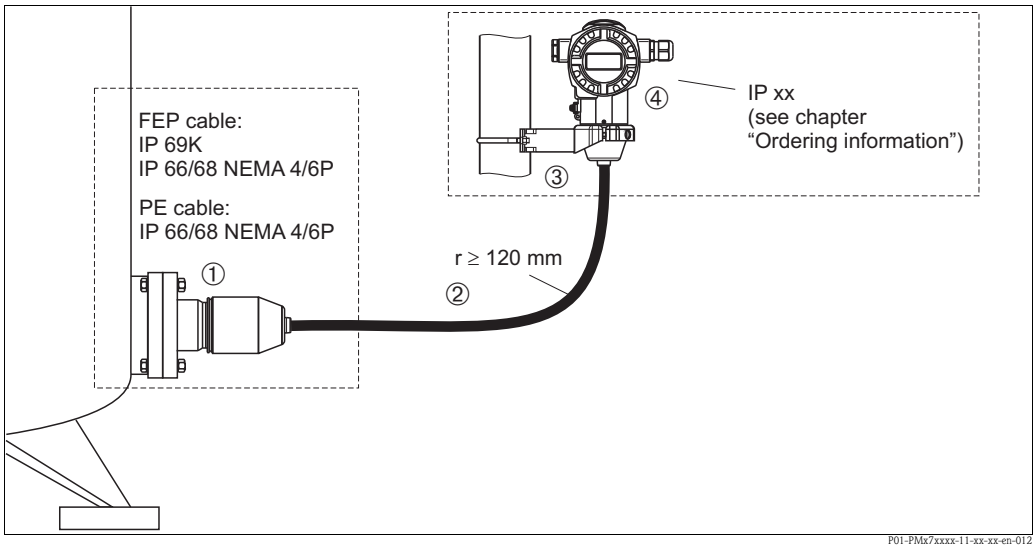
"Separate housing" version

With the "separate housing" version, you are able to mount the housing with the electronics insert at a distance from the measuring point. This facilitates zero-interference measurement:
- Under particularly difficult measuring conditions (at installation locations that are cramped or difficult to access)
- If rapid cleaning of the measuring point is required
- If the measuring point is exposed to vibrations.

You can choose between different cable versions:
- PE (2 m, 5 m and 10 m)
- FEP (5 m).

→ 77 ff, Feature 110, "Additional options 2", Version "G".

For the dimensions, → 60.



In the case of the "separate housing" version, the sensor is delivered with the process connection and cable ready mounted. The housing and a mounting bracket are enclosed as separate units. The cable is provided with a socket at both ends. These sockets are simply connected to the housing and the sensor.

1 Process connection with sensor
2 Cable, both ends are fitted with a socket
3 Mounting bracket provided, suitable for pipe and wall mounting
4 Housing with electronic insert

Degree of protection for the process connection with sensor with the use of
- FEP cable:
  - IP 69K
  - IP 66 NEMA 4/6P
  - IP 68 (1.83 mH_2O for 24 h) NEMA 4/6P
- PE cable:
  - IP 66 NEMA 4/6P
  - IP 68 (1.83 mH_2O for 24 h) NEMA 4/6P

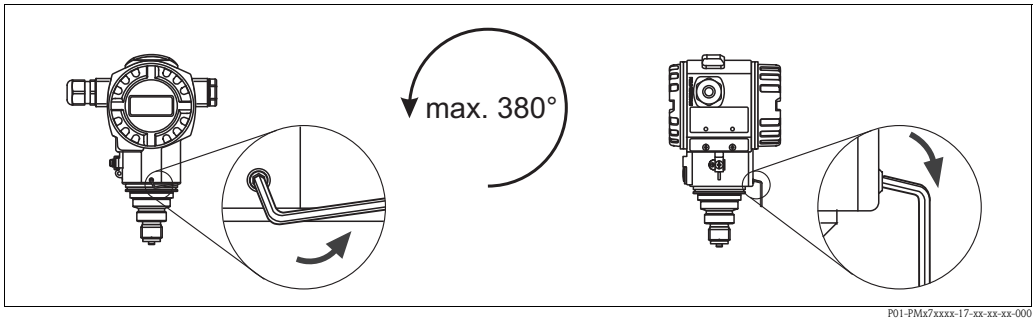
Technical data of the PE and FEP cable:
- Minimum bending radius: 120 mm (4.72 inch)
- Cable extraction force: max. 450 N
- Resistance to UV light

Use in hazardous area:
- Intrinsically safe installations (Ex ia/IS)
- FM/CSA IS: for Div.1 installatin only

Turn the housing

The housing can be rotated up to 380° after loosening the Allen screw.

Your benefits
- Simple mounting by optimally aligning the housing
- Good, accessible device operation
- Optimum readability of the on-site display (optional).



Align the housing by loosening the Allen screw.
T14 housing: 2 mm Allen key; T17 housing: 3 mm Allen key

Oxygen applications

Oxygen and other gases can react explosively to oils, grease and plastics, such that, among other things, the following precautions must be taken:
– All components of the system, such as measuring devices, must be cleaned in accordance with the BAM (DIN 19247) requirements.
– Dependent on the materials used, a certain maximum temperature and a maximum pressure for oxygen applications must not be exceeded.

The devices suitable for gaseous oxygen applications are listed in the following table with the specification p_{max}.

Order code for devices cleaned for oxygen applications	**p_{max} for oxygen applications**	**T_{max} for oxygen applications**
PMC71 – * * * ** * ** 2 * *, Devices with sensors, nominal value < 10 bar	Overpressure limit (OPL) of sensor[1, 2]	60°C (140°F)
PMC71 – * * * ** * ** 2 * *, Devices with sensors, nominal value ≥ 10 bar	30 bar	60°C (140°F)
PMP71 – * * * ** * * ** N * *	Depends on the weakest link in terms of pressure of the selected components: over pressure limit (OPL) of sensor[1] or process connection (1.5 x PN) or filling fluid (160 bar)	85°C (185°F)
PMP75 – * * * ** * * * ** N * *	Depends on the weakest link in terms of pressure of the selected components: over pressure limit (OPL) of sensor[1] or process connection (1.5 x PN) or filling fluid (160 bar)	85°C (185°F)

1) → 🖹 77 ff "Ordering information", feature 40 "Sensor range; sensor overload limit (= OPL)"

2) PMC71 with PVDF thread or flange p_{max} = 15 bar (225 psi)

Silicone-free applications

Cleaning of the transmitter for the use e.g. in paint shops → 🖹 79 "Ordering information PMC71", feature 80 "Seal", version "L" and "M".

Ultra pure gas applications

Endress+Hauser also offers the degreased device for special applications, such as ultra pure gas.
No special restrictions regarding the process conditions apply to this device.

→ 🖹 79, "Ordering information PMC71", feature 80 "Seal" or → 🖹 83, "Ordering information PMC71", feature 90 "Fill fluid".

Applications with hydrogen

With regard to materials in which hydrogen build-up takes place, hydrogen atoms can diffuse through the metal process isolating diaphragm. This can result in incorrect measurement results.
Endress+Hauser offers process isolating diaphragms with Gold-Rhodium coating for this application.

→ 📄 82 "Ordering information PMP71" and → 📄 86 "Ordering information PMP75", feature 60 "Membrane material" version "6".

Operating conditions (environment)

Ambient temperature limits

- PMC71:
  - –40...+85°C (–40...+185°F)
  - High temperature version: –20...+70°C (–4...+158°F)
    (Version "T" for feature 100 "Additional options 1" or feature 110 "Additional options 2"),
    → For the maximum insulation height see → 📄 25.
- PMP71: –40...+85°C (–40...+185°F)
  devices for lower temperatures on request
- PMP75: –40...+85°C (–40...+185°F)
  devices for lower temperatures on request
  → For the maximum insulation height see → 📄 25.
- On-site display: –20...+70°C (–4...+158°F)
  Extended temperature application range with restrictions in optical properties such as display speed and contrast: –40...+85°C (–40...+185°F)
- Separate housing: –40 to +60°C (–40 to +140°F)

Note!
For high-temperature applications, either a PMP75 with a temperature isolator or with a capillary can be used. If vibrations also occur in the application, Endress+Hauser recommends you use a PMP75 with a capillary. If a PMP75 with a temperature isolator or capillary is used, we recommend a suitable retaining unit for mounting (see "Wall and pipe-mounting" Section on → 📄 25).

For devices for use in hazardous areas, see Safety instructions, Installation or Control Drawing. (→ 📄 90, sections "Safety Instructions" and "Installation/Control Drawings".)

The device can be used in this temperature range. The values of the specification, such as thermal change, may be exceeded. → DIN 16086.

Storage temperature range

- –40...+ 90°C (–40...+ 194°F)
- On-site display: –40...+85°C (–40...+185°F)
- Separate housing: –40 to +60°C (–40 to +140°F)

Degree of protection

- → 📄 77 ff, feature 30 "Housing, Cable entry, Protection".
- Degree of protection IP 68 for T17 housing: 1.83 mH_2O for 24 h
- Seperate housing → 📄 26.

Climate class

Class 4K4H (air temperature: –20...55°C/–4...+131°F, relative humidity: 4...100%) fulfilled as per DIN EN 60721-3-4 (condensation possible)

1) With PMC71, avoid condensate in the device (avoid moisture collecting in the device).

Vibration resistance

Device/Additional option	Test standard	Vibration resistance
PMC71 [1]	GL	guaranteed for 3...25 Hz: ±1.6 mm; 25...100 Hz: 4 g in all 3 planes
PMP71		
PMP75 [2, 3]		
with mounting bracket	IEC 61298-3	guaranteed for 10...60 Hz: ±0.15 mm; 60...500 Hz: 2 g in all 3 planes

1) not for high temperature version with Ex d[ia], CSA XP or FM XP

2) with aluminium T14 housing only

3) For applications with high temperatures, either a PMP75 with a temperature isolator or with a capillary can be used. If vibrations also occur in the application, Endress+Hauser recommends using a PMP75 with a capillary. If a PMP75 with a temperature isolator or capillary is used, it must be mounted with a mounting bracket. (→ 🖹 25).

Electromagnetic compatibility

- Electromagnetic compatibility to EN 61326 and NAMUR recommendation EMC (NE21). For details refer to the declaration of conformity.
- With enhanced immunity against electromagnetic fields as per EN 61000-4-3: 30 V/m with closed cover [1]
- Maximum deviation: < 0.5% of span
- All EMC measurements were performed with a turn down (TD) = 2:1.

1) for devices with T14 housing

Overvoltage protection

- Overvoltage protection:
  - Nominal functioning DC voltage: 600 V
  - Nominal discharge current: 10 kA
- Surge current check $\hat{i}$ = 20 kA as per DIN EN 60079-14: 8/20 µs satisfied
- Arrester AC current check I = 10 A satisfied

→ 🖹 79 ff, feature 100 "Additional options 1" and feature 110 "Additional options 2", version "M Overvoltage protection".

Note!
Devices with integrated overvoltage protection must be earthed.

Operating conditions (Process)

Process temperature limits

PMC71 (with ceramic process isolating diaphragm)

- –25...+125°C (–13...+257°F)
- High temperature version: –20...+150°C (–4...+302°F)
  → 79, feature 100 "Additional options 1", Version "T".
- Observe the process temperature range of the seal. See also the following section "Process temperature range, seals".

Extreme jumps in temperature can result in temporary measuring errors. Temperature compensation takes effect after several minutes. Internal temperature compensation is faster the smaller the temperature jump and the longer the time interval.

PMP71 (with metallic process isolating diaphragm)

Description	Temperature operating range
Process connections with internal process isolating diaphragm	–40...+125°C (–40...+257°F) (+150 °C/302°F for max. one hour)
Process connections with flush-mounted process isolating diaphragm, G 1 A, G 1 1/2 A, G 2 A, 1 NPT, 1 1/2 NPT, 2 NPT, M 44 x 1.25, EN/DIN, ANSI and JIS flanges	–40...+100°C (–40...+212°F)
Process connections with flush-mounted process isolating diaphragm, G 1/2 A, M 20	–20...+85°C (–4...+185°F)

Lower temperatures on request.

PMP75 (with metallic process isolating diaphragm)

- depending on the diaphragm seal and filling oil from -70°C (-94°F) up to +400°C (+752°F). Observe the temperature application limits of the diaphragm seal oil. → 69, section "Diaphragm seal filling oils".

Note!
- Do not use diaphragm seals with 0.09 mm PTFE foil on AISI 316L (1.4435/1.4404) for vacuum applications, upper temperature limit +204°C (+400°F).
- For oxygen applications, observe → 27, section "Oxygen applications".

Process temperature range, seals

PMC71 (with ceramic process isolating diaphragm)

Version for feature 80 in the order code	Seal	Process temperature range
A, L	FKM Viton	–25...+125°C/150°C [1] (–13...+257°F/302°F)
B [2], [3]	EPDM (FDA 21CFR177.2600; 3A Class II; USP Class VI) DVGW (KTW, W270, W534), WRAS, ACS, NSF61	–20...+125°C/150°C [1] (–4...+257°F/302°F)
B [3]	EPDM	–20...+125°C (–4...+257°F)
D, M	Kalrez, Compound 4079	+5...+125°C/150°C [1] (+41...+257°F/302°F)
E	Chemraz, Compound 505	–10...+125°C/150°C [1] (+14...+257°F/302°F)
F [2, 4]	HNBR (FDA 21CFR177.2600; 3A Class II; KTW; AFNOR; BAM)	–25...+125°C (–13...+257°F)
F [4]	NBR	–10...+100°C (+14...+212°F)
G	FKM Viton, FDA	–5...+125°C (+23 ...+257°F)
1	FKM Viton, cleaned from oil and greace	–10...+125°C/150°C [1] (+14...+257°F/302°F)
2	FKM Viton, cleaned for oxygen service	–10...+60 °C (+14...+140°F)
The process temperature ranges specified here refer to permanent application of the PMC71. They may be exceeded for a short time (e.g. for cleaning).		

1) +150°C (+302°F): for high temperature version
→ 🖹 79, feature 100 "Additional options 1" and feature 110 "Additional options 2", Version "T".

2) These seals are used for devices with 3A-approved process connections.

3) With applications of saturated steam a Cerabar S with metallic process isolating diaphragm is to be used.

4) For devices with NBR or HNBR seals, the values for "Toatal Performance" (→ 🖹 20) and "Thermal change" (→ 🖹 21) must be multiplied by the factor 3.

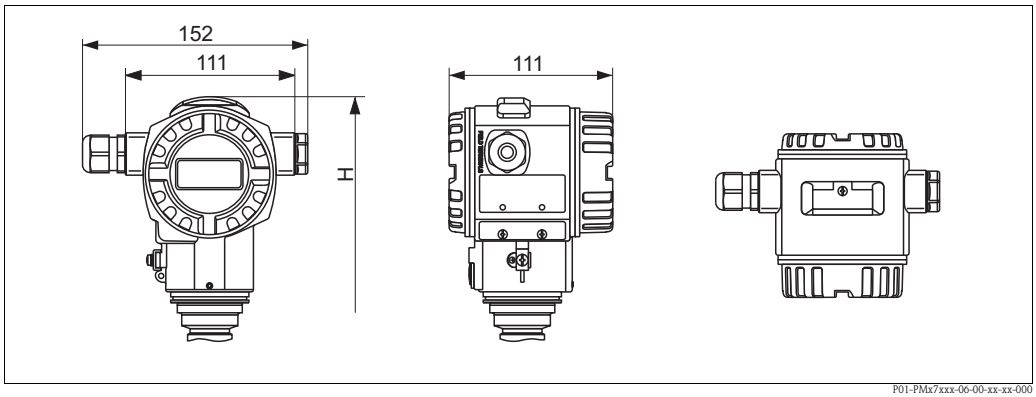
Pressure specifications

- The maximum pressure for the measuring device is dependent on the lowest-rated element with regard to pressure, see the following sections for this:
  – → 🖹 7 ff, section "Measuring range"
  – chapter "Mechanical construction".
  The MWP (maximum working pressure) is specified on the nameplate. This value refers to a reference temperature of 20°C (68°F) or 100°F for ANSI flanges and may be applied to the device for an unlimited time. Observe temperature dependency.
- The pressure values permitted at higher temperatures can be found in the following standards:
  – EN 1092-1: 2001 Tab. 18 [1]
  – ASME B 16.5a – 1998 Tab. 2-2.2 F316
  – ASME B 16.5a – 1998 Tab. 2.3.8 N10276
  – JIS B 2220.
- The test pressure corresponds to the over pressure limit of the measuring instrument (Over Pressure Limits OPL = 1.5 x MWP [2]) and may fit only temporally limited, so that no permanent damage develops.
- The Pressure Equipment Directive (EC Directive 97/23/EC) uses the abbreviation "PS". The abbreviation "PS" corresponds to the MWP (maximum working pressure) of the measuring device.
- In the case of sensor range and process connections where the OPL (Over pressure limit) of the pressure connection is smaller than the nominal value of the sensor, the device is set at the factory, at the very maximum, to the OPL value of the process connection. If you want to use the entire sensor range, select a process connection with a higher OPL value (1.5 x PN; PN = MWP).
- In oxygen applications, the values for "p_{max} and T_{max} for oxygen applications" as per → 🖹 27, "Oxygen applications" may not be exceeded.

1) With regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under 13EO in EN 1092-1 Tab. 18. The chemical composition of the two materials can be identical.
2) The equation does not apply for PMP71 and PMP75 with a 40 bar or 100 bar measuring cell.

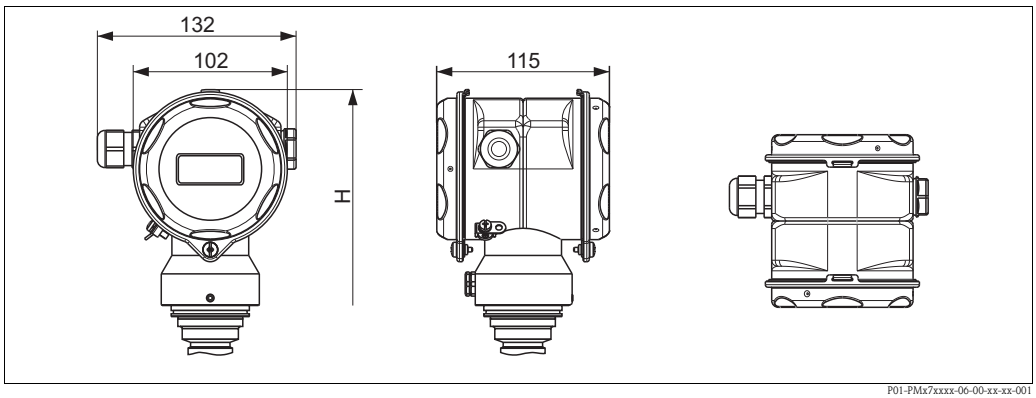
Mechanical construction

Housing dimensions T14



Front view, left-hand side view, top view
→ See the process connection in question for installation height. Housing weight → 61.

Housing dimensions T17

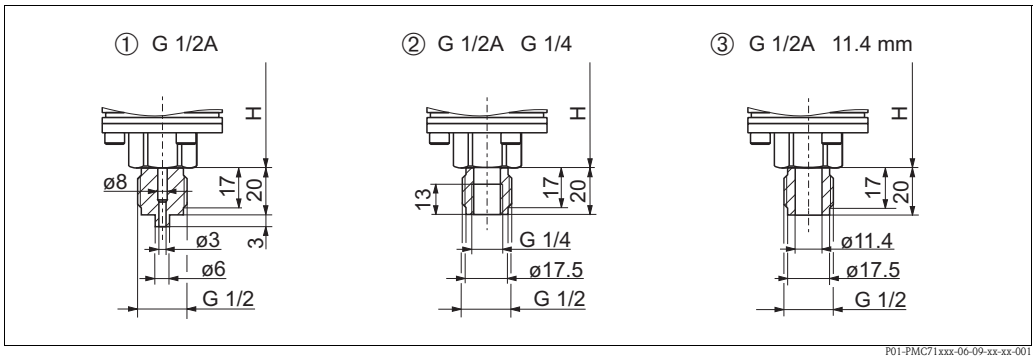


Front view, left-hand side view, top view
→ See the process connection in question for installation height. Housing weight → 61.

Process connections PMC71 (with ceramic process isolating diaphragm)

Note!
Some device versions have CRN approval. For a CRN-approved device, a CRN-approved process connection (→ 🖹 77, feature 70 "Process connection") has to be ordered with a CSA approval (→ 🖹 77, feature 10 "Approval"). These devices are fitted with a separate plate bearing the registration number 0F10525.5C.

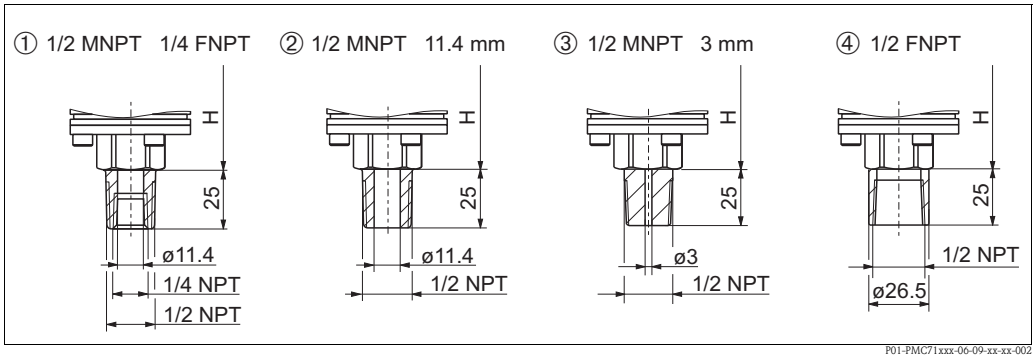
Thread, internal process isolating diaphragm



P01-PMC71xxx-06-09-xx-xx-001

Process connections PMC71, thread ISO 228
Installation height → 🖹 34.

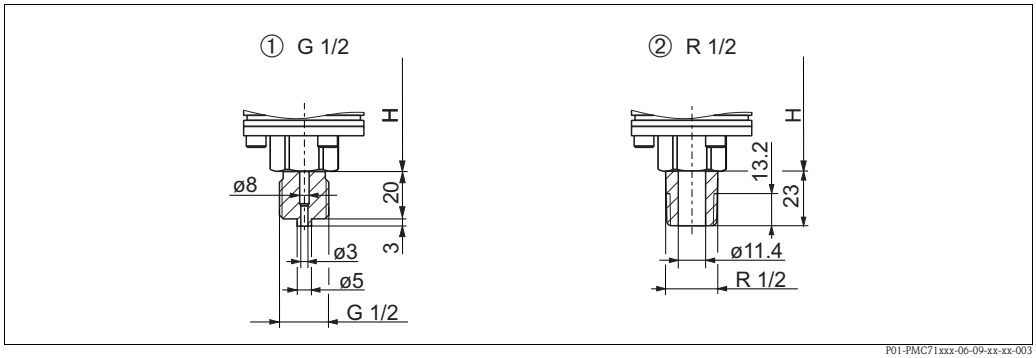
1 Thread ISO 228 G 1/2 A EN 837;
Material version GA: AISI 316L, version GB: Alloy C276/2.4819, version GC: Monel,
Version GD: PVDF (max.: 15 bar/225 psi, max.: –10...+60°C/+14...+140°F); mount version "GD" with a mounting bracket only (→ 🖹 25); Weight: 0.63 kg
2 Thread ISO 228 G 1/2 A G 1/4 (female);
Material version GE: AISI 316L, version GF: Alloy C276/2.4819, version GG: Monel; Weight: 0.63 kg
3 Thread ISO 228 G 1/2 A hole 11.4 mm;
Material version GH: AISI 316L, version GJ: Alloy C276/2.4819, version GK: Monel; Weight: 0.63 kg



P01-PMC71xxx-06-09-xx-xx-002

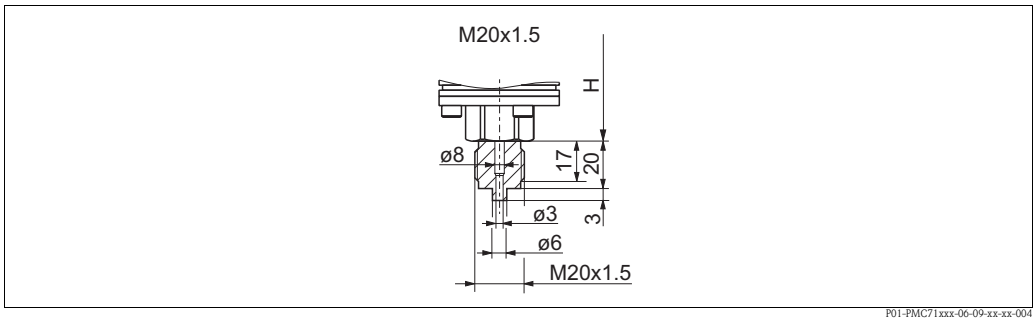
Process connections PMC71, thread ANSI
Installation height → 🖹 34.

1 Thread ANSI 1/2 MNPT 1/4 FNPT;
Material version RA: AISI 316L, version RB: Alloy C276/2.4819, version RC: Monel; Weight: 0.63 kg
2 Thread ANSI 1/2 MNPT hole 11.4;
Material version RD: AISI 316L, version RE: Alloy C276/2.4819, version RF: Monel; Weight: 0.63 kg
3 Thread ANSI 1/2 MNPT hole 3 mm;
Material version RG: PVDF(max.: 15 bar/225 psi, max.: –10...+60°C/+14...+140°F),
mount with mounting bracket only (→ 🖹 25); Weight: 0.63 kg
4 Thread ANSI 1/2 FNPT;
Material version RH: AISI 316L, version RJ: Alloy C276/2.4819, version RK: Monel; Weight: 0.63 kg



Process connections PMC71, thread JIS
Installation height → 📄 34.

1 Version GL: thread JIS B0202 G 1/2 (male), material: AISI 316L; Weight: 0.63 kg
2 Version RL: thread JIS B0203 R 1/2 (male), material: AISI 316L; Weight: 0.63 kg



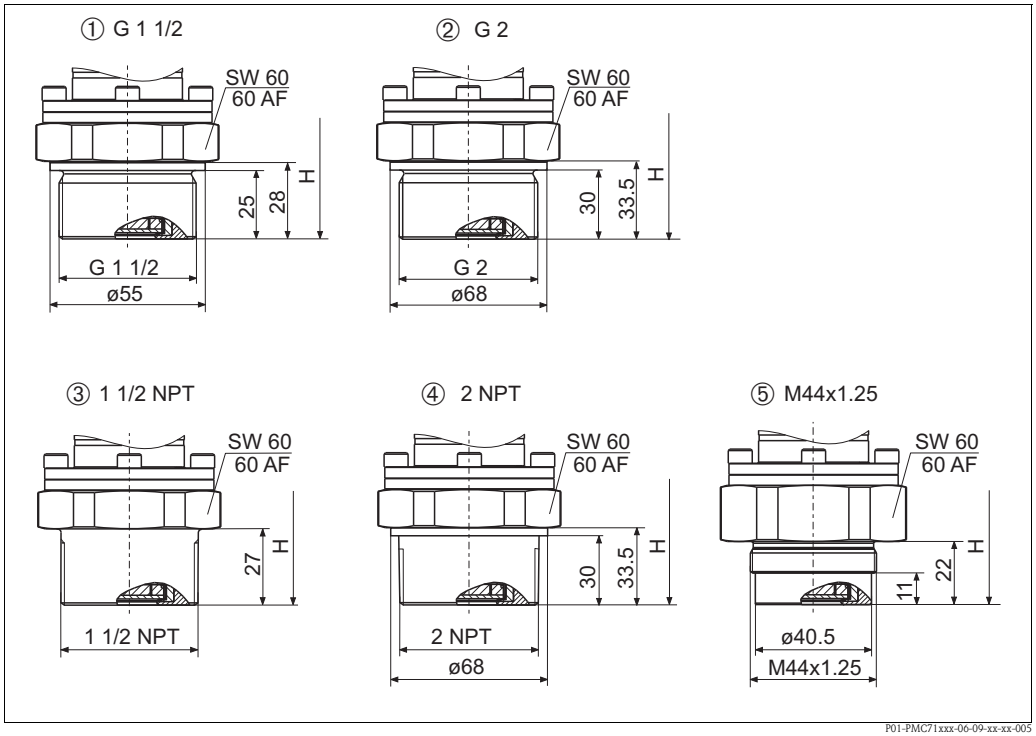
Process connections PMC71 thread DIN 13 M 20x1.5 hole 3 mm
Material version GP: AISI 316L, version GQ: Alloy C276/2.4819
Installation height → 📄 34; Weight: 0.63 kg.

Installation height H for devices with thread connection and internal process isolating diaphragm

Description	Housing T14	Housing T17
PMC71	155 mm	171 mm
PMC71 with Ex d[ia], CSA XP or FM XP	225 mm	241 mm (Ex d = 311 mm)
PMC71 High temperature version [1]	235 mm	251 mm
PMC 71 High temperature version [1] with Ex d[ia], CSA XP or FM XP	305 mm	321 mm (Ex d = 391 mm)

1) High temperature version, → 📄 79, feature 100 "Additional options 1" and feature 110 "Additional options 2", versions "T"

Thread, flush-mounted process isolating diaphragm



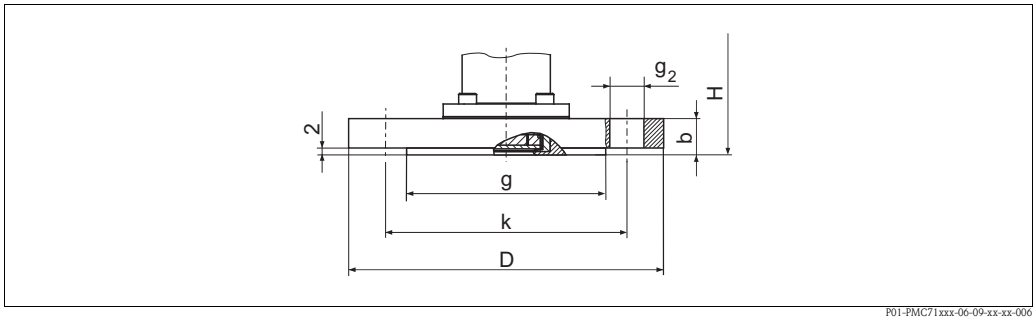
Process connections PMC71,
→ Installation height see table below.

1 Thread ISO 228 G 1 1/2 A;
Material version 1G: AISI 316L, version 1H: Alloy C276/2.4819, version 1J: Monel; Weight: 0.63 kg
2 Thread ISO 228 G 2 A;
Material version 1K: AISI 316L, version 1L: Alloy C276/2.4819, version 1M: Monel; Weight: 0.63 kg
3 Thread ANSI 1 1/2 MNPT;
Material version 2D: AISI 316L, version 2E: Alloy C276/2.4819, version 2F: Monel; Weight: 0.63 kg
4 Thread ANSI 2 MNPT;
Material version 2G: AISI 316L, version 2H: Alloy C276/2.4819, version 2J: Monel; Weight: 0.63 kg
5 Thread DIN 13 M 44x1.25;
Material version 1R: AISI 316L, version 1S: Alloy C276/2.4819; Weight: 0.63 kg

Installation height H for devices with thread connection and flush-mounted process isolating diaphragm

Description	Housing T14	Housing T17
PMC71/PMC71 high temperature version	215 mm	231 mm
PMC71/PMC71 high temperature version: with Ex d[ia], CSA XP or FM XP	280 mm	296 mm

EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527



Process connection PMC71, EN/DIN flange with raised face (flush-mounted process isolating diaphragm)
Installation height → 38.

	Flange[1]							Boltholes			
Version	**Material**	**Nominal diameter**	**Nominal pressure**	**Shape [2]**	**Diameter D** [mm]	**Thick-ness b** [mm]	**Raised face g** [mm]	**Quantity**	**Diameter g_2** [mm]	**Hole circle k** [mm]	**Flange weight [3]** [kg]
CP	AISI 316L	DN 32	PN 10-40	B1 (D)	140	18	77	4	18	100	1.9
CQ	AISI 316L	DN 40	PN 10-40	B1 (D)	150	18	87	4	18	110	2.2
BR	PVDF [4]	DN 50	PN 10-16	B1 (D)	165	21.4	102	4	18	125	0.6
B3	AISI 316L	DN 50	PN 10-40	B1 (D)	165	20	102	4	18	125	3.0
C3	AISI 316L	DN 50	PN 63	B2 (D)	180	26	108	4	22	135	4.6
BS	PVDF [4]	DN 80	PN 10/16	B1 (D)	200	21.4	138	8	18	160	1.0
B4	AISI 316L	DN 80	PN 10-40	B1 (D)	200	24	138	8	18	160	5.4

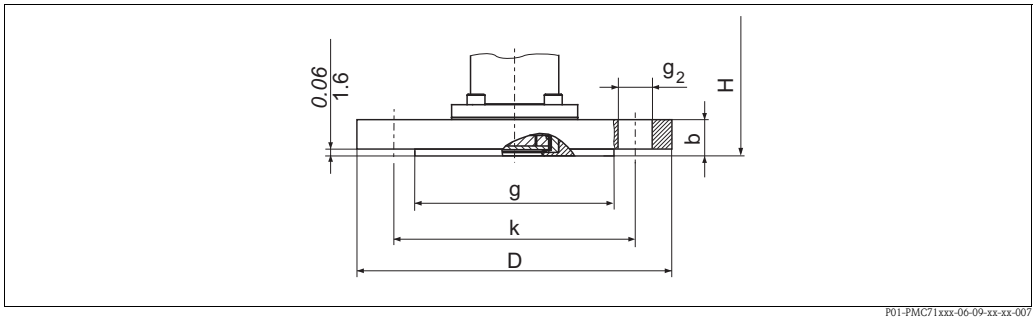
1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 µm. Lower surface roughness on request.

2) Designation in brackets as per DIN 2527

3) Housing weight → 61

4) Max.: 15 bar (225 psi), max.: –10...+60°C (+14...+140°F)

ANSI flange, connection dimensions as per ANSI B 16.5, raised face RF



Process connection PMC71, ANSI flange with raised face (flush-mounted process isolating diaphragm)
Installation height → 🖹 38.

	Flange [1]						**Boltholes**			
Version	**Material**	**Nominal diameter**	**Class**	**Diameter** **D**	**Thickness** **b**	**Raised face** **g**	**Quantity**	**Diameter** **g_2**	**Hole circle** **k**	**Flange weight** [2]
		[in]	[lb./sq.in]	[in] *[mm]*	[in] *[mm]*	[in] *[mm]*		[in] *[mm]*	[in] *[mm]*	[kg]
AE	AISI 316/316L [3]	1 1/2	150	5 / *127*	0.69 / *17.5*	2.88 / *73.2*	4	0.62 / *15.7*	3.88 / *98.6*	1.0
AQ	AISI 316/316L [3]	1 1/2	300	6.12 / *155.4*	0.81 / *20.6*	2.88 / *73.2*	4	0.88 / *22.4*	4.5 / *114.3*	2.6
AF	AISI 316/316L [3]	2	150	6 / *152.4*	0.75 / *19.1*	3.62 / *91.9*	4	0.75 / *19.1*	4.75 / *120.7*	2.4
JR	ECTFE [4]	2	150	6 / *152.4*	0.75 / *19.1*	3.62 / *91.9*	4	0.75 / *19.1*	4.75 / *120.7*	2.4
A3	PVDF [5]	2	150	6 / *152.4*	0.75 / *19.1*	3.62 / *91.9*	4	0.75 / *19.1*	4.75 / *120.7*	0.5
AR	AISI 316/316L [3]	2	300	6.5 / *165.1*	0.88 / *22.4*	3.62 / *91.9*	8	0.75 / *19.1*	5 / *127*	3.2
AG	AISI 316/316L [3]	3	150	7.5 / *190.5*	0.94 / *23.9*	5 / *127*	4	0.75 / *19.1*	6 / *152.4*	4.9
JS	ECTFE [4]	3	150	7.5 / *190.5*	0.94 / *23.9*	5 / *127*	4	0.75 / *19.1*	6 / *152.4*	4.9
A4	PVDF [5]	3	150	7.5 / *190.5*	0.94 / *23.9*	5 / *127*	4	0.75 / *19.1*	6 / *152.4*	0.9
AS	AISI 316/316L [3]	3	300	8.25 / *209.5*	1.12 / *28.4*	5 / *127*	8	0.88 / *22.4*	6.62 / *168.1*	6.8
AH	AISI 316/316L [3]	4	150	9 / *228.6*	0.94 / *23.9*	6.19 / *157.2*	8	0.75 / *19.1*	7.5 / *190.5*	7.1
JT	ECTFE [4]	4	150	9 / *228.6*	0.94 / *23.9*	6.19 / *157.2*	8	0.75 / *19.1*	7.5 / *190.5*	7.1
AT	AISI 316/316L [3]	4	300	10 / *254*	1.25 / *31.8*	6.19 / *157.2*	8	0.88 / *22.4*	7.88 / *200.2*	11.6

1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 µm. Lower surface roughness on request.

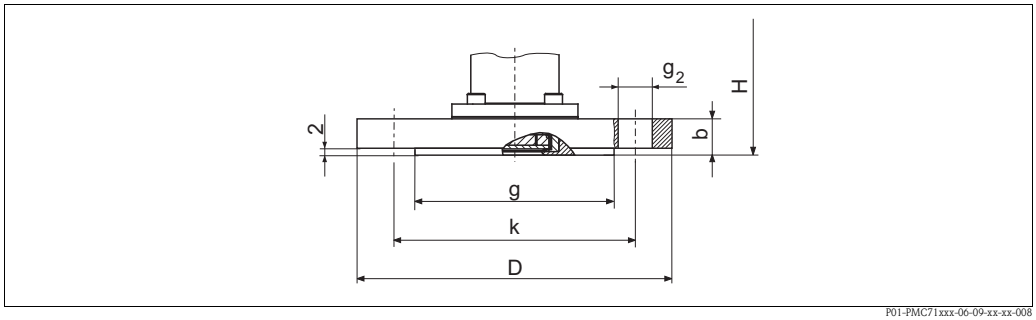
2) Housing weight → 🖹 61

3) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)

4) ECTFE coating on AISI 316L/1.4435
When operating in hazardous area, avoid electrostatic charge of the plastic surface.

5) max.: 15 bar (225 psi), max.: –10...+60°C (+14...+140°F)

JIS flange, connection dimensions as per JIS B 2220 BL, raised face RF



Process connection PMC71, JIS flange with raised face RF (flush-mounted process isolating diaphragm), AISI 316L/ 1.4435
→ Installation height see table below.

	Flange [1]					Boltholes			
Versions	**Nominal dimension**	**Nominal pressure**	**Diameter** **D** [mm]	**Thickness** **b** [mm]	**Raised face** **g** [mm]	**Quantity**	**Diameter** **g_2** [mm]	**Hole circle** **k** [mm]	**Flange weight [2]** [kg]
KF	50 A	10 K	155	16	96	4	19	120	2.0
KL	80 A	10 K	185	18	127	8	19	150	3.3
KH	100 A	10 K	210	18	151	8	19	175	4.4

1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8. Lower surface roughness on request.

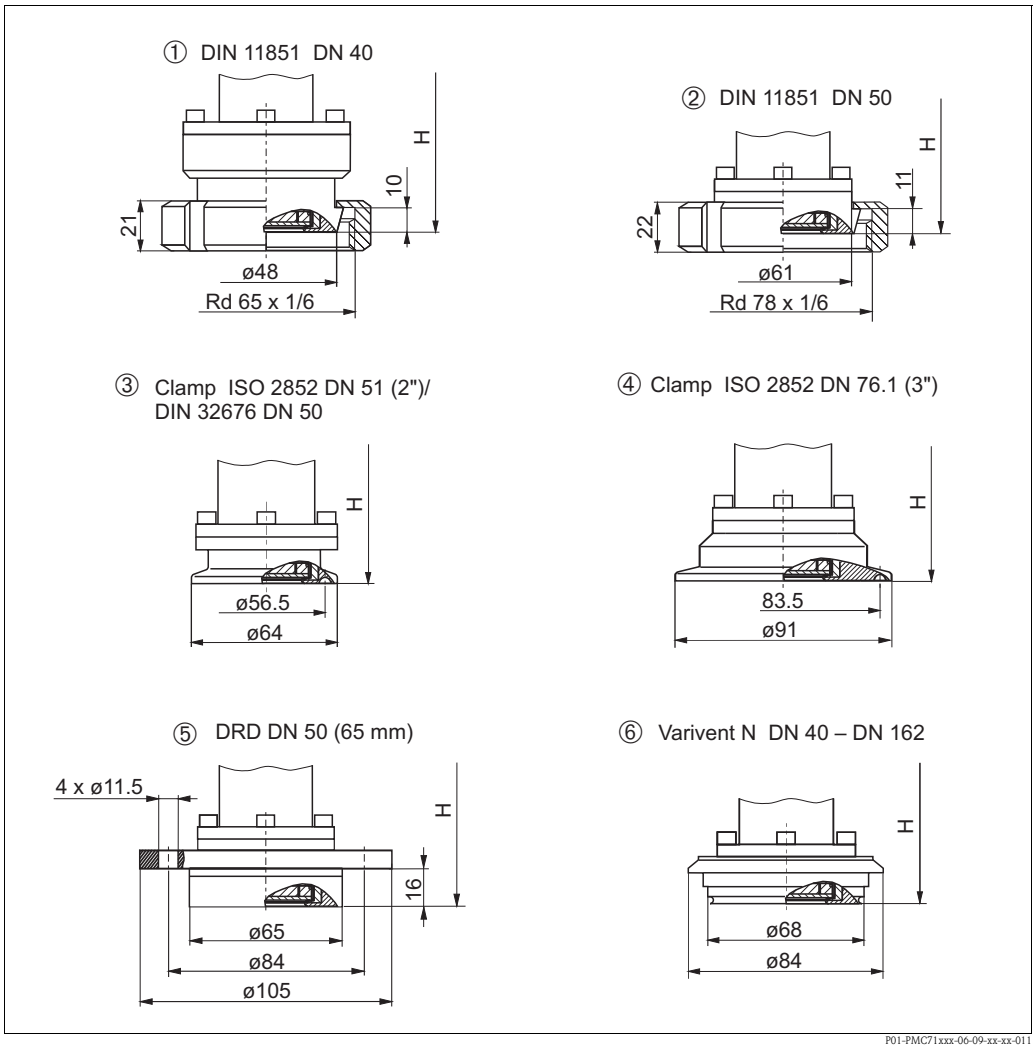
2) Housing weight see → 🖹 61

Installation height H for devices with flange

Description	T14 housing	T17 housing
PMC71	215 mm	231 mm
PMC71 with Ex d[ia], CSA XP or FM XP	280 mm	296 mm

Hygienic connections, flush-mounted process isolating diaphragm

Note!
Many process connections with an EPDM or HNBR seal are in accordance with the 3A-sanitary standard approved for PMC71. This means that a 3A-approved process connection in combination with an EPDM or HNBR seal must be selected when ordering for the 3A approval for the PMC71 version to be valid.
→ For ordering information on EPDM or HNBR seals, → 🖹 79 "Ordering information PMC71", feature 80 "Sensor seal", version B or F.



Process connections PMC71, Hygienic connections, material AISI 316L
surface roughness of the surfaces in contact with the medium ≤ 0.8 µm as standard. Lower surface roughness on request.

1 Version MP: DIN 11851 DN 40 PN 25, 3A with HNBR or EPDM seal
2 Version MR: DIN 11851 DN 50 PN 25, 3A with HNBR or EPDM seal
3 Version TD: Tri-Clamp ISO 2852 (2"), DIN 32675 DN 50, 3A with HNBR or EPDM seal
4 Version TF: Tri-Clamp ISO 2852 (3"), 3A with HNBR or EPDM seal
5 Version TK: DRD DN50 (65 mm) PN 25, 3A with HNBR or EPDM seal
6 Version TR: Varivent Type N for pipes 40 – 162, PN 40, 3A with HNBR or EPDM seal

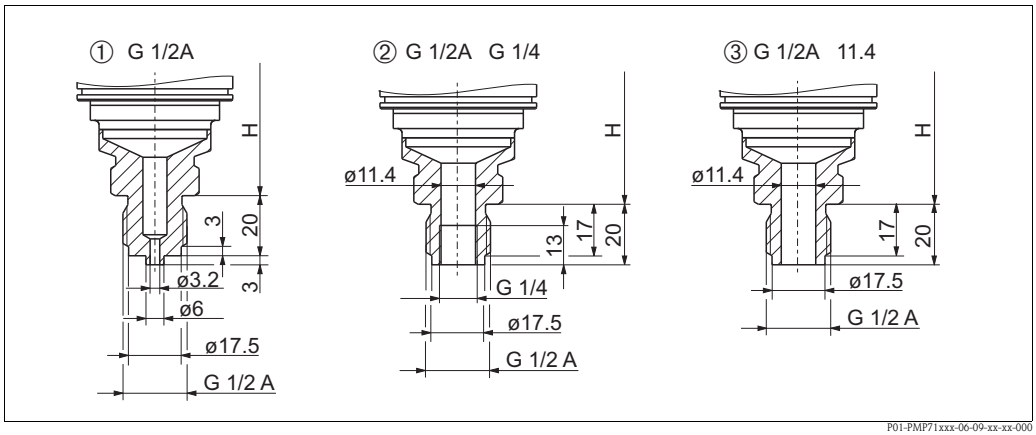
Installation height H for devices with hygienic connection and flush-mounted process isolating diaphragm

Description	T14 housing	T17 housing
PMC71/PMC71 high temperature version	215 mm	231 mm
PMC71/PMC71 high temperature version: with Ex d[ia], CSA XP or FM XP	280 mm	296 mm

Process connections PMP71 (with metallic process isolating diaphragm)

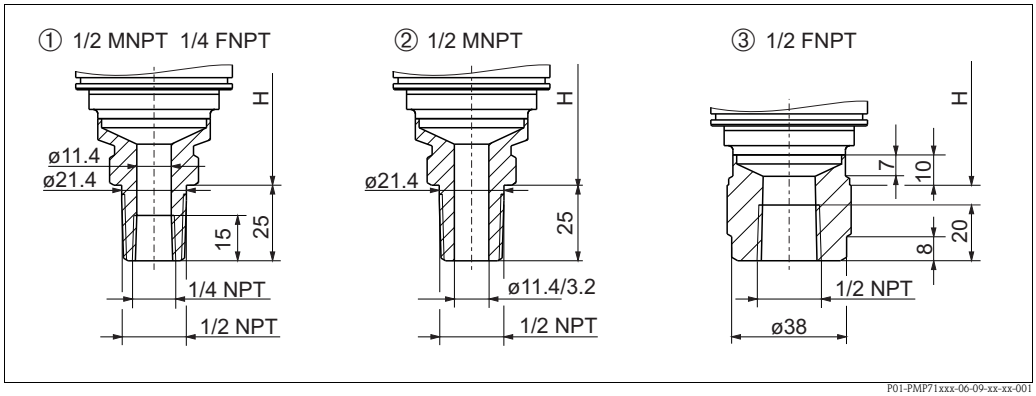
Note!
Some device versions have CRN approval. For a CRN-approved device, a CRN-approved process connection (→ 🖹 78, feature 70 "Process connection") has to be ordered with a CSA approval (→ 🖹 77, feature 10 "Approval"). These devices are fitted with a separate plate bearing the registration number 0F10525.5C.

Thread, internal process isolating diaphragm



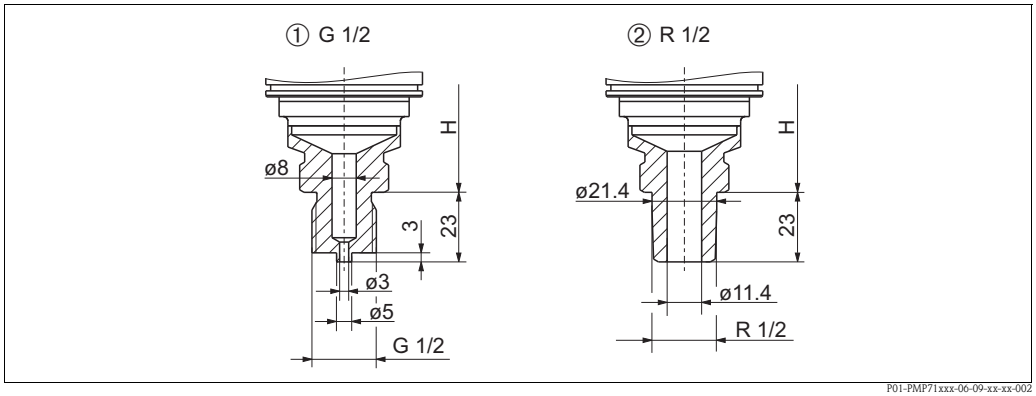
Process connections PMP71, thread ISO 228
Installation height H → 🖹 41.

1 Thread ISO 228 G 1/2 A EN 837;
Material version GA: AISI 316L, version GB: Alloy C276/2.4819; Weight: 0.6 kg
2 Thread ISO 228 G 1/2 A G 1/4 (female);
Material version GE: AISI 316L, version GF: Alloy C276/2.4819; Weight: 0.6 kg
3 Thread ISO 228 G 1/2 A hole 11.4 mm;
Material version GH: AISI 316L, version GJ: Alloy C276/2.4819; Weight: 0.6 kg



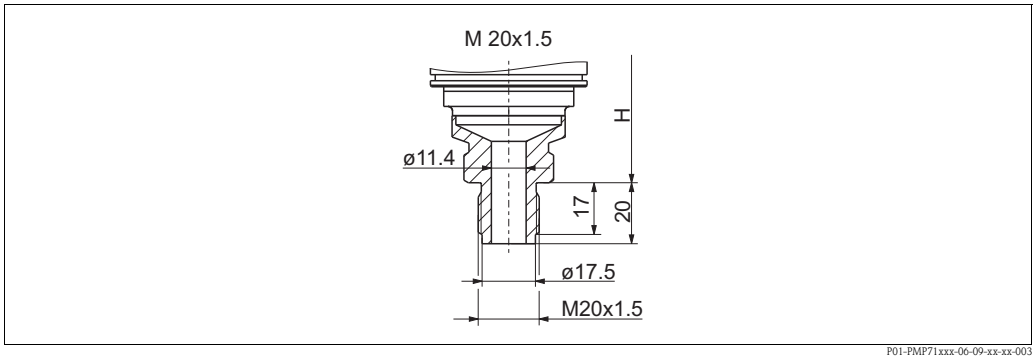
Process connections PMP71, thread ANSI
Installation height → 🖹 41.

1 Thread ANSI 1/2 MNPT 1/4 FNPT;
Material version RA: AISI 316L, version RB: Alloy C276/2.4819; Weight: 0.6 kg
2 Thread ANSI 1/2 MNPT; hole: 400 bar = 11.4 mm , 700 bar = 3.2 mm
Material version RD: AISI 316L, version RE: Alloy C276/2.4819; Weight: 0.6 kg
3 Thread ANSI 1/2 FNPT;
Material version RH: AISI 316L, version RJ: Alloy C276/2.4819; Weight: 0.7 kg



Process connections PMP71, thread JIS
→ Installation height H see table below.

1 Version GL: thread JIS B0202 G 1/2 (male), material: AISI 316L; Weight: 0.6 kg
2 Version RL: thread JIS B0203 R 1/2 (male), material: AISI 316L; Weight: 0.6 kg

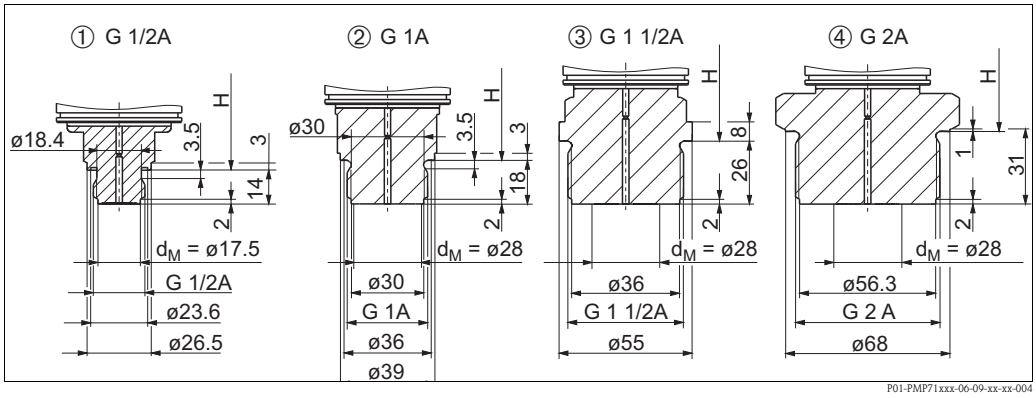


Process connections PMP71 thread DIN 13 M 20x1.5 hole 11.4 mm
Material version GP: AISI 316L, version GQ: Alloy C276/2.4819; Weight: 0.6 kg
→ Installation height H see table below.

Installation height H for devices with thread connection and internal flush-mounted process isolating diaphragm

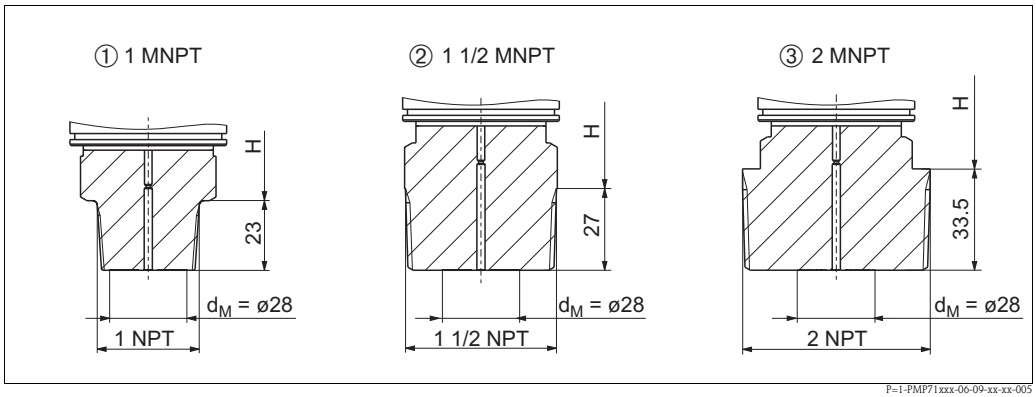
	T14 housing	**T17 housing**
Height H	165 mm	181 mm
	Note! The versions with 700 bar sensor are approx. 20 mm (0.79 inch) higher.	

Thread, flush-mounted process isolating diaphragm



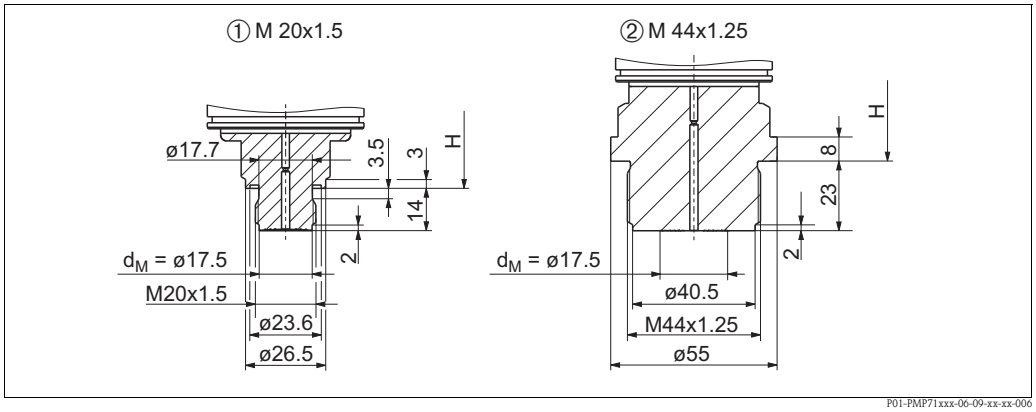
Process connections PMP71, thread ISO 228
Installation height → 📄 43.

1 Thread ISO 228 G 1/2 A DIN 3852 (viton seal provided);
Material version 1A: AISI 316L, version 1B: Alloy C276/2.4819; Weight: 0.4 kg
2 Thread ISO 228 G 1 A;
Material version 1D: AISI 316L, version 1E: Alloy C276/2.4819; Weight: 0.7 kg
3 Thread ISO 228 G 1 1/2 A
Material version 1G: AISI 316L, version 1H: Alloy C276/2.4819; Weight: 1.1 kg
4 Thread ISO 228 G 2 A
Material version 1K: AISI 316L, version 1L: Alloy C276/2.4819; Weight: 1.5 kg



Process connections PMP71, thread ANSI
Installation height → 📄 43.

1 Thread ANSI 1 MNPT;
Material version 2A: AISI 316L, version 2B: Alloy C276/2.4819; Weight: 0.7 kg
2 Thread ANSI 1 1/2 MNPT;
Material version 2D: AISI 316L, version 2E: Alloy C276/2.4819; Weight: 1.0 kg
3 Thread ANSI 2 MNPT
Material version 2G: AISI 316L, version 2H: Alloy C276/2.4819; Weight: 1.3 kg



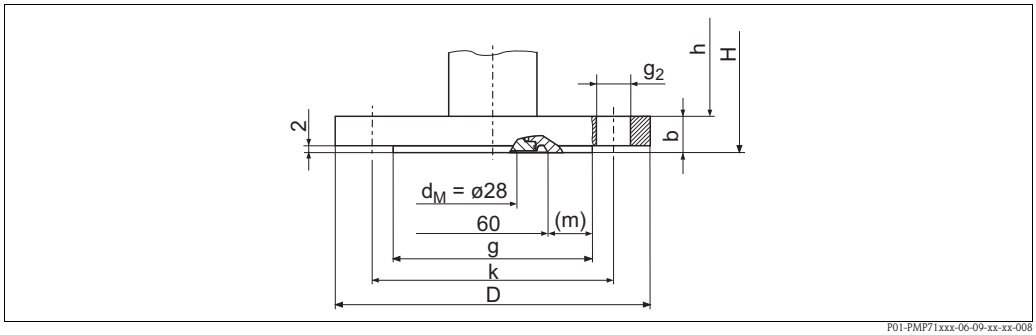
Process connections PMP71, thread DIN
→ Installation height see table, below.

1 Thread DIN 16288 M20;
Material version 1N: AISI 316L, version 1P: Alloy C276/2.4819; Weight: 0.4 kg
2 Thread DIN 13 M 44 x 1.25;
Material version 1R: AISI 316L, version 1S: Alloy C276/2.4819; Weight: 1.1 kg

Installation height H for devices with thread connection and flush-mounted process isolating diaphragm

Description	Housing T14	Housing T17
G 1/2	163 mm	179 mm
G 1	167 mm	183 mm
G 1 1/2 A	163 mm	179 mm
G 2 A	162 mm	178 mm
1 MNPT	162 mm	178 mm
1 1/2 MNPT	165 mm	181 mm
2 MNPT	159 mm	175 mm
M 20x1.5	163 mm	179 mm
M 44x1.25	170 mm	186 mm

EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527



Process connection PMP71, EN/DIN flange with raised face, material AISI 316L

H: device height = height of device without flange h + flange thickness b
Height h → *46.*

	Flange [1]							Boltholes			
Version	**Nominal diameter**	**Nominal pressure**	**Shape [2]**	**Diameter** **D** [mm]	**Thickness** **b** [mm]	**Raised face** **g** [mm]	**Width of the raised face** **(m)** [mm]	**Quantity**	**Diameter** **g_2** [mm]	**Hole circle** **k** [mm]	**Flange weight [3]** [kg]
CN	DN 25	PN 10-40	B1 (D)	115	18	66 [4]	4	4	14	85	1.2
CP	DN 32	PN 10-40	B1 (D)	140	18	77 [4]	8.5	4	18	100	1.9
CQ	DN 40	PN 10-40	B1 (D)	150	18	87 [4]	-	4	18	110	2.2
B3	DN 50	PN 10-40	B1 (D)	165	20	102	-	4	18	125	3.0
B4	DN 80	PN 10-40	B1 (D)	200	24	138	-	8	18	160	5.3

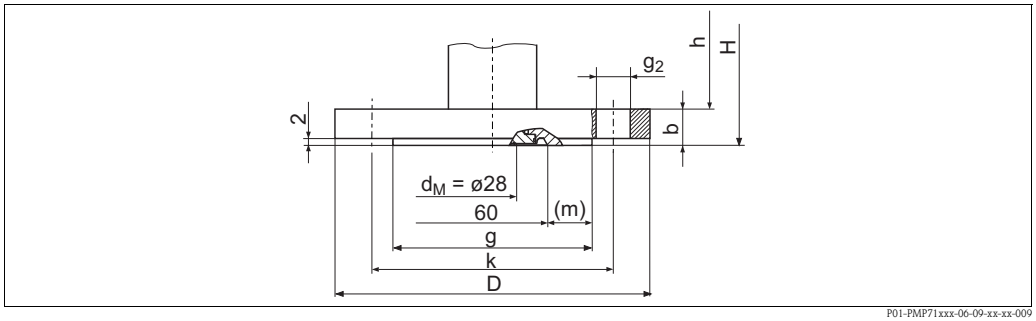
1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 µm. Lower surface roughness on request.

2) Designation as per DIN 2527 in brackets

3) Housing weight → 61

4) With these process connections the raised face is smaller than described in the standard. Due to a smaller raised face a special seal must be used. Refer to a manufacturer of seals or your local Endress+Hauser Sales Center.

ANSI flanges, connection dimensions as per ANSI B 16.5, raised face RF
JIS flanges, connection dimensions as per B 2220 BL, Raised face RF



Process connection PMP71, ANSI flange or JIS flange with raised face RF; material

H: device height = height of device without flange h + flange thickness b. For the height h → 🖹 46.

	Flange [1]							**Boltholes**			
Version	**Material**	**Nominal diameter**	**Class/ Nominal pressure**	**Diameter** **D** [in] / *[mm]*	**Thickness** **b** [in] / *[mm]*	**Diameter raised face** **g** [in] / *[mm]*	**Width of the raised face** **(m)** [in] / *[mm]*	**Quantity**	**Diameter** **g_2** [in] / *[mm]*	**Hole circle** **k** [in] / *[mm]*	**Flange weight** [2] [kg]
ANSI flange											
AN	AISI 316/316L [3]	1 in	300 lb./sq.in	4.88 / *124*	0.69 / *17.5*	2.76 [4] / *70*	0.2 */5*	4	0.75 / *19.1*	3.5 / *88.9*	1.3
AE	AISI 316/316L [3]	1 1/2 in	150 lb./sq.in	5 / *127*	0.69 / *17.5*	2.88 [4] / *73.2*	0.52 */6.6*	4	0.62 / *15.7*	3.88 / *98.6*	1.5
AQ	AISI 316/316L [3]	1 1/2 in	300 lb./sq.in	6.12 / *155.4*	0.81 / *20.6*	2.88 [4] / *73.2*	0.52 */6.6*	4	0.88 */22.4*	4.5 */114.3*	2.6
AF	AISI 316/316L [3]	2 in	150 lb./sq.in	6 / *152.4*	0.75 / *19.1*	3.62 / *91.9*	-	4	0.75 / *19.1*	4.75 */120.7*	2.4
AR	AISI 316/316L [3]	2 in	300 lb./sq.in	7.5 / *190.5*	0.88 / *22.3*	3.62 / *91.9*	-	8	0.75 / *19.1*	5 / *127*	3.2
AG	AISI 316/316L [3]	3 in	150 lb./sq.in	7.5 / *190.5*	0.94 / *23.9*	5 / *127*	-	4	0.75 */19.1*	6 / *152.4*	4.9
AS	AISI 316/316L [3]	3 in	300 lb./sq.in	8.25 / *209.5*	1.12 / *28.4*	5 / *127*	-	8	0.88 / *22.4*	6.62 / *168.1*	6.7
AH	AISI 316/316L [3]	4 in	150 lb./sq.in	9 / *228.6*	0.94 / *23.9*	6.19 / *157.2*	-	8	0.75 / *19.1*	7.5 / *190.5*	7.1
AT	AISI 316/316L [3]	4 in	300 lb./sq.in	10 / *254*	1.25 / *31.8*	6.19 / *157.2*	-	8	0.88 / *22.4*	7.88 / *200.2*	11.6
JIS flange											
KA	AISI 316L	25 A	20 K	*125*	*16*	*67*	0.14 / 3.5	4	*19*	*90*	1.5
KF	AISI 316L	50 A	10 K	*155*	*16*	*96*	-	4	*19*	*120*	2.0
KL	AISI 316L	80 A	10 K	*185*	*18*	*127*	-	8	*19*	*150*	3.3
KH	AISI 316L	100 A	10 K	*210*	*18*	*151*	-	8	*19*	*175*	4.4

1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 µm. Lower surface roughness on request.

2) Housing weight → 🖹 61

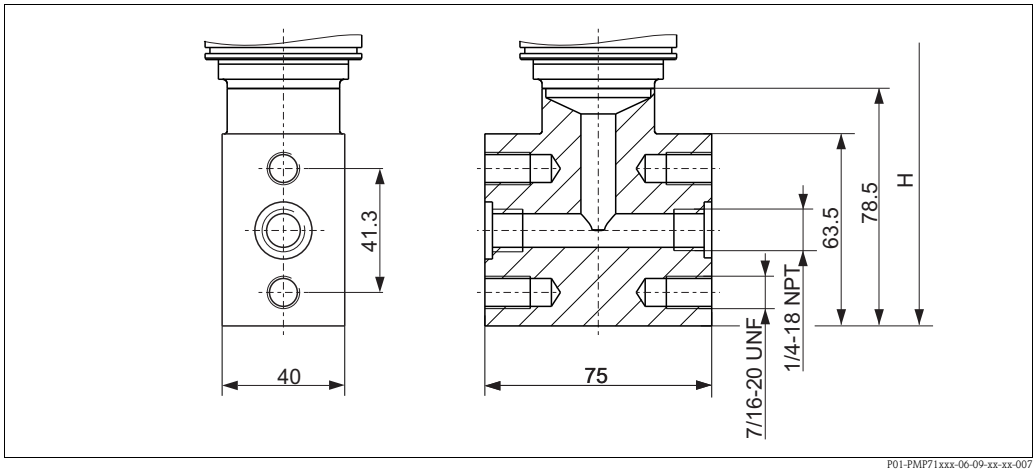
3) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)

4) With these process connections the raised face is smaller than described in the standard. Due to a smaller raised face a special seal must be used. Refer to a manufacturer of seals or your local Endress+Hauser Sales Center.

Height h for devices with flange

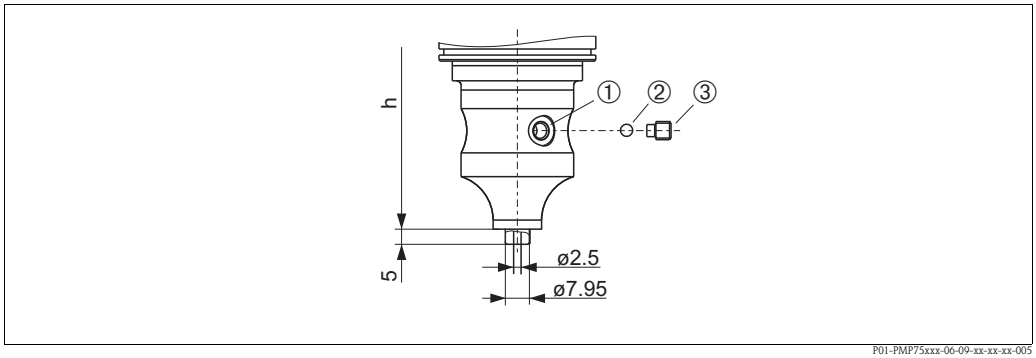
	T14 housing	T17 housing
Height h	165 mm	181 mm

Oval flange



Version UR: oval flange adapter 1/4-18 NPT according to IEC 61518, mounting: 7/16-20 UNF; Weight: 1.9 kg

Prepared for diaphragm seal mount

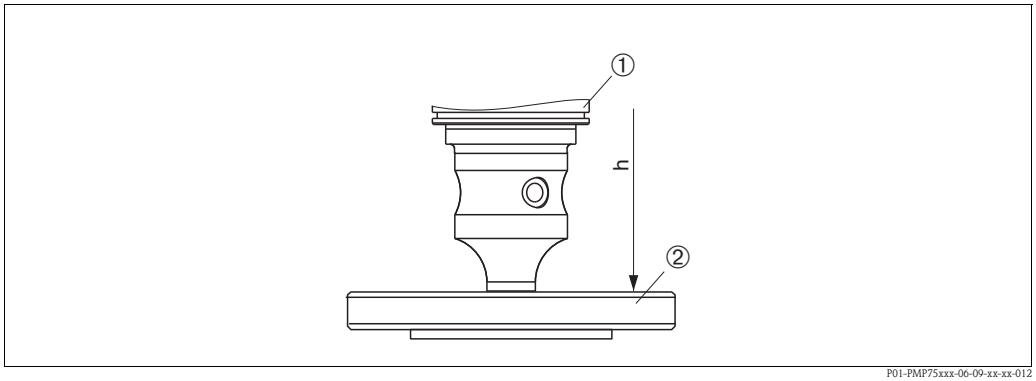


Version U1: prepared for diaphragm seal mount

1 Hole for filling fluid
2 Bearing
3 Threaded pin with an internal hexagon 4 mm

	T14 housing	T17 housing
Height h	190 mm	204 mm

PMP75 Basic unit



PMP75 Basic unit with diaphragm seal

1 PMP75 Basic unit
2 Diaphragm seal, here e.g. flange diaphragm seal

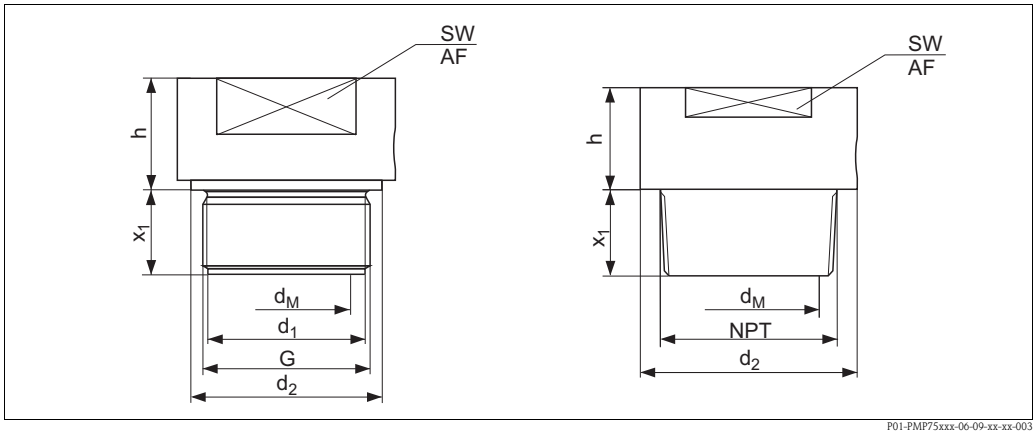
	T14 housing	**T17 housing**
Height	190 mm	204 mm

Process connections PMP75 (with metallic process isolating diaphragm)

Note!

- Some device versions have CRN approval. For a CRN-approved device, a CRN-approved process connection (→ 🖹 86, feature 70 "Process connection") has to be ordered with a CSA approval (→ 🖹 85, feature 10 "Approval"). Devices with capillary are not CRN-approved. These devices are fitted with a separate plate bearing the registration number 0F10525.5C.
- Specifications for the "T_K Process" are listed in the following tables. These are typical values. The temperature coefficients apply to silicone oil and the process isolating diaphragm material AISI 316L/1.4435. For other filling oils, this temperature coefficient must be multiplied by the T_K correction factor of the corresponding filling oil. For the T_K correction factors, → 🖹 69, section "Diaphragm seal filling oils".
- With regard to the temperature coefficient "T_K Ambient", devices with a temperature isolator behave like devices with the same process connection with 0.1 m capillary.
- In addition, the temperature coefficient "T_K Ambient" is listed in relation to the capillary length for the diaphragm seal versions which can be supplied with capillaries as standard. This information is found on → 🖹 69 ff, section "Influence of the temperature on the zero point".
- The weights of the diaphragm seals are given in the tables. → 🖹 61 for the weight of the housing.
- The following drawings are drawings that illustrate how the system works in principle. In other words, the dimensions of a diaphragm seal supplied can deviate from the dimensions given in this document.

Thread, flush-mounted process isolating diaphragm



Process connections PMP75, left: thread ISO 228, right: thread ANSI

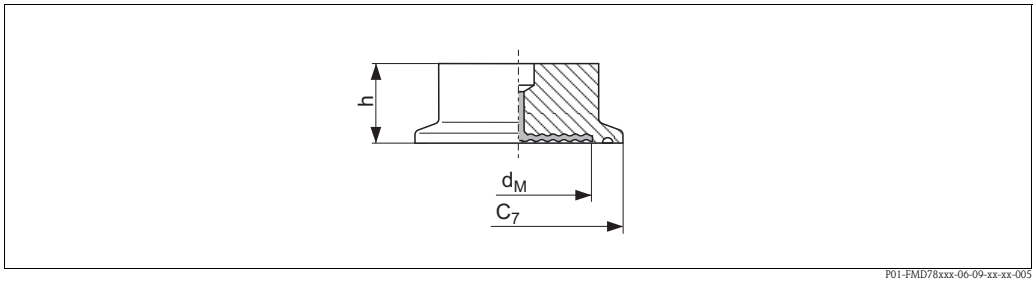
Threaded connection								Diaphragm seal					
Version	**Material** [1]	**Thread**	**Nominal pressure**	**Diameter**	**Diameter**	**Screw-in length**	**Across flats**	**max. Diaphragm diameter**	**T_K Ambient ≤ 40 bar**	**T_K Ambient > 40 bar**	**T_K Process**	**Height**	**Diaphragm seal weight**
			PN	**d_1**	**d_2**	**x_1**	**SW/AF**	**d_M**				**h**	
				[mm]	[mm]	[mm]		[mm]	[mbar/10 K]			[mm]	[kg]
1D	AISI 316L	G 1 A	400	30	39	21 [2]	41	30	+16.03	+24.33	+4.70	19	0.4
1E	Alloy C276								–	–	–		0.5
1G	AISI 316L	G 1 1/2 A	400	44	55	30	50	42	+5.4	+8.18	+3.50	20	0.9
1H	Alloy C276								–	–	–		1.0
1K	AISI 316L	G 2	400	56	68	30	65	50	+1.76	+2.68	+1.60	20	1.9
1L	Alloy C276								–	–	–		2.1
2A	AISI 316L	1 MNPT	400	–	48	28	41	24	+15.66	+24.42	+8.50	37	0.6
2B	Alloy C276								–	–	–		0.7
2D	AISI 316L	1 1/2 MNPT	400	–	52	30	46	36	+8.14	+12.39	+3.90	20	0.9
2E	Alloy C276								–	–	–		1.0
2G	AISI 316L	2 MNPT	400	–	78	30	65	38	+5.4	+8.18	+2.59	35	1.8
2H	Alloy C276								–	–	–		2.0

1) AISI 316L; Alloy C276/2.4819

2) 28 mm in conjucntion with high temperature oil

Note!
With the use of high temperature oils the design can deviate strongly.
For further information please contact your local Endress+Hauser Sales Center.

Tri-Clamp ISO 2852

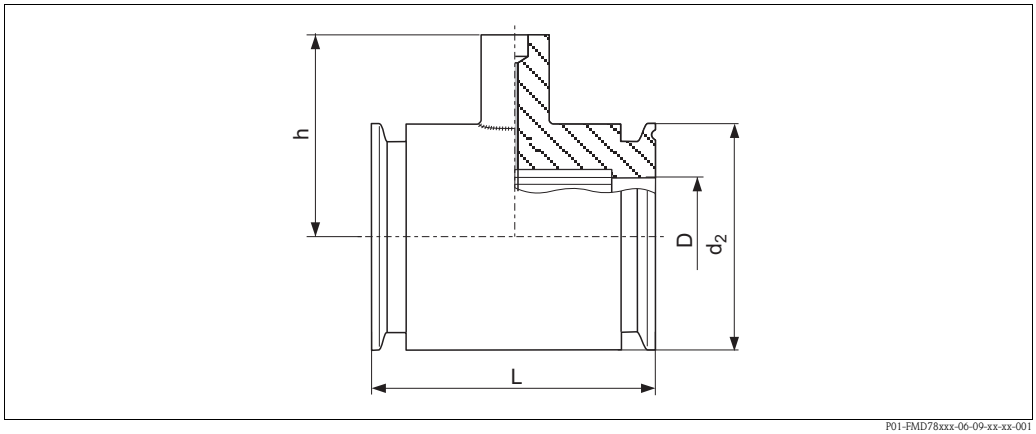


Process connection PMP75, material: AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Nominal diameter ISO 2852	Nominal diameter DIN 32676	Nominal diameter	Diameter C_7	max. Diaphragm diameter d_M	Height h	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Diaphragm seal weight
			[in]	[mm]	[mm]	[mm]	[mbar/10 K]			[kg]
TB	DN 25	DN 25	1	50.5	24	37	+15.33	+24.0	+4.25	0.32
TC [1]	DN 38	DN 40	1 1/2	50.5	34	30	+8.14	+12.39	+1.91	1.0
TD [1]	DN 51	DN 50	2	64	48	30	+3.45	+4.81	+1.25	1.1
TF	DN 76.1	–	3	91	73	30	+0.3	+0.35	+0.18	1.2

1) Diaphragm seal versions optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces $R_a \leq 0.38$ µm (15.75 µin; 180 grit), electropolished; to be ordered using feature 60 "Additional option", version "P" in the order code

Tri-Clamp pipe diaphragm seal ISO 2852

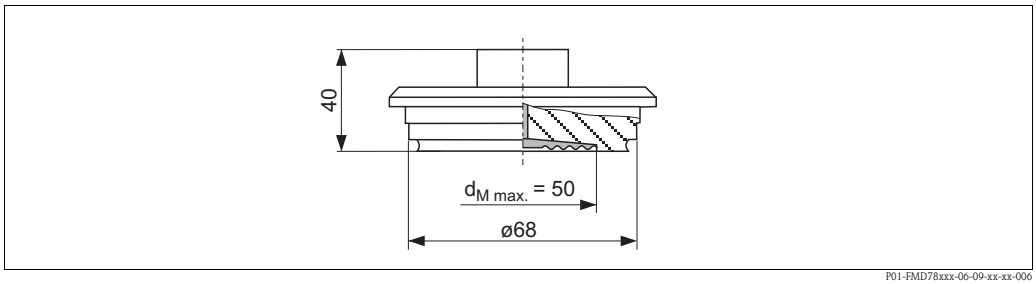


Process connection PMP75, material AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Nominal diameter ISO 2852	Nominal diameter	Diameter D	Diameter d_2	Height h	Face-to-face-length L	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Diaphragm seal weight
			[in]	[mm]	[mm]	[mm]	[mbar/10 K]			[kg]
SB	DN 25	1	22.5	50.5	67	126	+7.75	+8.69	+4.49	1.7
SC [1]	DN 38	1 1/2	35.5	50.5	67	126	+5.17	+5.69	+3.46	1.0
SD [1]	DN 51	2	48.6	64	79	100	+3.56	+3.91	+2.69	1.7

1) Including 3.1 and pressure test as per Pressure Equipment Directive, category II

Varivent N for pipes DN 40 – DN 162

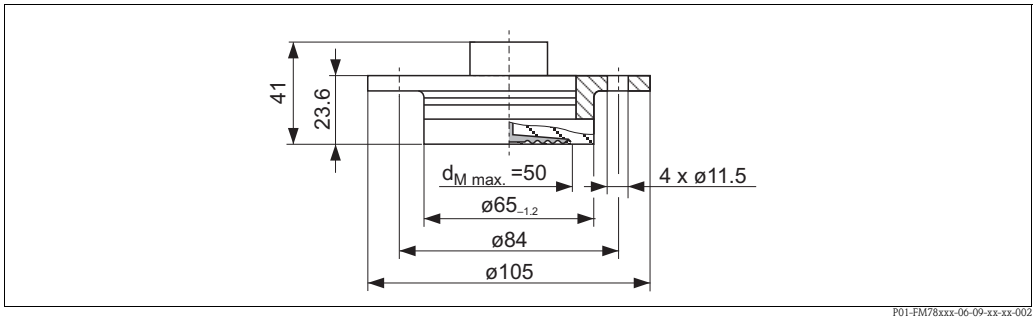


Process connection PMP75, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Material	Nominal pressure	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Diaphragm seal weight
			[mbar/10 K]			[kg]
TR [1]	AISI 316L	PN 40	+2.26	+3.11	+1.65	1.3

1) Diaphragm seal versions optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces $R_a \leq 0.38$ µm (15.75 µin; 180 grit), electropolished; to be ordered using feature 60 "Additional option", version "P" in the order code

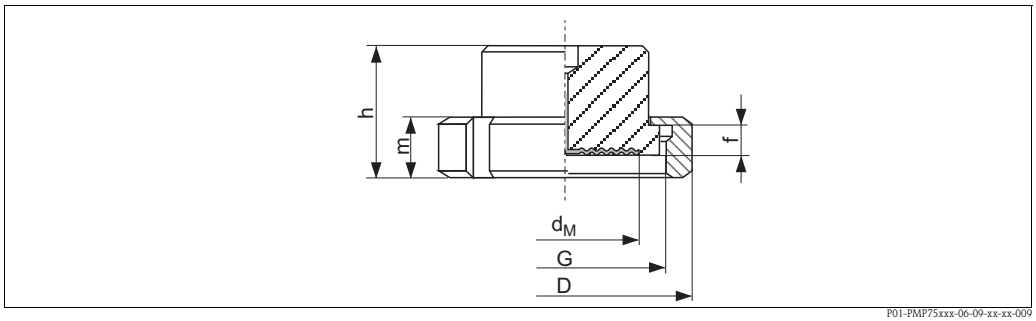
DRD DN50 (65 mm)



Process connection PMP75, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Material	Nominal pressure	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Diaphragm seal weight
			[mbar/10 K]			[kg]
TK	AISI 316L	PN 25	+2.26	+3.11	+1.65	0.75

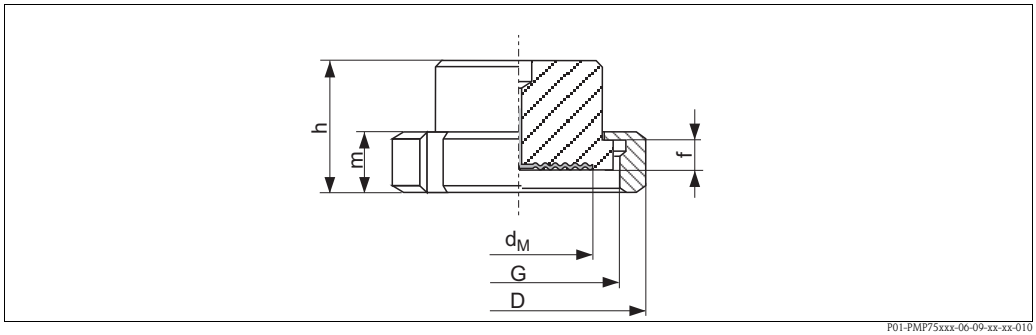
SMS nozzles with coupling nut



Process connection PMP75, material AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Nominal diameter	Nominal pressure	Diameter D	Adapter height f	Thread G	Height m	Height h	max. diaphragm diameter d_M	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Weight diaphragm seal
	[inch]	[bar]	[mm]	[mm]		[mm]	[mm]	[mm]	[mbar/10 K]			[kg]
TG	1	PN 25	54	3.5	Rd 40 – 1/6	20	42.5	24	+15.66	+24.22	+7.25	0.25
TH	1 1/2	PN 25	74	4	Rd 60 – 1/6	25	57	36	+8.18	+12.39	+2.59	0.65
TI	2	PN 25	84	4	Rd 70 – 1/6	26	62	48	+5.4	+8.18	+1.10	1.05

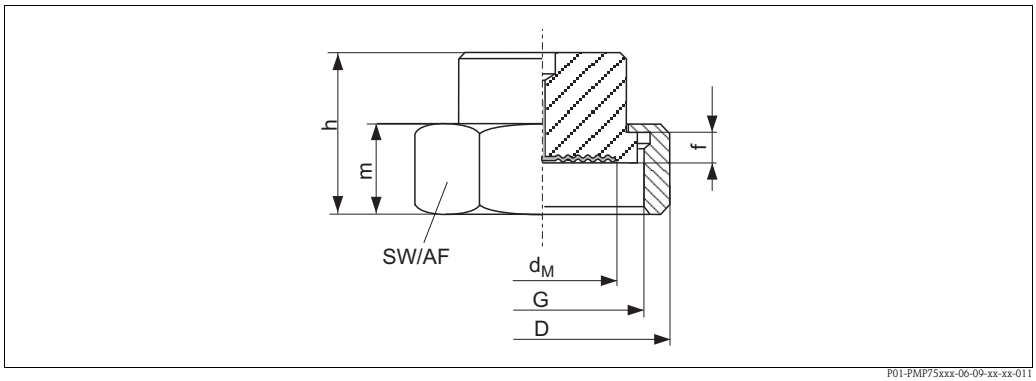
APV-RJT nozzles with coupling nut



Process connection PMP75, material AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Nominal diameter	Nominal pressure	Diameter	Adapter height	Thread	Height	Height	max. diaphragm diameter	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Weight diaphragm seal
		PN	D	f	G	m	h	d_M				
	[inch]	[bar]	[mm]	[mm]		[mm]	[mm]	[mm]	[mbar/10 K]			[kg]
TL	1	PN 40	77	6.5	1 13/16 – 1/8"	22	42.6	21	+15.66	+24.42	+4.21	0.45
TM	1 1/2	PN 40	72	6.4	2 5/16 – 1/8"	22	42.6	28	+8.18	+12.39	+2.59	0.75
TN	2	PN 40	86	6.4	2 7/8 – 1/8"	22	42.6	38	+5.4	+8.18	+1.76	1.2

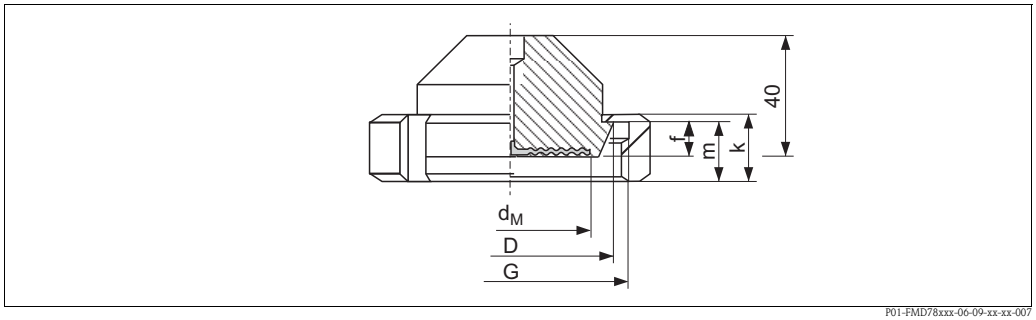
APV-ISS nozzles with coupling nut



Process connection PMP75, material AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

Version	Nominal diameter	Nominal pressure	Diameter	Adapter height	Thread	Height	Across flat	Height	max. diaphragm seal	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Weight Diaphragm seal
			D	f	G	m	AF	h	d_M				
	[inch]	[bar]	[mm]	[mm]		[mm]		[mm]	[mm]	[mbar/10 K]			[kg]
TP	1	PN 40	54.1	4	1 1/2" – 1/8"	30	46.8	50	24	+15.66	+24.42	+4.21	0.4
TQ	1 1/2	PN 40	72	4	2" – 1/8"	30	62	50	34	+8.14	+12.39	+2.59	0.6
TS	2	PN 40	89	4	2 1/2" – 1/8"	30	77	50	45	+5.4	+8.18	+1.76	1.1

Taper adapter with coupling nut, DIN 11851

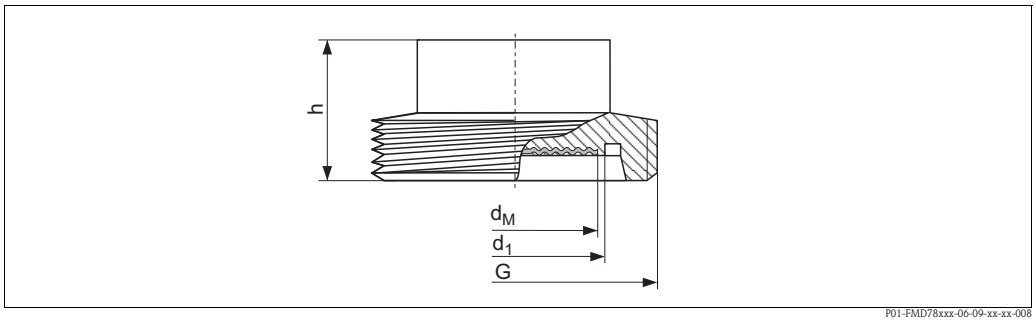


P01-FMD78xxx-06-09-xx-xx-007

Process connection PMP75, material AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

	Taper adapter				Slotted nut			Diaphragm seal				
Version	**Nominal diameter**	**Nominal pressure**	**Diameter** **D** [mm]	**Adapter height** **f** [mm]	**Thread** **G**	**Height** **k** [mm]	**Height** **m** [mm]	**max. Diaphragm diameter** d_M [mm]	T_K **Ambient ≤ 40 bar** [mbar/10 K]	T_K **Ambient > 40 bar** [mbar/10 K]	T_K **Process** [mbar/10 K]	**Diaphragm seal weight** [kg]
MR	DN 50	PN 25	68.5	11	Rd 78 x 1/6"	22	19	52	+2.21	+3.02	+1.40	1.1
MS	DN 65	PN 25	86	12	Rd 95 x 1/6"	35	21	66	+1.6	+2.1	+0.60	2.0
MT	DN 80	PN 25	100	12	Rd 110 x 1/4"	30	26	81	+0.66	+0.81	+0.40	2.55

Threaded adapter, DIN 11851

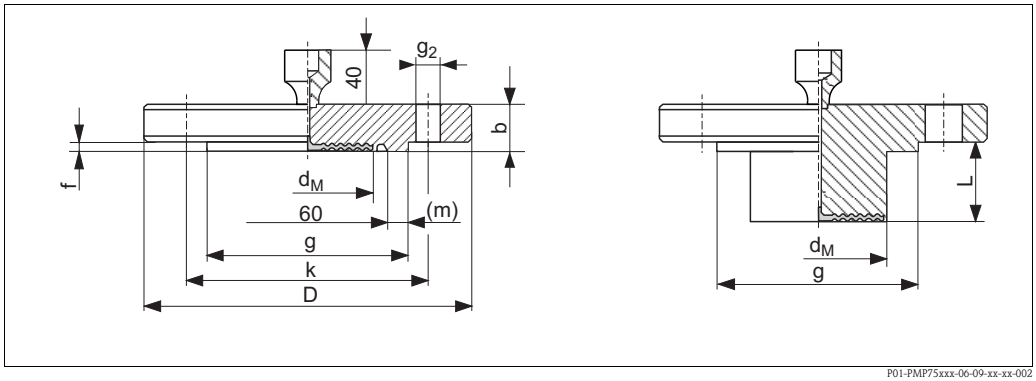


P01-FMD78xxx-06-09-xx-xx-008

Process connection PMP75, material AISI 316L, surface roughness of the surfaces in contact with the medium $R_a \leq 0.8$ µm as standard. Lower surface roughness on request.

	Threaded adapter					Diaphragm seal				
Version	**Nominal diameter**	**Nominal pressure**	**Diameter** d_1 [mm]	**Thread** **G**	**Height** **h** [mm]	**max. Diaphragm diameter** d_M [mm]	T_K **Ambient ≤ 40 bar** [mbar/10 K]	T_K **Ambient > 40 bar** [mbar/10 K]	T_K **Process** [mbar/10 K]	**Diaphragm seal weight** [kg]
M3	DN 50	PN 25	54	Rd 78 x 1/6"	35	52	+2.21	+3.02	+0.88	0.9
M4	DN 65	PN 25	71	Rd 95 x 1/6"	40	66	+1.6	+2.1	+0.60	1.7
M5	DN 80	PN 25	85	Rd 110 x 1/4"	40	81	+0.66	+0.81	+0.40	2.0

EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527 and DIN 2501-1



Process connection PMP75, EN/DIN flange with flush-mounted process isolating diaphragm, material AISI 316L

	Flange [1]								Boltholes			Diaphragm seal				
Version	**Nominal diameter**	**Nominal pressure**	**Shape [2]**	**Diameter**	**Thickness**	**Raised face**			**Quantity**	**Diameter**	**Hole circle**	**max. Diaphragm diameter**	**T_K Ambient**		**T_K Process**	**Diaphragm seal weight**
													≤ 40 bar	**> 40 bar**		
				D	**b**	**g**	**f**	**(m)**		**g_2**	**k**	**d_M**				
				[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mbar/10 K]			[kg]
CN	DN 25	PN 10-40	B1 (D)	115	18	66	3	3 [3]	4	14	85	32	+16.03	+24.33	+3.20	2.1
DN	DN 25	PN 63-160	E	140	24	68	2	-	4	18	100	28	+16.03	+24.33	+3.20	2.5
EN	DN 25	PN 250	E	150	28	68	2	-	4	22	105	28	+16.03	+24.33	+5.17	3.7
E1	DN 25	PN 400	E	180	38	68	2	-	4	26	130	28	+16.03	+24.33	+5.17	7.0
CP	DN 32	PN 10-40	B1 (D)	140	18	77	2.6	8.5 [3]	4	18	100	34	+8.14	+12.39	+2.59	1.9
CQ	DN 40	PN 10-40	B1 (D)	150	18	87	2.6	-	4	18	110	48	+5.40	+8.18	+2.15	2.2
B3	DN 50	PN 10-40	B1 (D)	165	26	102	3	-	4	18	125	59	+2.21	+3.02	+1.50	3.0
C3	DN 50	PN 63	B2 (E)	180	26	102	3	-	4	22	135	59	+2.21	+3.02	+1.00	4.6
EF	DN 50	PN 100/160	E	195	30	102	3	-	4	26	145	59	+2.21	+3.02	+1.00	6.2
ER	DN 50	PN 250	E	200	38	102	3	-	8	26	150	59	+2.21	+3.02	+1.15	7.7
E3	DN 50	PN 400	E	235	52	102	3	-	8	30	180	59	+2.21	+3.02	+1.15	14.7
B4	DN 80	PN 10-40	B1 (D)	200	24	138	3.5	-	8	18	160	89	+0.19	+0.25	+0.20	5.3
C4	DN 80	PN 100	B2 (E)	230	32	138	4	-	8	24	180	89	+0.19	+0.25	+0.35	8.9
C5	DN 100	PN 100	B2 (E)	265	36	175	5	-	8	30	210	89	+0.19	+0.25	+0.11	13.7
D3 [4]	DN 50	PN 10-40	B1 (D)	165	20	102	3	-	4	18	125	47	+3.45	+4.81	+1.67	[4]
D4 [4]	DN 80	PN 10-40	B1 (D)	200	24	138	3.5	-	8	18	160	72	+0.19	+0.25	+0.70	[4]

1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 μm. Lower surface roughness on request.

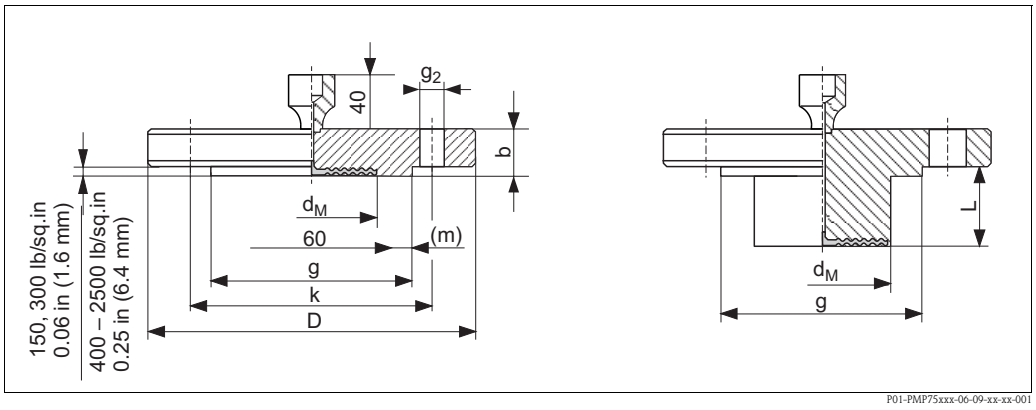
2) Designation as per DIN 2527 in brackets

3) With these process connections the width of the raised face is smaller than described in the standard. Due to a smaller width of the raised face a special seal must be used. Refer to a manufacturer of seals or your local Endress+Hauser Sales Center.

4) 50 mm, 100 mm or 200 mm extension selectable, for extension diameter and weight see the following table.

Version	Nominal diameter	Nominal pressure	Extension length [mm]	Extension diameter d_3 [mm]	Diaphragm seal weight [kg]
D3	DN 50	PN 10-40	50 / 100 / 200	48.3	3.2 / 3.8 / 4.4
D4	DN 80	PN 10-40	50 /100 / 200	76	6.2 / 6.7 / 7.8

ANSI flanges, connection dimensions as per ANSI B 16.5, raised face RF



Process connection PMP75, ANSI flange with and without extended diaphragm seal

	Flange [1]							Boltholes			Diaphragm seal				
Version	Material [2]	Nominal diameter	Class	Diameter	Thickness	Raised face		Quantity	Diameter	Hole circle	max. Diaphragm diameter	T_K Ambient ≤ 40 bar	T_K Ambient > 40 bar	T_K Process	Diaphragm seal weight
				D	b	g	(m)		g_2	k	d_M				
		[in]	[lb./ sq.in]	[in] *[mm]*	[in] *[mm]*	[in] *[mm]*	[in] *[mm]*		[in] *[mm]*	[in] *[mm]*	[in] *[mm]*	[mbar/10 K]			[kg]
AC	AISI 316/ 316L	1	150	4.25 *108*	0.56 *14.2*	2 *50.8*	-	4	0.62 *15.7*	3.12 *79.2*	1.26 *32*	+16.03	+24.33	+3.65	1.2
AN	AISI 316/ 316L	1	300	4.88 *124*	0.69 *17.5*	2.76 *70*	2 *5* [3]	4	0.75 *19.1*	3.5 *88.9*	1.26 *32*	+16.03	+24.33	+3.65	1.3
HC	AISI 316/ 316L	1	400/ 600	4.88 *124*	0.69 *17.5*	2 *50.8*	-	4	0.75 *19.1*	3.5 *88.9*	1.26 *32*	+16.03	+24.33	+5.17	1.4
HN	AISI 316/ 316L	1	900/ 1500	5.88 *149.4*	1.12 *28.4*	2 *50.8*	-	4	1 *25.4*	4 *101.6*	1.26 *32*	+16.03	+24.33	+5.17	3.2
HO	AISI 316/ 316L	1	2500	6.25 *158.8*	1.38 *35.1*	2 *50.8*	-	4	1 *25.4*	4.25 *108*	1.26 *32*	+16.03	+24.33	+5.17	4.6
AE	AISI 316/ 316L	1 1/2	150	5 *127*	0.69 *17.5*	2.88 *73.2*	0.52 *6.6* [3]	4	0.62 *15.7*	3.88 *96.6*	1.89 *48*	+8.14	+12.39	+1.90	1.5
AQ	AISI 316/ 316L	1 1/2	300	6.12 *155.4*	0.81 *20.6*	2.88 *73.2*	0.52 *6.6* [3]	4	0.88 *22.4*	4.5 *114.3*	1.89 *48*	+8.14	+12.39	+2.59	2.6
AF	AISI 316/ 316L	2	150	6 *152.4*	0.75 *19.1*	3.62 *91.9*	-	4	0.75 *19.1*	4.75 *120.7*	2.32 *59*	+2.21	+3.02	+1.60	2.2
J3 [4]	AISI 316/ 316L	2	150	6 *152.4*	0.75 *19.1*	3.62 *91.9*	-	4	0.75 *19.1*	4.75 *120.7*	1.85 *47*	+3.45	+4.81	+1.67	[4]
AR	AISI 316/ 316L	2	300	6.5 *165.1*	0.88 *22.4*	3.62 *91.9*	-	8	0.75 *19.1*	5 *127*	2.32 *59*	+2.21	+3.02	+0.85	3.4
HF	AISI 316/ 316L	2	400/ 600	6.5 *165.1*	1 *25.4*	3.62 *91.9*	-	8	0.75 *19.1*	5 *127*	2.32 *59*	+2.21	+3.02	+0.85	4.3

	Flange [1]							Boltholes			Diaphragm seal				
Version	**Material [2]**	**Nominal diameter**	**Class**	**Diameter**	**Thickness**	**Raised face**		**Quantity**	**Diameter**	**Hole circle**	**max. Diaphragm diameter**	**T_K Ambient**		**T_K Process**	**Diaphragm seal weight**
												≤ 40 bar	**> 40 bar**		
				D	**b**	**g**	**(m)**		**g_2**	**k**	**d_M**				
		[in]	[lb./ sq.in]	[in] *[mm]*	[in] *[mm]*	[in] *[mm]*	[in] *[mm]*		[in] *[mm]*	[in] *[mm]*	[in] *[mm]*	[mbar/10 K]			[kg]
HR	AISI 316/ 316L	2	900/ 1500	8.5 *215.9*	1.5 *38.1*	3.62 *91.9*	–	8	1 *25.4*	6.5 *165.1*	2.32 *59*	+2.21	+3.02	+0.75	10.3
H3	AISI 316/ 316L	2	2500	9.25 *235*	2 *50.8*	3.62 *91.9*	–	8	1.12 *28.4*	6.75 *171.5*	2.32 *59*	+2.21	+3.02	+0.75	15.8
AG	AISI 316/ 316L	3	150	7.5 *190.5*	0.94 *23.9*	5 *127*	–	4	0.75 *19.1*	6 *152.4*	3.50 *89*	+0.19	+0.25	+0.18	5.1
AS	AISI 316/ 316L	3	300	8.25 *209.5*	1.12 *28.4*	5 *127*	–	8	0.75 *19.1*	6 *152.4*	3.5 *89*	+0.19	+0.25	+0.11	7.0
J4 [4]	AISI 316/ 316L	3	150	7.5 *190.5*	0.94 *23.9*	5 *127*	–	4	0.75 *19.1*	6 *152.4*	2.83 *72*	+0.19	+0.25	+0.70	[4]
J7 [4]	AISI 316/ 316L	3	300	8.25 *209.5*	1.12 *28.4*	5 *127*	–	8	0.88 *22.4*	6.62 *168.1*	2.83 *72*	+0.19	+0.25	+0.70	[4]
AH	AISI 316/ 316L	4	150	9 *228.6*	0.94 *23.9*	6.19 *157.2*	–	8	0.75 *19.1*	7.5 *190.5*	3.50 *89*	+0.19	+0.25	+0.33	7.2
AT	AISI 316/ 316L	4	300	10 *254*	1.25 *31.8*	6.19 *157.2*	–	8	0.88 *22.4*	7.88 *200.2*	3.50 *89*	+0.19	+0.25	+0.11	11.7
J5 [4]	AISI 316/ 316L	4	150	9 *228.6*	0.94 *23.9*	6.19 *157.2*	–	8	0.75 *19.1*	7.5 *190.5*	3.50 *89*	+0.19	+0.25	+0.11	[4]
J8 [4]	AISI 316/ 316L	4	300	10 *254*	1.25 *31.8*	6.19 *157.2*	–	8	0.88 *22.4*	7.88 *200.2*	3.50 *89*	+0.19	+0.25	+0.11	[4]

1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 µ*m*. Lower surface roughness on request.

2) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)

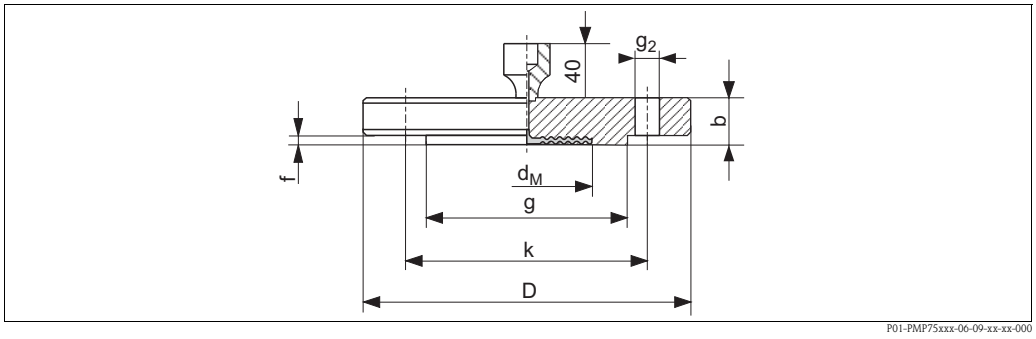
3) With these process connections the width of the raised face is smaller than described in the standard. Due to a smaller width of the raised face a special seal must be used. Refer to a manufacturer of seals or your local Endress+Hauser Sales Center.

4) 2", 4", 6" or 8" extension selectable, for extension diameter and weight see the following table

Version	**Nominal diameter**	**Class**	**Extension length (L)**	**Extension diameter**	**Diaphragm seal weight**
	[in]	[lb./sq.in]	[in] *[(mm)]*	[in] *[(mm)]*	[kg]
J3	2	150	– 2 *(50.8)* – 4 (101.6) – 6 *(152.4)* – 8 *(203.2)*	1.9 *(48.3)*	– 3.0 – 3.4 – 3.9 – 4.4
J4	3	150	– 2 *(50.8)* – 4 (101.6) – 6 *(152.4)* – 8 *(203.2)*	2.99 *(75.9)*	– 6.0 – 6.6 – 7.1 – 7.8
J7	3	300	– 2 *(50.8)* – 4 (101.6) – 6 *(152.4)* – 8 *(203.2)*	2.99 *(75.9)*	– 7.9 – 8.5 – 9.0 – 9.6
J5	4	150	– 2 *(50.8)* – 4 (101.6) – 6 *(152.4)* – 8 *(203.2)*	3.7 *(94)*	– 8.6 – 9.9 – 11.2 – 12.4

Version	Nominal diameter	Class	Extension length (L)	Extension diameter	Diaphragm seal weight
J8	4	300	– 2 *(50.8)* – 4 (101.6) – 6 *(152.4)* – 8 *(203.2)*	3.7 *(94)*	– 13.1 – 14.4 – 15.7 – 16.9

JIS flanges, connection dimensions as per JIS B 2220 BL, raised face RF



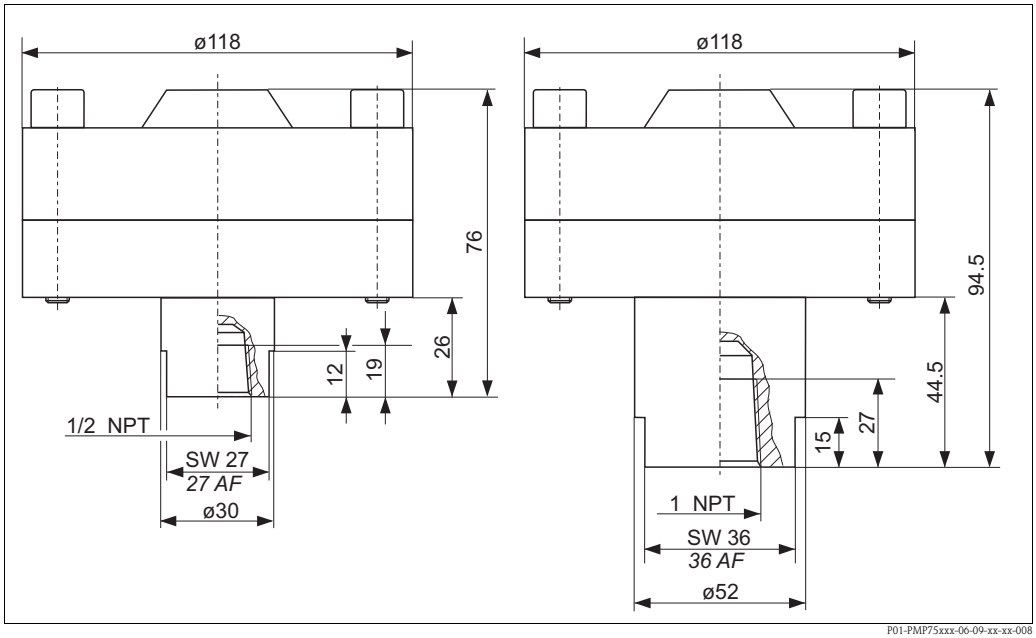
Process connection PMP75, JIS flange with raised face RF, material AISI 316L

	Flange [1]						Boltholes			Diaphragm seal				
Version	Nominal diameter	Nominal pressure	Diameter D [mm]	Thickness b [mm]	Diameter raised face g [mm]	Height raised face f [mm]	Quantity	Diameter g_2 [mm]	Hole circle k [mm]	max. Diaphragm diameter d_M [mm]	T_K Ambient ≤ 40 bar [mbar/10 K]	T_K Ambient > 40 bar [mbar/10 K]	T_K Process [mbar/10 K]	Diaphragm seal weight [2] [kg]
KC	25 A	10 K	125	14	67	1	4	19	90	32	+16.03	+24.33	+5.17	1.5
KF	50 A	10 K	155	16	96	2	4	19	120	59	+2.21	+3.02	+1.00	2.3
KL	80 A	10 K	185	18	127	2	8	19	150	89	+0.19	+0.25	+0.11	3.3
KH	100 A	10 K	210	18	151	2	8	19	175	89	+0.19	+0.25	+0.11	4.4

1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards), made of Hastelloy C, Monel or Tantalum is Ra 0.8 μm. Lower surface roughness on request.

2) Housing weight → 61

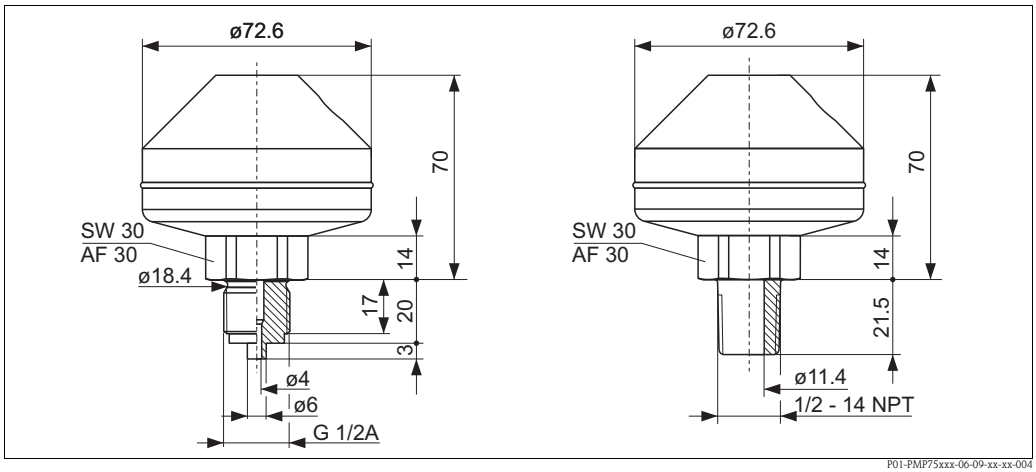
Thread 1/2 NPT und 1 NPT, seperator



Process connection PMP75, versions "UG" and "UH", screwed, material AISI 316L , seal Viton

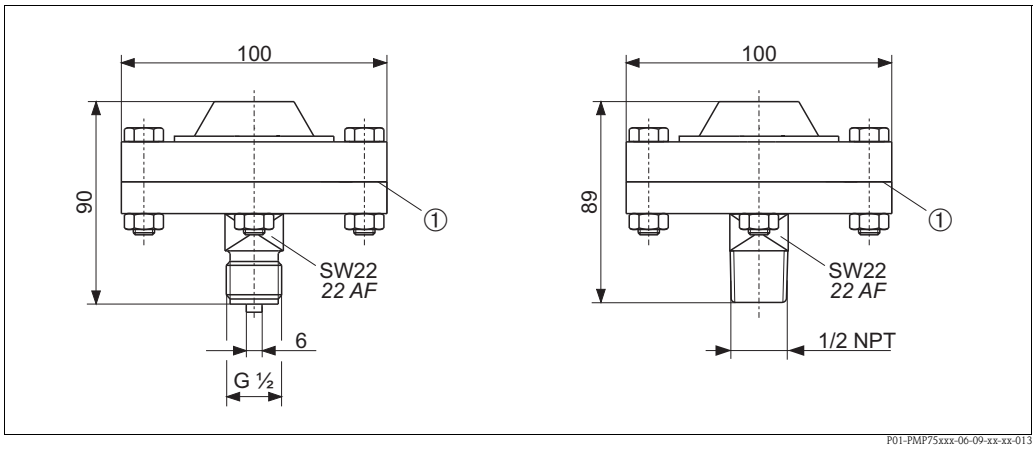
Version	Description	Nominal pressure	T_K Ambient	T_K Process	Diaphragm seal weight
			[mbar/10 K]		[kg]
UG	1/2 NPT	PN 250	+3.45	+1.28	4.75
UH	1 NPT	PN 250	+3.45	+1.28	5.0

Thread ISO 228 G 1/2 A and ANSI 1/2 MNPT, seperator



Process connection PMP75, versions "UA" and "UB", welded, material AISI 316L

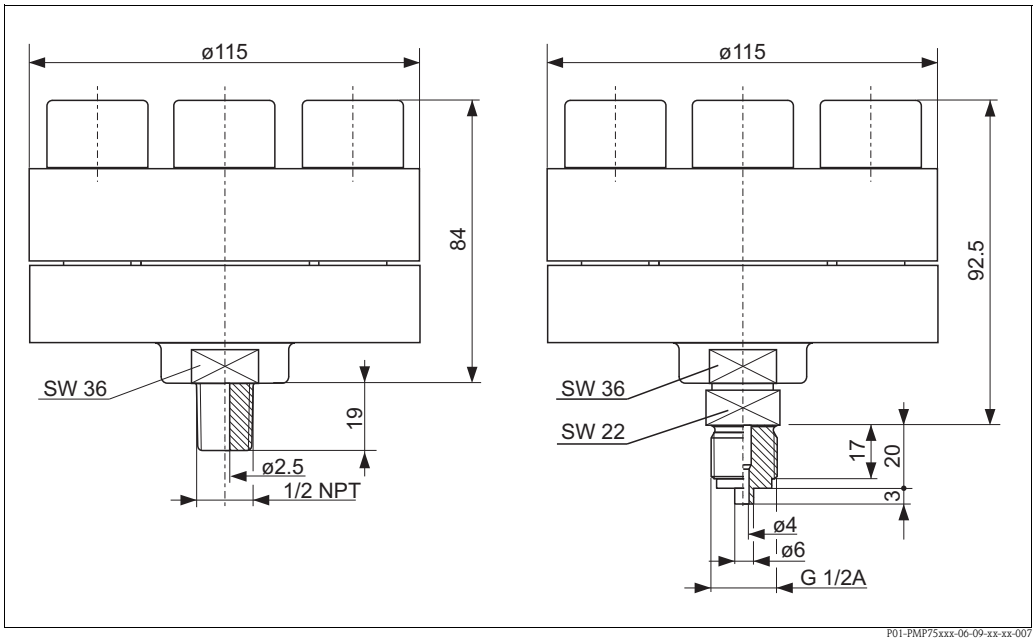
Version	Description	Nominal pressure	T_K Ambient	T_K Process	Diaphragm seal weight
			[mbar/10 K]		[kg]
UA	ISO 228 G 1/2 A	PN 160	+0.9	+0.30	1.43
UB	ANSI 1/2 MNPT	PN 160	+0.9	+0.30	1.43



Process connection PMP75, left: version "UC" with threaded connection ISO 228 G 1/2 B, right: version "UD" with threaded connection ANSI 1/2 MNPT

1 PTFE seal as standard max. 260 °C/500 °F (higher temperatures on request)

Version	Measuring range	Description	Nominal pressure	T_K Process [mbar/10 K]	Diaphragm seal weight [kg]
UC	≤ 40 bar	ISO 228 G 1/2 B	PN 40	+0.75	1.43
UD	≤ 40 bar	ANSI 1/2 MNPT	PN 40	+0.55	1.43

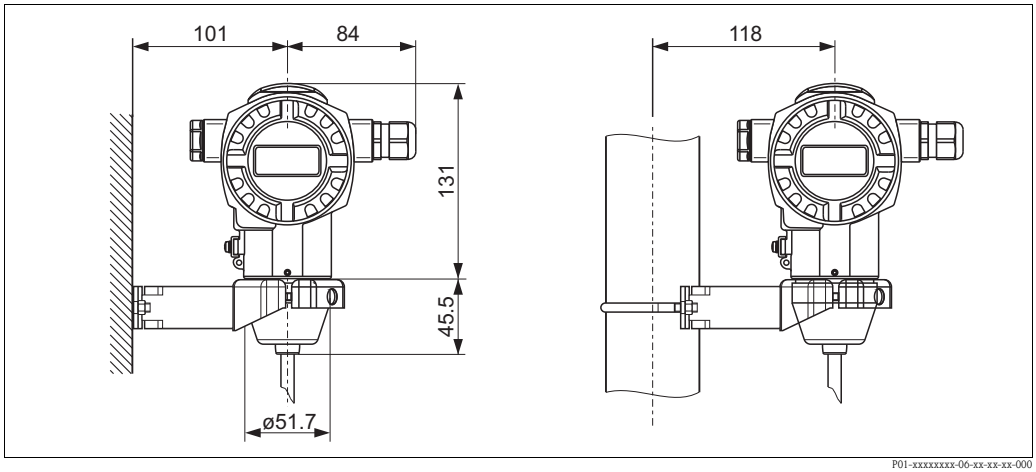


Process connection PMP75, versions "UC" and "UD", screwed, with integrated sealing lip, material AISI 316L

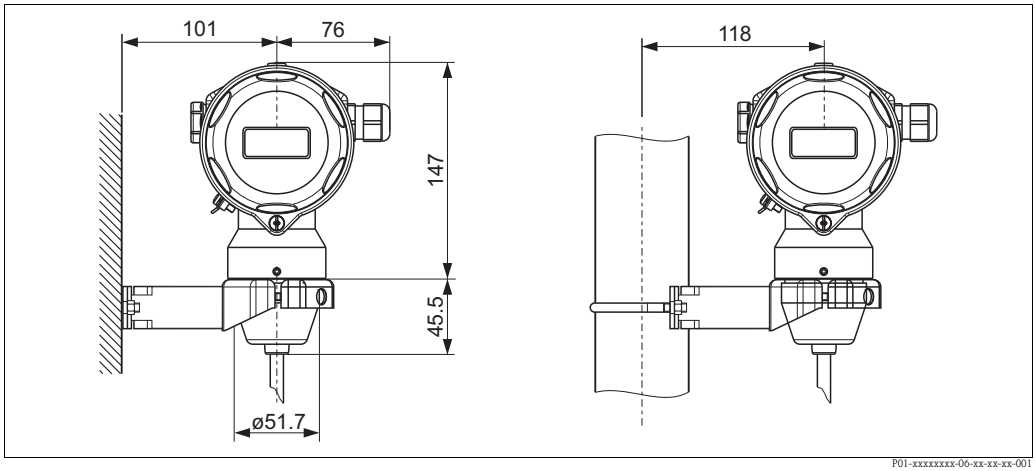
Version	Measuring range	Description	Nominal pressure	T_K Ambient [mbar/10 K]	T_K Process [mbar/10 K]	Diaphragm seal weight [kg]
UC	> 40 bar	ISO 228 G 1/2 A	PN 400	+3.45	+1.28	1.43
UD	> 40 bar	ANSI 1/2 MNPT	PN 400	+3.45	+1.28	4.75

Note!
With the use of high temperature oils the design can deviate strongly.
For further information please contact your local Endress+Hauser Sales Center.

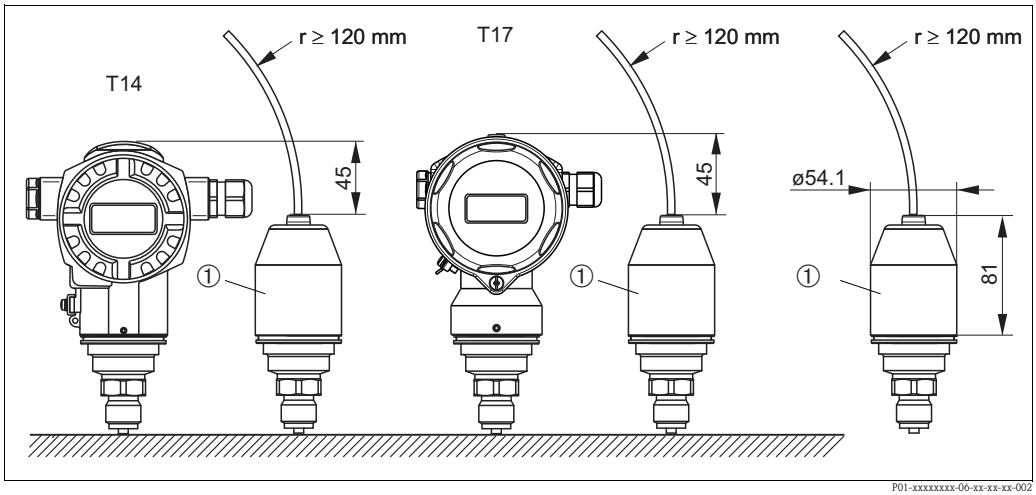
"Separate housing" version



Dimensions T14 housing, optional display on the side. Housing weight see → 61.



Dimensions T17 housing, optional display on the side. Housing weight see → 61.



Reduction of the mounting height of the process connection, for application of the separate housing.
1 Process connection adapter.

If the separate housing is used, the mounting height of the process connection is reduced by approx. 45 mm as compared to the dimensions of the standard version.
The minimum bending radius (r) for the cable is 120 mm (4.7").

Weight

Housing

	T14		T17	Separate housing
	Aluminium	**AISI 316L**	**AISI 316L**	
With electronic insert and on-site display	1.2 kg	2.1 kg	1.2 kg	Weight of housing T14 or T17 + 0.5 kg. Weight of sensor + 0.5 kg.
With electronic insert without on-site display	1.1 kg	2.0 kg	1.1 kg	

Process connections

- Process connections PMC71 (with ceramic process isolating diaphragm): → 33 ff
- Process connections PMP71 (with metallic process isolating diaphragm): → 40 ff
- Process connections PMP75 (with metallic process isolating diaphragm): → 47 ff

Material

T14 housing:
- T14 housing, selectable:
  - Die-cast aluminium with protective powder-coating on polyester basis: RAL 5012 (blue), cover: RAL 7035 (grey)
  - Precision cast stainless steel AISI 316L (1.4435)
- External operation (keys and key covering): Polycarbonate PC-FR, RAL 7035 (grey)
- Sight glass: Mineral glass
- Cable gland: Polyamid (PA)
- Pressure compensation filter: PA6 GF10
- Blind plug: PBT-GF30 FR, for Dust Ex, Ex d, FM XP and CSA XP: AISI 316L (1.4435)
- Seals:
  - Cable and blind plug seal: Silicone (VMQ)
  - Pressure compensation filter o-ring: Silicone (VMQ)
  - Cover: EPDM
  - Sight glass: Silicone (VMQ)
- Nameplates: AISI 304 (1.4301)

T17 housing:
- Housing: Stainless steel AISI 316L (1.4404)
- Sight glass:
  - Version for non-hazardous area, ATEX Ex ia, NEPSI Zone 0/1 Ex ia, IECEx Zone 0/1 Ex ia, FM NI, FM IS, CSA IS: Polycarbonate (PC)
  - ATEX 1/2 D, ATEX 1/3 D, ATEX 1 GD, ATEX 1/2 GD, ATEX 3 G, FM DIP, CSA Dust Ex: Mineral glass
- Cable gland: Polyamid PA, for Dust-Ex: CuZn nickel-plated
- Blind plug: PBT-GF30 FR, for Dust-Ex: AISI 316L (1.4435)
- Pressure compensation filter: PA6 GF10
- Seals:
  - Cable and blind plug seal: Silicone (VMQ)
  - Pressure compensation filter o-ring: Silicone (VMQ)
  - Cover: EPDM
  - Sight glass: EPDM
- Nameplates: lasered

Process connection

- "Clamp connections" and "Hygienic connections" (see also Chapter "Ordering information"): AISI 316L/ 1.4435
- "Threaded connection" and "DIN/EN flanges" (see also Chapter "Ordering information"): stainless steel AISI 316L with the material number 1.4435 or 1.4404
- With regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under 13E0 in EN 1092-1 Tab.18. The chemical composition of the two materials can be identical.

Cable for separate housing:

- PE cable:
  Slip-resistant cable with strain-relief members made of Dynemo; shielded using aluminium-coated film; insulated with polyethylene (PE-LD), black; copper wires, twisted, UV resistant
- FEP cable:
  Slip-resistant cable; shielded using galvanized steel wire netting; insulated with fluorinated ethylene propylene (FEP), black; copper wires, twisted, UV resistant

TSE Certificate of Suitability

The following applies to all process wetted device components:
- They do not contain any materials derived from animals.
- No auxiliaries or operating materials derived from animals are used in production or processing.

Note!
Process wetted device components are listed in the "Mechanical construction" (→ 📄 32) and "Ordering information" (→ 📄 77) sections.

Miscellaneous:

- Process isolating diaphragm PMC71: Al_2O_3 Aluminium-oxide-ceramic (FDA 21CFR186.1256, USP Class VI), ultrapure 99.9% (→ www.endress.com/ceraphire)
- Mounting accessories: Mounting kit with screws AISI 304 (1.4301)
- Capillary: AISI 316 Ti (1.4571)
- Protective hose for capillary: AISI 304 (1.4301)
- External earth terminal: AISI 304 (1.4301)

→ For process connections, process diaphragms, seals and filling oils see ordering information, → 📄 77 ff.

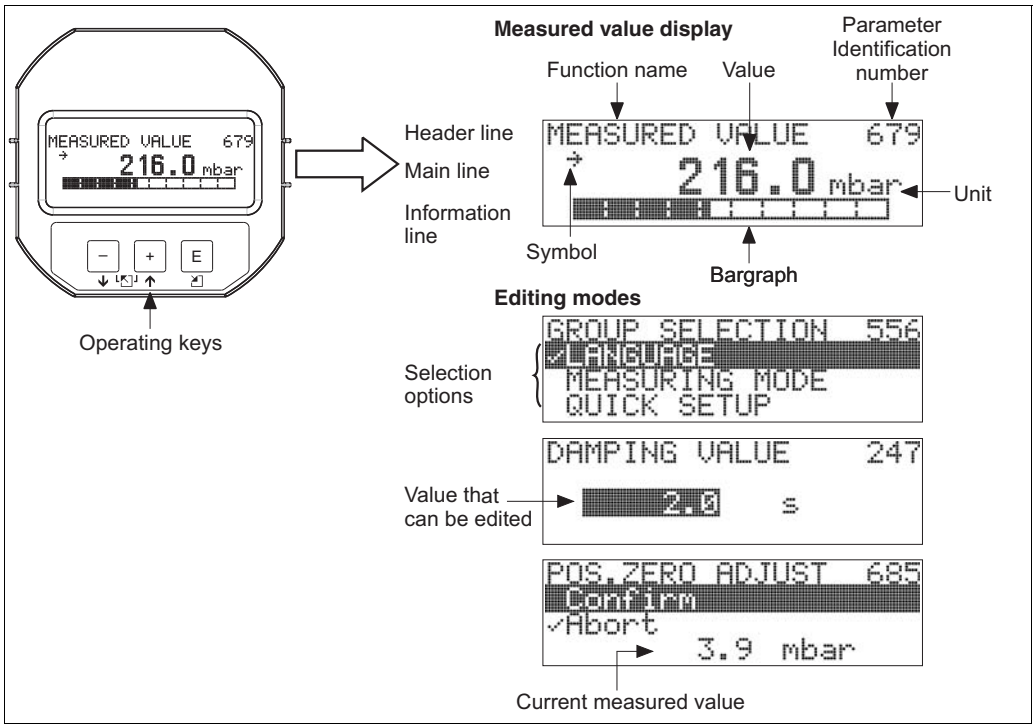
Human interface

Operating elements

On-site display (optional)

A 4-line liquid crystal display (LCD) is used for display and operation. The on-site display shows measured values, dialog text as well as fault and notice messages in plain text, thereby supporting the user in every stage of operation. The liquid crystal display of the device can be turned in 90° steps.
Depending on the installation position of the device, this makes it easy to operate the device and read the measured value.

Functions:
- 8-digit measured value display including sign and decimal point, bar graph for 4 to 20 mA HART as current display or for PROFIBUS PA as graphical display of the scaled value of the AI Block
- Simple and complete menu guidance thanks to seperation of the parameters into three levels
- Ech parameter is given as 3-digit ID number for easy navigation
- Option for configuring the display according to individual requirements and desires, such as language, alternating display, display of other measured values such as sensor temperature, contrast setting
- Comprehensive diagnostic functions (fault and warning message, peak-hold indicators, etc.)
- Rapid and safe commissioning with the Quick Setup menus



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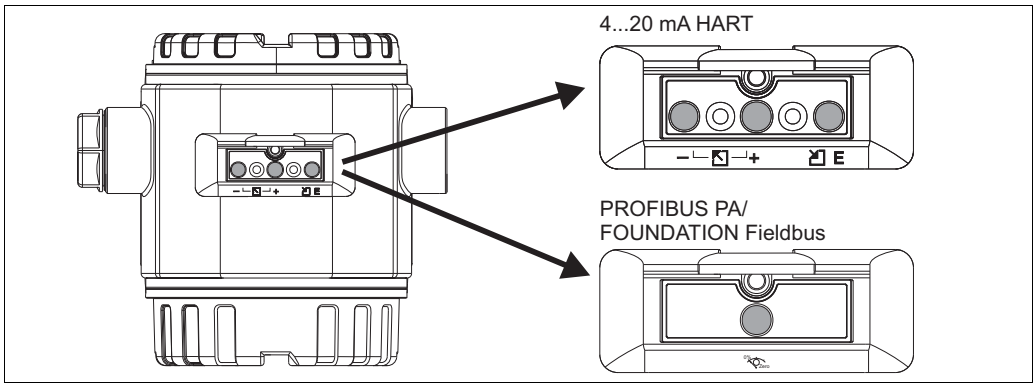
Operating elements

Operating keys on the exterior of the device

The operating keys of the housing T14 (aluminium or stainless steel) are located either outside of the housing, under the protection cap or upon the electronic insert. The operating keys of the housing T17 (ironing stainless steel) are located inside the housing upon the electronic insert



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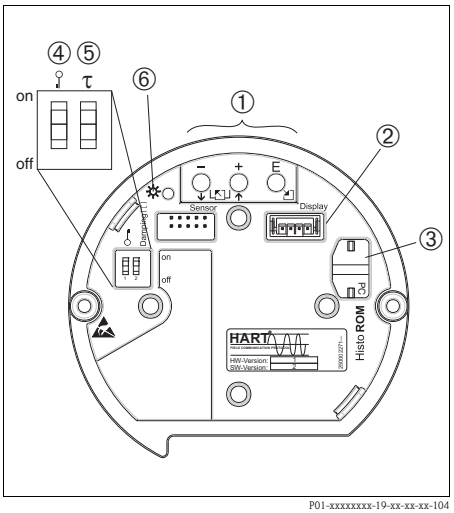
The operating keys located externally on the device work on the Hall sensor principle. As a result, no additional openings are required in the device. This guarantees:
- Complete protection against environmental influences such as moisture and contamination
- Simple operation without any tools
- No wear.

Operating keys and elements located internally on the electronic insert



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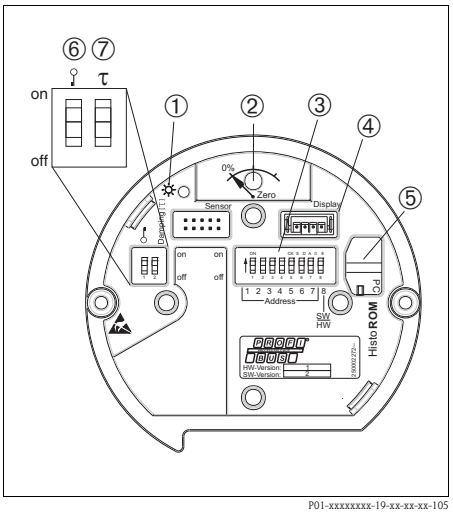
Electronic insert HART

1 *Operating keys*
2 *Slot for optional display*
3 *Slot for optional HistoROM®/M-DAT*
4 *DIP-switch for locking/unlocking measured-value-relevant parameters*
5 *DIP-switch for damping on/off*
6 *Green LED to indicate value being accepted*



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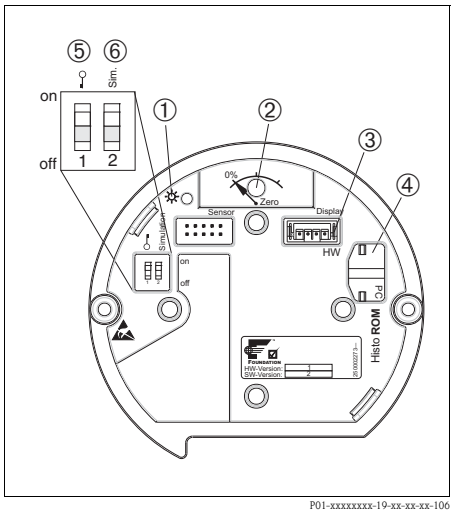
Electronic insert PROFIBUS PA

1 *Green LED to indicate value being accepted*
2 *Key for position calibration and device reset*
3 *DIP-switch for bus address*
4 *Slot for optional display*
5 *Slot for optional HistoROM®/M-DAT*
6 *DIP-switch for locking/unlocking measured-value-relevant parameters*
7 *DIP-switch for damping on/off*



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Electronic insert FOUNDATION Fieldbus

1 *Green LED to indicate value being accepted*
2 *Key for position calibration and device reset*
3 *Slot for optional display*
4 *Slot for optional HistoROM®/M-DAT*
5 *DIP-switch for locking/unlocking measured-value-relevant parameters*
6 *DIP-switch for simulation mode on/off*

Local operation

Function	External operation (operation keys, optional, not T17 housing)	Internal operation (electronic insert)	Display (optional)
Position calibration (zero point correction)	X	X	X
Setting lower-range value and upper-range value – reference pressure present at the device	X (HART only)	X (HART only)	X
Device Reset	X	X	X
Locking and unlocking measured-value-relevant parameters	—	X	X
Value acceptance indicated by green LED	X	X	X
Switching damping on and off	—	X (HART and PA only)	X
Setting bus address (PA)	—	X	X
Switching simulation mode on and off (FOUNDATION Fieldbus)	—	X	X

Remote operation

Depending on the position of the write protection switch at the device, all software parameters are accessible.

HART

Remote operation via:
- Handheld terminal Field Communicator 375 (see Chapter "Hard- und Software for on-site and remote operation" → 66)
- FieldCare (see Chapter "Hard- und Software for on-site and remote operation" → 66 ff) with
  – Commubox FXA191 (see Chapter "Hard- und Software for on-site and remote operation" → 66 ff)
  – Commubox FXA195 (see Chapter "Hard- und Software for on-site and remote operation" → 66 ff)
- Field Xpert:
  Field Xpert is an industrial PDA with integrated 3.5" touchscreen from Endress+Hauser based on Windows Mobile. It communicates via wireless with the optional VIATOR Bluetooth modem connected to a HART device point-to-point or wireless via WiFi and Endress+Hauser's Fieldgate FXA520. Field Xpert also works as a stand-alone device for asset management applications. For details refer to BA060S/00/en.

PROFIBUS PA

Remote operation via:
- FieldCare (see Chapter "Hard- und Software for on-site and remote operation" → 66 ff)
  – Profiboard: For the Connection of a Personal Computer to PROFIBUS
  – Proficard: For the Connection of a Laptop to PROFIBUS

FOUNDATION Fieldbus

Remote operation via:
- Handheld terminal Field Communicator 375 (see Chapter "Hard- und Software for on-site and remote operation" → 66 ff)
- Use an FF-configuration program for e.g. NI-FBUS configurator, to
  – connect devices with "FOUNDATION Fieldbus signal" into an FF-network
  – set FF-specific parameter
  Operation with NI-FBUS Configurator:
  The NI-FBUS Configurator is an easy-to-use graphical environment for creating linkages, loops and a schedule based on the fieldbus concept.
  You can use the NI-FBUS Configurator to configure a fieldbus network as follows:
  – Set block and device tags
  – Set device addresses
  – Create and edit function block control strategies (function block applications)
  – Configure vendor -defined function and transducer blocks
  – Create and edit schedules
  – Read and write to function block control strategies (function block applications)
  – Invoke Device Description (DD) methods

– Display DD menus
– Download a configuration
– Verify a configuration and compare it to a saved configuration
– Monitor a downloaded configuration
– Replace a virual device by a real device
– Save and print a configuration

Note!
For further information please contact your local Endress+Hauser Sales Center.

Hard- und Software for on-site and remote operation

Commubox FXA191

For intrinsically safe communication with FieldCare via the RS232C interface. For details refer to TI237F700/en.

Commubox FXA195

For intrinsically safe communication with FieldCare via the USB interface. For details TI404F/00/en.

Commubox FXA291

The Commubox FXA291 connects Endress+Hauser field instruent with CDI interface (=Endress+Hauser Common Data Interface) to the USB interface of a personal computer or a notebook.
For details TI405C/07/en.

Note!
For the following Endress+Hauser instruments you need the "ToF Adapter FXA291" as an additional accessory:

- Cerabar S PMC71, PMP7x
- Deltabar S PMD7x, FMD7x
- Deltapilot S FMB70

ToF Adapter FXA291

The ToF Adapter FXA291 connects the Commubox FXA291 with instruments of the ToF platform, pressure instruments and Gammapilot via the USB interface of a personal computer or a notebook. For details refer to KA271F.

Field Communicator 375

With a handheld terminal, all the parameters can be configured anywhere along the 4 to 20 mA line via menu operation.

HistoROM®/M-DAT (optional)

HistoROM®/M-DAT is a memory module, which is attached to the electronic insert. The HistoROM®/M-DAT can be retrofitted at any stage (Order number: 52027785).

Your benefits

- Quick and safe commissioning of the same measuring points by copying the configuration data of one transmitter to another transmitter
- Reliable process monitoring thanks to cyclical recording of pressure and sensor temperature measured values
- Simple dagnosis by recording diverse events such as alarms, configuration changes, counters for measuring range undershoot and overshoot for pressure and temperature as well as user limit overshoot and undershoot for pressure and temperature etc.
- Analysis and graphic evaluation of the events and process parameters via software (contained in scope of supply).

HistoROM®/M-DAT can be ordered via feature 100 "Additional options 1" or feature 110 "Additional options 2" or as spare parts. → 🖹 77 ff. A CD with Endress+Hauser operating program is also included in the scope of delivery.
You can copy data from one transmitter to another transmitter when operating a FOUNDATION Fieldbus device via an FF configuration program. You need the Endress+Hauser FieldCare operating program and the Commubox FXA291 service interface and the ToF Adapter FXA291 to be able to access the data and events saved in the HistoROM®/M-DAT.

FieldCare

FieldCare is an Endress+Hauser asset management tool based on FDT technology. With FieldCare, you can configure all Endress+Hauser devices as wella s devices from other manufacturers that support the FDT standard.

FieldCare supports the following functions:
- Configuration of transmitter in offline and online operation
- Loading and saving device data (upload/download)
- HistoROM®/M-DAT analysis
- Documentation of the measuring point

Connection options:
- HART via Commubox FXA191 and the RS232C serial interface of a computer
- HART via Commubox FXA195 and the USB port on a computer
- PROFIBUS PA via segment coupler and PROFIBUS interface card
- FOUNDATION Fieldbus via Commubox FXA193 and the RS232C serial interface of a computer
- Service interface with adapter Commubox FXA291 and ToF Adapter FXA291 (USB).

For further information → www.endress.com

Planning instructions, diaphragm seal systems

With the Endress Hauser selection tool "Applicator" you will find the optimum diaphragm seal for your application. Online on "www.endress.com/applicator" or offline on CD.
For further information please contact your local Endress+Hauser Sales Center.

Applications

Diaphragm seal systems should be used if the process media and the device should be separated. Diaphragm seal systems offer clear advantages in the following instances:
- In the case of high process temperatures (→ 30, section "Process temperature limits".)
- For aggressive media
- If good and rapid measuring point cleaning is necessary
- If the measuring point is exposed to vibrations
- For mounting locations that are difficult to access
- For very humid mounting locations

Planning instructions

Diaphragm seals are separating equipment between the measuring system and the process medium.

A diaphragm seal system consists of:
- A diaphragm seal in a one-sided system
- Capillary tube
- Fill fluid and
- A pressure transmitter.

The process pressure acts via the process isolating diaphragm of a diaphragm seal on the liquid-filled system, which transfers the process pressure via the capillary tube onto the sensor of the pressure transmitter. Endress+Hauser delivers all diaphragm seal systems as welded versions. The system is hermetically sealed, which ensures the highest reliability.

Note!
The correlations between the individual diaphragm seal components are presented in the following section. For further information and comprehensive diaphragm seal system designs, please contact your local Endress+Hauser Sales Center.

Diaphragm seal

The diaphragm seal determines the application range of the system by
- the process isolating diaphragm diameter
- the diaphragms: stiffness and material
- the design (oil volume).

Process isolating diaphragm diameter

The larger the process isolating diaphragm diameter (less stiffness), the smaller the temperature effect on the measurement result.
Note: To keep the temperature effect in practice-oriented limits, you should select diaphragm seals with a nominal diameter of ≥ DN 80, in as far as the process connection allows for it.

Process isolating diaphragm stiffness

The stiffness is dependent on the process isolating diaphragm diameter, the material, any available coating and on the process isolating diaphragm thickness and shape. The process isolating diaphragm thickness and the shape are defined constructively. The stiffness of a process isolating diaphragm of a diaphragm seal influences the temperature operating range and the measuring error caused by temperature effects.

Capillary

Capillaries with an internal diameter of 1 mm are used as standard.
The capillary tube influences the T_K zero point, the ambient temperature operating range and the response time of a diaphragm seal system as a result of its length and internal diameter.
→ 69 ff, sections "Influence of the temperature on the zero point" and "Ambient temperature range".
→ Observe the installation instructions regarding capillary tubes. → 74 ff, section "Installation instructions".

Filling oil

When selecting the filling oil, fluid and ambient temperature as well as the operating pressure are of crucial importance. Observe the temperatures and pressures during commissioning and cleaning. A further selection criterion is the compatibility of the filling oil with the requirements of the process medium. For this reason, only filling oils that are harmless to health are used in the food industry, such as vegetable oil or silicone oil → See also the following section "Diaphragm seal filling oils" section.
The filling oil used influences the T_K zero point and the temperature operating range of a diaphragm seal system and the response time. → 🖹 69 ff, section "Influence of the temperature on the zero point".

Pressure transmitter

The pressure transmitter influences the temperature operating range, the T_K zero point and the response time as a result of its volume change. The volume change is the volume that has to be shifted to pass through the complete measuring range.
Pressure transmitters from Endress+Hauser are optimised with regard to minimum volume change.

Diaphragm seal filling oils

Version [1]	Filling oil	Permissible temperature range [2] at 0.05 bar ≤ p_{abs} ≤ 1 bar	Permissible temperature [2] range at p_{abs} ≥ 1 bar	Density [g/cm³]	Viscosity [cSt at 25°C (77°F)]	Coefficient of thermal expansion [1/K]	T_K correction factor	Note
A, H, 1 or 2	Silicone oil	–40...+180°C (–40...+356°F)	–40...+250°C (–40...+482°F)	0.96	100	0.00096	1	suitable for foods FDA 21 CFR 175.105
G, 3 or 4	High temperature oil	–10...+200°C (+14...+392°F)	–10...+400°C (+14...+752°F)	1.07	37	0.0007	0.72	high temperatures
F or N	Inert oil	–40...+80°C (–40...+176°F)	–40...+175°C (–40...+347°F)	1.87	27	0.000876	0.91	for ultra pure gas and oxygen applications
D, 5 or 6	Vegetable oil	–10...+120°C (+14...+248°F)	–10...+200°C (+14...+392°F)	0.94	9.5	0.00101	1.05	suitable for foods FDA 21 CFR 172.856
7 or 8	Low temperature oil	–70...+80°C –94...+176°F	–70...+180°C –94...+356°F	0.92	4.4	0.00108	1.12	low temperatures

1) Version for feature 90 in the order code

2) Observe temperature limits of the device (→ 🖹 28 and → 🖹 30).

Influence of the temperature on the zero point

A temperature change results in a volume change of the filling oil. The volume change is dependent on the coefficient of thermal expansion of the filling oil and on the volume of the filling oil at calibration temperature (constant in the range: +21 to +33°C (+69.8 to 91.4°F)). → 🖹 69, "Filling oil" section.
For example, the filling oil expands in the event of a temperature increase. The additional volume presses against the process isolating diaphragm of a diaphragm seal. The stiffer a process isolating diaphragm is, the greater its return force, which counteracts a volume change and acts on the measuring cell together with the operating pressure, thus shifting the zero point. For the "T_K Process" and "T_K Ambient (for devices without capillary)", see → 🖹 47 ff, section "Process connections PMP75".

The following diagrams display the temperature coefficient "T_K Ambient" dependent on the capillary length. The following application is displayed: capillary temperature and transmitter temperature (ambient temperature) change, the process temperature corresponds to the calibration temperature.
The temperature coefficients obtained from the diagrams apply to silicone oil and the process isolating diaphragm material AISI 316L/1.4435. For other filling oils, these temperature coefficients must be multiplied by the T_K correction factor of the corresponding filling oil. For the T_K correction factors, see → 🖹 69, section "Diaphragm seal filling oils".
With regard to the temperature coefficient "T_K Ambient", devices with temperature isolator behave like devices with the same process connection and 0.1 m capillary.

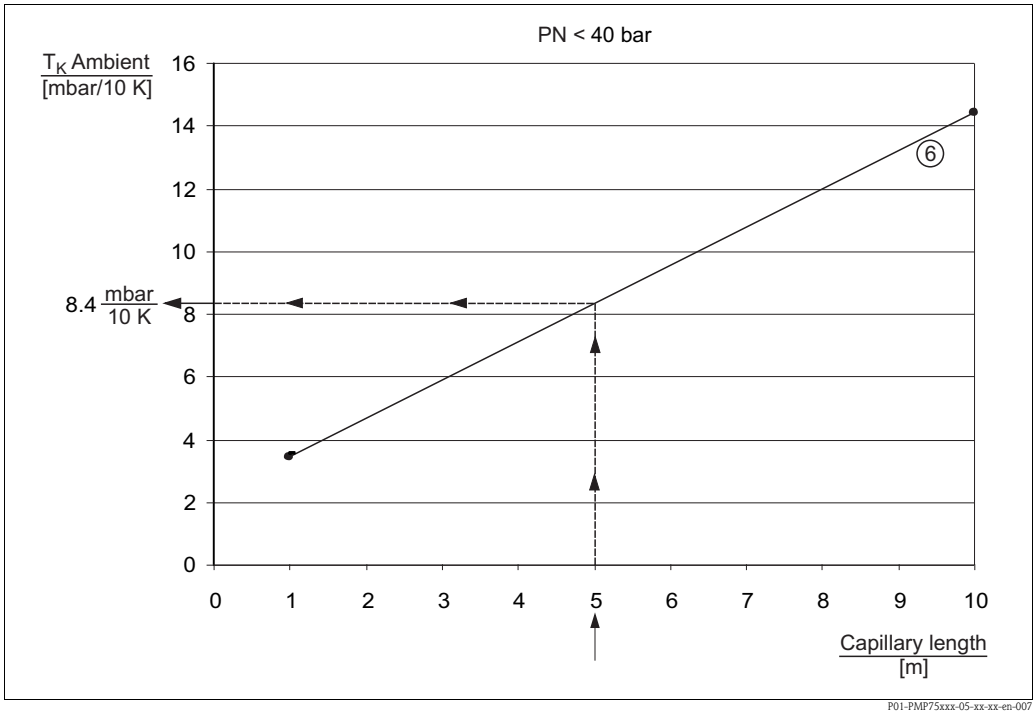


Diagram T_K Ambient dependent on the capillary length for PMP75, PN < 40 bar

Example for:
– Diaphragm seal versions "B3, EN/DIN flange DN 50 PN 10-40 B1, AISI 316L"
– Capillary length: 5 m
– Ambient temperature, capillary/transmitter: 45°C
– Filling oil: silicone oil

1. Select characteristic curve type for the diaphragm seal versions "B3" in accordance with the following table.
   Result: characteristic curve type 6
2. Obtain value for T_K Ambient from the diagram.
   Result: 8.4 mbar/10 K
3. $T_{Ambient} - T_{Calibration}$ = 45°C – 25°C = 20°C ⇒ 8.4 mbar/10 K x 20 K = 16.8 mbar

Result: In this application, the zero point is shifted by 16.8 mbar.

Note!
- The influence of temperature on the zero point can be corrected with position calibration.
- The temperature influence can be minimised by using a filling oil with a smaller coefficient of thermal expansion, shorter capillary, diaphragm seal with larger process isolating diaphragm diameter or by using a smaller capillary internal diameter.

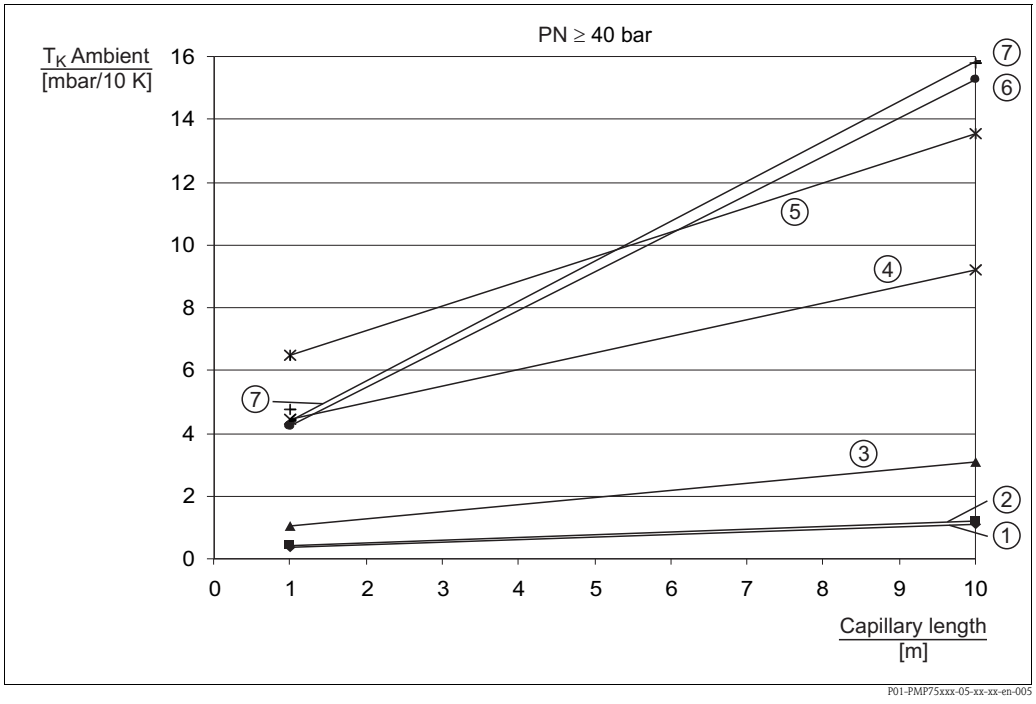


Diagram T_K Ambient dependent on the capillary length for PMP75, PN ≥ 40 bar

Characteristic curve type	Version	Diaphragm seal
1	B4	EN/DIN flange DN 80 PN 10-40 B1, AISI 316L
	C4	EN/DIN flange DN 80 PN 100 B2, AISI 316L
	C5	EN/DIN flange DN 100 PN 100 B2, AISI 316L
	KL	JIS flange 10K 80A RF, AISI 316L
	KH	JIS flange 10K 100A RF, AISI 316L
	D4	EN/DIN flange DN 80, PN 10-40 B1, Extensions: 50 mm/100 mm/200 mm, AISI 316L
	AG	ANSI flange 3" 150 lbs RF, AISI 316/316L
	AS	ANSI flange 3" 300 lbs RF, AISI 316/316L
	AH	ANSI flange 4" 150 lbs RF, AISI 316/316L
	AT	ANSI flange 4" 300 lbs RF, AISI 316/316L
	J4	ANSI flange 3" 150 lbs RF, Extensions: 2"/4"/6"/8", AISI 316/316L
	J7	ANSI flange 3" 300 lbs RF, Extensions: 2"/4"/6"/8", AISI 316/316L
	J5	ANSI flange 4" 150 lbs RF, Extensions: 2"/4"/6"/8", AISI 316/316L
	J8	ANSI flange 4" 300 lbs RF, Extensions: 2"/4"/6"/8", AISI 316/316L
2	TF	Tri-Clamp, ISO 2852 DN 76.1 (3"), AISI 316L/1.4435
3	MT	DIN 11851 DN 80 PN 25, AISI 316L/1.4435
	M5	DIN 11851 DN 80 PN 25 socket, AISI 316L/1.4435
4	SD	Pipe diaphragm seal Tri-Clamp, ISO 2852 DN 51 (2"), AISI 316L
5	SC	Pipe diaphragm seal Tri-Clamp, ISO 2852 DN 38 (1 1/2"), AISI 316L
6	B3	EN/DIN flange DN 50 PN 1040 B1, AISI 316L
	C3	EN/DIN flange DN 50 PN 63 B2, AISI 316L
	EF	EN/DIN flange DN 50 PN 100-160 E, AISI 316L
	ER	EN/DIN flange DN 50 PN 250 E, AISI 316L
	E3	EN/DIN flange DN 50 PN 400 E, AISI 316L
	AF	ANSI flange 2" 150 lbs RF, AISI 316/316L
	AR	ANSI flange 2" 300 lbs RF, AISI 316/316L
	HF	ANSI flange 2" 400/600 lbs RF, AISI 316/316L
	HR	ANSI flange 2" 900/1500 lbs RF, AISI 316/316L
	H3	ANSI flange 2" 2500 lbs RF, AISI 316/316L
	KF	JIS 10K 50A RF, AISI 316L
	MR	DIN 11851 DN 50 PN 25, AISI 316L/1.4435
	MS	DIN 11851 DN 65 PN 25, AISI 316L/1.4435
	M3	DIN 11851 DN 50 PN 25 socket, AISI 316L/1.4435
	M4	DIN 11851 DN 65 PN 25 socket, AISI 316L/1.4435
7	TR	Varivent Type N for tubes DN 40 – DN 162, PN 40, AISI 316L/1.4435
	TK	DRD DN50 (65 mm), PN 25, AISI 316L/1.4435

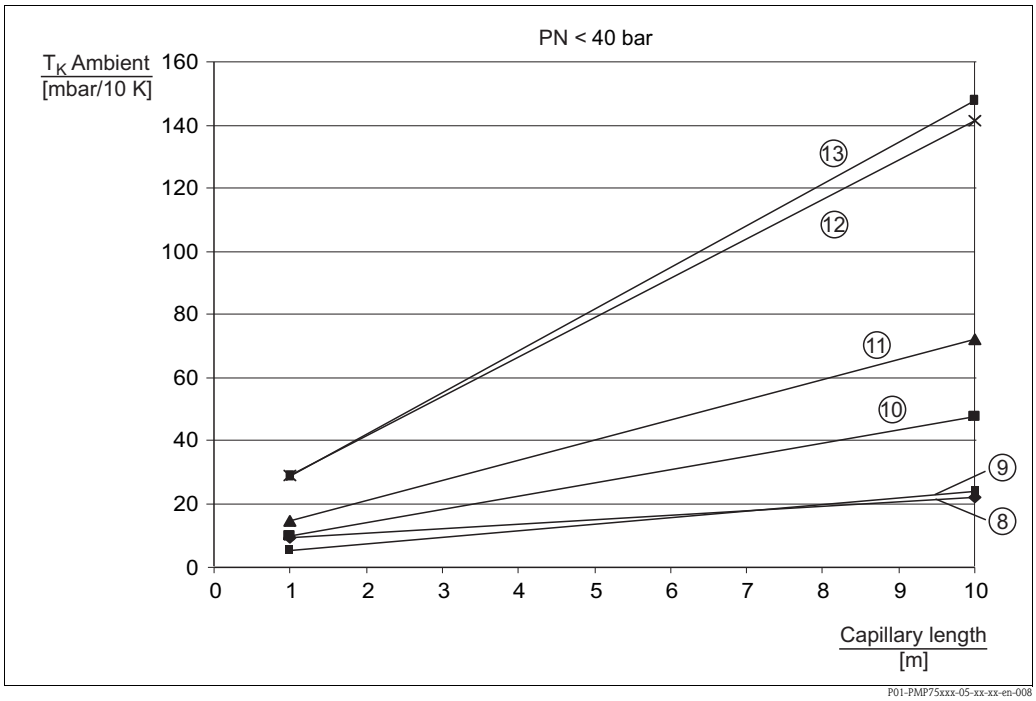


Diagram T_K Ambient dependent on the capillary length for PMP75, PN < 40 bar

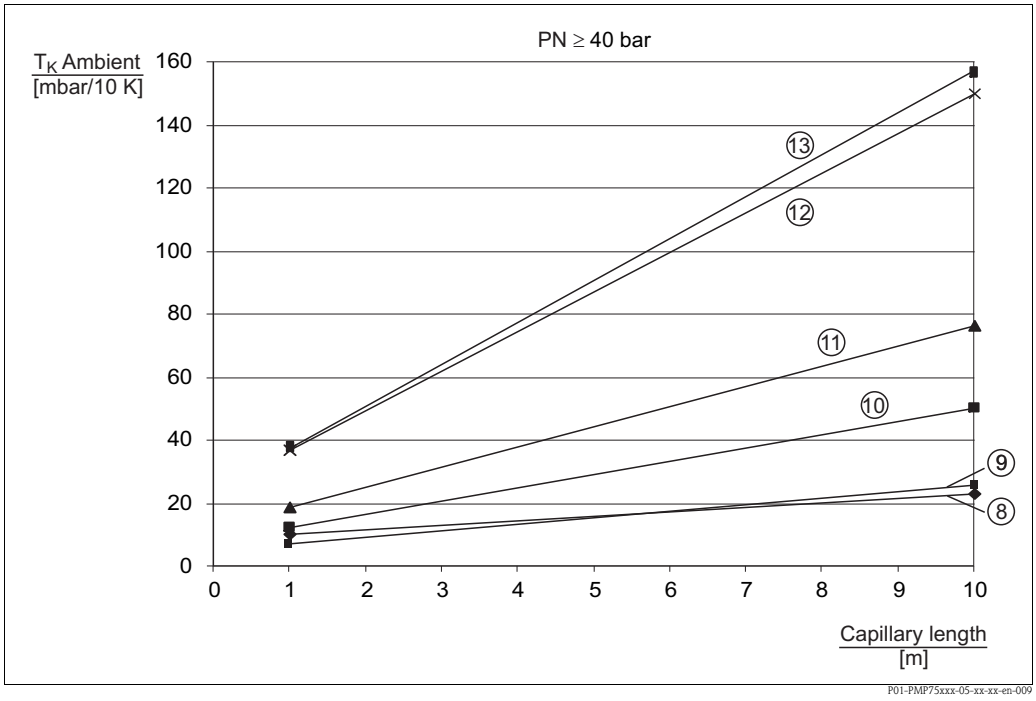
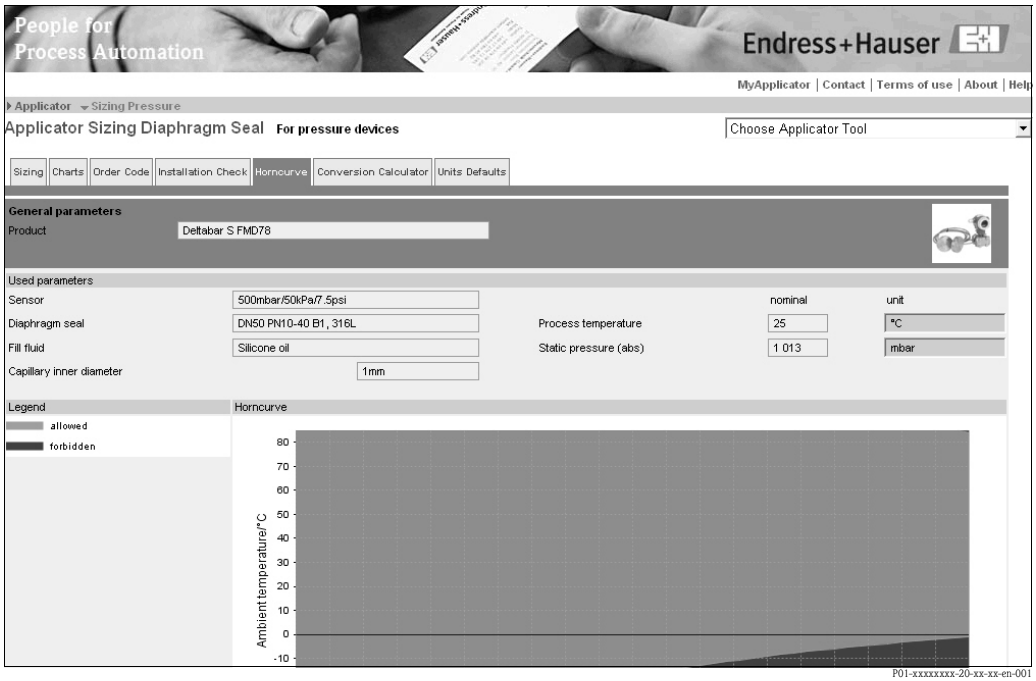


Diagram T_K Ambient dependent on the capillary length for PMP75, PN≥ 40 bar

Characteristic curve type	Version	Diaphragm seal
8	SB	Pipe diaphragm seal Tri-Clamp, ISO 2852 DN 25 (1"), AISI 316L
9	D3	EN/DIN flange PN10-40 B1, Extensions: 50 mm/100 mm/200 mm, AISI 316L
	J3	ANSI flange 2" 150 lbs, Extensions: 2"/4"/6"/8", AISI 316/316L
	TD	Tri-Clamp, ISO 2852 DN 51 (2"), AISI 316L/1.4435
10	CQ	EN/DIN flange DN 40 PN 10-40 B1, AISI 316L
	TI	SMS 2" PN 25, AISI 316L/1.4435
	TN	APV-RJT 2" PN 40, AISI 316L/1.4435
	TS	APV-ISS 2" PN 40, AISI 316L/1.4435
11	CP	EN/DIN flange DN32 PN 10-40 B1, AISI 316L
	AE	ANSI flange 1 1/2" 150 lbs RF, AISI 316/316L
	AQ	ANSI flange 1 1/2" 300 lbs RF, AISI 316/316L
	TC	Tri-Clamp, ISO 2852 DN 38 (1 1/2"), DIN 32676 DN 40, AISI 316L/1.4435
	TH	SMS 1 1/2" PN 25, AISI 316L/1.4435
	TM	APV-RJT 1 1/2" PN 40, AISI 316L/1.4435
	TS	APV-ISS 1 1/2" PN 40, AISI 316L/1.4435
12	CN	EN/DIN flange PN 10-40 B1, AISI 316L
	DN	EN/DIN flange PN 64-160 E, AISI 316L
	EN	EN/DIN flange PN 250 E, AISI 316L
	E1	EN/DIN flange PN 400 E, AISI 316L
	AC	ANSI flange 1" 150 lbs RF, AISI 316/316L
	AN	ANSI flange 1" 300 lbs RF, AISI 316/316L
	HC	ANSI flange 1" 400/600 lbs RF, AISI 316/316L
	HN	ANSI flange 1" 900/1500 lbs RF, AISI 316/316L
	HO	ANSI flange 1" 2500 lbs RF, AISI 316/316L
	KC	JIS flange 10K 25 A RF, AISI 316L
13	TB	Tri-Clamp, ISO 2852 DN 25 (1"), DIN 32676 DN 25, AISI 316L/1.4435

Ambient temperature range

The operating temperature range of a diaphragm seal system depends on Fill fluid, "Capillary length and internal diameter, Process temperature and Diaphragm seal oil volume.
The range of application can be extended by using a fill fluid with a smaller expansion coefficient and a shorter capillary. The permitted operating temperature ranges in relation to the capillary length can be calculated online at "Applicator Sizing Diaphragm Seal":
http://www.endress.com/applicator -> Applicator Sizing Diaphragm Seal -> Horncurve



Note!

- Endress+Hauser recommends you use a low temperature oil for applications that require short response times or are close to the lower temperature limit (see "diaphragm seal fill fluid").
- Please contact your Endress+Hauser sales office for further information, comprehensive diaphragm seal system designs and measuring technology solutions that are close to the application limits.

Installation instructions

Instructions for diaphragm seal systems

- Endress+Hauser offer flushing rings as accessory to clean process isolating diaphragms without taking the transmitters out of process.
  For further information please contact your local Endress+Hauser Sales Center.
- The diaphragm seal together with the transmitter form a closed, calibrated system, which is filled through ports in the diaphragm seal and in the measurement system of the transmitter. These ports are sealed and must not be opened.
- In the case of devices with diaphragm seals and capillaries, the zero point shift caused by the hydrostatic pressure of the filling liquid column in the capillaries must be taken into account when selecting the measuring cell. If a measuring cell with a small measuring range is selected, a position adjustment can cause an overdrive. See the following diagram and the following example.
- For devices with temperature isolator or capillary a suitable fastening device (mounting bracket) is recommended.
- When using a mounting bracket, sufficient strain relief must be allowed for in order to prevent the capillary bending down (bending radius ≥ 100 mm).

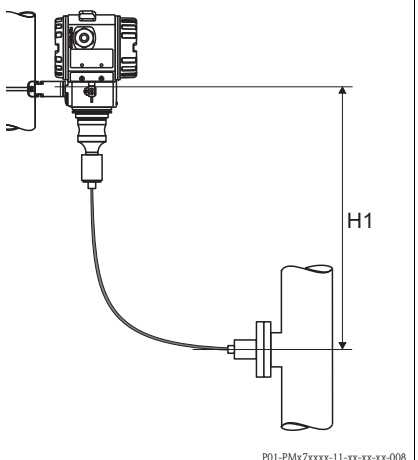
Installation instructions for capillaries

In order to obtain more precise measurement results and to avoid a defect in the device, mount the capillaries as follows:
- vibration-free (in order to avoid additional pressure fluctuations)
- not in the vicinity of heating or cooling lines
- insulate if the ambient temperature is below ore above the reference temperature
- with a bending radius of ≥ 100 mm.

Vacuum applications

For applications under vacuum, Endress+Hauser recommends mounting the pressure transmitter below the diaphragm seal. A vacuum load of the diaphragm seal caused by the presence of fill fluid in the capillary prevents is hereby prevented.

When the pressure transmitter is mounted above the diaphragm seal, the maximum height difference H1 in accordance with the following illustration on the left must not be exceeded. The maximum height difference is dependent on the density of the filling oil and the smallest ever pressure that is permitted to occur at the diaphragm seal (empty tank), see the following illustration, on the right.



Installation above the diaphragm seal

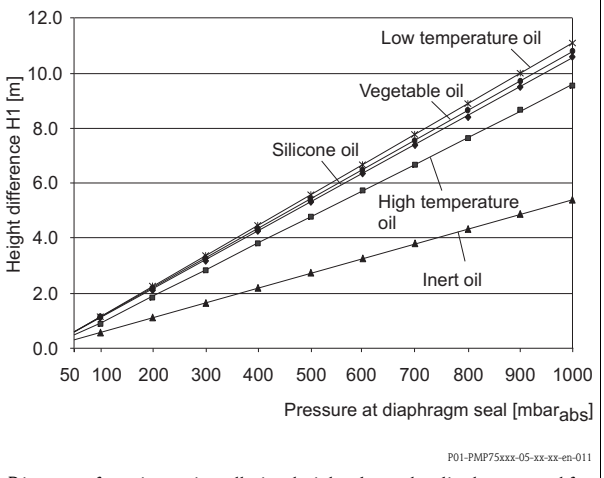


Diagram of maximum installation height above the diaphragm seal for vacuum applications

Certificates and approvals

CE mark

The device meets the legal requirements of the relevant EC directives.
Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.

Ex approvals

- ATEX
- FM
- CSA
- NEPSI
- IECEx
- GOST
- also combinations of different approvals

All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas.
→ 90 ff, sections "Safety Instructions" and "Installation/Control Drawings".

Suitability for hygenic processes

The Cerabar S is suitable for the employment in hygenic processes.
Overview of permitted process connections from page 32.
Many versions meet the requirements of 3A-Sanitary Standard No. 74 and are certified by the EHEDG.

Note!
The gap-free connections can be cleaned without residue using the usual cleaning methods.

Marine certificate

- GL
- ABS

Functional Safety SIL / IEC 61508 Declaration of conformity (optional)

The Cerabar S with 4 to 20 mA output signal have been developed to IEC 61508 standard. These devices can be used for process pressure and level measurement monitoring up to SIL 3.
For a detailed description of the safety functions with Cerabar S, settings and characteristic quantities for functional safety, please refer to the "Manual for Functional Safety- Cerabar S" SD190.
For devices with SIL / IEC 61508 declaration of conformity see → 77 ff, Feature 100 "Additional option 1" and Feature 110 "Additional option 2" version E "SIL / IEC 61508, declaration of Conformity".

Overspill protection

WHG

CRN approvals

Some device versions have CRN approval. For a CRN-approved device, a CRN-approved process connection (→ 78, feature 70 "Process connection") has to be ordered with a CSA approval (→ 77, feature 10 "Approval"). PMP75 devices with capillary are not CRN-approved. These devices are fitted with a separate plate bearing the registration number 0F10525.5C.

Pressure Equipment Directive (PED)

The devices PMC71, PMP71 and PMP75 correspond to Article 3 (3) of the EC directive 97/23/EC (Pressure Equipment Directive) and has been designed and manufactured according to good engineering practice.

Additionally applies:
– PMP71 with threaded connection and internal process isolating diaphragm PN > 200 as well as oval flange adapter PN > 200:
  Suitable for stable gases in group 1, category I
– PMP75 with pipe diaphragm seal ≥ 1.5"/PN 40:
  Suitable for stable gases in group 1, category II
– PMP75 with separator PN > 200:
  Suitable for stable gases in group 1, category 1
– PMP75 with threaded connection PN > 200

Standards and guidelines

DIN EN 60770 (IEC 60770):
Transmitters for use in industrial-process control systems
Part 1: Methods for inspection and routine testing

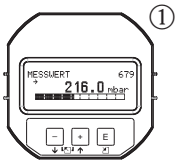
DIN 16086:
Electrical pressure measuring instruments, pressure sensors, pressure transmitters, pressure measuring instruments, concepts, specifications in data sheets

EN 61326-X:
EMC product family standard for electrical equipment for measurement, control and laboratory use.

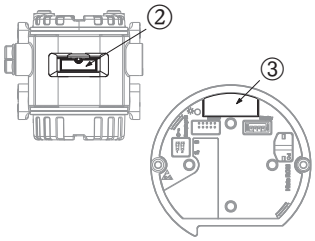
Ordering information

PMC71

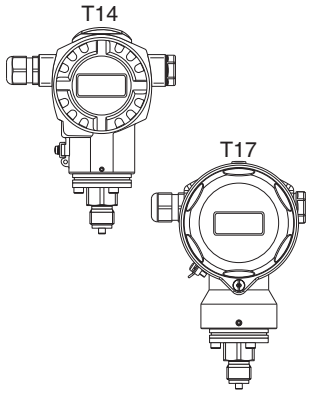
This overview does not mark options which are mutually exclusive.



10	Approval:
A	For non-hazardous areas
E	Combi-certification ATEX II Ex ia + FM IS + CSA IS ATEX II 1/2G Ex ia IIC T6 + FM/CSA IS Class I, II, III Division 1 Group A - G
1	ATEX II 1/2 G Ex ia IIC T6
6	ATEX II 1/2 G Ex ia IIC T6, overspill protection WHG
2	ATEX II 1/2 D Ex ia IIC T6
8	ATEX II 1 GD Ex ia IIC T6
3	ATEX II 1/2 GD Ex ia IIC T6
5	ATEX II 2 G Ex d[ia] IIC T6
7	ATEX II 3 G Ex nA II T6
S	FM IS, Class I, II, III Division 1, Groups A – G; NI Class I Division 2, Groups A – D; AEx ia
T	FM XP, Class I Division 1, Groups A – D; AEx d
R	FM NI, Class I, Division 2, Groups A – D
U	CSA IS, Class I, II, III Division 1, Groups A – G; Class I Division 2, Groups A – D, Ex ia
V	CSA XP, Class I Division 1, Groups B – D; Ex d
G	NEPSI Ex d[ia] IIC T4/T6
H	NEPSI Ex ia IIC T6
L	TIIS Ex d (ia) IIC T6
M	TIIS Ex d (ia) IIC T4
I	IECEx Zone 0/1 Ex ia IIC T6



20		Output; Operation:
A		4...20 mA HART, operation outside, LCD (→ see Fig. ①, ②)
B		4...20 mA HART, operation inside, LCD (→ see Fig. ①, ③)
C		4...20 mA HART, operation inside (→ see Fig.③)
M		PROFIBUS PA, operation outside, LCD (→ see Fig. ①, ②)
N		PROFIBUS PA, operation inside, LCD (→ see Fig. ①, ③)
O		PROFIBUS PA, operation inside (→ see Fig. ③)
P		FOUNDATION Fieldbus, operation outside, LCD (→ see Fig. ①, ③)
Q		FOUNDATION Fieldbus, operation inside, LCD (→ see Fig. ①, ③)
R		FOUNDATION Fieldbus, operation inside (→ see Fig. ③)



30			**Housing; Cable entry; Protection:**
A			Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5
B			Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2
C			Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT
D			Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug
E			Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug
F			Aluminium T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°
1			AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5
2			AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2
3			AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT
4			AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug
5			AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug
6			AISI 316L T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°
R			T17 316L Hygiene IP66/68 NEMA6P; M20 gland, T17 = side cover
S			T17 316L Hygiene IP66/68 NEMA6P; G1/2 thread, T17 = side cover
T			T17 316L Hygiene IP66/68 NEMA6P; NPT1/2 thread, T17 = side cover
U			T17 316L Hygiene IP66/68 NEMA6P; M12 plug, T17 = side cover
V			T17 316L Hygiene IP66/68 NEMA6P; 7/8" plug, T17 = side cover

40				**Sensor range; Sensor overload limit (= OPL):**	
				Sensors for gauge pressure	
				Measurement limits: –100 % (–1 bar)...+100 % of sensor nominal range	
				Sensor nominal value (URL)	**OPL (Over pressure limit)**
			1C	100 mbar/10 kPa/1.5 psi g	4 bar/400 kPa/60 psi g
			1E	250 mbar/25 kPa/3.75 psi g	5 bar/500 kPa/75 psi g
			1F	400 mbar/40 kPa/6 psi g	8 bar/800 kPa/120 psi g
			1H	1 bar/100 kPa/15 psi g	10 bar/1 MPa/150 psi g
			1K	2 bar/200 kPa/30 psi g	18 bar/1.8 MPa/270 psi g
			1M	4 bar/400 kPa/60 psi g	25 bar/2.5 MPa/375 psi g
			1P	10 bar/1 MPa/150 psi g	40 bar/4 MPa/600 psi g
			1S	40 bar/4 MPa/600 psi g	60 bar/6 MPa/900 psi g

40	Sensor range; Sensor overload limit (= OPL):		
	Sensors for absolute pressure		
	Sensor nominal value (URL)	**OPL (Over pressure limit)**	
2C	100 mbar/10 kPa/1.5 psi abs	4 bar/400 kPa/60 psi abs	
2E	250 mbar/25 kPa/3.75 psi abs	5 bar/500 kPa/75 psi abs	
2F	400 mbar/40 kPa/6 psi abs	8 bar/800 kPa/120 psi abs	
2H	1 bar/100 kPa/15 psi abs	10 bar/1 MPa/150 psi abs	
2K	2 bar/200 kPa/30 psi abs	18 bar/1.8 MPa/270 psi abs	
2M	4 bar/400 kPa/60 psi abs	25 bar/2.5 MPa/375 psi abs	
2P	10 bar/1 MPa/150 psi abs	40 bar/4 MPa/600 psi abs	
2S	40 bar/4 MPa/600 psi abs	60 bar/6 MPa/900 psi abs	

50	Calibration; Unit:
1	Sensor range; mbar/bar
2	Sensor range; kPa/MPa
3	Sensor range; mmH_2O/mH_2O
4	Sensor range; inH_2O/ftH_2O
6	Sensor range; psi
B	Customised; see additional specification
C	Factory certificate 5-point; see additional specification
D	DKD certificate; see additional specification
K	Platinum; see additional specification
L	Platinum and factory certificate 5-point; see additional specification
M	Platinum and DKD certificate; see additional specification

70	Process connection; Material:	
	Thread, internal process isolating diaphragm	
GA	Thread ISO 228 G 1/2 A EN 837, AISI 316L (CRN)	
GB	Thread ISO 228 G 1/2 A EN 837, Alloy C (CRN)	
GC	Thread ISO 228 G 1/2 A EN 837, Monel	
GD	Thread ISO 228 G 1/2 A EN 837, PVDF (max. 15 bar/225 psi, –10...+60°C/+14...+140°F)	
GE	Thread ISO 228 G 1/2 A G 1/4 (female), AISI 316L (CRN)	
GF	Thread ISO 228 G 1/2 A G 1/4 (female), Alloy C (CRN)	
GG	Thread ISO 228 G 1/2 A G 1/4 (female), Monel	
GH	Thread ISO 228 G 1/2 A hole 11.4 mm, AISI 316L (CRN)	
GJ	Thread ISO 228 G 1/2 A hole 11.4 mm, Alloy C (CRN)	
GK	Thread ISO 228 G 1/2 A hole 11.4 mm, Monel	
RA	Thread ANSI 1/2 MNPT 1/4 FNPT, AISI 316L (CRN)	
RB	Thread ANSI 1/2 MNPT 1/4 FNPT, Alloy C (CRN)	
RC	Thread ANSI 1/2 MNPT 1/4 FNPT, Monel	
RD	Thread ANSI 1/2 MNPT, hole 11.4 mm, AISI 316L (CRN)	
RE	Thread ANSI 1/2 MNPT, hole 11.4 mm, Alloy C (CRN)	
RF	Thread ANSI 1/2 MNPT, hole 11.4 mm, Monel	
RG	Thread ANSI 1/2 MNPT hole 3 mm, PVDF (max. 15 bar/225 psi, –10...+60°C/+14...+140°F)	
RH	Thread ANSI 1/2 FNPT, AISI 316L (CRN)	
RJ	Thread ANSI 1/2 FNPT, Alloy C (CRN)	
RK	Thread ANSI 1/2 FNPT, Monel	
GL	Thread JIS B0202 G 1/2 (male), AISI 316L	
RL	Thread JIS B0203 R 1/2 (male), AISI 316L	
GP	Thread DIN 13 M 20x1.5 EN 837 hole 3 mm, AISI 316L	
GQ	Thread DIN 13 M 20x1.5 EN 837 hole 3 mm, Alloy C	
	For continuation "Process connection, Material" see next page.	
	Thread, flush-mounted process isolating diaphragm	
1G	Thread ISO 228 G 1 1/2 A, AISI 316L	
1H	Thread ISO 228 G 1 1/2 A, Alloy C	
1J	Thread ISO 228 G 1 1/2 A, Monel	
1K	Thread ISO 228 G 2 A, AISI 316L	
1L	Thread ISO 228 G 2 A, Alloy C	
1M	Thread ISO 228 G 2 A, Monel	
2D	Thread ANSI 1 1/2 MNPT, AISI 316L (CRN)	
2E	Thread ANSI 1 1/2 MNPT, Alloy C (CRN)	
2F	Thread ANSI 1 1/2 MNPT, Monel (CRN)	
2G	Thread ANSI 2 MNPT, AISI 316L (CRN)	
2H	Thread ANSI 2 MNPT, Alloy C	
2J	Thread ANSI 2 MNPT, Monel	
1R	Thread DIN 13 M 44x1.25, AISI 316L	
1S	Thread DIN 13 M 44x1.25, Alloy C	
	EN/DIN flanges, flush-mounted process isolating diaphragm	

70	Process connection; Material:
CP	DN 32 PN 10-40 B1, AISI 316L
CQ	DN 40 PN 10-40 B1, AISI 316L
BR	DN 50 PN 10-16 A, PVDF (max. 15 bar/150 psi, –10...+60°C/+14...+140°F)
B3	DN 50 PN 10-40 B1, AISI 316L
C3	DN 50 PN 63 B2, AISI 316L
BS	DN 80 PN 10-16 A, PVDF (max. 15 bar/150 psi, –10...+60°C/+14...+140°F)
B4	DN 80 PN 10-40 B1, AISI 316L
	ANSI flanges, flush-mounted process isolating diaphragm
AE	1 1/2" 150 lbs RF, AISI 316/316L (CRN)
AQ	1 1/2" 300 lbs RF, AISI 316/316L (CRN)
AF	2" 150 lbs RF, AISI 316/316L (CRN)
JR	2" 150 lbs RF, AISI 316L with ECTFE-coating
A3	2" 150 lbs RF, PVDF (max. 15 bar/225 psi, –10...+60°C/+14...+140°F)
AR	2" 300 lbs RF, AISI 316/316L (CRN)
AG	3" 150 lbs RF, AISI 316/316L (CRN)
JS	3" 150 lbs RF, AISI 316L with ECTFE-coating
A4	3" 150 lbs RF, PVDF (max. 15 bar/225 psi, –10...+60°C/+14...+140°F)
AS	3" 300 lbs RF, AISI 316/316L (CRN)
AH	4" 150 lbs RF, AISI 316/316L (CRN)
JT	4" 150 lbs RF, AISI 316L with ECTFE-coating
AT	4" 300 lbs RF, AISI 316/316L (CRN)
	JIS flanges, flush-mounted process isolating diaphragm
KF	10K 50A RF, AISI 316L
KL	10K 80A RF, AISI 316L
KH	10K 100A RF, AISI 316L
	Hygienic connections, flush-mounted process isolating diaphragm
MP	DIN 11851 DN 40 PN 25, AISI 316L, EHEDG, 3A with HNBR/EPDM seal (CRN)
MR	DIN 11851 DN 50 PN 25, AISI 316L, EHEDG, 3A with HNBR/EPDM seal (CRN)
TD	Tri-Clamp ISO 2852 DN 51 (2"), AISI 316L, EHEDG, 3A with HNBR/EPDM seal (CRN)
TF	Tri-Clamp ISO 2852 DN 76.1 (3"), AISI 316L, EHEDG, 3A with HNBR/EPDM seal (CRN)
TK	DRD DN50 (65 mm), PN 25, AISI 316L, EHEDG, 3A with HNBR/EPDM seal
TR	Varivent type N for tubes DN 40 – DN 162, PN 40, AISI 316L, EHEDG, 3A with HNBR/EPDM seal (CRN)

80	Seal:
A	FKM Viton
B	EPDM
D	Kalrez
E	Chemraz
F	NBR/3A: HNBR (FDA)
L	FKM Viton, cleaned for silicone-free service
M	Kalrez, cleaned for silicone-free service
1	FKM Viton, cleaned from oil and greace
2	FKM Viton, oxygen service Note application limits pressure/temp.

100	Additional option 1:
A	not selected
E	SIL/IEC 61508 Declaration of conformity
T	High temperature version
B	Material test certificate for wetted parts, inspection certificate as per EN 10204 3.1 acc. to specification 52005759
M	Overvoltage protection
J	Software adjustment, see additional spec.
N	HistoROM/M-DAT
S	GL (German Lloyd)/ABS marine certificate
V	Mounting on shut-off valve from above
2	Test report acc. to EN 10204 2.2
3	Routine test with certificate, inspection certificate as per EN 10204 3.1
4	Overpressure test with certificate, inspection certificate as per EN 10204 3.1

110	Additional option 2:
A	not selected
E	SIL/IEC 61508 Declaration of conformity
G	Separate housing, cable length see additional spec. + mounting bracket, wall/pipe, 316L
T	High temperature version
M	Overvoltage protection
J	Software adjustment, see additional spec.

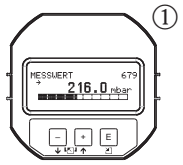
110										**Additional option 2:**	
										N	HistoROM/M-DAT
										S	GL (German Lloyd)/ABS marine certificate
										U	Mounting bracket for wall/pipe, AISI 304
										2	Test report acc. to EN 10204 2.2
										3	Routine test with certificate, inspection certificate as per EN 10204 3.1
										4	Overpressure test with certificate, inspection certificate as per EN 10204 3.1
										5	Helium leak test EN 1518 with test certificate, inspection certificate as per EN 10204 3.1

995											**Marking:**
										1	Tagging (TAG), see additional spec.
										2	Bus adress, see additional spec.

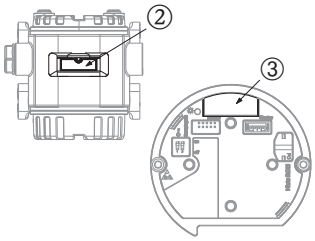
PMC71										order code

PMP71

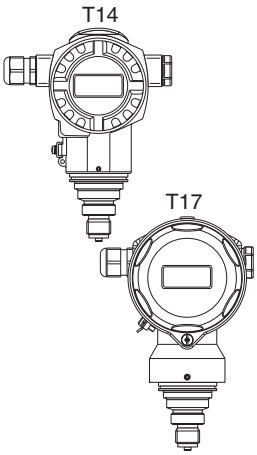
This overview does not mark options which are mutually exclusive.



10	Approval:
A	For non-hazardous areas
1	ATEX II 1/2 G Ex ia IIC T6
6	ATEX II 1/2 G Ex ia IIC T6, overspill protection WHG
2	ATEX II 1/2 D
4	ATEX II 1/3 D
8	ATEX II 1 GD Ex ia IIC T6
3	ATEX II 1/2 GD Ex ia IIC T6
5	ATEX II 2 G Ex d IIC T6
7	ATEX II 3 G Ex nA II T6
S	FM IS, Class I, II, III Division 1, Groups A – G; NI Class I Division 2, Groups A – D; AEx ia
T	FM XP, Class I Division 1, Groups A – D; AEx d
Q	FM DIP, Class II, III Division 1, Groups E – G
R	FM NI, Class I, Division 2, Groups A – D
U	CSA IS, Class I, II, III Division 1, Groups A – G; Class I Division 2, Groups A – D, Ex ia
V	CSA XP, Class I Division 1, Groups B – D; Ex d
W	CSA Class II, III Division 1, Groups E – G (Dust Ex)
G	NEPSI Ex d IIC T6
H	NEPSI Ex ia IIC T6
L	TIIS Ex d IIC T6
I	IECEx Zone 0/1 Ex ia IIC T6
B	Combined certificates: ATEX II 1/2 G Ex ia IIC T6 + II 2 G Ex d IIC T6
C	Combined certificates: FM IS and XP Class I Division 1, Groups A – D
D	Combined certificates: CSA IS and XP Class I Division 1, Groups A – D
E	Combined certificates: FM/CSA IS and XP Class I Division 1, Groups A – D
F	Combined certificates: ATEX II Ex ia / Ex d + FM/CSA IS + XP ATEX II 1/2G Ex ia IIC T6+ ATEX II 2G Ex d IIC T6+ FM/CSA IS + XP Cl.I Div.1 Gr.A-D



20	Output; Operation:
A	4...20 mA HART, operation outside, LCD (→ see Fig. ①, ②)
B	4...20 mA HART, operation inside, LCD (→ see Fig. ①, ③)
C	4...20 mA HART, operation inside (→ see Fig. ③)
M	PROFIBUS PA, operation outside, LCD (→ see Fig. ①, ②)
N	PROFIBUS PA, operation inside, LCD (→ see Fig. ①, ③)
O	PROFIBUS PA, operation inside (→ see Fig. ③)
P	FOUNDATION Fieldbus, operation outside, LCD (→ see Fig. ①, ③)
Q	FOUNDATION Fieldbus, operation inside, LCD (→ see Fig. ①, ③)
R	FOUNDATION Fieldbus, operation inside (→ see Fig. ③)



30	Housing; Cable entry; Protection:
A	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5
B	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2
C	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT
D	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug
E	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug
F	Aluminium T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°
1	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5
2	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2
3	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT
4	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug
5	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug
6	AISI 316L T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°
R	T17 316L Hygiene IP66/68 NEMA6P; M20 gland, T17 = side cover
S	T17 316L Hygiene IP66/68 NEMA6P; G1/2 thread, T17 = side cover
T	T17 316L Hygiene IP66/68 NEMA6P; NPT1/2 thread, T17 = side cover
U	T17 316L Hygiene IP66/68 NEMA6P; M12 plug, T17 = side cover
V	T17 316L Hygiene IP66/68 NEMA6P; 7/8" plug, T17 = side cover

40	Sensor range; Sensor overload limit (= OPL):		
	Sensors for gauge pressure		
	Measurement limits: –100 % (–1 bar)...+100 % of sensor nominal range		
		Sensor nominal value (URL)	**OPL (Over pressure limit)**
1F		400 mbar/40 kPa/6 psi g	6 bar/600 kPa/90 psi g
1H		1 bar/100 kPa/15 psi g	10 bar/1 MPa/150 psi g
1K		2 bar/200 kPa/30 psi g	20 bar/2 MPa/300 psi g

40			Sensor range; Sensor overload limit (= OPL):	
		1M	4 bar/400 kPa/60 psi g	28 bar/2.8 MPa/420 psi g
		1P	10 bar/1 MPa/150 psi g	40 bar/4 MPa/600 psi g
		1S	40 bar/4 MPa/600 psi g	160 bar/16 MPa/2400 psi g
		1U	100 bar/10 MPa/1500 psi g	400 bar/40 MPa/6000 psi g
		1W	400 bar/40 MPa/6000 psi g	600 bar/60 MPa/9000 psi g
		1X	700 bar/70 MPa/10500 psi g	1050 bar/105 MPa/15700 psi g
		Sensors for absolute pressure		
			Sensor nominal value (URL)	**OPL (Over pressure limit)**
		2F	400 mbar/40 kPa/6 psi abs	6 bar/600 kPa/90 psi abs
		2H	1 bar/100 kPa/15 psi abs	10 bar/1 MPa/150 psi abs
		2K	2 bar/200 kPa/30 psi abs	20 bar/2 MPa/300 psi abs
		2M	4 bar/400 kPa/60 psi abs	28 bar/2.8 MPa/420 psi abs
		2P	10 bar/1 MPa/150 psi abs	40 bar/4 MPa/600 psi abs
		2S	40 bar/4 MPa/600 psi abs	160 bar/16 MPa/2400 psi abs
		2U	100 bar/10 MPa/1500 psi g	400 bar/40 MPa/6000 psi g
		2W	400 bar/40 MPa/6000 psi g	600 bar/60 MPa/9000 psi g
		2X	700 bar/70 MPa/10500 psi g	1050 bar/105 MPa/15700 psi g

50				Calibration; Unit:
			1	Sensor range; mbar/bar
			2	Sensor range; kPa/MPa
			3	Sensor range; mmH_2O/mH_2O
			4	Sensor range; inH_2O/ftH_2O
			6	Sensor range; psi
			B	Customised; see additional specification
			C	Factory certificate 5-point; see additional specification
			D	DKD certificate; see additional specification
			K	Platinum; see additional specification
			L	Platinum and factory certificate 5-point; see additional specification
			M	Platinum and DKD certificate; see additional specification

60					Membrane material:
				1	AISI 316L
				2	Alloy C276
				6	AISI 316L with Gold-Rhodium coating

70						Process connection; Material:
						Thread, internal process isolating diaphragm
					GA	Thread ISO 228 G 1/2 A EN 837, AISI 316L
					GB	Thread ISO 228 G 1/2 A EN 837, Alloy C
					GE	Thread ISO 228 G 1/2 A G 1/4 (female), AISI 316L
					GF	Thread ISO 228 G 1/2 A G 1/4 (female), Alloy C
					GH	Thread ISO 228 G 1/2 A hole 11.4 mm, AISI 316L
					GJ	Thread ISO 228 G 1/2 A hole 11.4 mm, Alloy C
					RA	Thread ANSI 1/2 MNPT 1/4 FNPT, AISI 316L (CRN)
					RB	Thread ANSI 1/2 MNPT 1/4 FNPT, Alloy C (CRN)
					RD	Thread ANSI 1/2 MNPT hole, AISI 316L (CRN)
					RE	Thread ANSI 1/2 MNPT hole, Alloy C (CRN)
					RH	Thread ANSI 1/2 FNPT, AISI 316L
					RJ	Thread ANSI 1/2 FNPT, Alloy C
					GL	Thread JIS B0202 G 1/2 (male), AISI 316L
					RL	Thread JIS B0203 R 1/2 (male), AISI 316L
						For continuation "Process connection; Material", see next page.
						Thread, internal process isolating diaphragm (continued)
					GP	Thread DIN 13 M 20x1.5 EN 837 hole 11.4 mm, AISI 316L
					GQ	Thread DIN 13 M 20x1.5 EN 837 hole 11.4 mm, Alloy C
						Thread, flush-mounted process isolating diaphragm
					1A	Thread ISO 228 G 1/2 A, DIN 3852, AISI 316L
					1B	Thread ISO 228 G 1/2 A, DIN 3852, Alloy C
					1D	Thread ISO 228 G 1 A, AISI 316L
					1E	Thread ISO 228 G 1 A, Alloy C
					1G	Thread ISO 228 G 1 1/2 A, AISI 316L
					1H	Thread ISO 228 G 1 1/2 A, Alloy C
					1K	Thread ISO 228 G 2 A, AISI 316L
					1L	Thread ISO 228 G 2 A, Alloy C
					2A	Thread ANSI 1 MNPT, AISI 316L (CRN)
					2B	Thread ANSI 1 MNPT, Alloy C (CRN)
					2D	Thread ANSI 1 1/2 MNPT, AISI 316L (CRN)
					2E	Thread ANSI 1 1/2 MNPT, Alloy C (CRN)

70	Process connection; Material:
2G	Thread ANSI 2 MNPT, AISI 316L (CRN)
2H	Thread ANSI 2 MNPT, Alloy C
1N	Thread DIN 16288 M 20x1.5, AISI 316L
1P	Thread DIN 16288 M 20x1.5, Alloy C
1R	Thread DIN 13 M 44x1.25, AISI 316L
1S	Thread DIN 13 M 44x1.25, Alloy C
	EN/DIN flanges, flush-mounted process isolating diaphragm
CN	DN 25 PN 10-40 B1, AISI 316L
CP	DN 32 PN 10-40 B1, AISI 316L
CQ	DN 40 PN 10-40 B1, AISI 316L
B3	DN 50 PN 10-40 B1, AISI 316L
B4	DN 80 PN 10-40 B1, AISI 316L
	ANSI flanges, flush-mounted process isolating diaphragm
AN	1" 300 lbs RF, AISI 316/316L (CRN)
AE	1 1/2" 150 lbs RF, AISI 316/316L (CRN)
AQ	1 1/2" 300 lbs RF, AISI 316/316L (CRN)
AF	2" 150 lbs RF, AISI 316/316L (CRN)
AR	2" 300 lbs RF, AISI 316/316L (CRN)
AG	3" 150 lbs RF, AISI 316/316L (CRN)
AS	3" 300 lbs RF, AISI 316/316L (CRN)
AH	4" 150 lbs RF, AISI 316/316L (CRN)
AT	4" 300 lbs RF, AISI 316/316L (CRN)
	JIS flanges, flush-mounted process isolating diaphragm
KA	20K 25A RF, AISI 316L
KF	10K 50A RF, AISI 316L
KL	10K 80A RF, AISI 316L
KH	10K 100A RF, AISI 316L
	Other
UR	Ovalflange adapter 1/4-18 NPT, mounting: 7/16-20 UNF, AISI 316L (CRN)
U1	Prepared for diaphragm seal mount, AISI 316L (CRN)

90	Fill fluid:
A	Silicone oil fill
F	Inert oil fill
K	Inert oil fill, cleaned from oil and greace
N	Inert oil fill, cleaned for oxygen services (Note application limits pressure/temperature)

100	Additional option 1:
A	not selected
E	SIL/IEC 61508 Declaration of conformity
B	Material test certificate for wetted parts, inspection certificate as per EN 10204 3.1 acc. to specification 52005759
C	NACE MR0175 (wetted parts)
D	Material test certificate for wetted parts as per EN 10204 3.1 and NACE MR0175 material, inspection certificate as per EN 10204 acc. to specification 52010806
M	Overvoltage protection
J	Software adjustment, see additional spec.
N	HistoROM/M-DAT
S	GL (German Lloyd)/ABS marine certificate
2	Test report acc. to EN10204 2.2
3	Routine test with certificate, inspection certificate as per EN 10204 3.1
4	Overpressure test with certificate, inspection certificate as per EN 10204 3.1

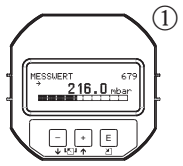
110	Additional option 2:
A	not selected
E	SIL/IEC 61508 Declaration of conformity
G	Separate housing, cable length see additional spec. + mounting bracket, wall/pipe, 316L
M	Overvoltage protection
J	Software adjustment, see additional spec.
N	HistoROM/M-DAT
S	GL (German Lloyd)/ABS marine certificate
U	Mounting bracket for wall/pipe, AISI 304
2	Test report acc. to EN10204 2.2
3	Routine test with certificate, inspection certificate as per EN 10204 3.1
4	Overpressure test with certificate, inspection certificate as per EN 10204 3.1
5	Helium leak test EN 1528 with test certificate, inspection certificate as per EN 10204 3.1

995											**Marking:**	
											1	Tagging (TAG), see additional spec.
											2	Bus adress, see additional spec.

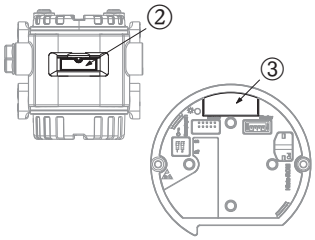
PMP71											order code

PMP75

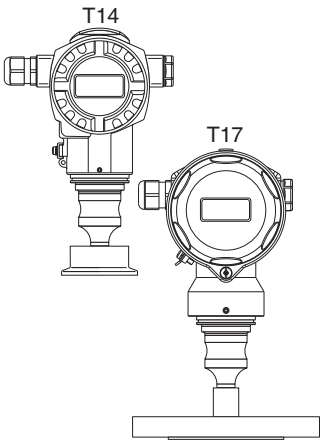
This overview does not mark options which are mutually exclusive.



10	Approval:
A	For non-hazardous areas
1	ATEX II 1/2 G Ex ia IIC T6
6	ATEX II 1/2 G Ex ia IIC T6, overspill protection WHG
2	ATEX II 1/2 D
4	ATEX II 1/3 D
8	ATEX II 1 GD Ex ia IIC T6
3	ATEX II 1/2 GD Ex ia IIC T6
5	ATEX II 2 G Ex d IIC T6
7	ATEX II 3 G Ex nA II T6
S	FM IS, Class I, II, III Division 1, Groups A – G; NI Class I Division 2, Groups A – D; AEx ia
T	FM XP, Class I Division 1, Groups A – D; AEx d
Q	FM DIP, Class II, III Division 1, Groups E – G
R	FM NI, Class I, Division 2, Groups A – D
U	CSA IS, Class I, II, III Division 1, Groups A – G; Class I Division 2, Groups A – D, Ex ia
V	CSA XP, Class I Division 1, Groups B – D; Ex d
W	CSA Class II, III Division 1, Groups E – G (Dust Ex)
G	NEPSI Ex d IIC T6
H	NEPSI Ex ia IIC T6
L	TIIS Ex d IIC T6
I	IECEx Zone 0/1 Ex ia IIC T6
B	Combined certificates: ATEX II 1/2 G Ex ia IIC T6 + II 2 G Ex d IIC T6
C	Combined certificates: FM IS and XP Class I Division 1, Groups A – D
D	Combined certificates: CSA IS and XP Class I Division 1, Groups A – D
E	Combined certificates: FM/CSA IS and XP Class I Division 1, Groups A – D
F	Combined certificates: ATEX II Ex ia / Ex d + FM/CSA IS + XP ATEX II 1/2G Ex ia IIC T6+ ATEX II 2G Ex d IIC T6+ FM/CSA IS + XP Cl.I Div.1 Gr.A-D



20	Output; Operation:
A	4...20 mA HART, operation outside, LCD (→ see Fig. ①, ②)
B	4...20 mA HART, operation inside, LCD (→ see Fig. ①, ③)
C	4...20 mA HART, operation inside (→ see Fig. ③)
M	PROFIBUS PA, operation outside, LCD (→ see Fig. ①, ②)
N	PROFIBUS PA, operation inside, LCD (→ see Fig. ①, ③)
O	PROFIBUS PA, operation inside (→ see Fig. ③)
P	FOUNDATION Fieldbus, operation outside, LCD (→ see Fig. ①, ③)
Q	FOUNDATION Fieldbus, operation inside, LCD (→ see Fig. ①, ③)
R	FOUNDATION Fieldbus, operation inside (→ see Fig. ③)



30	Housing; Cable entry; Protection:
A	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5
B	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2
C	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT
D	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug,
E	Aluminium T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug
F	Aluminium T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°
1	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5
2	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2
3	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT
4	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug
5	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug
6	AISI 316L T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°
R	T17 316L Hygiene IP66/68 NEMA6P; M20 gland, T17 = side cover
S	T17 316L Hygiene IP66/68 NEMA6P; G1/2 thread, T17 = side cover
T	T17 316L Hygiene IP66/68 NEMA6P; NPT1/2 thread, T17 = side cover
U	T17 316L Hygiene IP66/68 NEMA6P; M12 plug, T17 = side cover
V	T17 316L Hygiene IP66/68 NEMA6P; 7/8" plug, T17 = side cover

40	Sensor range; Sensor overload (= OPL):	
	Sensors for gauge pressure	
	Measurement limits: –100 % (–1 bar)...+100 % of sensor nominal range	
	Sensor nominal value (URL)	**OPL (Over pressure limit)**
1F	400 mbar/40 kPa/6 psi	6 bar/600 kPa/90 psi
1H	1 bar/100 kPa/15 psi	10 bar/1 MPa/150 psi
1K	2 bar/200 kPa/30 psi	20 bar/2 MPa/300 psi

40					Sensor range; Sensor overload (= OPL):	
				1M	4 bar/400 kPa/60 psi	28 bar/2.8 MPa/420 psi
				1P	10 bar/1 MPa/150 psi	40 bar/4 MPa/600 psi
				1S	40 bar/4 MPa/600 psi	160 bar/16 MPa/2400 psi
				1U	100 bar/10 MPa/1500 psi	400 bar/40 MPa/6000 psi
				1W	400 bar/40 MPa/6000 psi	600 bar/60 MPa/9000 psi
					Sensors for absolute pressure	
					Sensor nominal value (URL)	**OPL (Over pressure limit)**
				2F	400 mbar/40 kPa/6 psi abs	6 bar/600 kPa/90 psi abs
				2H	1 bar/100 kPa/15 psi abs	10 bar/1 MPa/150 psi abs
				2K	2 bar/200 kPa/30 psi abs	20 bar/2 MPa/300 psi abs
				2M	4 bar/400 kPa/60 psi abs	28 bar/2.8 MPa/420 psi abs
				2P	10 bar/1 MPa/150 psi abs	40 bar/4 MPa/600 psi abs
				2S	40 bar/4 MPa/600 psi abs	160 bar/16 MPa/2400 psi abs
				2U	100 bar/10 MPa/1500 psi abs	400 bar/40 MPa/6000 psi abs
				2W	400 bar/40 MPa/6000 psi abs	600 bar/60 MPa/9000 psi abs

50						Calibration; Unit:
					1	Sensor range; mbar/bar
					2	Sensor range; kPa/MPa
					3	Sensor range; mmH_2O/mH_2O
					4	Sensor range; inH_2O/ftH_2O
					6	Sensor range; psi
					B	Customised; see additional specification
					C	Factory certificate 5-point; see additional specification
					D	DKD calibration: see additional specification

60							Membrane material:
						1	AISI 316L
						2	Alloy C276
						3	Monel
						5	Tantal
						6	AISI 316L with Gold-Rhodium coating
						7	AISI 316L with 0.09 mm PTFE foil (not for vacuum applications)
						8	AISI 316L with 0.25 mm PTFE foil (not for vacuum applications, only for non-hazardous areas)

70								Process connection, Material:
								Thread, flush-mounted process isolating diaphragm
							1D	Thread ISO 228 G 1 A, AISI 316L
							1E	Thread ISO 228 G 1 A, Alloy C
							1G	Thread ISO 228 G 1 1/2 A, AISI 316L
							1H	Thread ISO 228 G 1 1/2 A, Alloy C
							1K	Thread ISO 228 G 2 A, AISI 316L
							1L	Thread ISO 228 G 2 A, Alloy C
							2A	Thread ANSI 1 MNPT, AISI 316L
							2B	Thread ANSI 1 MNPT, Alloy C (CRN)
							2D	Thread ANSI 1 1/2 MNPT, AISI 316L
							2E	Thread ANSI 1 1/2 MNPT, Alloy C (CRN)
							2G	Thread ANSI 2 MNPT, AISI 316L
							2H	Thread ANSI 2 MNPT, Alloy C (CRN)
								Clamp connections
							TB	Tri-Clamp, ISO 2852 DN 25 (1"), DIN 32676 DN 25, AISI 316L (CRN), EHEDG
							TC	Tri-Clamp, ISO 2852 DN 38 (1 1/2"), DIN 32676 DN 40, AISI 316L (CRN), EHEDG
							TD	Tri-Clamp, ISO 2852 DN 40 – DN 51 (2")/DN 50, AISI 316L (CRN), EHEDG
							TF	Tri-Clamp, ISO 2852 DN 70 – DN 76.1 (3"), AISI 316L (CRN), EHEDG
								Pipe diaphragm seal, Clamp
							SB	Tri-Clamp, ISO 2852 DN 25 (1"), AISI 316L (CRN)
							SC	Tri-Clamp, ISO 2852 DN 38 (1 1/2"), AISI 316L, 3.1 + Pressure test acc. to PED Cat.II (CRN)
							SD	Tri-Clamp, ISO 2852 DN 51 (2"), AISI 316L, 3.1 + Pressure test acc. to PED Cat.II (CRN)
								Hygienic connections
							MR	DIN 11851 DN 50 PN 25, AISI 316L, EHEDG
							MS	DIN 11851 DN 65 PN 25, AISI 316L, EHEDG
							MT	DIN 11851 DN 80 PN 25, AISI 316L, EHEDG
							M3	DIN 11851 DN 50 PN 25 thread, AISI 316L, EHEDG
							M4	DIN 11851 DN 65 PN 25 thread, AISI 316L, EHEDG
							M5	DIN 11851 DN 80 PN 25 thread, AISI 316L, EHEDG
							TG	SMS 1" PN 25, AISI 316L, EHEDG
							TH	SMS 1 1/2" PN 25, AISI 316L, EHEDG
							TI	SMS 2" PN 25, AISI 316L, EHEDG

70	Process connection, Material:
TL	APV-RJT 1" PN 40, AISI 316L
TM	APV-RJT 1 1/2" PN 40, AISI 316L
TN	APV-RJT 2" PN 40, AISI 316L
TP	APV-ISS 1" PN 40, AISI 316L
TQ	APV-ISS 1 1/2" PN 40, AISI 316L
TS	APV-ISS 2" PN 40, AISI 316L
TK	DRD DN50 (65 mm) PN 25, AISI 316L
TR	Varivent Type N for pipes DN 40 – DN 162 PN 40, AISI 316L, EHEDG
	EN/DIN flanges, flush-mounted process isolating diaphragm
CN	DN 25 PN 10-40 B1, AISI 316L
DN	DN 25 PN 63-160 E, AISI 316L
EN	DN 25 PN 250 E, AISI 316L
E1	DN 25 PN 400 E, AISI 316L
CP	DN 32 PN 10-40 B1, AISI 316L
CQ	DN 40 PN 10-40 B1, AISI 316L
B3	DN 50 PN 10-40 B1, AISI 316L
C3	DN 50 PN 63 B2, AISI 316L 2
EF	DN 50 PN 100-160 E, AISI 316L
ER	DN 50 PN 250 E, AISI 316L
E3	DN 50 PN 400 E, AISI 316L
B4	DN 80 PN 10-40 B1, AISI 316L
C4	DN 80 PN 100 B2, AISI 316L
C5	DN 100 PN 100 B2, AISI 316L
	EN/DIN flanges with extended diaphragm seal, flush-mounted process isolating diaphragm
D3	DN 50 PN 10-40 B1, Tubus 50 mm/100 mm/200 mm, AISI 316L
D4	DN 80 PN 10-40 B1, Tubus 50 mm/100 mm/200 mm, AISI 316L
	ANSI flanges, flush-mounted process isolating diaphragm
AC	1" 150 lbs RF, AISI 316/316L (CRN)
AN	1" 300 lbs RF, AISI 316/316L (CRN)
HC	1" 400/600 lbs RF, AISI 316/316L (CRN)
HN	1" 900/1500 lbs RF, AISI 316/316L (CRN)
H0	1" 2500 lbs RF, AISI 316/316L (CRN)
AE	1 1/2" 150 lbs RF, AISI 316/316L (CRN)
AQ	1 1/2" 300 lbs RF, AISI 316/316L (CRN)
AF	2" 150 lbs RF, AISI 316/316L (CRN)
AR	2" 300 lbs RF, AISI 316/316L (CRN)
HF	2" 400/600 lbs RF, AISI 316/316L (CRN)
HR	2" 900/1500 lbs RF, AISI 316/316L (CRN)
H3	2" 2500 lbs RF, AISI 316/316L
AG	3" 150 lbs RF, AISI 316/316L (CRN)
AS	3" 300 lbs RF, AISI 316/316L (CRN)
AH	4" 150 lbs RF, AISI 316/316L (CRN)
AT	4" 300 lbs RF, AISI 316/316L (CRN)
	ANSI flanges with extended diaphragm seal
J3	2" 150 lbs RF, Tubus 2"/4"/6"/8", AISI 316/316L (CRN)
J4	3" 150 lbs RF, Tubus 2"/4"/6"/8", AISI 316/316L (CRN)
J7	3" 300 lbs RF, Tubus 2"/4"/6"/8", AISI 316/316L (CRN)
J5	4" 150 lbs RF, Tubus 2"/4"/6"/8", AISI 316/316L (CRN)
J8	4" 300 lbs RF, Tubus 2"/4"/6"/8", AISI 316/316L (CRN)
	JIS flanges, flush-mounted process isolating diaphragm
KC	10K 25A RF, AISI 316L
KF	10K 50A RF, AISI 316L
KL	10K 80A RF, AISI 316L
KH	10K 100A RF, AISI 316L
	Other
UA	Thread ISO 228 G 1/2 A PN 160, seperator, EN 837, welded, AISI 316L
UB	Thread ANSI 1/2 MNPT PN 160, seperator, welded, AISI 316L (CRN)
UC	Thread ISO 228 G 1/2 B, seperator, EN 837, threaded, AISI 316L
UD	Thread ANSI 1/2 MNPT, seperator, threaded, AISI 316L
UG	Thread 1/2 NPT PN 250, seperator, threaded, AISI 316L
UH	Thread 1 NPT PN 250, seperator, threaded, AISI 316L

90	Fill fluid:
A	Silicone oil
B	...m capillary, inert oil
C	...ft capillary, inert oil
D	Vegetable oil
F	Inert oil

90									**Fill fluid:**				
									G	High temperature oil, Temp. isolator 100 mm			
									H	Silicone oil, Temp. isolator 100 mm			
									K	Inert oil, cleaned from oil and greace			
									N	Inert oil, cleaned for oxygen services			
									1	... m capillary, silicone oil			
									2	... ft capillary, silicone oil			
									3	... m capillary, high temperature oil			
									4	... ft capillary, high temperature oil			
									5	... m capillary, vegetable oil			
									6	... ft capillary, vegetable oil			
									7	... m capillary, Low temperature oil			
									8	... ft capillary, Low temperature oil			
100										**Additional option 1:**			
										A	not selected		
										E	SIL/IEC 61508 Declaration of conformity		
										B	Material test certificate for wetted parts, inspection certificate as per EN 10204 3.1 acc. to specification 52005759		
										C	NACE MR0175 (wetted parts)		
										D	Material test certificate for wetted parts, inspection certificate as per EN 10204 3.1 and NACE MR0175 material, inspection certificate as per EN 10204 acc. to specification 52010806		
										M	Overvoltage protection		
										J	Software adjustment, see additional spec.		
										N	HistoROM/M-DAT		
										S	GL (German Lloyd)/ABS marine certificate		
										2	Test report acc. to EN 10204 2.2		
										3	Routine test with certificate, inspection certificate as per EN 10204 3.1		
										4	Overpressure test with certificate, inspection certificate as per EN 10204 3.1		
110											**Additional option 2:**		
											A	not selected	
											E	SIL/IEC 61508 Declaration of conformity	
											G	Separate housing, cable length see additional spec. + mounting bracket, wall/pipe, 316L	
											M	Overvoltage protection	
											J	Software adjustment, see additional spec.	
											N	HistoROM/M-DAT	
											P	Ra < 0.38 µm/15.75 µin, electropolished + EN10204-3.1 material (wetted) inspection certificate; in conjunction with process connection versions "TC", "TD" and "TR" please order roughness test separetely	
											S	GL (German Lloyd)/ABS marine certificate	
											U	Mounting bracket for wall/pipe, AISI 304	
											2	Test report acc. to EN 10204 2.2	
											3	Routine test with certificate, inspection certificate as per EN 10204 3.1	
											4	Overpressure test with certificate, inspection certificate as per EN 10204 3.1	
995												**Marking:**	
												1	Tagging (TAG), see additional spec.
												2	Bus adress, see additional spec.
PMP75													order code

Additional documentation

Field of Activities	■ Pressure measurement, Powerful instruments for process pressure, differential pressure, level and flow: FA004P/00/en
Technical Information	■ Deltabar S: TI382P/00/en ■ Deltapilot S: TI416P/00/en ■ EMC test basic principles TI241F/00/en
Operating Instructions	4...20 mA HART: ■ Cerabar S: BA271P/00/de ■ Description of device functions Cerabar S/Deltabar S/Deltapilot S: BA274P/00/en PROFIBUS PA: ■ Cerabar S: BA295P/00/de ■ Description of device functions Cerabar S/Deltabar S/Deltapilot S: BA296P/00/en FOUNDATION Fieldbus: ■ Cerabar S: BA302P/00/de ■ Description of device functions Cerabar S/Deltabar S: BA303P/00/en
Brief operating instructions	■ 4...20 mA HART, Cerabar S: KA1019P/00/en ■ PROFIBUS PA, Cerabar S: KA1022P/00/en ■ FOUNDATION Fieldbus, Cerabar S: KA1025P/00/en
Manual for Functional Safety (SIL)	■ Cerabar S (4...20 mA): SD190P/00/en

Safety Instructions

Certificate/Type of Protection	Device	Electronic insert	Documentation	Version in the order code
ATEX II 1/2 G Ex ia IIC T6	PMC71, PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA244P	1
ATEX II 1/2 D	PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– XA246P – XA289P	2
ATEX II 1/2 D Ex ia IIC	PMC71	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– XA247P – XA290P	2
ATEX II 1/3 D	PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– XA248P – XA291P	4
ATEX II 2 G Ex d IIC T6	PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA249P	5
ATEX II 2 G Ex d[ia] IIC T6	PMC71	– 4...20 mA HART, PROFIBUS PA., FOUNDATION Fieldbus	– XA250P	5
ATEX II 3 G Ex nA II T6	PMC71, PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA251P	7
ATEX II 1/2 GD Ex ia IIC T6	PMC71, PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA253P	3
ATEX II 1 GD Ex ia IIC T6	PMC71, PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA276P	8
ATEX II 1/2 G Ex ia IIC T6 + ATEX II 2 G Ex d IIC T6	PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA252P	B

Certificate/Type of Protection	Device	Electronic insert	Documentation	Version in the order code
IECEx Zone 0/1 Ex ia IIC T6	PMC71, PMP71, PMP75	– 4...20 mA HART	– XB005P	I

Certificate/Type of Protection	Device	Electronic insert	Documentation	Version in the order code
NEPSI Ex ia IIC T6	PMC71, PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XC003P	H
NEPSI Ex d IIC T6	PMP71, PMP75	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XC005P	G
NEPSI Ex d[ia] IIC T6	PMC71	– 4...20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XC005P	G

Installation/Control Drawings

Certificate/Type of Protection	Device	Electronic Insert	Documentation	Version in the order code
FM IS Class I, II, III, Division 1, Groups A – G; NI, Class I Division 2, Groups A – D; AEx ia	PMC71, PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD147P – ZD188P	S
CSA IS Class I, II, III, Division 1, Groups A – G; Class I Division 2, Groups A – G	PMC71, PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD148P – ZD189P	U
FM IS + XP Class , Division 1, Groups A – D	PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD187P – ZD190P	C
CSA IS + XP Class I Division 1, Groups A – D	PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD154P – ZD191P	D
FM/CSA IS + XP Class I Division 1, Groups A – D	PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD154P + ZD187P – ZD190P + ZD191P	E
CSA +XP Class I Division 1, Groups B - D, Class II Division 1, Groups E - G, Class III	PMP71, PMP75	– 4...20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– in Vorbereitung	-

Overspill protection

- WHG: ZE260P/00/de

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