

# Technical Information

## Cerabar S

### PMC71, PMP71, PMP75

Process pressure measurement

Pressure transmitter with ceramic and metal sensors



#### Applications

The device is used for the following measuring tasks:

- Absolute pressure and gauge pressure measurement in gases, steams or liquids in all areas of process engineering and process measurement technology
- Level, volume or mass measurements in liquids
- High process temperatures
  - up to 150 °C (302 °F) without diaphragm seal
  - up to 400 °C (752 °F) with typical diaphragm seals
- High pressures up to 700 bar (10 500 psi)
- Low-energy version with voltage output (1-5V DC), e.g. for operation on solar-operated control units (Remote Terminal Unit (RTU))

#### Your benefits

- Very good reproducibility and long-term stability
- High reference accuracy up to  $\pm 0.025$  %
- Turn down up to 100:1, higher on request
- Used for process pressure monitoring up to SIL 3, certified to IEC 61508 by TÜV SÜD
- High level of safety during operation thanks to function monitoring from the measuring cell to the electronics
- Easy electronics replacement guaranteed with HistoROM®/M-DAT

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## About this document

### Document function



The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

### Symbols used









#### Safety symbols

Symbol	Meaning
	<b>DANGER!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
	<b>WARNING!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
	<b>CAUTION!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
	<b>NOTICE!</b> This symbol contains information on procedures and other facts which do not result in personal injury.

#### Electrical symbols

Symbol	Meaning	Symbol	Meaning
	<b>Protective ground connection</b> A terminal which must be connected to ground prior to establishing any other connections.		<b>Ground connection</b> A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

#### Symbols for certain types of information

Symbol	Meaning
	<b>Permitted</b> Procedures, processes or actions that are permitted.
	<b>Preferred</b> Procedures, processes or actions that are preferred.
	<b>Forbidden</b> Procedures, processes or actions that are forbidden.
	<b>Tip</b> Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Visual inspection

### Symbols in graphics

Symbol	Meaning
1, 2, 3 ...	Item numbers
1., 2., 3. ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

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### Documentation


See the "Supplementary documentation" section →  130



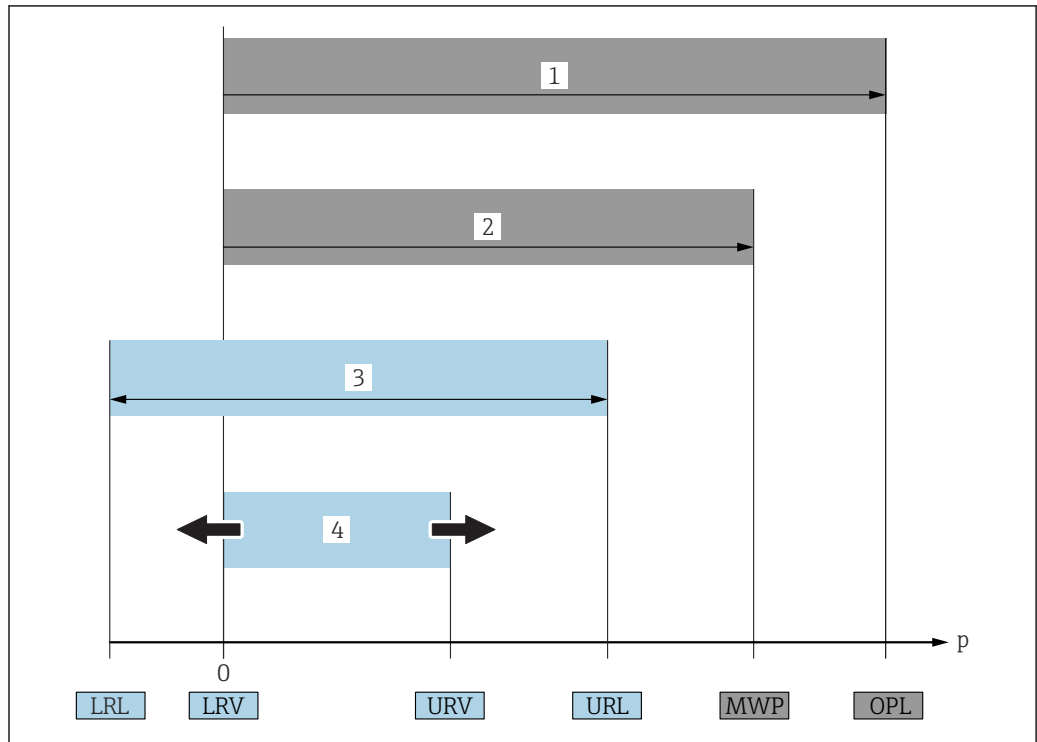
The document types listed are available:

In the Download Area of the Endress+Hauser Internet site: [www.endress.com](http://www.endress.com) → Download

### Safety Instructions (XA)

See the "Safety instructions" section →  130

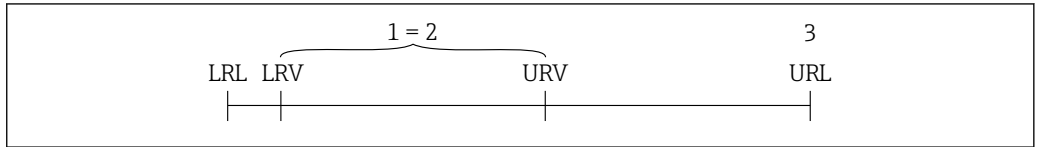
Terms and abbreviations



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Item	Term/abbreviation	Explanation
1	OPL	The OPL (over pressure limit = sensor overload limit) for the measuring device depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional notes see the "Pressure specifications" section → 51. The OPL may only be applied for a limited period of time.
2	MWP	The MWP (maximum working pressure) for the sensors depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional notes see the "Pressure specifications" section → 51. The MWP may be applied at the device for an unlimited period. The MWP can also be found on the nameplate.
3	Maximum sensor measuring range	Span between LRL and URL This sensor measuring range is equivalent to the maximum calibratable/adjustable span.
4	Calibrated/adjusted span	Span between LRV and URV Factory setting: 0 to URL Other calibrated spans can be ordered as customized spans.
p	-	Pressure
-	LRL	Lower range limit
-	URL	Upper range limit
-	LRV	Lower range value
-	URV	Upper range value
-	TD (Turn down)	Turn down Example - see the following section.

**Turn down calculation**



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- 1 *Calibrated/adjusted span*
- 2 *Zero point-based span*
- 3 *URL sensor*

**Example**

- Sensor: 10 bar (150 psi)
- Upper range value (URL) = 10 bar (150 psi)
- Calibrated/adjusted span: 0 to 5 bar (0 to 75 psi)
- Lower range value (LRV) = 0 bar (0 psi)
- Upper range value (URV) = 5 bar (75 psi)

Turn down (TD):

$$TD = \frac{URL}{|URV - LRV|}$$

$$TD = \frac{10 \text{ bar (150 psi)}}{|5 \text{ bar (75 psi)} - 0 \text{ bar (0 psi)}|} = 2$$

In this example, the TD is 2:1.  
This span is based on the zero point.

**Registered trademarks**

**HART®**

Registered trademark of the FieldComm Group, Austin, USA

**PROFIBUS®**

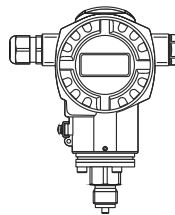
Registered trademark of the PROFIBUS User Organization, Karlsruhe, Germany

**FOUNDATION™Fieldbus**

Registered trademark of the FieldComm Group, Austin, Texas, USA

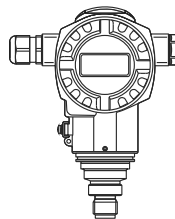
## Function and system design

### Device features



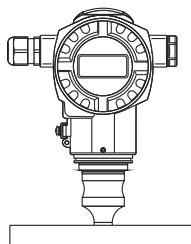
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PMC71 with capacitive measuring cell and ceramic process isolating diaphragm (Ceraphire®)



A0020463

PMP71 with piezoresistive measuring cell and metallic welded process isolating diaphragm



A0020464

PMP75 with diaphragm seal

### Field of application

- Gauge pressure and absolute pressure
- Level

### Process connections

PMC71:

- Thread
- EN flanges DN 25 – DN 80
- ANSI flanges 1" – 4"
- JIS flanges 50 A – 100 A

PMP71:

- Thread
- DN 25 – DN 80
- ASME 1 ½" – 4"
- JIS 25 A – 100 A
- Oval flange adapters
- Prepared for diaphragm seal mount

PMP75:

Wide range of diaphragm seals

### Measuring ranges

- PMC71: From –100/0 to 100 mbar (–1.5/0 to 1.5 psi) to –1/0 to 40 bar (–15/0 to 600 psi)
- PMP71: From –400/0 to 400 mbar (–6/0 to 6 psi) to –1/0 to 700 bar (–15/0 to 10500 psi)
- PMP75: From –400/0 to 400 mbar (–6/0 to 6 psi) to –1/0 to 400 bar (–15/0 to 6000 psi)



#### OPL

- PMC71: max. 60 bar (900 psi)
- PMP71: max. 1050 bar (15 750 psi)
- PMP75: max. 600 bar (9 000 psi)

#### Process temperature range (temperature at process connection)

- PMC71: -25 to +125 °C (-13 to +257 °F)  
-20 to +150 °C (-4 to +302 °F) (High-temperature version, see Product Configurator "Additional option 1" or 110 "Additional option 2" section, option "T")
- PMP71: -40 to +125 °C (-40 to +257 °F)
- PMP75: -70 to +400 °C (-94 to +752 °F)  
(depending on the filling oil)

#### Ambient temperature range

- Without LCD display: up to -60 to +85 °C (-76 to +185 °F)
- With LCD display: -20 to +70 °C (-4 to +158 °F)  
(extended temperature application range -60 to +85 °C (-76 to +185 °F) with limitations in optical properties, such as display speed and contrast)
- Separate housing: -20 to +60 °C (-4 to +140 °F)
- PMP75: Diaphragm seal systems depending on the version

#### Reference accuracy

- PMC71: Up to ±0.05% of the set span  
PLATINUM version: up to ±0.025 % of the set span
- PMP71: Up to ±0.05% of the set span  
PLATINUM version: up to ±0.025 % of the set span
- PMP75: Up to ±0.075% of the set span

#### Supply voltage

Supply voltage non-Ex

- 4 to 20 mA HART: 10.5 to 45 V DC
- 1-5V DC: 9 to 35 V DC
- PROFIBUS PA and FOUNDATION Fieldbus: 9 to 32 V DC

Supply voltage Ex ia

10.5 to 30 V DC

Supply voltage Ex d (1-5V DC)

9 to 35 V DC

#### Output

- 4 to 20 mA with superimposed HART protocol
- 1-5V DC
- PROFIBUS PA
- FOUNDATION Fieldbus

#### Options

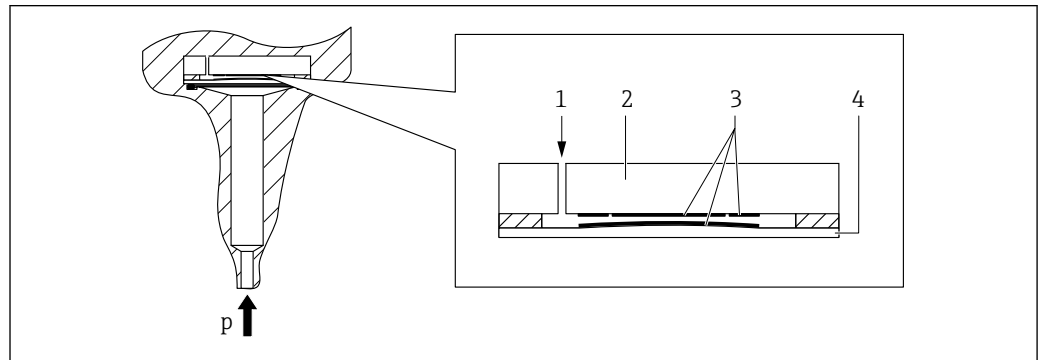
- Inspection certificate 3.1
- HistoROM®/M-DAT memory chip
- Separate housing
- PMP75: gold-coated process isolating diaphragm
- PMP71, PMP75: gold-rhodium coated process isolating diaphragm
- PMP71, PMP75: NACE-compliant materials

### Specialties

- PMC71:
  - Metal-free measurement with PVDF connection
  - Special cleaning of the transmitter to remove paint-wetting substances, for use in paint shops
- PMP71:
  - Process connections with minimum oil volume
  - Gas-tight, elastomer-free
- PMP75:
  - Wide range of diaphragm seals
  - For high medium temperatures
  - Process connections with minimum oil volume
  - Completely welded versions

### Measuring principle

#### Devices with ceramic process isolating diaphragm (Ceraphire®)



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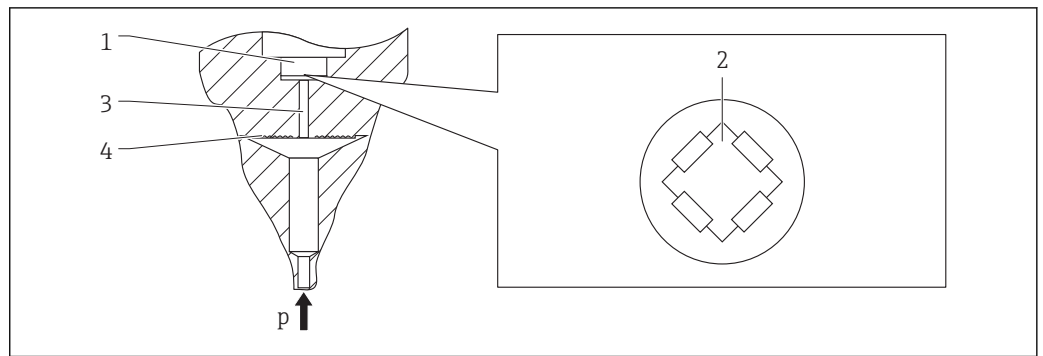
- 1 Air pressure (gauge pressure sensors)
- 2 Ceramic substrate
- 3 Electrodes
- 4 Ceramic process isolating diaphragm

The ceramic sensor is an oil-free sensor, i.e. the process pressure acts directly on the robust ceramic process isolating diaphragm and causes it to deflect. A pressure-dependent change in capacitance is measured at the electrodes of the ceramic substrate 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 (see "OPL" column in table) → ☰ 13)
- The ultrapure 99.9% ceramic (Ceraphire®, see also "[www.endress.com/ceraphire](http://www.endress.com/ceraphire)") ensures:
  - Extremely high chemical durability
  - High mechanical durability
- Suitable for vacuums
- Secondary containment for enhanced integrity
- Process temperatures up to 150 °C (302 °F)

**Devices with metallic process isolating diaphragm**



- 1 Silicon measuring element, substrate
- 2 Wheatstone bridge
- 3 Channel with fill fluid
- 4 Metal process isolating diaphragm

*PMP71*

The process pressure deflects the metal process isolating diaphragm of the sensor and a fill fluid transfers the pressure to a Wheatstone bridge (semiconductor technology). The pressure-dependent change in the bridge output voltage is measured and evaluated.

**Advantages:**

- Can be used for process pressures up to 700 bar (10 500 psi)
- High long-term stability
- Guaranteed overload resistance up to 4 times the nominal pressure
- Secondary containment for enhanced integrity
- Significantly reduced thermal effect e.g. compared to diaphragm seal systems with capillaries

*PMP75*

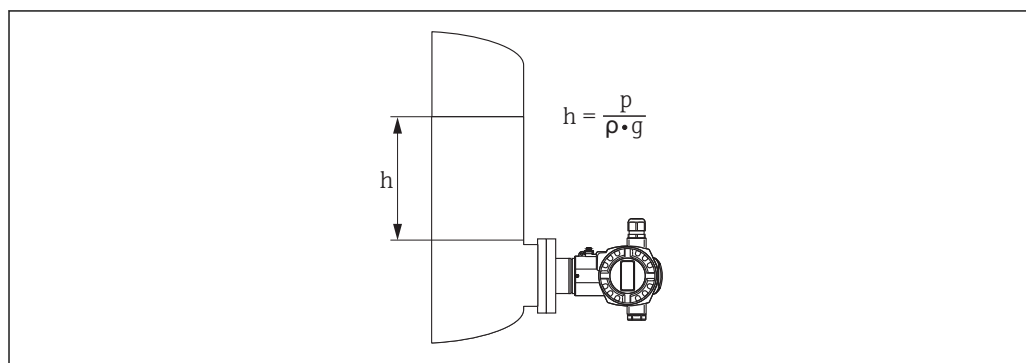
The operating pressure acts on the process isolating diaphragm of the diaphragm seal and is transferred to the process isolating diaphragm of the sensor by a diaphragm seal fill fluid. The process isolating diaphragm is deflected and a fill fluid transfers the pressure to a resistance measuring bridge.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

**Advantages:**

- Depending on the version, can be used for process pressures up to 400 bar (6 000 psi) and for extreme process temperatures
- High long-term stability
- Guaranteed overload resistance up to 4 times the nominal pressure
- Secondary containment for enhanced integrity

## Product design

## Level measurement (level, volume and mass):



A0020466

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

## Your benefits

- Selection of the level operating mode which is optimum for your application in the device software
- Volume and mass measurements in any vessel shape by means of a freely programmable characteristic curve
- Choice of diverse level units with automatic unit conversion
- A customized unit can be specified.
- Has a wide range of uses, e.g.
  - for foam formation
  - in vessels with agitators or screen fittings
  - for liquid gases

## Applications suitable for custody transfer measurement

The Parts Certificate is issued on the basis of the following standards:

- WELMEC guide 8.8 "General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments under the MID".
- OIML R117-1 Edition 2007 (E) "Dynamic measuring systems for liquids other than water".
- EN 12405-1/A1 Edition 2006 "Gas meters – Conversion devices – Part 1: Volume conversion".

## Communication protocol

- 4 to 20 mA with HART communication protocol
- PROFIBUS PA
  - Endress+Hauser devices meet the requirements specified by the FISCO model.
  - Due to a low current consumption of  $13 \text{ mA} \pm 1 \text{ mA}$ , the following number of devices can be operated on one bus segment if installing as per FISCO: up to 7 devices for Ex ia, CSA IS and FM IS applications or up to 27 devices for all other applications e.g. in non-hazardous areas, Ex nA etc. Further information on PROFIBUS PA can be found in Operating Instructions BA00034S "PROFIBUS DP/PA: Guidelines for planning and commissioning" and in the PNO Guideline.
- FOUNDATION Fieldbus
  - Endress+Hauser devices meet the requirements specified by the FISCO model.
  - Due to a low current consumption of  $15.5 \text{ mA} \pm 1 \text{ mA}$ , the following number of devices can be operated on one bus segment if installing as per FISCO: up to 6 devices for Ex ia, CSA IS and FM IS applications or up to 24 devices for all other applications e.g. in non-hazardous areas, Ex nA etc. Further information on FOUNDATION Fieldbus, such as requirements for bus system components, can be found in Operating Instructions BA00013S "FOUNDATION Fieldbus Overview".

## Input

### Measured variable

### Measured process variables

- Absolute pressure
- Gauge pressure

### Measuring range

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

Sensor	Maximum sensor measuring range		Lowest calibratable span <sup>1)</sup>	MWP	OPL	Vacuum resistance	Option <sup>2)</sup>
	lower (LRL)	upper (URL)					
	[bar (psi)]	[bar (psi)]					
100 mbar (1.5 psi)	-0.1 (-1.5)	+0.1 (+1.5)	0.005 (0.075)	2.7 (40.5)	4 (60)	0.7 (10.5)	1C
250 mbar (3.75 psi)	-0.25 (-3.75)	+0.25 (+3.75)	0.005 (0.075)	3.3 (49.5)	5 (75)	0.5 (7.5)	1E
400 mbar (6 psi)	-0.4 (-6)	+0.4 (+6)	0.005 (0.075)	5.3 (79.5)	8 (120)	0	1F
1 bar (15 psi)	-1 (-15)	+1 (+15)	0.01 (0.15)	6.7 (100.5)	10 (150)	0	1H
2 bar (30 psi)	-1 (-15)	+2 (+30)	0.02 (0.3)	12 (180)	18 (270)	0	1K
4 bar (60 psi)	-1 (-15)	+4 (+60)	0.04 (0.6)	16.7 (250.5)	25 (375)	0	1M
10 bar (150 psi)	-1 (-15)	+10 (+150)	0.1 (1.5)	26.7 (400.5)	40 (600)	0	1P
40 bar (600 psi)	-1 (-15)	+40 (+600)	0.4 (6)	40 (600)	60 (900)	0	1S

- 1) Turndown > 100:1 on request or can be set on device
- 2) Product Configurator, order code for "Sensor range; sensor over pressure limit"

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

Sensor	Maximum sensor measuring range		Lowest calibratable span <sup>1)</sup>	MWP	OPL	Vacuum resistance	Option <sup>2)</sup>
	lower (LRL)	upper (URL)					
	[bar <sub>abs</sub> (psi <sub>abs</sub> )]	[bar <sub>abs</sub> (psi <sub>abs</sub> )]					
100 mbar (1.5 psi)	0	+0.1 (+1.5)	0.005 (0.075)	2.7 (40.5)	4 (60)	0	2C
250 mbar (3.75 psi)	0	+0.25 (+3.75)	0.005 (0.075)	3.3 (49.5)	5 (75)	0	2E
400 mbar (6 psi)	0	+0.4 (+6)	0.005 (0.075)	5.3 (79.5)	8 (120)	0	2F
1 bar (15 psi)	0	+1 (+15)	0.01 (0.15)	6.7 (100.5)	10 (150)	0	2H
2 bar (30 psi)	0	+2 (+30)	0.02 (0.3)	12 (180)	18 (270)	0	2K
4 bar (60 psi)	0	+4 (+60)	0.04 (0.6)	16.7 (250.5)	25 (375)	0	2M
10 bar (150 psi)	0	+10 (+150)	0.1 (1.5)	26.7 (400.5)	40 (600)	0	2P
40 bar (600 psi)	0	+40 (+600)	0.4 (6)	40 (600)	60 (900)	0	2S

- 1) Turndown > 100:1 on request or can be set on device
- 2) Product Configurator, order code for "Sensor range; sensor over pressure limit"

## PMP71 and PMP75 – metal process isolating diaphragm for gauge pressure

Sensor	Maximum sensor measuring range		Lowest calibratable span <sup>1)</sup>	MWP	OPL	Vacuum resistance <sup>2)</sup>	Option <sup>3)</sup>
	lower (LRL)	upper (URL)				Silicone oil/ Inert oil	
	[bar (psi)]	[bar (psi)]				[bar <sub>abs</sub> (psi <sub>abs</sub> )]	
400 mbar (6 psi)	-0.4 (-6)	+0.4 (+6)	0.005 (0.075)	4 (60)	6 (90)	0.01/0.04 (0.15/0.6)	1F
1 bar (15 psi)	-1 (-15)	+1 (+15)	0.01 (0.15)	6.7 (100)	10 (150)		1H
2 bar (30 psi)	-1 (-15)	+2 (+30)	0.02 (0.3)	13.3 (200)	20 (300)		1K
4 bar (60 psi)	-1 (-15)	+4 (+60)	0.04 (0.6)	18.7 (280.5)	28 (420)		1M
10 bar (150 psi)	-1 (-15)	+10 (+150)	0.1 (1.5)	26.7 (400.5)	40 (600)		1P
40 bar (600 psi)	-1 (-15)	+40 (+600)	0.4 (6)	100 (1500)	160 (2400)		1S
100 bar (1500 psi)	-1 (-15)	+100 (+1500)	1.0 (15)	100 (1500)	400 (6000) <sup>4)</sup>		1U
400 bar (6000 psi)	-1 (-15)	+400 (+6000)	4.0 (60)	400 (6000)	600 (9000)		1W
700 bar (10500 psi) <sup>5)</sup>	-1 (-15)	+700 (+10500)	7.0 (105)	700 (10500)	1050 (15750)		1X

- 1) Turn down > 100:1 on request or can be set on device
- 2) The vacuum resistance applies for the measuring cell under reference operating conditions. A ceramic process isolating diaphragm is recommended for applications in the limit range. For type PMP75, the pressure and temperature application limits of the selected filling oil must also be observed → 115.
- 3) Product Configurator, order code for "Sensor range; sensor over pressure limit"
- 4) If the option "JN" is ordered in the order code for "Test, certificate", then the OPL is 160 bar (2400 psi).
- 5) PMP71 only, PMP75 on request

## PMP71 and PMP75 – metal process isolating diaphragm for absolute pressure

Sensor	Maximum sensor measuring range <sup>1)</sup>		Lowest calibratable span <sup>2)</sup>	MWP	OPL	Vacuum resistance <sup>3)</sup>	Option <sup>4)</sup>
	lower (LRL)	upper (URL)				Silicone oil/ Inert oil	
	[bar <sub>abs</sub> (psi <sub>abs</sub> )]	[bar <sub>abs</sub> (psi <sub>abs</sub> )]				[bar (psi)]	
400 mbar (6 psi)	0	+0.4 (+6)	0.005 (0.075)	4 (60)	6 (90)	0.01/0.04 (0.15/0.6)	2F
1 bar (15 psi)	0	+1 (+15)	0.01 (0.15)	6.7 (100)	10 (150)		2H
2 bar (30 psi)	0	+2 (+30)	0.02 (0.3)	13.3 (200)	20 (300)		2K
4 bar (60 psi)	0	+4 (+60)	0.04 (0.6)	18.7 (280.5)	28 (420)		2M
10 bar (150 psi)	0	+10 (+150)	0.1 (1.5)	26.7 (400.5)	40 (600)		2P
40 bar (600 psi)	0	+40 (+600)	0.4 (6)	100 (1500)	160 (2400)		2S
100 bar (1500 psi)	0	+100 (+1500)	1.0 (15)	100 (1500)	400 (6000) <sup>5)</sup>		2U
400 bar (6000 psi)	0	+400 (+6000)	4.0 (60)	400 (6000)	600 (9000)		2W
700 bar (10500 psi) <sup>6)</sup>	0	+700 (+10500)	7.0 (105)	700 (10500)	1050 (15750)		2X

- 1) PMP75: Within the sensor measuring range, the minimum upper range value of 80 mbar<sub>abs</sub> (1.16 psi<sub>abs</sub>) must be observed.
- 2) Turn down > 100:1 on request or can be set on device
- 3) The vacuum resistance applies for the measuring cell under reference operating conditions. A ceramic process isolating diaphragm is recommended for applications in the limit range. For type PMP75, the pressure and temperature application limits of the selected filling oil must also be observed → 115.
- 4) Product Configurator, order code for "Sensor range; sensor over pressure limit"
- 5) If the option "JN" is ordered in the order code for "Test, certificate", then the OPL is 160 bar (2400 psi).
- 6) PMP71 only, PMP75 on request

PMP71 - metallic process isolating diaphragms for absolute pressure with MID parts certificate

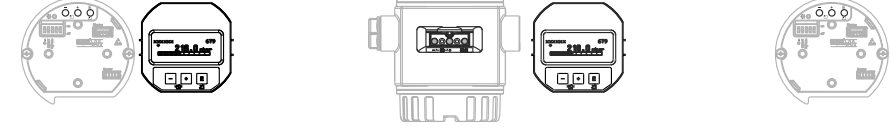
Sensor	Maximum sensor measuring range		Min. WP for gas applications suitable for custody transfer measurement	Min. WP for liquid applications suitable for custody transfer measurement	MWP	OPL	Vacuum resistance <sup>1)</sup>	Option <sup>2)</sup>
	lower (LRL) <sup>3)</sup>	upper (URL) <sup>4)</sup>					Silicone oil/ Inert oil	
[bar (psi)]	[bar <sub>abs</sub> (psi <sub>abs</sub> )]	[bar <sub>abs</sub> (psi <sub>abs</sub> )]	[bar (psi)]	[bar (psi)]	[bar <sub>abs</sub> (psi <sub>abs</sub> )]	[bar <sub>abs</sub> (psi <sub>abs</sub> )]	[bar (psi)]	
10 (150)	0	+10 (150)	0.5 (7.5)	0.5 (7.5)	26.7 (400.5)	40 (600)	0.01/0.04 (0.15/1)	MP
50 (750)	0	+50 (750)	10 (150)	2.5 (37.5)	100 (1500)	400 (6000)	0.01/0.04 (0.15/1)	MT
100 (1500)	0	+100 (1500)	5 (75)	5 (75)	100 (1500)	400 (6000)	0.01/0.04 (0.15/1)	MU

- 1) The vacuum resistance applies to the measuring cell under reference operating conditions
- 2) Product Configurator, order code for "Sensor range; sensor over pressure limit"
- 3) By default, the device is set to a lower sensor measuring range of 0 bar. Please specify when ordering if the lower sensor measuring range is to be set to a different default value.
- 4) Max. WP (working pressure) for gas and liquid applications suitable for calibration to regulatory standards

## Output

### Output signal

- 4 to 20 mA with superimposed digital communication protocol HART, 2-wire
- 1-5V DC, 3-wire
- Digital communication signal PROFIBUS PA (Profile 3.0), 2-wire
  - Signal coding: Manchester Bus Powered (MBP): Manchester II
  - Transmission rate: 31.25 KBit/s voltage mode
- Digital communication signal FOUNDATION Fieldbus, 2-wire
  - Signal coding: Manchester Bus Powered (MBP): Manchester II
  - Transmission rate: 31.25 KBit/s voltage mode

Output	Internal + LCD	External + LCD	Internal
			
	Option <sup>1)</sup>		
4 to 20mA HART	B	A	C
4 to 20mA HART, Li=0	E	D	F
1-5V DC	H	G	-
PROFIBUS PA	N	M	O
FOUNDATION Fieldbus	Q	P	R

1) Product Configurator, order code for "Display, operation:"

### Signal range

#### 4 to 20 mA

3.8 mA to 20.5 mA

#### 1-5V DC

0.95 to 5.125 V

### Signal on alarm

#### 4 to 20 mA HART

As per NAMUR NE43.

- Max. alarm: can be set from 21 to 23 mA (factory setting: 22 mA)
- Hold measured value: last measured value is held
- Min. alarm: 3.6 mA

#### 1-5V DC

- Max. alarm: can be set from 5.25 to 5.75 V
- Min. Alarm: 0.9 V

#### PROFIBUS PA

As per NAMUR NE43.

Can be set in the Analog Input Block.

Options:

- Last Valid Out Value (factory setting)
- Fail Safe Value
- Status bad

#### FOUNDATION Fieldbus

As per NAMUR NE43.

Can be set in the Analog Input Block.



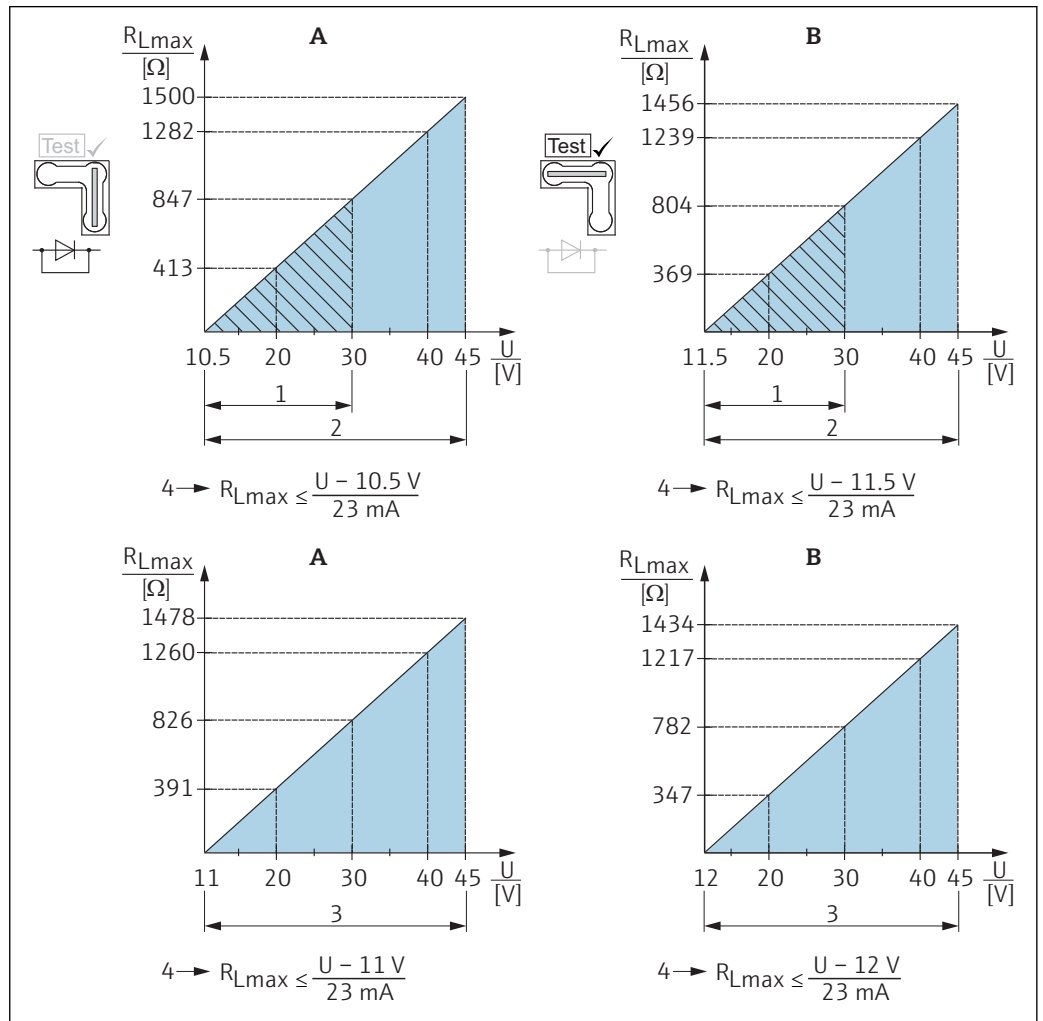
Options:

- Last Good Value
- Fail Safe Value (factory setting)
- Wrong Value

**Load**

**4 to 20 mA HART**

In order to guarantee sufficient terminal voltage in two-wire devices, a maximum load resistance R (including line resistance) must not be exceeded depending on the supply voltage U<sub>0</sub> of the supply unit. In the following load diagrams, observe the position of the jumper and the explosion protection:



A0020467

- A Jumper for 4 to 20 mA test signal set to "Non-test" position
- B Jumper for 4 to 20 mA test signal set to "Test" position
- 1 Power supply 10.5 (11.5) to 30 V DC for 1/2 G, 1 GD, 1/2 GD, FM IS, CSA IS, IECEx ia, NEPSI Ex ia
- 2 Power supply 10.5 (11.5) to 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 ignition-proof, NEPSI Ex d
- 3 Power supply 11 (12) to 45 V DC for PMC71, Ex d[ia], NEPSI Ex d[ia]
- 4  $R_{Lmax}$  maximum load resistance
- U Supply voltage

**i** When operating via a handheld terminal or via a PC with an operating program, a minimum communication resistor of 250 Ω must be taken into account.

**1-5V DC**

The load must be at least 100 kΩ.

**Damping**

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

- via local display, handheld terminal or PC (handheld terminal or PC not for 1-5V DC) with operating program, continuous from 0 to 999 s
- Also for HART and PROFIBUS PA: Via DIP switch on the electronic insert, switch position "on" = set value and "off"
- 1-5V DC: via DIP switch on electronic insert switch position "on" = set value and "off"
- Factory setting: 2 s

**Alarm current**

Designation	Option <sup>1)</sup>
Min alarm current	J
HART burst mode PV	J
Min alarm current + HART burst mode PV	J

1) Product Configurator, order code for "Additional options 1" and "Additional options 2"

**Firmware version**

Designation	Option <sup>1)</sup>
02.20.zz, HART 7, DevRev22	72
02.11.zz, HART 5, DevRev21	73
04.00.zz, FF, DevRev07	74
04.01.zz, PROFIBUS PA, DevRev03	75
02.10.zz, HART 5, DevRev21	76
03.00.zz, FF, DevRev06	77
04.00.zz, PROFIBUS PA	78
02.30.zz, HART 7	71

1) Product Configurator, order code for "Firmware version"

**Protocol-specific data HART**

Manufacturer ID	17 (11 hex)
Device type ID	24 (18 hex)
Device revision	<ul style="list-style-type: none"> <li>■ 21 (15 hex) - SW version 02.1y.zz - HART specification 5</li> <li>■ 22 (16 hex) - SW version 02.2y.zz - HART specification 7</li> </ul>
HART specification	<ul style="list-style-type: none"> <li>■ 5</li> <li>■ 7</li> </ul>
DD revision	<ul style="list-style-type: none"> <li>■ 4 (Russian in language selection) for device revision 21</li> <li>■ 3 (Dutch in language selection) for device revision 21</li> <li>■ 1 for device revision 22</li> </ul>
Device description files (DTM, DD)	Information and files under: <ul style="list-style-type: none"> <li>■ <a href="http://www.endress.com">www.endress.com</a></li> <li>■ <a href="http://www.fieldcommgroup.org">www.fieldcommgroup.org</a></li> </ul>
HART load	Min. 250 Ω

HART device variables	<p>The measured values are assigned to the device variables as follows:</p> <p><b>Measured values for PV (primary variable)</b></p> <ul style="list-style-type: none"> <li>▪ Pressure</li> <li>▪ Level</li> <li>▪ Tank content</li> </ul> <p><b>Measured values for SV, TV (second and third variable)</b></p> <p>Pressure</p> <p><b>Measured values for QV (fourth variable)</b></p> <p>Temperature</p>
Supported functions	<ul style="list-style-type: none"> <li>▪ Burst mode</li> <li>▪ Additional transmitter status</li> <li>▪ Device locking</li> <li>▪ Alternative measuring modes</li> </ul>

**Wireless HART data**

Minimum starting voltage	11.5 V (default) or 10.5 V if jumper not set to "Test" position <sup>1)</sup>
Start-up current	12 mA
Starting time	10 s
Minimum operating voltage	11.5 V (default) or 10.5 V if jumper not set to "Test" position <sup>1)</sup>
Multidrop current	4 mA
Time for connection setup	1 s

1) Or higher if operating near the ambient temperature limits (-40 to +85 °C (-40 to +185))

**Protocol-specific data  
PROFIBUS PA**

Manufacturer ID	17 (11 hex)
Identification number	1541 hex
Profile version	<p>3.0</p> <ul style="list-style-type: none"> <li>▪ SW version 03.00.zz</li> <li>▪ SW version 04.00.zz</li> </ul> <p>3.02</p> <p>SW version 04.01.zz ( device revision 3)</p> <p>Compatibility with SW version 03.00.zz and higher.</p>
GSD revision	<ul style="list-style-type: none"> <li>▪ 4 (SW version 3.00.zz and 4.00.zz)</li> <li>▪ 5 (device revision 3)</li> </ul>
DD revision	<ul style="list-style-type: none"> <li>▪ 1 (SW version 3.00.zz and 4.00.zz)</li> <li>▪ 1 (device revision 3)</li> </ul>
GSD file	Information and files under:
DD files	<ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com">www.endress.com</a></li> <li>▪ <a href="http://www.profibus.org">www.profibus.org</a></li> </ul>
Output values	<p><b>Measured values for PV (via Analog Input Function Block)</b></p> <ul style="list-style-type: none"> <li>▪ Pressure</li> <li>▪ Level</li> <li>▪ Tank content</li> </ul> <p><b>Measured values for SV</b></p> <ul style="list-style-type: none"> <li>▪ Pressure</li> <li>▪ Temperature</li> </ul>

Input values	Input value sent from PLC, can be shown on display
Supported functions	<ul style="list-style-type: none"> <li>▪ Identification &amp; maintenance, simplest device identifier on the control system and nameplate</li> <li>▪ Condensed status (only with Profile Version 3.02)</li> <li>▪ Automatic ID number adjustment and switchable to the following ID numbers (only with Profile Version 3.02): <ul style="list-style-type: none"> <li>▪ 9700: Profile-specific transmitter identification number with the "Classic" or "Condensed" status.</li> <li>▪ 1501: Compatibility mode for the old Cerabar S generation (PMC731, PMP731, PMC631, PMP635).</li> <li>▪ 1541: Identification number of the new Cerabar S generation (PMC71, PMP71, PMP75).</li> </ul> </li> <li>▪ Device locking: The device can be locked by hardware or software.</li> </ul>

**Protocol-specific data  
FOUNDATION Fieldbus**

Manufacturer ID	452B48 hex
Device type	1007 hex
Device revision	<ul style="list-style-type: none"> <li>▪ 6 - SW version 03.00.zz</li> <li>▪ 7 - SW version 04.00.zz (FF-912)</li> </ul>
DD revision	<ul style="list-style-type: none"> <li>▪ 3 (device revision 6)</li> <li>▪ 2 (device revision 7)</li> </ul>
CFF revision	<ul style="list-style-type: none"> <li>▪ 4 (device revision 6)</li> <li>▪ 1 (device revision 7)</li> </ul>
DD files	Information and files under:
CFF files	<ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com">www.endress.com</a></li> <li>▪ <a href="http://www.fieldcommgroup.org">www.fieldcommgroup.org</a></li> </ul>
Device tester version (ITK version)	<ul style="list-style-type: none"> <li>▪ 5.0 (device revision 6)</li> <li>▪ 6.01 (device revision 7)</li> </ul>
Number of ITK test campaign	<ul style="list-style-type: none"> <li>▪ IT054600 (Device Revision 6)</li> <li>▪ IT085500 (Device Revision 7)</li> </ul>
Link-Master (LAS) capable	Yes
Choice of "Link Master" and "Basic Device"	Yes; Factory setting: Basic Device
Node address	Factory setting: 247 (F7 hex)
Supported functions	<p>Field diagnostics profile (only with FF912)</p> <p>The following methods are supported:</p> <ul style="list-style-type: none"> <li>▪ Reboot</li> <li>▪ Configure error as warning or alarm</li> <li>▪ HistoROM</li> <li>▪ Peakhold</li> <li>▪ Alarm info</li> <li>▪ Sensor trim</li> </ul>
Number of VCRs	<ul style="list-style-type: none"> <li>▪ 44 (device revision 6)</li> <li>▪ 24 (device revision 7)</li> </ul>
Number of Link Objects in VFD	50

**Virtual communication references (VCRs)**

	Device revision 6	Device revision 7
Permanent Entries	44	1
Client VCRs	0	0
Server VCRs	5	10
Source VCRs	8	43
Sink VCRs	0	0
Subscriber VCRs	12	43
Publisher VCRs	19	43

**Link settings**

	Device revision 6	Device revision 7
Slot time	4	4
Min. Inter PDU delay	12	10
Max. response delay	10	10

**Transducer Blocks**

Block	Contents	Output values
TRD1 Block	Contains all parameters related to the measurement	<ul style="list-style-type: none"> <li>■ Pressure or level (channel 1)</li> <li>■ Process temperature (channel 2)</li> </ul>
Service Block	Contains service information	<ul style="list-style-type: none"> <li>■ Pressure after damping (channel 3)</li> <li>■ Pressure peakhold indicator (channel 4)</li> <li>■ Counter for max. pressure transgressions (channel 5)</li> </ul>
Diagnostic block	Contains diagnostic information	Error code via DI channels (channel 0 to 16)
Display block	Contains parameters to configure the onsite display	No output values

## Function blocks

Block	Contents	Number Blocks	Execution time		Functionality	
			Device Revision 6	Device Revision 7	Device Revision 6	Device Revision 7
Resource Block	The Resource Block contains all the data that uniquely identify the device. It is an electronic version of a nameplate of the device.	1			enhanced	enhanced
Analog Input Block 1 Analog Input Block 2	The AI Block receives the measuring data from the Sensor Block, (selectable via a channel number) and makes the data available to other function blocks at its output. Enhancement: Digital outputs for process alarms, fail safe mode	2	45 ms	45 ms (without trend and alarm reports)	enhanced	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 other blocks at the output.	1	40 ms	30 ms	standard	enhanced
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.	1	60 ms	40 ms	standard	enhanced
PID Block	This block is used as a proportional-integral-derivative controller and can be used universally for closed-loop-control in the field. It enables cascade mode and feedforward control. Input IN can be indicated on the display. The selection is performed in the Display Block (DISPLAY_MAIN_LINE_CONTENT).	1	120 ms	70 ms	standard	enhanced
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 performed.	1	50 ms	40 ms	standard	enhanced
Input Selector Block	The Input Selector Block facilitates the 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 enables the selection of maximum, minimum, average and 'first good' values. Inputs IN1 to IN4 can be shown on the display. The selection is performed in the Display Block (DISPLAY_MAIN_LINE_CONTENT).	1	35 ms	35 ms	standard	enhanced
Signal Characterizer Block	The Signal Characterizer Block has two sections, each with an output value that is a non-linear function of the input value. The non-linear function is generated by a single look-up table with 21 arbitrary x-y pairs.	1	30 ms	40 ms	standard	enhanced
Integrator Block	The Integrator 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 a binary signal when the setpoint is reached.	1	35 ms	40 ms	standard	enhanced
Analog Alarm Block	This block contains all process alarm conditions (working like a comparator) and represents them at the output.	1	35 ms	35 ms	standard	enhanced

*Additional function block information:*

Instantiate Function Block	JA	JA
Number of additional instantiatable function blocks	11	5

## Power supply

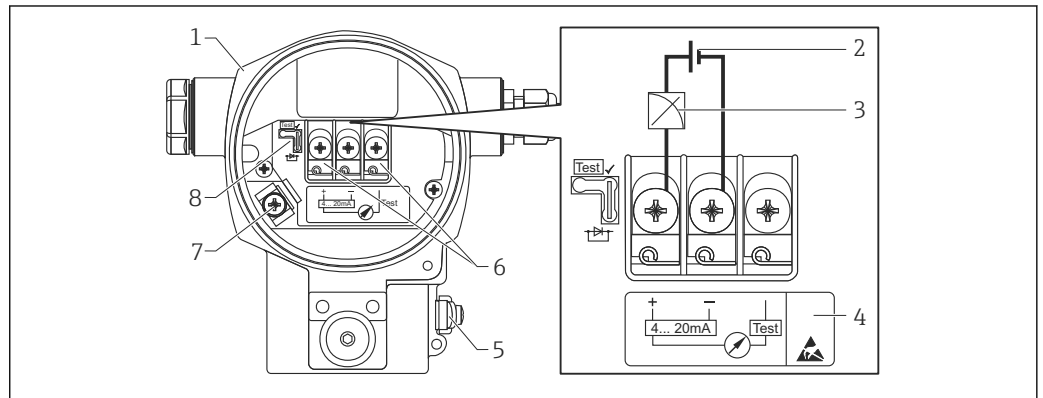
### **⚠ WARNING**

#### Electrical safety is compromised by an incorrect connection!

- ▶ When using the measuring device in hazardous areas, the relevant national standards and regulations as well as the Safety Instructions or Installation or Control Drawings must be observed → 130.
- ▶ All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all Ex-systems → 130.
- ▶ Devices with integrated overvoltage protection must be grounded → 28.
- ▶ Protective circuits against reverse polarity, HF influences and overvoltage peaks are integrated.

### Terminal assignment

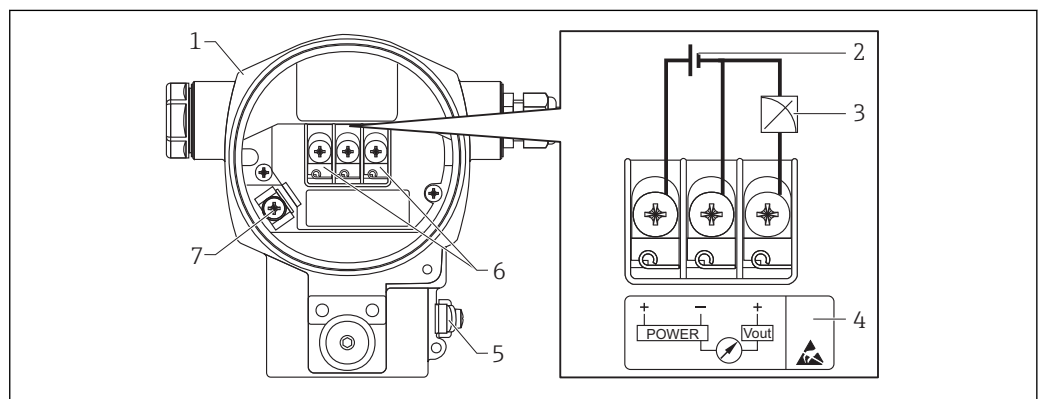
#### 4 to 20 mA HART



A0019989

- 1 Housing
- 2 Supply voltage
- 3 4 to 20 mA
- 4 Devices with integrated overvoltage protection are labeled "OVP" (overvoltage protection) here.
- 5 External ground terminal
- 6 4 to 20 mA test signal between positive and test terminal
- 7 Internal ground terminal
- 8 Jumper for 4 to 20 mA test signal → 24

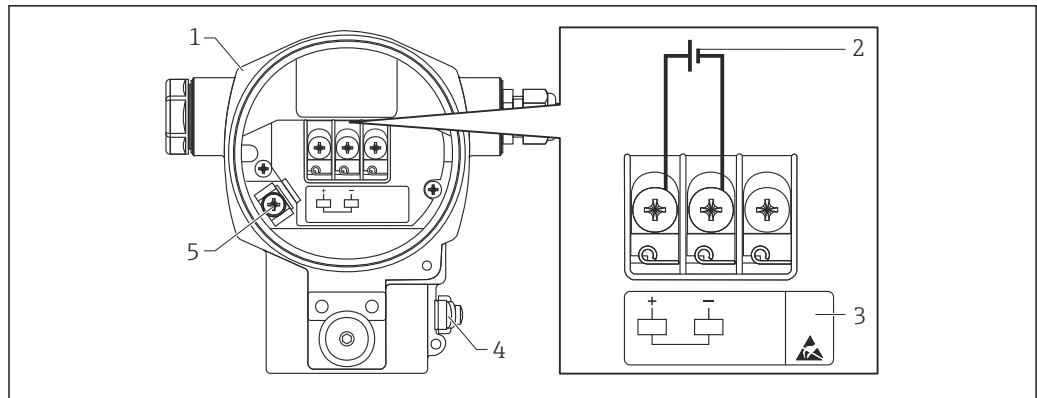
#### 1-5V DC



A0031676

- 1 Housing
- 2 Supply voltage
- 3 1-5V DC
- 4 Overvoltage protection (OVP) marking
- 5 External ground terminal
- 6 Terminals
- 7 Internal ground terminal

**PROFIBUS PA and FOUNDATION Fieldbus**



A0020158

- 1 Housing
- 2 Supply voltage
- 3 Devices with integrated overvoltage protection are labeled "OVP" (overvoltage protection) here.
- 4 External ground terminal
- 5 Internal ground terminal

**Supply voltage**

**4 to 20 mA HART**

Electronic version	Jumper for 4 to 20 mA test signal in "Test" position (delivery status)	Jumper for 4 to 20 mA test signal in "Non-test" position
Version for non-hazardous area	11.5 to 45 V DC	10.5 to 45 V DC
Intrinsically safe	11.5 to 30 V DC	10.5 to 30 V DC
<ul style="list-style-type: none"> <li>▪ Other types of protection</li> <li>▪ Devices without certificate</li> </ul>	11.5 to 45 V DC (versions with 35 V DC plug-in connection)	10.5 to 45 V DC (versions with 35 V DC plug-in connection)

*Measuring a 4 to 20 mA test signal*

Jumper position for test signal	Description
<p style="text-align: right; font-size: small;">A0019992</p>	<ul style="list-style-type: none"> <li>▪ Measurement of 4-20 mA test signal via the positive and test terminal: Possible. (Thus, the output current can be measured without interruption via the diode.)</li> <li>▪ As-delivered state</li> <li>▪ Minimum supply voltage: 11.5 V DC</li> </ul>
<p style="text-align: right; font-size: small;">A0019993</p>	<ul style="list-style-type: none"> <li>▪ Measurement of 4-20 mA test signal via positive and test terminal: Not possible.</li> <li>▪ Minimum supply voltage: 10.5 V DC</li> </ul>

**1-5V DC**

- Non-hazardous area: 9 to 35 V DC
- Ex-d: 9 to 35 V DC

**PROFIBUS PA**

- Version for non-hazardous areas: 9 to 32 V DC
- Ex ia: 10.5 to 30 V DC



**FOUNDATION Fieldbus**

- Version for non-hazardous areas: 9 to 32 V DC
- Ex ia: 10.5 to 30 V DC

**Current consumption**

- 1-5V DC:  
9 V = 1.8 mA  
35 V = 0.8 mA
- PROFIBUS PA: 13 mA ±1 mA, switch-on current corresponds to IEC 61158-2, Clause 21
- FOUNDATION Fieldbus: 15.5 mA ±1 mA, switch-on current corresponds to IEC 61158-2, Clause 21

**Electrical connection**

**PROFIBUS PA**

The digital communication signal is transmitted to the bus via a two-wire connection. The bus also provides the power supply. 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 BA00034S "PROFIBUS DP/PA: Guidelines for planning and commissioning" and the PNO Guideline.

**FOUNDATION Fieldbus**

The digital communication signal is transmitted to the bus via a two-wire connection. The bus also provides the power supply. 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 BA00013S "FOUNDATION Fieldbus Overview" and the FOUNDATION Fieldbus Guideline.

**Terminals**

- Supply voltage and internal ground terminal: 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)
- External ground terminal: 0.5 to 4 mm<sup>2</sup> (20 to 12 AWG)

**Cable entries**

Approval	Cable gland	Clamping range
Standard, II 1/2 G Ex ia, IS	Plastic M20x1.5	5 to 10 mm (0.2 to 0.39 in)
ATEX II 1/2 D, II 1/3 D, II 1/2 GD Ex ia, II 1 GD Ex ia, II 3 G Ex nA	Metal M20x1.5 (Ex e)	7 to 10.5 mm (0.28 to 0.41 in)

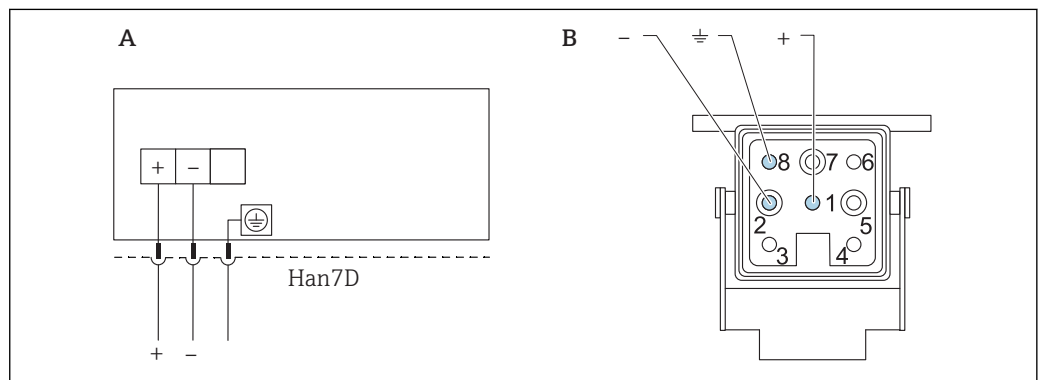
**1-5V DC**

The cable entries have a 1/2 FNPT thread. The connection on the customer's side is protected by a plastic connector. A cable gland is not envisaged.

For additional technical data, see section on housing → 53

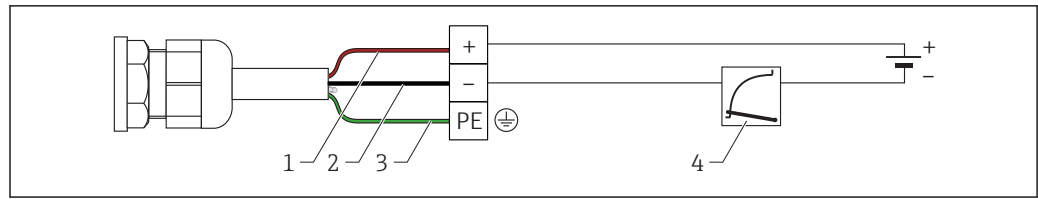
**Device plugs**

**Connection of devices with Harting plug Han7D**



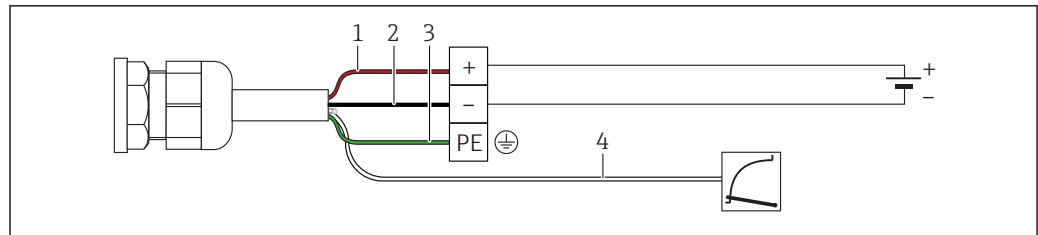
A Electrical connection for devices with Harting plug Han7D  
 B View of the plug-in connection on the device

Material: CuZn, contacts for plug-in jack and connector are gold-plated

**Cable version connection**

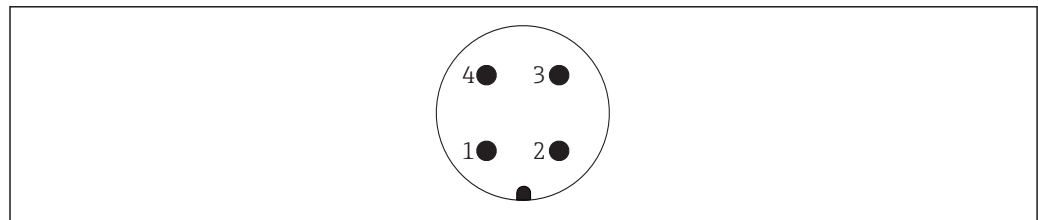
A0019991

- 1 *rd = red*
- 2 *bk = black*
- 3 *gnye = green*
- 4 *4 to 20 mA*

**Connection via cable version 1-5V DC**

A0032269

- 1 *rd = red*
- 2 *bk = black*
- 3 *gnye = green*
- 4 *1-5V DC*

**Connection of devices with M12 plug**

A0011175

- 1 *Signal +*
- 2 *Not assigned*
- 3 *Signal -*
- 4 *Ground*

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

Plug-in jack M 12x1, straight

- Material: body PA; coupling nut CuZn, nickel-plated
- Degree of protection (fully locked): IP67
- Order number: 52006263

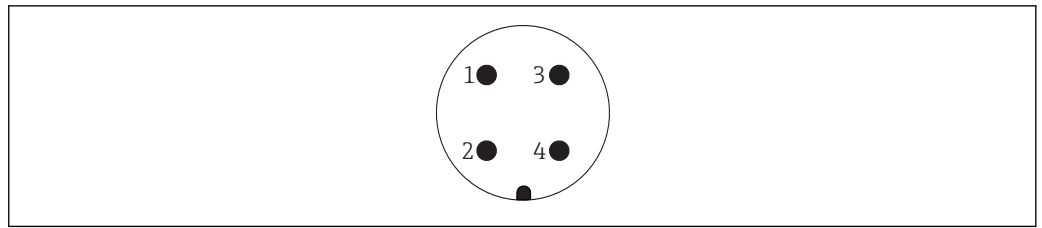
Plug-in jack M 12x1, elbowed

- Material: body PBT/PA; coupling nut GD-Zn, nickel-plated
- Degree of protection (fully locked): IP67
- Order number: 71114212

Cable 4x0.34 mm<sup>2</sup> (20 AWG) with M12 socket, elbowed, screw plug, length 5 m (16 ft)

- Material: body PUR; coupling nut CuSn/Ni; cable PVC
- Degree of protection (fully locked): IP67
- Order number: 52010285

**Connection of devices with 7/8" plug**



A001176

- 1 Signal -
- 2 Signal +
- 3 Shielding
- 4 Not assigned

External thread: 7/8 - 16 UNC  
 ■ Material: 316L (1.4401)  
 ■ Degree of protection: IP68

**Cable specification**

**HART**

- Endress+Hauser recommends using shielded, twisted-pair two-wire cables.
- Cable outer diameter: 5 to 9 mm (0.2 to 0.35 in) depending on the cable entry used → 25

**1-5V DC**

- Endress+Hauser recommends using a shielded cable.
- Cable outer diameter: 5 to 9 mm (0.2 to 0.35 in) depending on the cable entry used → 25


*Maximum cable length*

The following table shows the tolerance of the voltage output for a representative cable with a length of up to 100 m (328 ft), a resistance of 18 Ohm/km and specification 18 AWG (cable cross-section 0.8 mm<sup>2</sup>).

Tolerance of voltage output at cable end	Length
0.5 mV	25 m (82 ft)
1 mV	50 m (164 ft)
1.5 mV	75 m (246 ft)
2 mV	100 m (328 ft)

**PROFIBUS PA**

Use a twisted, shielded twin-core cable, preferably cable type A.

-  For further information on the cable specifications, see Operating Instructions BA00034S "PROFIBUS DP/PA: Guidelines for planning and commissioning", the PNO Guideline 2.092 PROFIBUS PA User and Installation Guideline" and IEC 61158-2 (MBP).

**FOUNDATION Fieldbus**

Use a twisted, shielded twin-core cable, preferably cable type A.

-  For further information on the cable specifications, see Operating Instructions BA00013S "FOUNDATION Fieldbus Overview", FOUNDATION Fieldbus Guideline and IEC 61158-2 (MBP).

**Start-up current**

12 mA

**Residual ripple**

Without influence on 4 to 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)].

**Overvoltage protection  
(optionally for HART,  
PROFIBUS PA and  
FOUNDATION Fieldbus)**

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

Ordering information: Product Configurator, order code for "Additional options 1" or Additional options 2", option "M"

**NOTICE****Device could be destroyed!**

- ▶ Devices with integrated overvoltage protection must be grounded.

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**Influence of power supply**

$\leq 0.0006$  % of URL/1 V

## Performance characteristics for measuring devices with ceramic process isolating diaphragm

<b>Response time</b>	<p><b>HART</b></p> <ul style="list-style-type: none"> <li>▪ Acyclic: min. 330 ms, typically 590 ms (depending on command # and number of preambles)</li> <li>▪ Cyclic (burst): min. 160 ms, typically 350 ms (depending on command # and number of preambles)</li> </ul> <p><b>PROFIBUS PA</b></p> <ul style="list-style-type: none"> <li>▪ Acyclic: approx. 60 ms to 70 ms (depending on Min. Slave Interval)</li> <li>▪ Cyclic: approx. 10 ms to 13 ms (depending on Min. Slave Interval)</li> </ul> <p><b>FOUNDATION Fieldbus</b></p> <ul style="list-style-type: none"> <li>▪ Acyclic: typically 100 ms (for standard bus parameter settings)</li> <li>▪ Cyclic: max. 20 ms (for standard bus parameter settings)</li> </ul>
<b>Reference operating conditions</b>	<ul style="list-style-type: none"> <li>▪ As per IEC 62828-2 / IEC 60770</li> <li>▪ Ambient temperature <math>T_A</math> = constant, in the range +21 to +33 °C (+70 to +91 °F)</li> <li>▪ Humidity <math>\varphi</math> = constant, in the range: 5 to 80 % RH <math>\pm</math> 5 %</li> <li>▪ Ambient pressure <math>p_A</math> = constant, in the range: 860 to 1060 mbar (12.47 to 15.37 psi)</li> <li>▪ Position of the measuring cell: horizontal <math>\pm</math>1°</li> <li>▪ Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value</li> <li>▪ Zero based span</li> <li>▪ Membrane material PMC71: Al<sub>2</sub>O<sub>3</sub> aluminum oxide ceramic FDA, ultrapure 99.9 %</li> <li>▪ Supply voltage: 24 V DC <math>\pm</math>3 V DC</li> <li>▪ Load with HART: 250 <math>\Omega</math></li> <li>▪ Turn down (TD) = <math>URL /  URV - LRV </math></li> </ul>
<b>Maximum measured error (total performance)</b>	<p>The performance characteristics refer to the accuracy of the measuring device. The factors influencing accuracy can be divided into two groups</p> <ul style="list-style-type: none"> <li>▪ Total performance of measuring device</li> <li>▪ Installation factors</li> </ul> <p>All performance characteristics are in conformance with <math>\geq \pm 3</math> sigma.</p> <p>The total performance of the measuring device comprises the reference accuracy and the ambient temperature effect and is calculated using the following formula:</p> $\text{Total performance} = \pm \sqrt{(E1)^2 + (E2)^2}$ <p>E1 = Reference accuracy E2 = Temperature effect</p> <p>Calculation of E2:</p> <p>Temperature effect per <math>\pm 28</math> °C (50 °F) (corresponds to the range from -3 to +53 °C (+27 to +127 °F))</p> $E2 = E2_M + E2_E$ <p>E2<sub>M</sub> = Main temperature error E2<sub>E</sub> = Electronics error</p> <p>The values refer to the calibrated span.</p>

### Calculation of the total performance with the Endress+Hauser Applicator

Detailed measured errors, such as for other temperature ranges or the high-temperature version of the measuring device, for example, can be calculated with the Applicator "[Sizing Pressure Performance](#)".



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### Reference accuracy [E1]

Reference accuracy comprises the non-linearity [IEC 62828-1/DIN EN 61298-2] including the hysteresis [IEC 62828-1/DIN EN 61298-2] and the non-repeatability [IEC 62828-1/DIN EN 61298-2] in accordance with the limit point method as per [IEC 62828-1/DIN EN 60770-2]. Reference accuracy for standard up to TD 100:1, for platinum up to TD 5:1.

100 mbar (1.5 psi) sensor

- Standard:  $TD \leq 10:1 = \pm 0.075 \%$ ;  $TD > 10:1 = \pm 0.0075 \% \cdot TD$
- Platinum:  $TD 1:1 = \pm 0.05 \%$ ;  $TD > 1:1 = \pm 0.075 \%$

250 mbar (3.75 psi) sensor

- Standard:  $TD \leq 10:1 = \pm 0.075 \%$ ;  $TD > 10:1 = \pm 0.0075 \% \cdot TD$
- Platinum:  $TD \geq 1:1 = \pm 0.05 \%$

400 mbar (6 psi) and 1 bar (15 psi) sensor

- Standard:  $TD \leq 10:1 = \pm 0.05 \%$ ;  $TD > 10:1 = \pm 0.005 \% \cdot TD$
- Platinum:  $TD \geq 1:1 = \pm 0.035 \%$

2 bar (30 psi) sensor

- Standard:  $TD \leq 10:1 = \pm 0.05 \%$ ;  $TD > 10:1 = \pm 0.005 \% \cdot TD$
- Platinum:  $TD 1:1 = \pm 0.025 \%$ ;  $TD \geq 1:1 = \pm 0.035 \%$

4 bar (60 psi) sensor

- Standard:  $TD \leq 10:1 = \pm 0.05 \%$ ;  $TD > 10:1 = \pm 0.005 \% \cdot TD$
- Platinum:  $TD \geq 1:1 = \pm 0.025 \%$

10 bar (150 psi) and 40 bar (600 psi) sensor

- Standard:  $TD \leq 10:1 = \pm 0.05 \%$ ;  $TD > 10:1 = \pm 0.005 \% \cdot TD$
- Platinum:  $TD \geq 1:1 = \pm 0.035 \%$

**Temperature effect [E2]**

*E<sub>M</sub> - Main temperature error*

The output changes due to the effect of the ambient temperature [IEC 62828-1/IEC 61298-3] with respect to the reference temperature [IEC 62828-1/DIN 16086]. The values specify the maximum error due to min./max. ambient or process temperature conditions.

100 mbar (1.5 psi), 250 mbar (3.75 psi) and 400 mbar (6 psi) sensor

- Standard:  $\pm (0.07 \% \cdot TD + 0.038 \%)$
- Platinum:  $\pm (0.07 \% \cdot TD + 0.038 \%)$

1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi) and 40 bar (600 psi) sensor

- Standard:  $\pm (0.065 \% \cdot TD + 0.02 \%)$
- Platinum:  $\pm (0.065 \% \cdot TD + 0.02 \%)$

*E<sub>E</sub> - Electronics error*

- Analog output (4 to 20 mA): 0.05 %
- Digital output (HART/PA/FF): 0 %

**Resolution**

Current output: 1  $\mu$ A

**Total error**

The total error of the measuring device comprises the total performance and the influence of long-term stability and is calculated using the following formula:

Total error = total performance + long-term stability

**Calculation of the total error with the Endress+Hauser Applicator**

Detailed measured errors, such as for other temperature ranges or the high-temperature version of the measuring device, for example, can be calculated with the Applicator "[Sizing Pressure Performance](#)".



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**Calculation of the diaphragm seal error with the Endress+Hauser Applicator**

Diaphragm seal errors are not taken into consideration. Diaphragm seal errors are calculated separately in the Applicator "[Sizing Diaphragm Seal](#)".



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**Long-term stability**

The specifications refer to the upper range limit (URL).

Gauge pressure sensors

- 1 year: ± 0.05 %
- 5 years: ± 0.08 %
- 10 years: ± 0.10 %

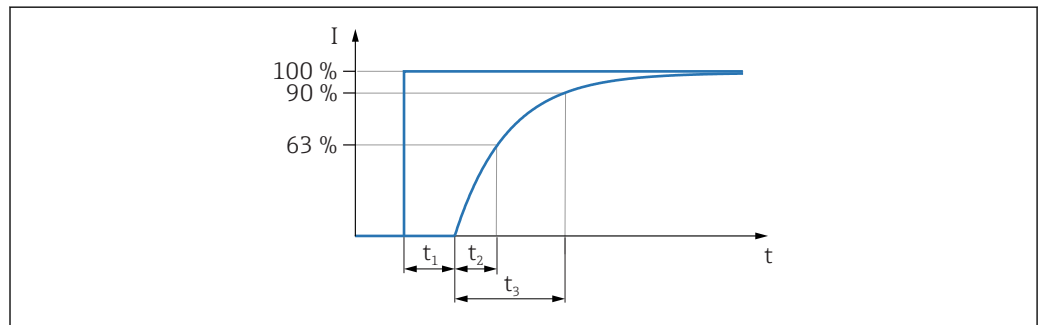
Absolute pressure sensors

- 1 year: ± 0.05 %
- 5 years: ± 0.15 %
- 10 years: ± 0.20 %

**Response time T63 and T90**

**Dead time, time constant**

Presentation of the dead time and the time constant as per DIN 16086:



**Dynamic behavior, current output**

	Dead time ( $t_1$ )	Time constant T63 ( $t_2$ )	Time constant T90 ( $t_3$ )
Max.	90 ms	120 ms	276 ms

**Dynamic behavior, digital output (HART electronics)**

A typical burst rate of 300 ms results in the following behavior:

	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 ( $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 ( $t_3$ )
Min.	250 ms	370 ms	436 ms
Max.	1050 ms	1170 ms	1236 ms

*Reading cycle*

- Acyclic: max. 3/s, typical 1/s (depends on command # and number of preambles)
- Cyclic (burst): max. 3/s, typical 2/s

The device commands the BURST MODE function for cyclic value transmission via the HART communication protocol.

*Cycle time (update time)*

Cyclic (burst): min. 300 ms

**Dynamic behavior, PROFIBUS PA**

A typical PLC cycle time of 1 s results in the following behavior:

	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 ( $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 ( $t_3$ )
Min.	125 ms	245 ms	311 ms
Max.	1325 ms	1445 ms	1511 ms



*Reading cycle (PLC)*

- Acyclic: typically 25/s
- Cyclic: typically 30/s (dependent on the number and type of function blocks used in a closed-control loop)

*Cycle time (update time)*

Min. 200 ms

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. A new measured value can be determined up to five times a second.

**Dynamic behavior, FOUNDATION Fieldbus**

A typical configuration for the macro cycle time (host system) of 1 s results in the following behavior:

	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 ( $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 ( $t_3$ )
Min.	135 ms	255 ms	321 ms
Max.	1135 ms	1255 ms	1321 ms

*Reading cycle*

- Acyclic: typically 10/s
- Cyclic: max. 10/s (dependent on the number and type of function blocks used in a closed-control loop)


*Cycle time (update time)*

Cyclic: min. 100 ms

**Installation factors**

**Influence of installation position**

≤ 0.18 mbar (0.003 psi). Device rotated 180°, process connection pointing upwards.

 A position-dependent zero point shift can be corrected. Please refer to the "Commissioning → Position adjustment" section of the Operating Instructions.

Different tightening torques (e.g. for Clamp or Varivent connections) can merely cause a shift in the zero point. This effect is corrected by position adjustment during commissioning.

**Warm-up period**

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

## Performance characteristics for measuring devices with metal process isolating diaphragm

### Response time

#### HART

- Acyclic: min. 330 ms, typically 590 ms (depending on command # and number of preambles)
- Cyclic (burst): min. 160 ms, typically 350 ms (depending on command # and number of preambles)

#### PROFIBUS PA

- Acyclic: approx. 60 ms to 70 ms (depending on Min. Slave Interval)
- Cyclic: approx. 10 ms to 13 ms (depending on Min. Slave Interval)

#### FOUNDATION Fieldbus

- Acyclic: typically 100 ms (for standard bus parameter settings)
- Cyclic: max. 20 ms (for standard bus parameter settings)

### Reference operating conditions

- As per IEC 62828-2 / IEC 60770
- Ambient temperature  $T_A$  = constant, in the range +21 to +33 °C (+70 to +91 °F)
- Humidity  $\phi$  = constant, in the range: 5 to 80 % RH  $\pm$  5 %
- Ambient pressure  $p_A$  = constant, in the range: 860 to 1 060 mbar (12.47 to 15.37 psi)
- Position of the measuring cell: horizontal  $\pm$ 1°
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Zero based span
- Membrane material PMP71/PMP75: AISI 316L (1.4435) or Alloy C
- Filling oil PMP71/PMP75: silicone oil
- Supply voltage: 24 V DC  $\pm$ 3 V DC
- Load with HART: 250  $\Omega$
- Turn down (TD) =  $URL / |URV - LRV|$

### Maximum measured error (total performance)

The performance characteristics refer to the accuracy of the measuring device. The factors influencing accuracy can be divided into two groups

- Total performance of measuring device
- Installation factors

All performance characteristics are in conformance with  $\geq \pm 3$  sigma.

The total performance of the measuring device comprises the reference accuracy and the ambient temperature effect and is calculated using the following formula:

$$\text{Total performance} = \pm \sqrt{(E1)^2 + (E2)^2}$$

E1 = Reference accuracy

E2 = Ambient temperature effect

Calculation of E2:

Ambient temperature effect per  $\pm 28$  °C (50 °F)

(corresponds to the range from -3 to +53 °C (+27 to +127 °F))

$$E2 = E2_M + E2_E$$

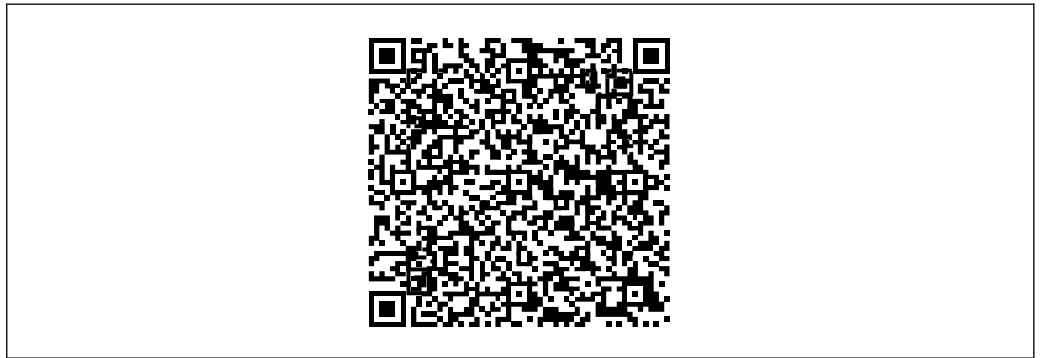
$E2_M$  = Main temperature error

$E2_E$  = Electronics error

- The values apply for process membrane made of 316L (1.4435)
- The values refer to the calibrated span.

**Calculation of the total performance with the Endress+Hauser Applicator**

Detailed measured errors, such as for other temperature ranges, for example, can be calculated with the Applicator "[Sizing Pressure Performance](#)".



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**Calculation of the diaphragm seal error with the Endress+Hauser Applicator**

Diaphragm seal errors are not taken into consideration. Diaphragm seal errors are calculated separately in the Applicator "[Sizing Diaphragm Seal](#)".



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**Reference accuracy [E1]**

Reference accuracy comprises the non-linearity [IEC 62828-1/DIN EN 61298-2] including the hysteresis [IEC 62828-1/DIN EN 61298-2] and the non-repeatability [IEC 62828-1/DIN EN 61298-2] in accordance with the limit point method as per [IEC 62828-1/DIN EN 60770-2]. Reference accuracy for standard up to TD 100:1, for platinum up to TD 5:1.

*PMP71*

400 mbar (6 psi) sensor

- Standard: TD 1:1 =  $\pm 0.05\%$ ; TD > 1:1 =  $\pm 0.05\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.025\%$ ; TD > 1:1 =  $\pm 0.04\%$

1 bar (15 psi) sensor

- Standard: TD  $\leq 2.5:1$  =  $\pm 0.05\%$ ; TD > 2.5:1 =  $\pm 0.02\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.025\%$ ; TD > 1:1 =  $\pm 0.03\%$

2 bar (30 psi) sensor

- Standard: TD  $\leq 5:1$  =  $\pm 0.05\%$ ; TD > 5:1 =  $\pm 0.01\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.025\%$ ; TD > 1:1 =  $\pm 0.03\%$

4 bar (60 psi), 10 bar (150 psi) and 40 bar (600 psi) sensor

- Standard: TD  $\leq 10:1$  =  $\pm 0.05\%$ ; TD > 10:1 =  $\pm 0.005\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.025\%$ ; TD > 1:1 =  $\pm 0.03\%$

100 bar (1 500 psi) sensor

- Standard: TD  $\leq 10:1$  =  $\pm 0.05\%$ ; TD > 10:1 =  $\pm 0.005\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.035\%$ ; TD > 1:1 =  $\pm 0.04\%$

400 bar (6 000 psi) and 700 bar (10 500 psi) sensor

- Standard: TD  $\leq 5:1$  =  $\pm 0.1\%$ ; TD > 5:1 =  $\pm 0.02\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.065\%$ ; TD > 1:1 =  $\pm 0.09\%$

PMP71 with 1-5V DC:

- 400 mbar (6 psi) to 100 bar (1 500 psi) sensor, multiply values by a factor of 2
- 400 bar (6 000 psi) and 700 bar (10 500 psi) sensor, multiply values by a factor of 1.5

Platinum not for flush-mounted process connections G ½ and M20.

*PMP75*

400 mbar (6 psi) sensor

Standard: TD 1:1 =  $\pm 0.15\%$ ; TD > 1:1 =  $\pm 0.15\% \cdot \text{TD}$

1 bar (15 psi) sensor

Standard: TD  $\leq 2.5:1$  =  $\pm 0.075\%$ ; TD > 2.5:1 =  $\pm 0.03\% \cdot \text{TD}$

2 bar (30 psi) sensor

Standard: TD  $\leq 5:1$  =  $\pm 0.075\%$ ; TD > 5:1 =  $\pm 0.015\% \cdot \text{TD}$

4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) and 100 bar (1 500 psi) sensor

Standard: TD  $\leq 10:1$  =  $\pm 0.075\%$ ; TD > 10:1 =  $\pm 0.0075\% \cdot \text{TD}$

400 bar (6 000 psi) sensor

Standard: TD  $\leq 5:1$  =  $\pm 0.15\%$ ; TD > 5:1 =  $\pm 0.03\% \cdot \text{TD}$

**Temperature effect [E2]**

*E<sub>M</sub> - Main temperature error*

The output changes due to the effect of the ambient temperature [IEC 62828-1/IEC 61298-3] with respect to the reference temperature [IEC 62828-1/DIN 16086]. The values specify the maximum error due to min./max. ambient or process temperature conditions.

400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi) and 4 bar (60 psi) sensor  
 $\pm (0.04 \% \cdot TD + 0.08 \%)$

10 bar (150 psi) and 40 bar (600 psi) sensor  
 $\pm (0.03 \% \cdot TD + 0.03 \%)$

100 bar (1 500 psi), 400 bar (6 000 psi) and 700 bar (10 500 psi) sensor  
 $\pm (0.015 \% \cdot TD + 0.06 \%)$

*E<sub>E</sub> - Electronics error*

- Analog output (4 to 20 mA): 0.05 %
- Digital output (HART/PA/FF): 0 %
- PMP71 with 1-5V DC: 0.18 %

The additional electronics error that occurs in the temperature range -50 to -41 °C (-58 to -42 °F) is covered by E<sub>LT</sub>.

*E<sub>LT</sub> - Low temperature error*

The specifications refer to the calibrated span.

- -40 to +85 °C (-40 to +185 °F): 0 %
- -50 to -41 °C (-58 to -42 °F): 1.5 %

**Resolution**

Current output: 1 µA  
 Voltage output: 1 mW

**Total error**

The total error of the measuring device comprises the total performance and the influence of long-term stability and is calculated using the following formula:

Total error = total performance + long-term stability

**Calculation of the total error with the Endress+Hauser Applicator**

Detailed measured errors, such as for other temperature ranges, for example, can be calculated with the Applicator "[Sizing Pressure Performance](#)".



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**Calculation of the diaphragm seal error with the Endress+Hauser Applicator**

Diaphragm seal errors are not taken into consideration. Diaphragm seal errors are calculated separately in the Applicator "[Sizing Diaphragm Seal](#)".



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**Long-term stability**

The specifications refer to the upper range limit (URL).

2 bar (30 psi) sensor

- 1 year: ± 0.07 %
- 5 years: ± 0.12 %
- 10 years: ± 0.15 %

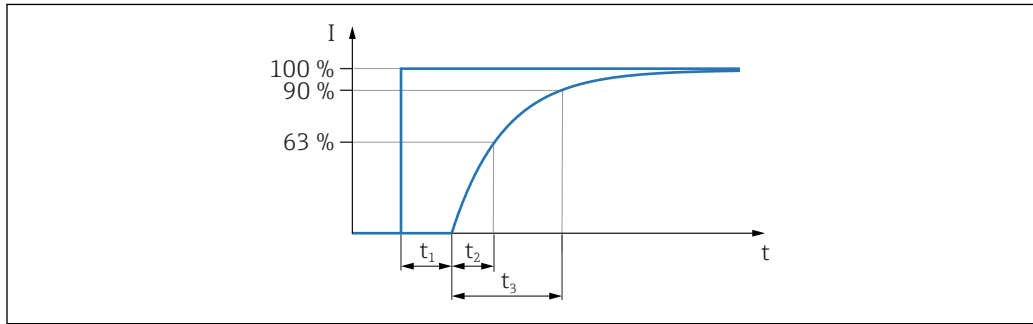
All other sensors

- 1 year: ± 0.05 %
- 5 years: ± 0.07 %
- 10 years: ± 0.10 %

**Response time T63 and T90**

**Dead time, time constant**

Presentation of the dead time and the time constant as per DIN 16086:



A0019786

**Dynamic behavior, current output**

Type		Sensor	Dead time ( $t_1$ )	Time constant T63 ( $t_2$ )	Time constant T90 ( $t_3$ )
PMP71	Max.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	45 ms	<ul style="list-style-type: none"> <li>▪ 70 ms</li> <li>▪ 35 ms</li> </ul>	<ul style="list-style-type: none"> <li>▪ 161 ms</li> <li>▪ 81 ms</li> </ul>
PMP75	Max.	PMP71 + influence of the diaphragm seal			

**Dynamic behavior, digital output (HART electronics)**

A typical burst rate of 300 ms results in the following behavior:

Type		Sensor	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 ( $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 ( $t_3$ )
PMP71	Min.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	205 ms	<ul style="list-style-type: none"> <li>▪ 275 ms</li> <li>▪ 240 ms</li> </ul>	<ul style="list-style-type: none"> <li>▪ 321 ms</li> <li>▪ 241 ms</li> </ul>
	Max.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	1005 ms	<ul style="list-style-type: none"> <li>▪ 1075 ms</li> <li>▪ 1040 ms</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1121 ms</li> <li>▪ 1041 ms</li> </ul>
PMP75	Max.	PMP71 + influence of the diaphragm seal			

*Reading cycle*

- Acyclic: max. 3/s, typical 1/s (depends on command # and number of preambles)
- Cyclic (burst): max. 3/s, typical 2/s

The device commands the BURST MODE function for cyclic value transmission via the HART communication protocol.

*Cycle time (update time)*

Cyclic (burst): min. 300 ms

**Dynamic behavior 1-5V DC**

Type		Sensor	Dead time (t <sub>1</sub> )	Time constant T63 (t <sub>2</sub> )	Time constant T90 (t <sub>3</sub> )
PMP71	Max.	All	40 ms	70 ms	180 ms

**Dynamic behavior, PROFIBUS PA**

A typical PLC cycle time of 1 s results in the following behavior:

Type		Sensor	Dead time (t <sub>1</sub> )	Dead time (t <sub>1</sub> ) + Time constant T63 (t <sub>2</sub> )	Dead time (t <sub>1</sub> ) + Time constant T90 (t <sub>3</sub> )
PMP71	Min.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	80 ms	<ul style="list-style-type: none"> <li>▪ 150 ms</li> <li>▪ 115 ms</li> </ul>	<ul style="list-style-type: none"> <li>▪ 196 ms</li> <li>▪ 116 ms</li> </ul>
	Max.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	1280 ms	<ul style="list-style-type: none"> <li>▪ 1350 ms</li> <li>▪ 1315 ms</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1396 ms</li> <li>▪ 1316 ms</li> </ul>
PMP75	Max.	PMP71 + influence of the diaphragm seal			

*Reading cycle (PLC)*

- Acyclic: typically 25/s
- Cyclic: typically 30/s (dependent on the number and type of function blocks used in a closed-control loop)

*Cycle time (update time)*

Min. 200 ms

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. A new measured value can be determined up to five times a second.

**Dynamic behavior, FOUNDATION Fieldbus**

A typical configuration for the macro cycle time (host system) of 1 s results in the following behavior:

Type		Sensor	Dead time (t <sub>1</sub> )	Dead time (t <sub>1</sub> ) + Time constant T63 (t <sub>2</sub> )	Dead time (t <sub>1</sub> ) + Time constant T90 (t <sub>3</sub> )
PMP71	Min.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	90	<ul style="list-style-type: none"> <li>▪ 160</li> <li>▪ 125</li> </ul>	<ul style="list-style-type: none"> <li>▪ 206</li> <li>▪ 126</li> </ul>
	Max.	<ul style="list-style-type: none"> <li>▪ 400 mbar (6 psi)</li> <li>▪ ≥1 bar (15 psi)</li> </ul>	1090	<ul style="list-style-type: none"> <li>▪ 1160</li> <li>▪ 1125</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1206</li> <li>▪ 1126</li> </ul>
PMP75	Max.	PMP71 + influence of the diaphragm seal			

*Reading cycle*

- Acyclic: typically 10/s
- Cyclic: max. 10/s (dependent on the number and type of function blocks used in a closed-control loop)

Cycle time (update time)

Cyclic: min. 100 ms

---

**Installation factors****Influence of installation position**

PMP71: Device rotated 180°, process connection pointing upwards. The value is doubled for devices with inert oil.

- Process connection thread G 1 A, G 1 ½, G 2, 1 ½ MNPT, 2 MNPT, M 44x1.25, EN/DIN, ASME and JIS flanges: ≤ 10 mbar (0.15 psi).
- Process connection thread: G ½, ½ MNPT, JIS G ½, JIS R ½, M20x1.5: ≤ 4 mbar (0.06 psi).



A position-dependent zero point shift can be corrected. Please refer to the "Commissioning → Position adjustment" section of the Operating Instructions.

Different tightening torques (e.g. for Clamp or Varivent connections) can merely cause a shift in the zero point. This effect is corrected by position adjustment during commissioning.




**Warm-up period**

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



## Installation

### General installation instructions

- For PMP75: →  115 "Installation instructions" section.
- A position-dependent zero point shift can be corrected directly at the device via operating keys, and also in hazardous areas in the case of devices with external operation. Diaphragm seals also shift the zero point, depending on the installation position →  115.
- The device housing can be rotated up to 380°.
- Endress+Hauser offers a mounting bracket for installing the device on pipes or walls →  42.
- Use flushing rings for flange and cell diaphragm seals if buildup or clogging can be expected at the diaphragm seal connection. The flushing ring can be fitted between the process connection and diaphragm seal. Material buildup in front of the process isolating diaphragm can be flushed away, and the pressure chamber vented, via the two lateral flushing holes.
- When measuring in media containing solids, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.
- Point the cable and connector downwards where possible to prevent moisture from entering (e.g. rain or condensation water).

### Measuring arrangement for devices without diaphragm seals – PMC71, PMP71

Cerabar S devices without diaphragm seals are mounted in accordance with the same guidelines as a manometer (DIN EN 837-2). We recommend the use of shutoff devices and siphons. The orientation depends on the measuring application.

#### Pressure measurement in gases

Mount the Cerabar S with shutoff device above the tapping point so that any condensate can flow into the process.

#### Pressure measurement in vapors

Use siphons for pressure measurement in steam. The siphon reduces the temperature to almost ambient temperature. Fill the siphon with liquid before commissioning. Preferably mount the Cerabar S with the siphon below the tapping point.

Advantages:

- defined water column only causes minimal/negligible measured errors
- only minimal/negligible thermal effects on the device

Mounting above the tapping point is also possible. Observe the max. permitted ambient temperature of the transmitter!

#### Pressure measurement in liquids

Mount the Cerabar S with shutoff device below or at the same level as the tapping point.

#### Level measurement

- Mount the Cerabar S below the lowest measuring point.
- Do not install the device in the following positions: In the filling curtain, in the tank outlet or at a point in the vessel 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 downstream from a shutoff device.

### Measuring arrangement for devices with diaphragm seals – PMP75

→  115

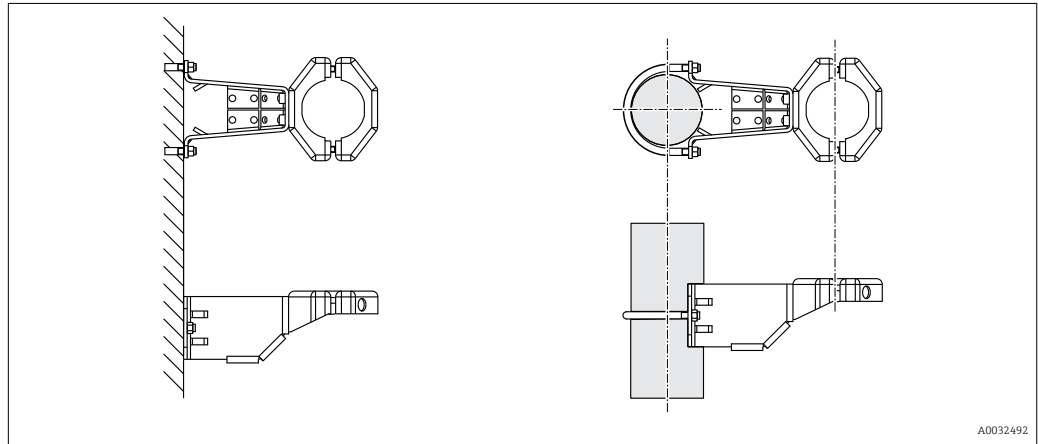
### Orientation

The orientation may cause a zero point shift.

This position-dependent zero point shift can be corrected directly at the device via the operating key, and also in hazardous areas in the case of devices with external operation (position adjustment).

**Wall and pipe mounting, transmitter (optional)**

Endress+Hauser offers the following mounting bracket for installing the device on pipes or walls:

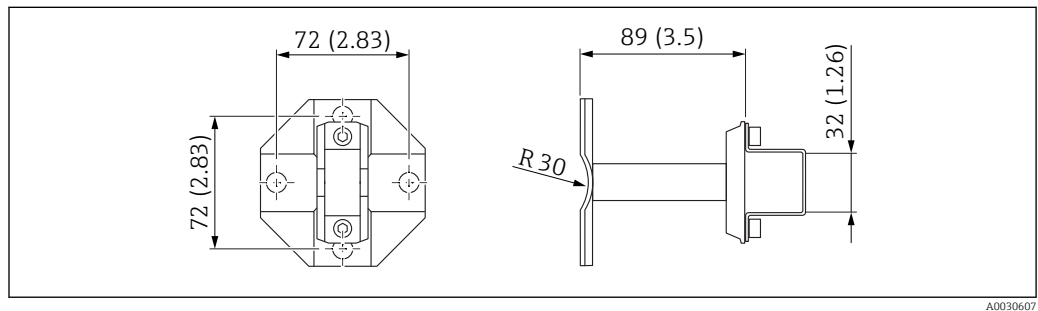


Ordering information:

- Product Configurator, order code for "Accessories enclosed", option "PA"
- For devices with separate housing (can be ordered using the order code for "Additional options 2") included in the scope of delivery
- Can be ordered as a separate accessory (part no.: 71102216).

For further details, see → 98.

**Wall and pipe mounting, valve manifold (optional)**



For the technical data (such as the dimensions or order numbers for screws), see the document SD01553P/00/EN.

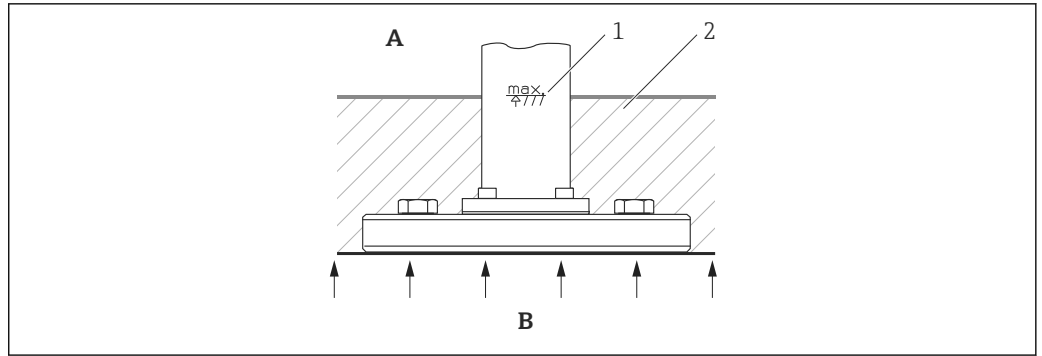
Ordering information:

Product Configurator, order code for "Accessories enclosed", option "PK"

**Heat insulation – PMC71 high-temperature version**

The PMC71 high-temperature version must only be insulated up to a certain height. The maximum permitted insulation height is indicated on the devices and applies to an insulation material with a heat conductivity  $\leq 0.04 \text{ W}/(\text{m} \times \text{K})$  and to the maximum permitted ambient and process temperature (see table below). The data were determined under the most critical application "quiescent air".

The data were determined under the most critical application "quiescent air".



A0021075

- A Ambient temperature range
- B Process temperature
- 1 Insulation height
- 2 Insulation material

	Temperature
Ambient temperature range	$\leq 70\text{ }^{\circ}\text{C}$ (158 °F)
Process temperature	$\leq 150\text{ }^{\circ}\text{C}$ (302 °F)

**Mounting of PVDF screw-in fittings**

**⚠ WARNING**

**Risk of damage to process connection!**

Risk of injury!

- ▶ PVDF process connections with threaded connections must be installed with the enclosed mounting bracket!

The mounting bracket can be installed on pipes with a diameter of 1¼" to 2" or on walls.

Dimensions → 📄 52.

**"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 version facilitates trouble-free 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 and
- If the measuring point is exposed to vibrations.

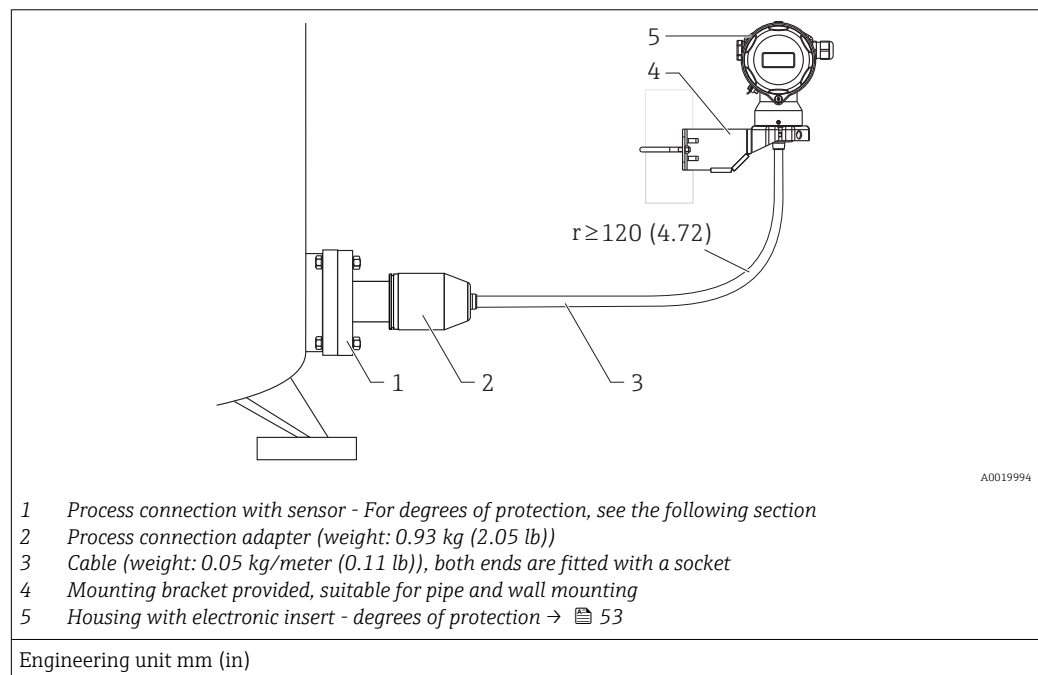
You can choose between different cable versions:

- PE: 2 m (6.6 ft), 5 m (16 ft) and 10 m (33 ft)
- FEP: 5 m (16 ft).

Ordering information: Product Configurator, order code for "Additional options 2", version "G".

Dimensions →  98

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.



Degree of protection for the process connection and sensor with the use of

- FEP cable:
  - IP 69<sup>1)</sup>
  - IP 66 NEMA 4/6P
  - IP 68 (1.83 mH<sub>2</sub>O for 24 h) NEMA 4/6P
- PE cable:
  - IP 66 NEMA 4/6P
  - IP 68 (1.83 mH<sub>2</sub>O for 24 h) NEMA 4/6P

Technical data of the PE and FEP cable:

- Minimum bending radius: 120 mm (4.72 in)
- Cable extraction force: max. 450 N (101.16 lbf)
- Resistance to UV light

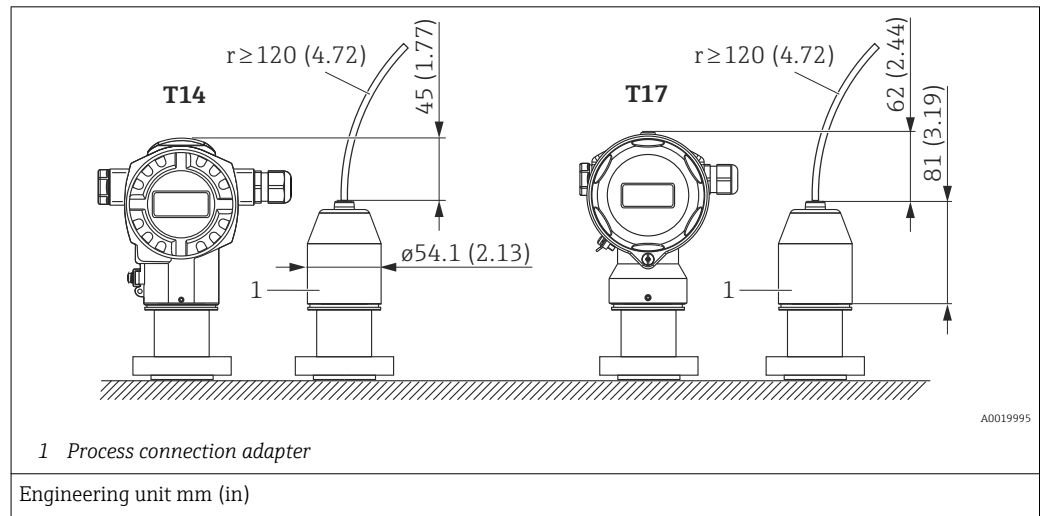
Use in hazardous area:

- Intrinsically safe installations (Ex ia/IS)
- FM/CSA IS: for Div. 1 installation only

1) Designation of the IP protection class according to DIN EN 60529. Previous designation "IP69K" according to DIN 40050 Part 9 is no longer valid (standard withdrawn on November 1, 2012). The tests required by both standards are identical.

**Reduction of the installation height**

If the separate housing is used, the installation height of the process connection is reduced compared to the dimensions of the standard version.

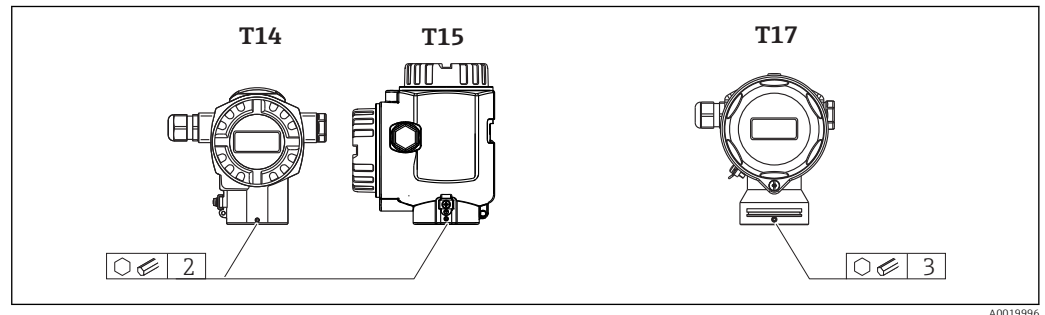


**Turning the housing**

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

**Your benefits**

- Easy mounting due to optimum alignment of housing
- Good, accessible device operation
- Optimum readability of the onsite display (optional).



## Environment

### Ambient temperature range

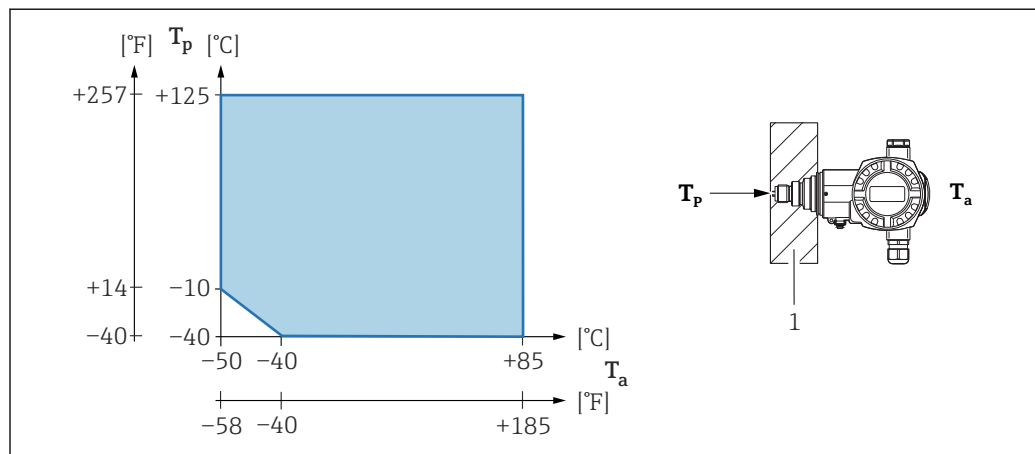
Version	PMC71 High-temperature version	PMC71	PMP71	PMP75
Without LCD display	-20 to +70 °C (-4 to +158 °F)	-40 to +85 °C (-40 to +185 °F)	-50 to +85 °C (-58 to +185 °F) <sup>1)</sup> -60 to +85 °C (-76 to +185 °F) <sup>2)</sup>	
With LCD display <sup>3)</sup>		-20 to +70 °C (-4 to +158 °F)		
With M12 plug, elbowed		-25 to +85 °C (-13 to +185 °F)		
With separate housing	—	-20 to +60 °C (-4 to +140 °F)		—
Diaphragm seal systems <sup>4)</sup>	—	—	—	→ ☰ 116
MID parts certificate	—	—	-25 to +55 °C (-13 to +131 °F)	—

- 1) If the temperature is below -40 °C (-40 °F), the chance of failure increases. Product Configurator, order code for "Test, Certificate" option "JN".
- 2) If the temperature is below -40 °C (-40 °F), the chance of failure increases. Product Configurator, order code for "Test, Certificate" option "JT".
- 3) Extended temperature application range (-50 to +85 °C (-58 to +185 °F)) with restrictions in optical properties, such as display speed and contrast
- 4) Ambient temperature range and process temperature range are mutually dependent - see "Heat insulation" section → ☰ 116

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 using a PMP75 with a capillary. If a PMP75 with a temperature isolator or capillary is used, we recommend a suitable bracket for mounting (see "Wall and pipe mounting" section → ☰ 42).

### PMP71: Ambient temperature $T_a$ depending on the process temperature $T_p$

The process connection must be fully insulated for ambient temperatures below -40 °C (-40 °F).



1 Insulation material

A0039403

**Hazardous area**

- For devices for use in hazardous areas, see Safety Instructions, Installation or Control Drawing → 130.
- Pressure measuring devices that have the usual explosion protection certificates (e.g. ATEX-/ CSA-/ FM-/ IEC Ex,...) can be used in hazardous areas at ambient temperatures down to -50 °C (-58 °F) (order code for "Test, Certificate" option "JN"). The functionality of the explosion protection is also guaranteed for ambient temperatures down to -50 °C (-58 °F).
- Pressure measuring devices that have the usual explosion protection certificates (e.g. ATEX-/ IEC Ex, etc.) can be used in hazardous areas at ambient temperatures down to -60 to +85 °C (-76 to +185 °F) (order code for "Test, Certificate" option "JT"). The functionality of the explosion protection is also guaranteed for ambient temperatures down to -50 °C (-58 °F). At temperatures ≤ -50 °C (-58 °F), explosion protection is guaranteed by the housing in the case of flameproof enclosure (Ex d) type of protection. The functionality of the transmitter cannot be fully guaranteed.

**Storage temperature range**

- -40 to +90 °C (-40 to +194 °F)  
Option -50 to +90 °C (-58 to +194 °F) order code 580 "Test, Certificate" option "JN". If the temperature is below -40 °C (-40 °F), the probability of a failure increases.  
Option -60 to +90 °C (-76 to +194 °F) order code 580 "Test, Certificate" option "JT". If the temperature is below -40 °C (-40 °F), the probability of a failure increases.
- Local display: -40 to +85 °C (-40 to +185 °F)
- Separate housing: -40 to +60 °C (-40 to +140 °F)
- Devices with PVC-armored capillary: -25 to +80 °C (-13 to +176 °F)

**Degree of protection**

- Depends on the deployed
- housing: → 53
  - separate housing: → 98

**Climate class**

Class 4K4H (air temperature: -20 to +55 °C (-4 to +131 °F), relative humidity: 4 to 100 %) fulfilled as per DIN EN 60721-3-4 (condensation possible. With PMC71, avoid condensate in the device.)

**Electromagnetic compatibility**

- Electromagnetic compatibility as per EN 61326 and NAMUR recommendation EMC (NE21).
- With enhanced immunity against electromagnetic fields as per EN 61000-4-3: 30 V/m with closed cover (for devices with T14 housing)  
Increased interference immunity with 30 V/m not available for 1-5V DC. EMC interference immunity for 1-5V DC: 10 V/m
- Maximum deviation: < 0.5 % of span
- All EMC measurements were performed with a turn down (TD) = 2:1.
- Class E3 as per OIML R75-2

For further details refer to the Declaration of Conformity.

**Vibration resistance**

Device/accessory	Test standard	Vibration resistance
PMC71 <sup>1)</sup>	GL	Guaranteed for 3 to 25 Hz: ±1.6 mm (0.063 in); 25 to 100 Hz: 4 g in all 3 axes
PMP71		
PMP75 <sup>2) 3)</sup>		
With mounting bracket	IEC 62828-1 / IEC 61298-3	Guaranteed for 10 to 60 Hz: ±0.15 mm (0.0059 in); 60 to 500 Hz: 2 g in all 3 axes
PMP71 with MID parts certificate	OIML R117-1	Class M3

- 1) Not for high-temperature version with Ex d[ia], CSA XP or FM XP
- 2) With aluminum T14 housing only
- 3) For applications with very high temperatures, a PMP75 with either a temperature isolator or 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

**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 requirements.
- Depending on the materials used, a certain maximum temperature and a maximum pressure must not be exceeded for oxygen applications.

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

HB = Cleaned for oxygen service

Order code for devices <sup>1)</sup> , cleaned for oxygen applications	$p_{\max}$ for oxygen applications	$T_{\max}$ for oxygen applications
PMC71 - * * * * * 2 * * or PMC71 - * * * * * A * * HB, Devices with sensors, nominal value < 10 bar (150 psi)	Over pressure limit (OPL) <sup>2) 3)</sup> of sensor	60 °C (140 °F)
PMC71 - * * * * * 2 * *, PMC71 - * * * * * A * * HB, Devices with sensors, nominal value ≥ 10 bar (150 psi)	40 bar (600 psi)	60 °C (140 °F)
PMP71 - * * * * * N * * or PMP71 - * * * * * F * * HB	Depends on the lowest-rated element, with regard to pressure, of the selected components: over pressure limit (OPL) of the sensor, process connection (1.5 x PN) or fill fluid (80 bar (1 200 psi))	60 °C (140 °F)
PMP75 - * * * * * N * * or PMP75 - * * * * * F * * HB	Depends on the lowest-rated element, with regard to pressure, of the selected components: over pressure limit (OPL) of the sensor, process connection (1.5 x PN) or fill fluid (80 bar (1 200 psi))	60 °C (140 °F)

1) Devices only, not accessories or enclosed accessories.

2) Product Configurator, order code for "Sensor range; sensor over pressure limit (= OPL)"

3) PMC71 with PVDF threaded connection or PVDF flange: Only mount with the enclosed mounting bracket. MWP 10 bar (150 psi), OPL max. 15 bar (225 psi). Process temperature range -10 to +60 °C (+14 to +140 °F)

**PWIS-free applications**

Special cleaning of the transmitter to remove paint-wetting substances, for use in paint shops, for instance.

Ordering information:

Product Configurator, order code for "Seal", option "L" or "M".

**Ultrapure gas applications**

Endress+Hauser also offers devices for special applications, such as ultrapure gas, cleaned from oil and grease. No special restrictions regarding the process conditions apply to these devices.

Ordering information:

- Product Configurator, order code for "Seal" or
- Product Configurator, order code for "Fill fluid".

**Hydrogen applications**


A **ceramic** process isolating diaphragm or a **gold-coated** metal process isolating diaphragm offers universal protection against hydrogen diffusion, both in gas applications and in applications with aqueous solutions.

**Applications with hydrogen in aqueous solutions**

A **gold/rhodium-coated** metal process isolating diaphragm (AU/Rh) offers effective protection against hydrogen diffusion.

**Operation in very corrosive environment**

PMP75:

For corrosive environments (e.g. maritime environment / coastal areas), Endress+Hauser recommends the use of a PVC or PTFE armor for the capillaries (→  103).



## Process

**Process temperature limits** For oxygen applications →  48

### PMC71 (with ceramic process isolating diaphragm)

- -25 to +125 °C (-13 to +257 °F)
- High-temperature version: -25 to +150 °C (-13 to +302 °F); Product Configurator, order code for "Additional options 1", version "T".
- For saturated steam applications, use a device with a metal process isolating diaphragm, or provide a siphon for temperature isolation when installing.
- Observe the process temperature range of the seal in the following table.

Seal	Notes	Process temperature range	Option <sup>1)</sup>
FKM Viton	—	-25 to +125 °C (-13 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	A, L
EPDM 70	FDA 21CFR177.2600	-40 to +125 °C (-40 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	B
EPDM 331	FDA 21CFR177.2600; 3A Class II; USP Class VI DVGW (UBA "KTW", W270), NSF61	-20 to +125 °C (-4 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	B <sup>3)</sup>
FFKM Perlast G75LT	—	-20 to +125 °C (-4 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	C
Kalrez, Compound 4079	—	+5 to +125 °C (+41 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	D, M
Chemraz, Compound 505	—	-10 to +125 °C (+14 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	E
HNBR	FDA 21CFR177.2600; 3A Class II; KTW; AFNOR; BAM	-25 to +125 °C (-13 to +257 °F)	F <sup>4)</sup>
NBR	—	-10 to +100 °C (+14 to +212 °F)	F
FKM Viton	FDA 21CFR177.2600	-5 to +125 °C (+23 to +257 °F)	G
FKM Viton	cleaned of oil and grease	-10 to +125 °C (+14 to +257 °F)/ 150 °C (302 °F) <sup>2)</sup>	1
FKM Viton	cleaned for oxygen service	-10 to +60 °C (+14 to +140 °F)	2 or A <sup>5)</sup>

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) Product Configurator, order code for "Seal"
- 2) 150 °C (302 °F) for high-temperature version
- 3) In combination with order code for "Additional options 1" option "F" or with order code for "Process connection" option "MP", "MR", "TD", "TF", "TK" or "TR"
- 4) These seals are used for devices with 3A-approved process connections.
- 5) With option "HB", see Product Configurator, order code for "Service"

### Applications with jumps in temperature

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 jump in temperature and the longer the time interval involved.



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

**PMP71 (with metal process isolating diaphragm)**

Designation	Limits
Process connections with internal process isolating diaphragm	-40 to +125 °C (-40 to +257 °F) (150 °C (302 °F) for max. one hour)
Process connections with flush-mounted process isolating diaphragm <sup>1)</sup>	-40 to +100 °C (-40 to +212 °F)
Process connections with flush-mounted process isolating diaphragm, G ½ A, M20x1.5	-20 to +85 °C (-4 to +185 °F)

1) Process connection thread ISO 228 G ½" A, DIN 3852: supplied seal for process temperature to -20 °C (-4 °F)

**PMP71 (with metal process isolating diaphragm) with MID parts certificate**

-25 to +55 °C (-13 to +131 °F)

**PMP75 (with diaphragm seal)**

- Depending on the design and depending on the diaphragm seal and filling oil: -70 °C (-94 °F) up to +400 °C (+752 °F). Observe temperature application limits of diaphragm seal oil → 115.
- Please observe the maximum gauge pressure and maximum temperature.

*Devices with PTFE-coated process isolating diaphragm*

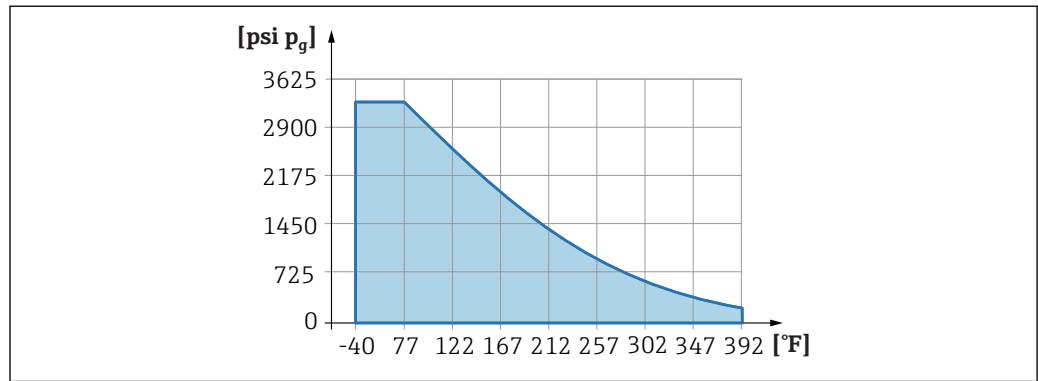
The non-stick coating has excellent gliding properties and is used to protect the process isolating diaphragm against abrasive media.

**NOTICE**

**Incorrect use of the PTFE foil will destroy the device!**

- ▶ The PTFE foil used is designed to protect the unit against abrasion. It does not provide protection against corrosive media.

For the range of application of the 0.25 mm (0.01 in) PTFE foil on an AISI 316L (1.4404/1.4435) process isolating diaphragm, see the following diagram:

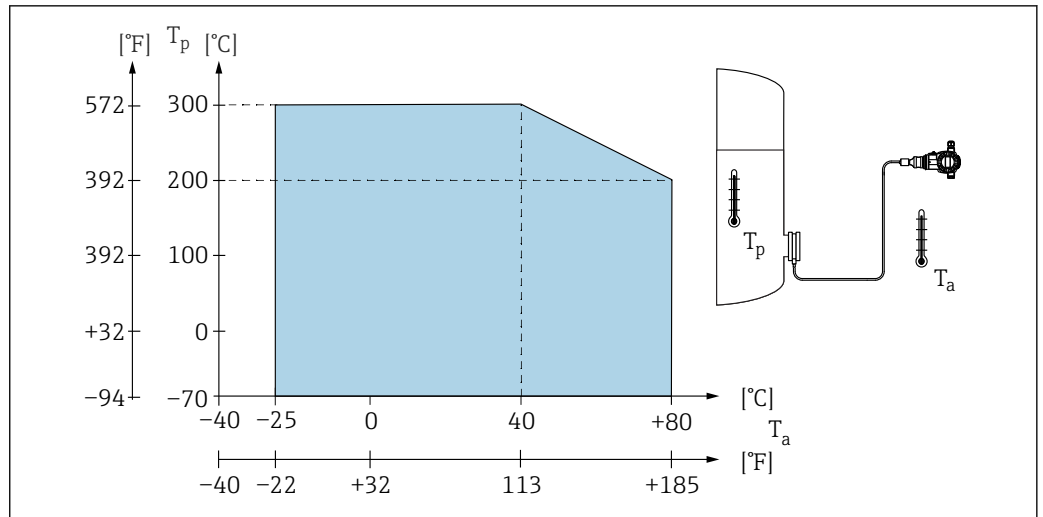


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**i** For vacuum applications: p<sub>abs</sub> ≤ 1 bar (14.5 psi) to 0.05 bar (0.725 psi) up to max. +150 °C (302 °F).

**Process temperature limits of capillary armoring: PMP75**

- 316L: No restrictions
- PTFE: No restrictions
- PVC: See the following diagram



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**Pressure specifications**

**⚠ WARNING**

**The maximum pressure for the measuring device depends on the lowest-rated element with regard to pressure.**

- ▶ For pressure specifications, see the "Measuring range" section and the "Mechanical construction" section.
- ▶ The measuring device must be operated only within the specified limits!
- ▶ MWP (maximum working pressure): The MWP (maximum working pressure) is specified on the nameplate. This value refers to a reference temperature of +20 °C (+68 °F) and may be applied to the device for an unlimited time. Observe the temperature dependency of the MWP. For the pressure values permitted at higher temperatures for flanges, please refer to standards EN 1092-1 (with regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under EN 1092-1; the chemical composition of the two materials can be identical.), ASME B 16.5a, JIS B 2220 (the latest version of the standard applies in each case).
- ▶ The test pressure corresponds to the over pressure limit of the individual sensors (OPL = 1.5 x MWP (formula does not apply to the PMP71 or PMP75 with a 40 bar (600 psi) or 100 bar (1500 psi) measuring cell)) and may be applied only for a limited period of time to prevent any lasting damage.
- ▶ The Pressure Equipment Directive (2014/68/EU) 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 over pressure limit (OPL) of the process 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; MWP = PN)
- ▶ In oxygen applications, the values for  $p_{max}$  and  $T_{max}$  for oxygen applications must not be exceeded → 48.
- ▶ Devices with ceramic process isolating diaphragm: Avoid steam hammering! Steam hammering can cause zero point drifts. Recommendation: Residue (water droplets or condensation) may remain on the process isolating diaphragm following SIP cleaning and can result in local steam hammering the next time steam cleaning takes place. In practice, drying the process isolating diaphragm (e.g. by blowing off excess moisture) has proven to be a successful way of avoiding steam hammering.

**Burst pressure**

Device	Measuring range	Burst pressure
PMP71 <sup>1)</sup>	400 mbar (6 psi)...10 bar (150 psi)	100 bar (1 450 psi)
	40 bar (600 psi)	250 bar (3 625 psi)
	100 bar (1 500 psi)	1 000 bar (14 500 psi)
	400 bar (6 000 psi)	2 000 bar (29 000 psi)
	700 bar (10 500 psi)	2 800 bar (40 600 psi)

1) Excluding PMP75 with mounted diaphragm seal system, PMC71 with ceramic membrane, and the universal adapter process connection.

## Mechanical construction

**i** For the dimensions, see the Product Configurator: [www.endress.com](http://www.endress.com)

Search for product → click "Configuration" to the right of the product image → after configuration click "CAD"

The following dimensions are rounded values. For this reason, they may deviate slightly from the dimensions given on [www.endress.com](http://www.endress.com).

### Device height

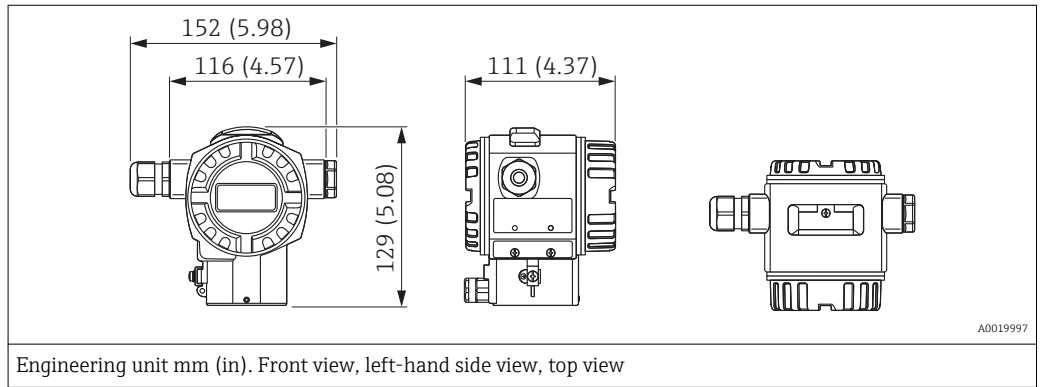
#### The device height is calculated from

- the height of the housing
- the height of optional mounted parts such as temperature isolators or capillaries
- the height of the relevant process connection.

The individual heights of the components can be found in the following sections. To calculate the device height, simply add up the individual heights of the components. If necessary, the installation space (the space used to install the device) must also be taken into account. You can use the following table for this:

Section	Page	Elevation	Example
Height of housing	→ 53 ff.	(A)	
Optional mounted parts	→ 77	(B)	
Process connections	→ 55	(H)	
Installation space	-	(I)	
Device height			

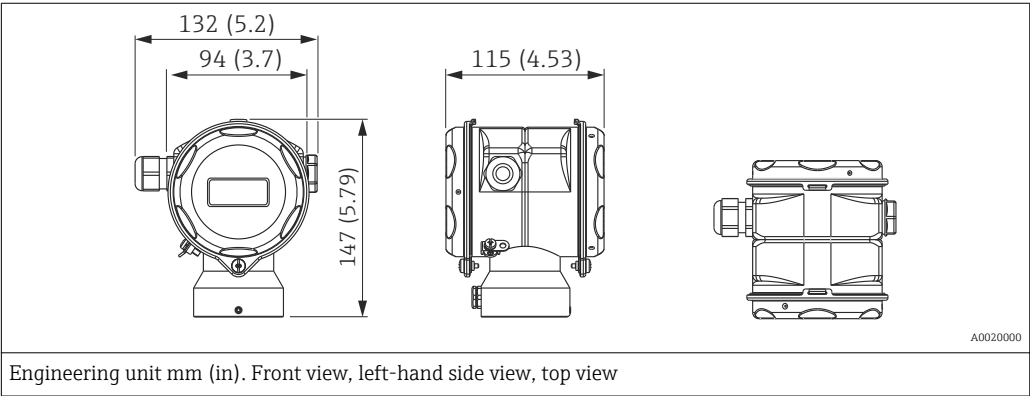
**T14 housing, optional display on the side**



Material		Degree of protection	Cable entry	Weight in kg (lb)		Option <sup>1)</sup>
Housing	Cover seal			with display	without display	
Aluminum	EPDM	IP66/67 NEMA 6P	M20 gland	1.2 (2.65)	1.1 (2.43)	A
		IP66/67 NEMA 6P	G ½" thread			B
		IP66/67 NEMA 6P	NPT ½" thread			C
		IP66/67 NEMA 6P	M12 plug			D
		IP66/67 NEMA 6P	7/8" plug			E
		IP65 NEMA 4	HAN7D plug 90 degrees			F
	FVMQ	IP66/67 NEMA 6P	M20 gland			G
	FVMQ	IP66/67 NEMA 6P	NPT ½" thread			H
316L	EPDM	IP66/67 NEMA 6P	M20 gland	2.1 (4.63)	2.0 (4.41)	1
		IP66/67 NEMA 6P	G ½" thread			2
		IP66/67 NEMA 6P	NPT ½" thread			3
		IP66/67 NEMA 6P	M12 plug			4
		IP66/67 NEMA 6P	7/8" plug			5
		IP65 NEMA 4	HAN7D plug 90 degrees			6
	FVMQ	IP66/67 NEMA 6P	M20 gland			7
	FVMQ	IP66/67 NEMA 6P	NPT ½" thread			8

1) Product Configurator, order code for "Housing, cover seal, cable entry, degree of protection"

T17 housing (hygienic), optional display on the side

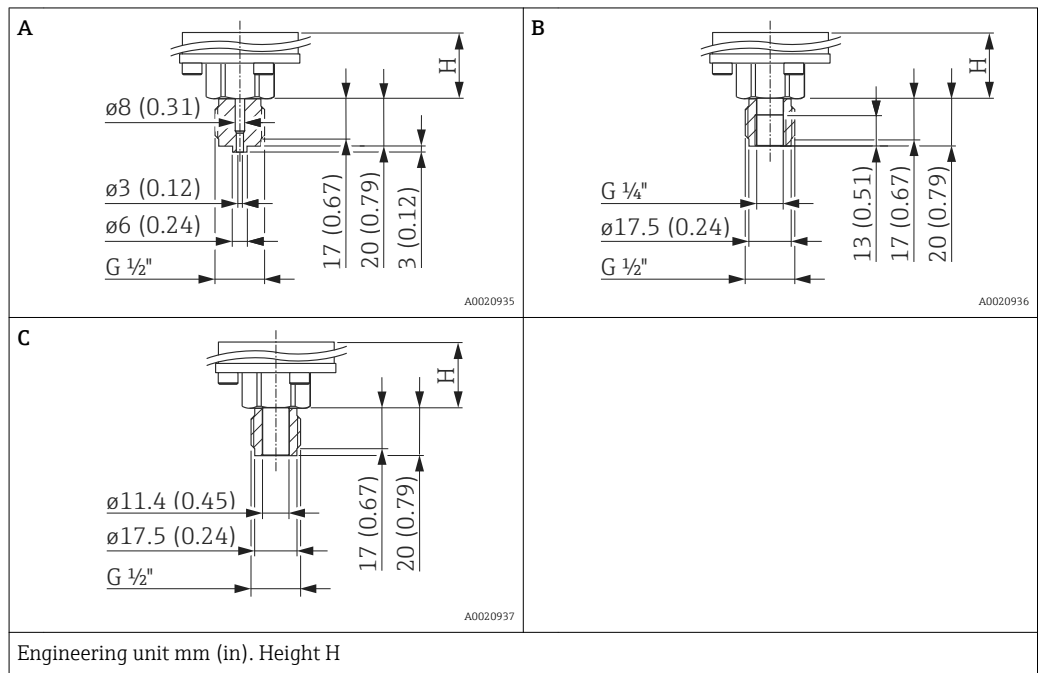


Material		Degree of protection <sup>1)</sup>	Cable entry	Weight in kg (lb)		Option <sup>2)</sup>
Housing	Cover seal			with display	without display	
316L	EPDM	IP66/68 NEMA 6P	M20 gland	1.2 (2.65)	1.1 (2.43)	R
		IP66/68 NEMA 6P	G ½" thread			S
		IP66/68 NEMA 6P	NPT ½" thread			T
		IP66/68 NEMA 6P	M12 plug			U
		IP66/68 NEMA 6P	7/8" plug			V

1) Degree of protection IP 68: 1.83 mH<sub>2</sub>O for 24 h  
 2) Product Configurator, order code for "Housing, cover seal, cable entry, degree of protection"

Process connections for  
PMC71 with internal process  
isolating diaphragm

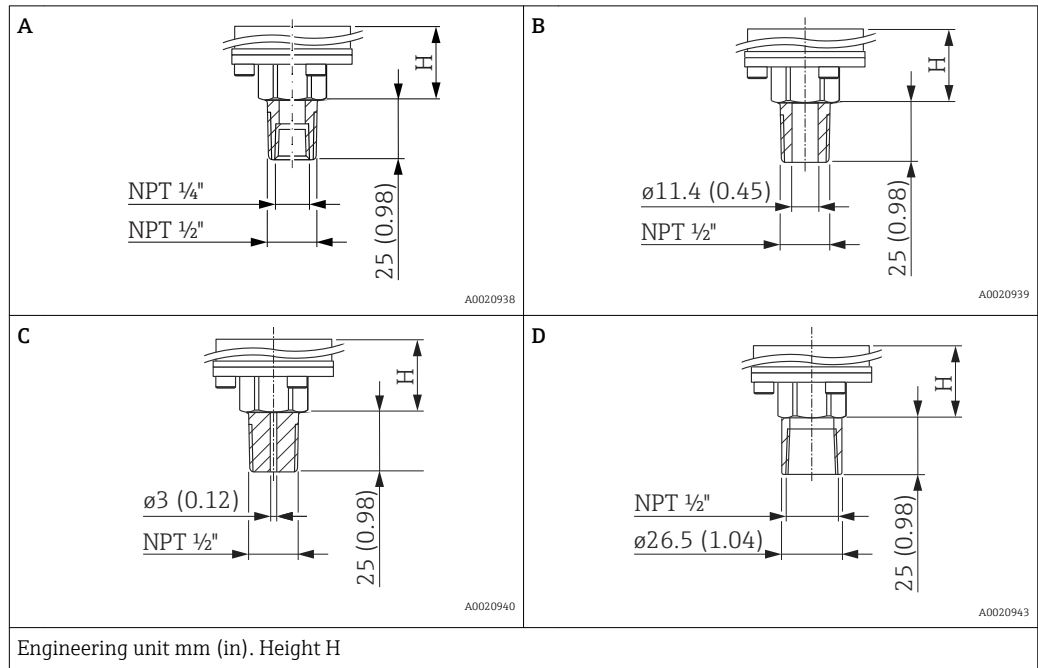
Threaded connection ISO 228 G



Item	Description	Material	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)		
A	Thread ISO 228 G 1/2" A EN 837	AISI 316L	0.63 (1.39)	CRN	GA
		Alloy C276 (2.4819)		CRN	GB
		Monel (2.4360)		-	GC
		<b>PVDF</b> <ul style="list-style-type: none"> <li>■ Only mount with a mounting bracket (included)</li> <li>■ MWP 10 bar (150 psi), OPL max. 15 bar (225 psi)</li> <li>■ Process temperature range: -10 to +60 °C (+14 to +140 °F)</li> </ul>		-	GD
B	Thread ISO 228 G 1/2" A, G 1/4" (internal)	AISI 316L	0.63 (1.39)	CRN	GE
		Alloy C276 (2.4819)		CRN	GF
		Monel (2.4360)		-	GG
C	Thread ISO 228 G 1/2" A, Hole 11.4 mm (0.45 in)	AISI 316L	0.63 (1.39)	CRN	GH
		Alloy C276 (2.4819)		CRN	GJ
		Monel (2.4360)		-	GK

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"

**Threaded connection ANSI**



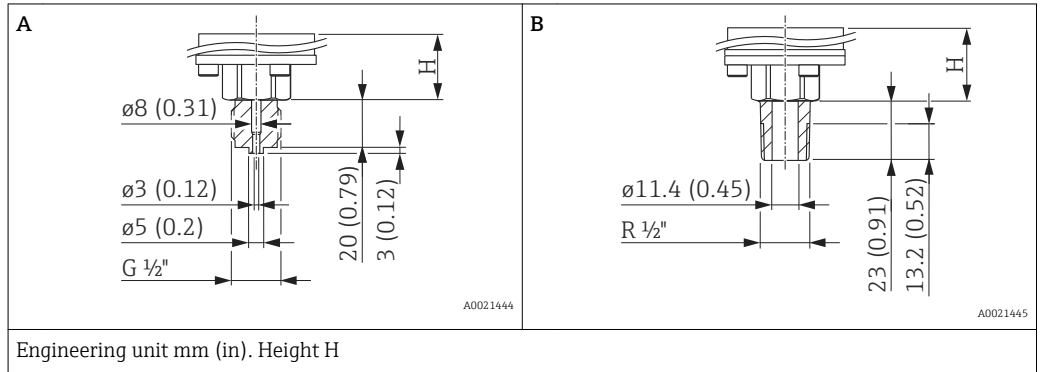
Item	Description	Material	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)		
A	ANSI 1/2" MNPT, 1/4" FNPT	AISI 316L	0.63 (1.39)	CRN	RA
		Alloy C276 (2.4819)		CRN	RB
		Monel (2.4360)		-	RC
B	ANSI 1/2" MNPT, Hole 11.4 mm (0.45 in)	AISI 316L		CRN	RD
		Alloy C276 (2.4819)		CRN	RE
		Monel (2.4360)		-	RF
C	ANSI 1/2" MNPT, Hole 3 mm (0.12 in)	<b>PVDF</b> <ul style="list-style-type: none"> <li>■ Only mount with a mounting bracket (included)</li> <li>■ MWP 10 bar (150 psi), OPL max. 15 bar (225 psi)</li> <li>■ Process temperature range: +10 to +60 °C (+14 to +140 °F)</li> </ul>		-	RG
D	ANSI 1/2" FNPT Hole 11.4 mm (0.45 in)	AISI 316L	CRN	RH	
		Alloy C276 (2.4819)	CRN	RJ	
		Monel (2.4360)	-	RK	

1) CSA approval: Product Configurator, order code for "Approval"  
 2) Product Configurator, order code for "Process connection"



Process connections for  
PMC71 with internal process  
isolating diaphragm

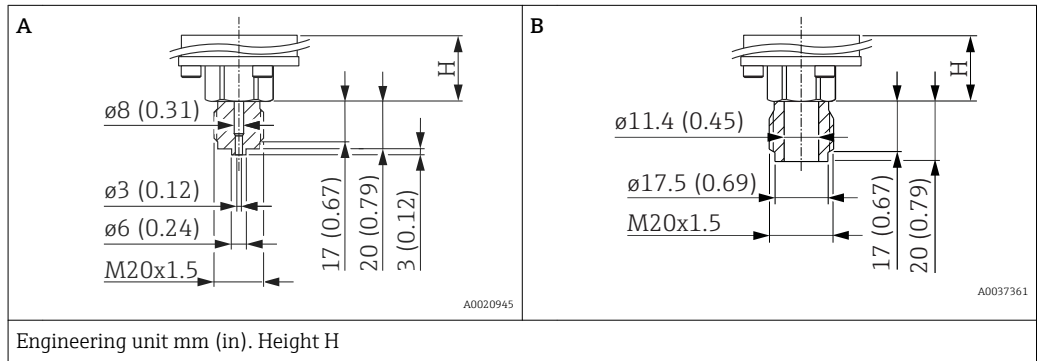
Threaded connection JIS



Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	JIS B0202 G 1/2" (male)	AISI 316L	0.63 (1.39)	GL
B	JIS B0203 R 1/2" (male)			RL

1) Product Configurator, order code for "Process connection"

Threaded connection DIN 13

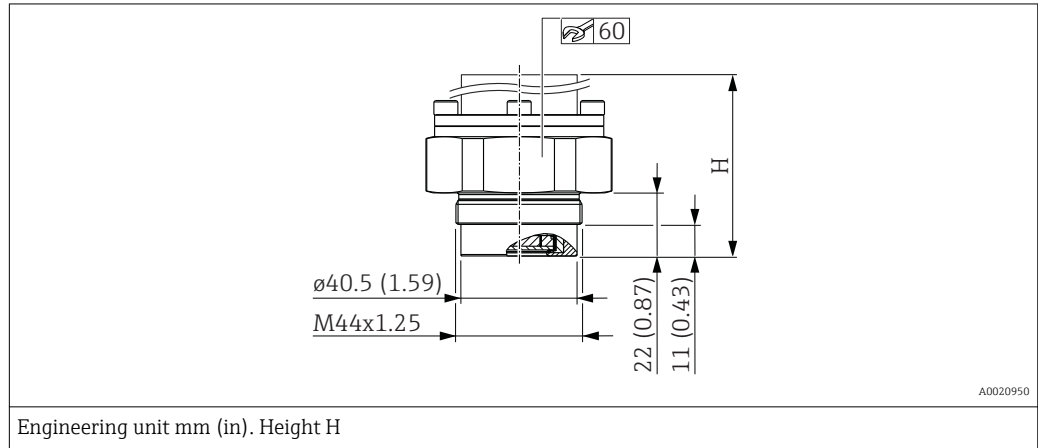


Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	DIN 13 M20 x 1.5, EN 837 3 mm (0.12 in)	AISI 316L	0.63 (1.39)	GP
		Alloy C276 (2.4819)		GQ
B	DIN 13 M20 x 1.5 11.4 mm (0.45 in)	AISI 316L		GR

1) Product Configurator, order code for "Process connection"

Process connections for  
PMC71 with flush-mounted  
process isolating diaphragm

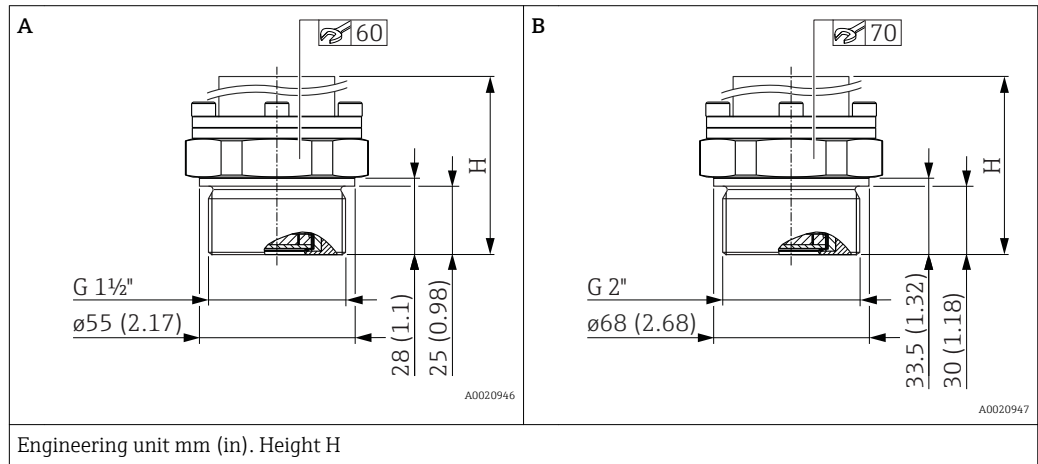
Threaded connection DIN 13



Designation	Material	Weight	Option <sup>1)</sup>
		kg (lb)	
DIN 13 M44 x 1.25	AISI 316L	0.63 (1.39)	1R
	Alloy C276 (2.4819)		1S

1) Product Configurator, order code for "Process connection"

Threaded connection ISO 228 G

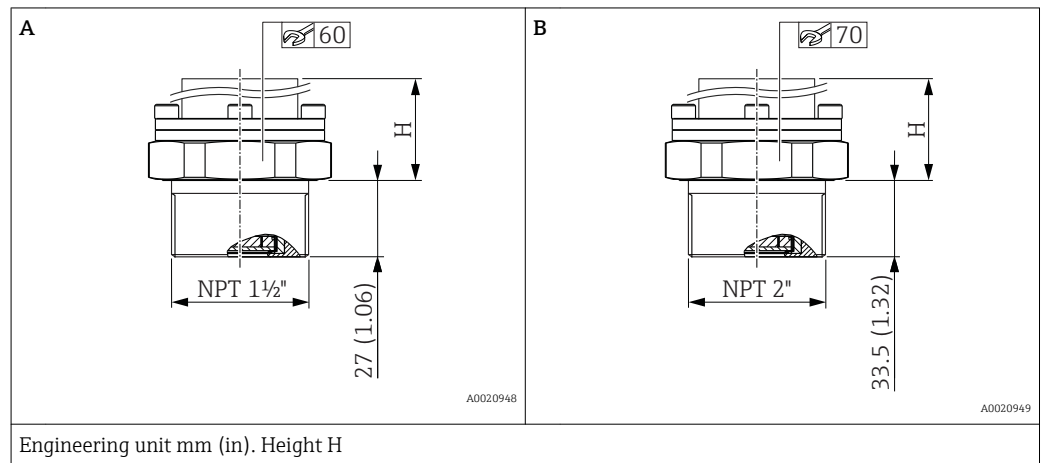


Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	Thread ISO 228 G 1 1/2" A	AISI 316L	0.63 (1.39)	1G
		Alloy C276 (2.4819)		1H
		Monel (2.4360)		1J
B	Thread ISO 228 G 2" A	AISI 316L	0.63 (1.39)	1K
		Alloy C276 (2.4819)		1L
		Monel (2.4360)		1M

1) Product Configurator, order code for "Process connection"

Process connections for  
PMC71 with flush-mounted  
process isolating diaphragm

Threaded connection ANSI



Item	Designation	Material	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)		
A	ANSI 1 1/2" MNPT	AISI 316L (CRN)	0.63 (1.39)	CRN	2D
		Alloy C276 (2.4819) (CRN)		CRN	2E
		Monel (2.4360)		CRN	2F
B	ANSI 2" MNPT	AISI 316L (CRN)		CRN	2G
		Alloy C276 (2.4819) (CRN)		CRN	2H
		Monel (2.4360)		-	2J

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"

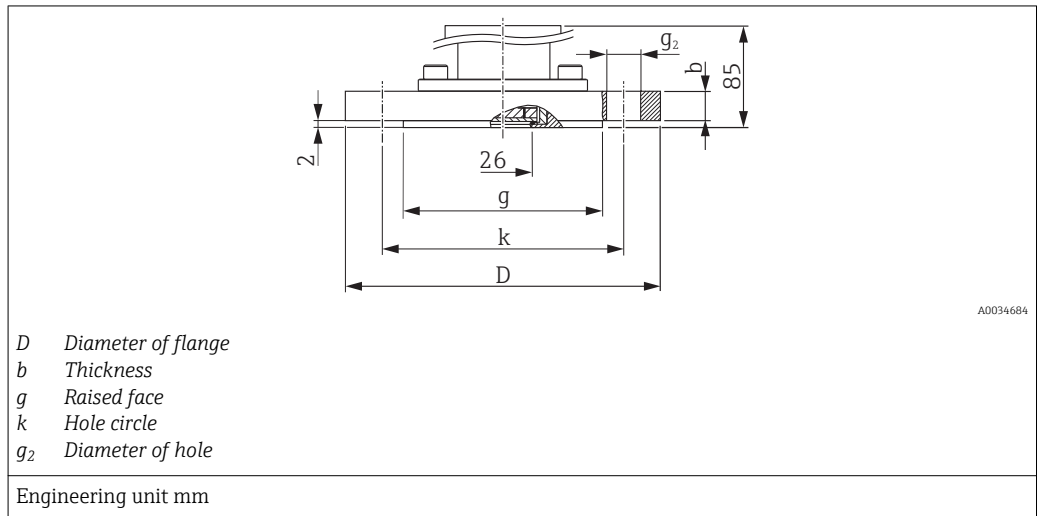
Process connections for  
PMC71 - Height H

Process connection	Height H	
	Standard	Ex d version
FNPT1/2 MNPT1/2 MNPT1/2 FNPT1/4 G1/2 G1/2 M20x1.5 B0202 B0203	28 mm (1.1 in)	94 mm (3.7 in)
MNPT1-1/2 MNPT2 G1-1/2 G2 M44x1.25	59 mm (2.32 in)	125 mm (4.92 in)
Flanges	83 mm (3.27 in)	150 mm (5.91 in)

Process connection	Height H	
	High-temperature version	Ex d version including high-temperature version
FNPT1/2 MNPT1/2 MNPT1/2 FNPT1/4 G1/2 G1/2 M20x1.5 B0202 B0203	107 mm (4.21 in)	173 mm (6.81 in)
MNPT1-1/2 MNPT2 G1-1/2 G2 M44x1.25	59 mm (2.32 in)	125 mm (4.92 in)
Flanges	83 mm (3.27 in)	150 mm (5.91 in)

Process connections for  
PMC71 with flush-mounted  
process isolating diaphragm

EN/DIN flanges, connection dimensions in accordance with EN 1092-1

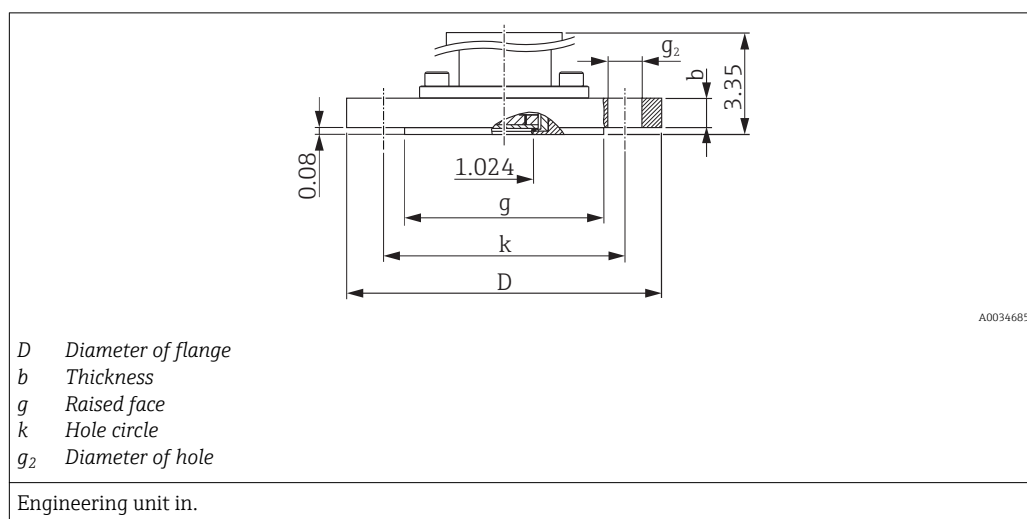


Flange							Boltholes			Weight	Option <sup>1)</sup>
Material	Nominal diameter	Nominal pressure	Shape	D	b	g	Number	g <sub>2</sub>	k		
				mm	mm	mm					kg (lb)
AISI 316L	DN 25	PN 10-40	B1	115	18	68	4	14	85	1.4 (3.09)	BA
AISI 316L	DN 32	PN 10-40	B1	140	18	78	4	18	100	2.0 (4.41)	CP
AISI 316L	DN 40	PN 10-40	B1	150	18	88	4	18	110	2.4 (5.29)	CQ
AISI 316L	DN 50	PN 10-40	B1	165	20	102	4	18	125	3.2 (7.06)	B3
PVDF <sup>2)</sup>	DN 50	PN 10-16	B1	165	21.4	102	4	18	125	0.6 (1.32)	BR
AISI 316L	DN 50	PN 63	B2	180	26	102	4	22	135	4.6 (10.14)	C3
PVDF <sup>2)</sup>	DN 80	PN 10-16	B1	200	21.4	138	8	18	160	1.0 (2.21)	BS
AISI 316L	DN 80	PN 10-40	B1	200	24	138	8	18	160	5.4 (11.91)	B4

1) Product Configurator, order code for "Process connection"

2) MWP 10 bar (150 psi), OPL max. 15 bar (225 psi); process temperature range: -10 to +60 °C (+14 to +140 °F)

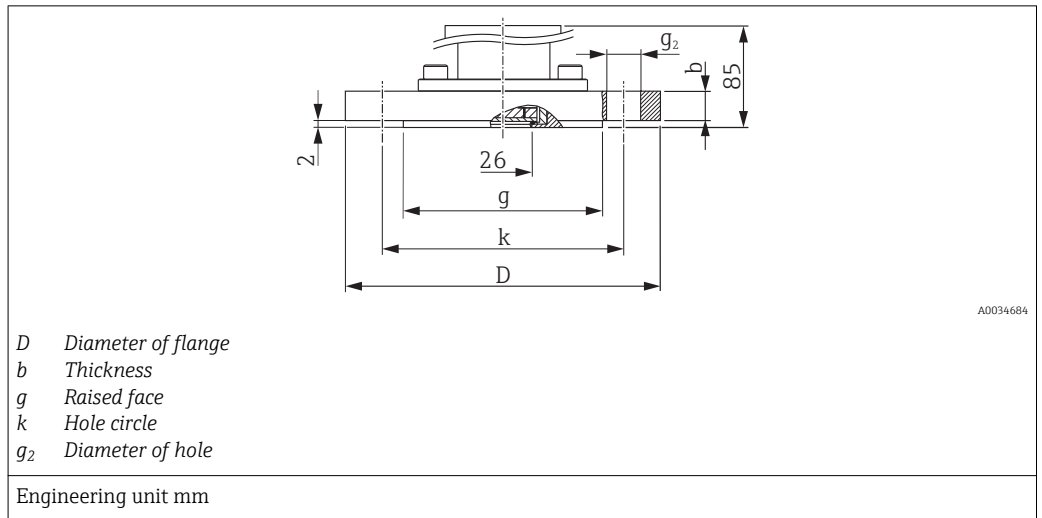
## ASME flanges, connection dimensions in accordance with ASME B 16.5, raised face RF



Flange						Boltholes			Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
Material	Nominal diameter	Class	D	b	g	Number	g <sub>2</sub>	k			
	[in]	[lb./sq.in]	[in]	[in]	[in]		[in]	[in]	[kg (lb)]		
AISI 316/316L <sup>3)</sup>	1	150	4.25	1.18	2	4	0.62	3.12	0.9 (1.98)	-	AA <sup>4)</sup>
AISI 316/316L <sup>3)</sup>	1	300	4.88	1.18	2	4	0.75	3.5	1.4 (3.09)	-	AB <sup>4)</sup>
AISI 316/316L <sup>3)</sup>	1 ½	150	5	0.69	2.88	4	0.62	3.88	1.0 (2.21)	CRN	AE
AISI 316/316L <sup>3)</sup>	1 ½	300	6.12	0.81	2.88	4	0.88	4.5	2.6 (5.73)	CRN	AQ
AISI 316/316L <sup>3)</sup>	2	150	6	0.75	3.62	4	0.75	4.75	2.4 (5.29)	CRN	AF
ECTFE <sup>5)</sup>	2	150	6	0.75	3.62	4	0.75	4.75	2.4 (5.29)	-	JR
PVDF <sup>6)</sup>	2	150	6	0.75	3.62	4	0.75	4.75	0.5 (1.1)	-	A3
AISI 316/316L <sup>3)</sup>	2	300	6.5	0.88	3.62	8	0.75	5	3.2 (7.06)	CRN	AR
AISI 316/316L <sup>3)</sup>	3	150	7.5	0.94	5	4	0.75	6	4.9 (10.8)	CRN	AG
ECTFE <sup>5)</sup>	3	150	7.5	0.94	5	4	0.75	6	4.9 (10.8)	-	JS
PVDF <sup>6)</sup>	3	150	7.5	0.94	5	4	0.75	6	0.9 (1.98)	-	A4
AISI 316/316L <sup>3)</sup>	3	300	8.25	1.12	5	8	0.88	6.62	6.8 (14.99)	CRN	AS
AISI 316/316L <sup>3)</sup>	4	150	9	0.94	6.19	8	0.75	7.5	7.1 (15.66)	CRN	AH
ECTFE <sup>5)</sup>	4	150	9	0.94	6.19	8	0.75	7.5	7.1 (15.66)	-	JT
AISI 316/316L <sup>3)</sup>	4	300	10	1.25	6.19	8	0.88	7.88	11.6 (25.58)	CRN	AT

- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, order code for "Process connection"
- 3) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 4) Screws must be 15 mm (0.59 in) longer than the standard flange screws
- 5) ECTFE coating on AISI 316/316L. When operating in hazardous areas, avoid electrostatic charge on the plastic surfaces.
- 6) MWP 10 bar (150 psi), OPL max. 15 bar (225 psi); process temperature range: -10 to +60 °C (+14 to +140 °F)

JIS flanges, connection dimensions in accordance with JIS B 2220 BL, raised face RF

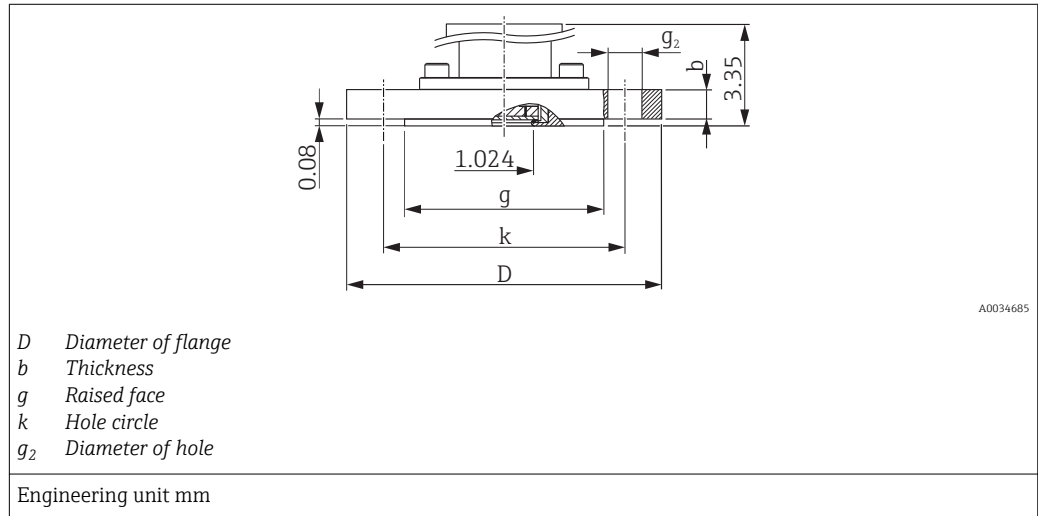


Flange						Boltholes			Weight	Option <sup>1)</sup>
Material	Nominal diameter	Nominal pressure	D	b	g	Number	g <sub>2</sub>	k		
			mm	mm	mm			mm	mm	kg (lb)
AISI 316L (1.4435)	50 A	10 K	155	16	96	4	19	120	2.0 (4.41)	CF
	80 A	10 K	185	18	127	8	19	150	3.3 (7.28)	KL
	100 A	10 K	210	18	151	8	19	175	4.4 (9.7)	KH

1) Product Configurator, order code for "Process connection"

Process connections for  
PMC71 with flush-mounted  
process isolating diaphragm

China standard flanges, connection dimensions HG/T 20592-2009 (DN-flanges) or HG/T 20615-2009 ("-flanges), raised face RF



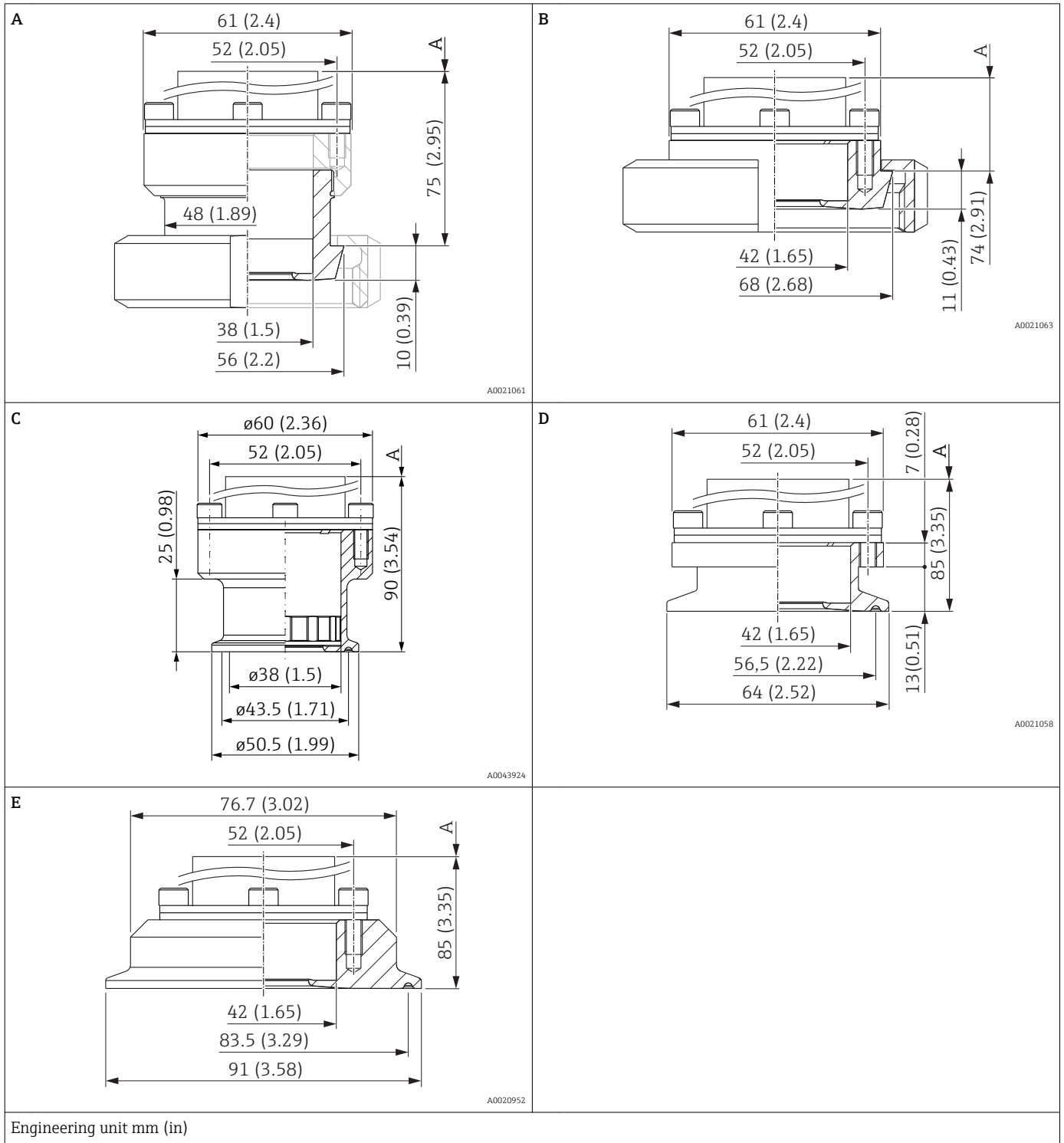
Flange <sup>1)</sup>						Boltholes			Weight	Option <sup>2)</sup>
Nominal diameter	Class/nominal pressure	D	b	g	m	Number	g <sub>2</sub>	k		
		[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[kg (lb)]
DN										
DN50	40 bar	165	20	102	27.5	4	18	125	3 (6.6)	7H
DN80	40 bar	200	24	138	45.5	8	18	160	5.5 (12.13)	7K
[in]										
2"	150lb./sq.in	150	17.5	92.1	22.55	4	18	120.7	2.2 (4.85)	7P
2"	300 lb./sq.in	165	20.7	92.1	22.55	8	18	127	3 (6.62)	7R
3"	150 lb./sq.in	190	22.3	127	40	4	18	152.4	4.7 (10.36)	7V
3"	300 lb./sq.in	210	27	127	40	8	22	168.3	6.6 (14.55)	7X

- 1) Material: AISI 316L
- 2) Product Configurator, order code for "Process connection"



**Hygienic process connections for PMC71 with flush-mounted process isolating diaphragm**

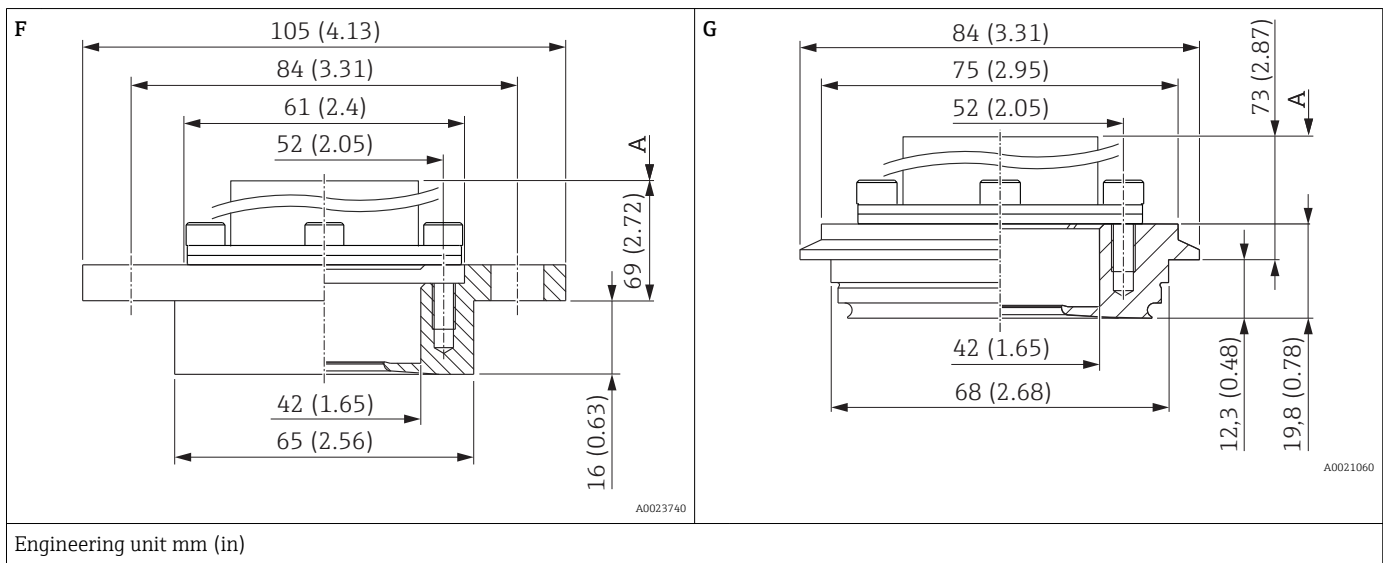
Many process connections with an EPDM or HNBR seal are approved for the PMC71 in accordance with the guidelines of the 3A Sanitary Standard. To ensure that the 3A approval is valid for the PMC71 version, a 3A-approved process connection together with an EPDM or HNBR seal must be selected when ordering (Product Configurator, order code for "Seal", option B or F).



Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb)		
A	DIN 11851 DN 40 PN 25, with HNBR or EPDM seal	PN 25	AISI 316L (1.4435)	0.7 (1.54)	EHEDG, 3A, CRN	MP <sup>4)</sup>
B	DIN 11851 DN 50 PN 25, with HNBR or EPDM seal	PN 25		0.9 (1.98)		MR <sup>4)</sup>

Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb)		
C	Tri-Clamp ISO 2852 DN 38 (1 1/2"), DIN32676	PN 40 <sup>6)</sup>		0.9 (1.98)	<sup>5)</sup>	TJ
D	Tri-Clamp ISO 2852 DN 51 (2"), with HNBR or EPDM seal	PN 40 <sup>6)</sup>		0.7 (1.54)	EHEDG, 3A, CRN	TD
E	Tri-Clamp ISO 2852 DN 76.1 (3"), with NBR or EPDM seal	PN 40 <sup>6)</sup>		0.9 (1.98)	EHEDG, 3A, CRN	TF

- 1) Delta ferrite content < 1 %. Roughness of wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard. Lower surface roughness available on request.
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies these slotted-nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).
- 5) See Section "Certificates and approvals"
- 6) Restricted nominal pressure (13.8 bar (200 psi)) for the following approvals: Product Configurator, order code for "Approval", option "E", "U" and "V".



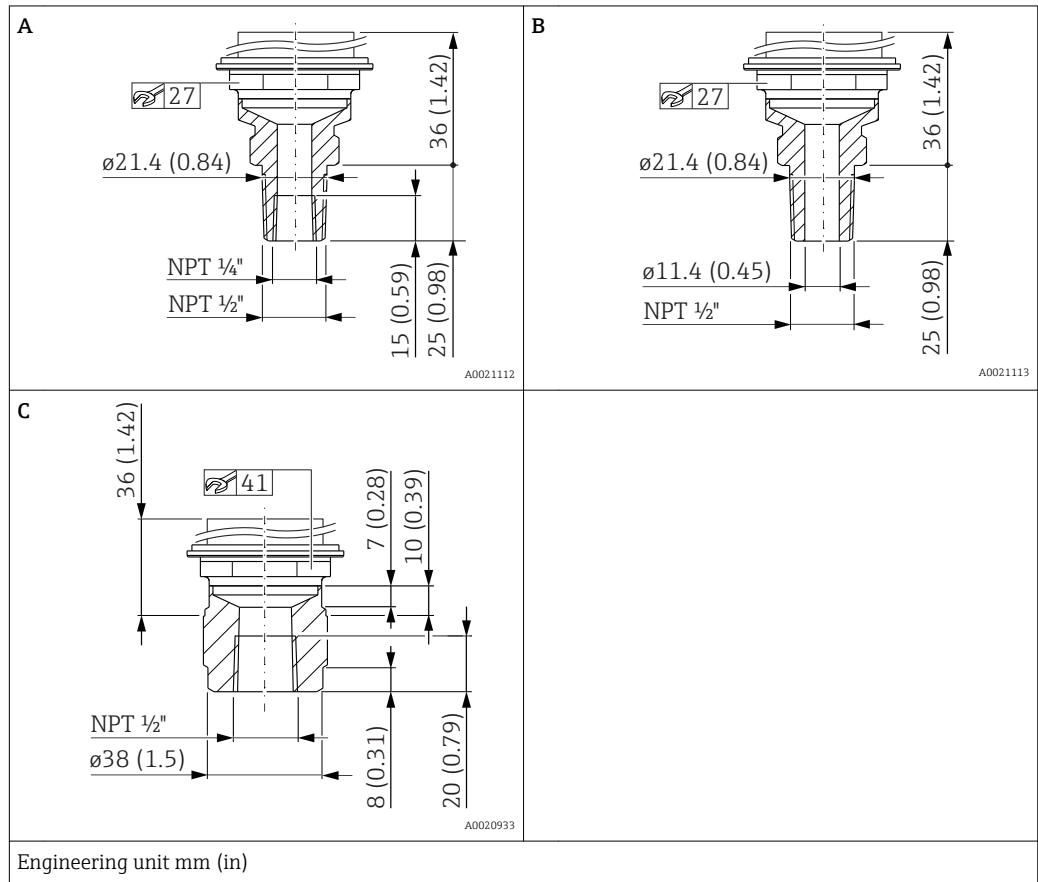
Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb)		
F	DRD DN50 (65 mm) Slip-on flange with HNBR or EPDM seal	PN 25	AISI 316L (1.4435)	0.9 (1.98)	-	TK
G	Varivent type N for pipes 40 - 162, with HNBR or EPDM seal	PN 40		1 (2.21)	EHEDG, 3A, CRN	TR <sup>4)</sup>

- 1) Delta ferrite content < 1 %. Roughness of wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard. Lower surface roughness available on request.
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies these slotted-nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).



Process connections for PMP71 with internal process isolating diaphragm

Threaded connection ANSI

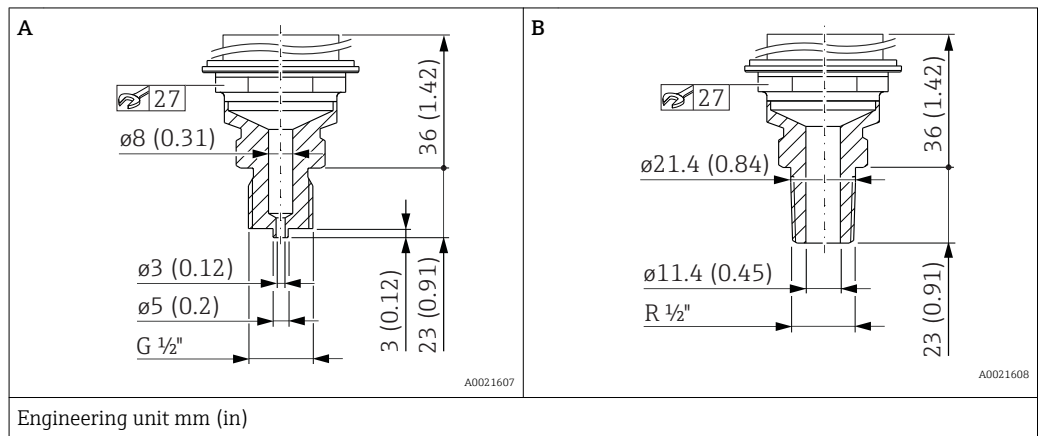


Item	Designation	Material	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)		
A	ANSI 1/2" MNPT, 1/4" FNPT	AISI 316L	0.63 (1.39)	CRN	RA
		Alloy C276 (2.4819)			RB
B	ANSI 1/2" MNPT, Hole 11.4 mm (0.45 in) = 400 bar (6 000 psi) Hole 3.2 mm (0.13 in) = 700 bar (10 500 psi)	AISI 316L		CRN	RD
		Alloy C276 (2.4819)		CRN	RE
C	ANSI 1/2" FNPT	AISI 316L	0.7 (1.54)	CRN	RH
		Alloy C276 (2.4819)			CRN

1) CSA approval: Product Configurator, order code for "Approval"  
 2) Product Configurator, order code for "Process connection"

Process connections for PMP71 with internal process isolating diaphragm

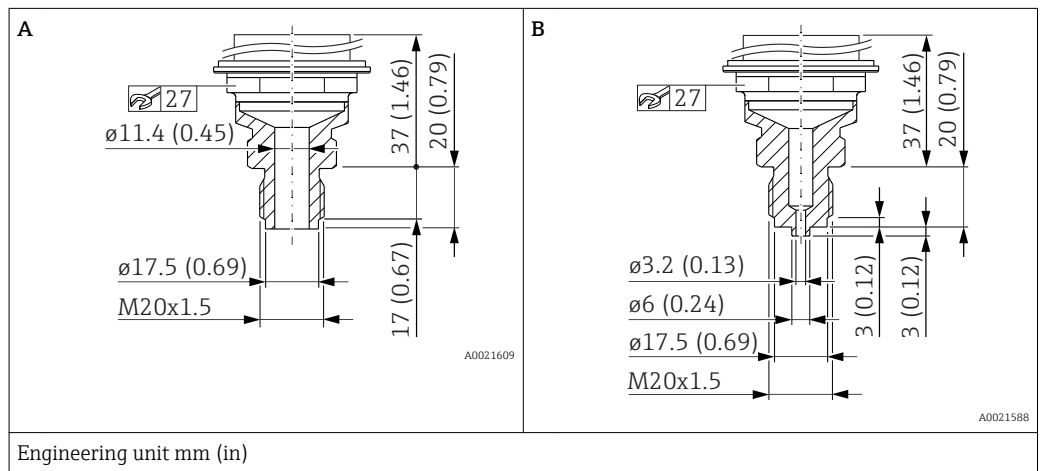
Threaded connection JIS



Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	JIS B0202 G 1/2" (male)	AISI 316L	0.6 (1.32)	GL
B	JIS B0203 R 1/2" (male)			RL

1) Product Configurator, order code for "Process connection"

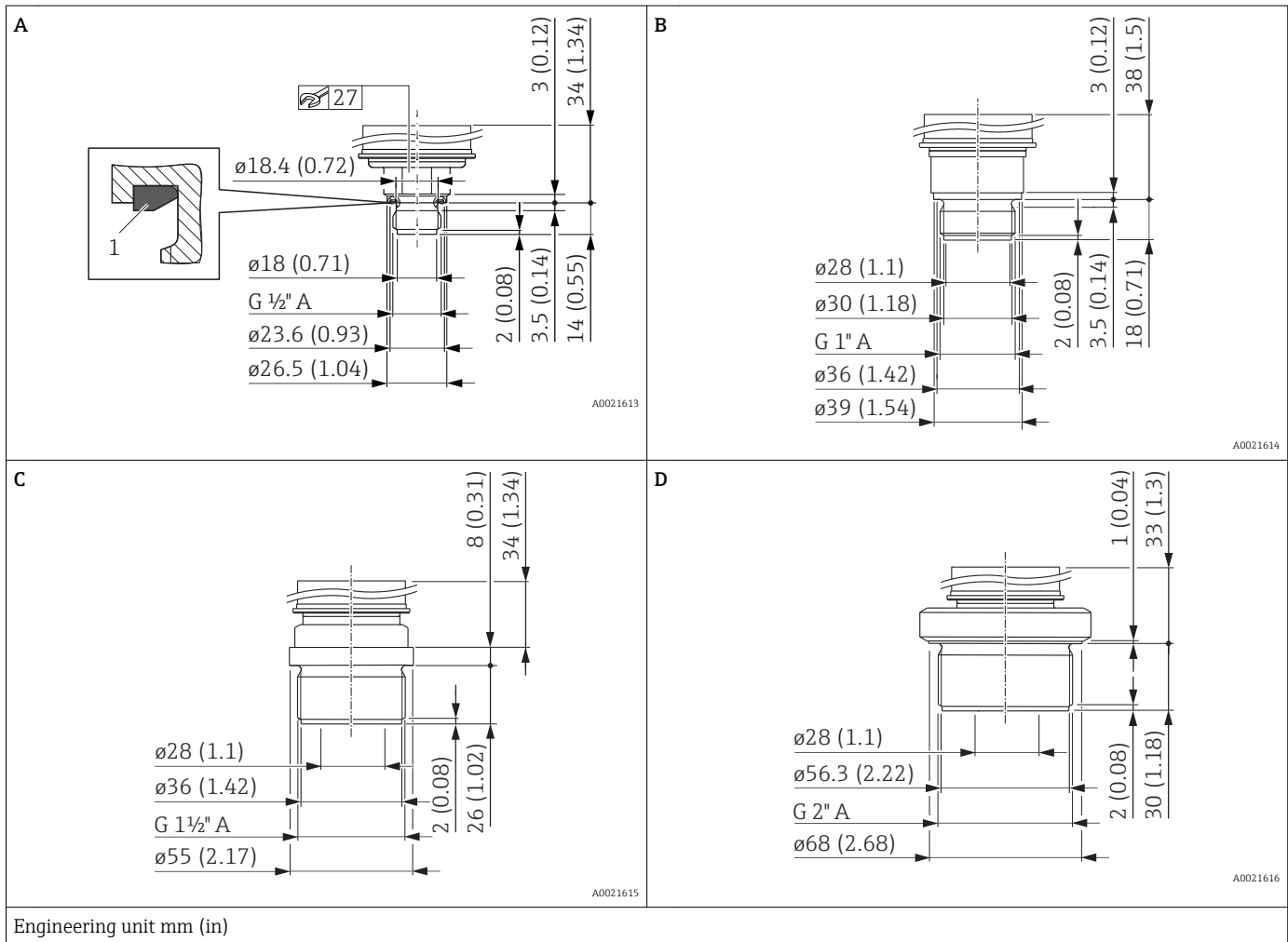
Threaded connection DIN 13



Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	DIN 13 M20 x 1.5 11.4 mm (0.45 in)	AISI 316L	0.6 (1.32)	GP
		Alloy C276 (2.4819)		GQ
B	DIN 13 M20 x 1.5, EN 837 3 mm (0.12 in)	AISI 316L		GR
		Alloy C276 (2.4819)		GS

1) Product Configurator, order code for "Process connection"

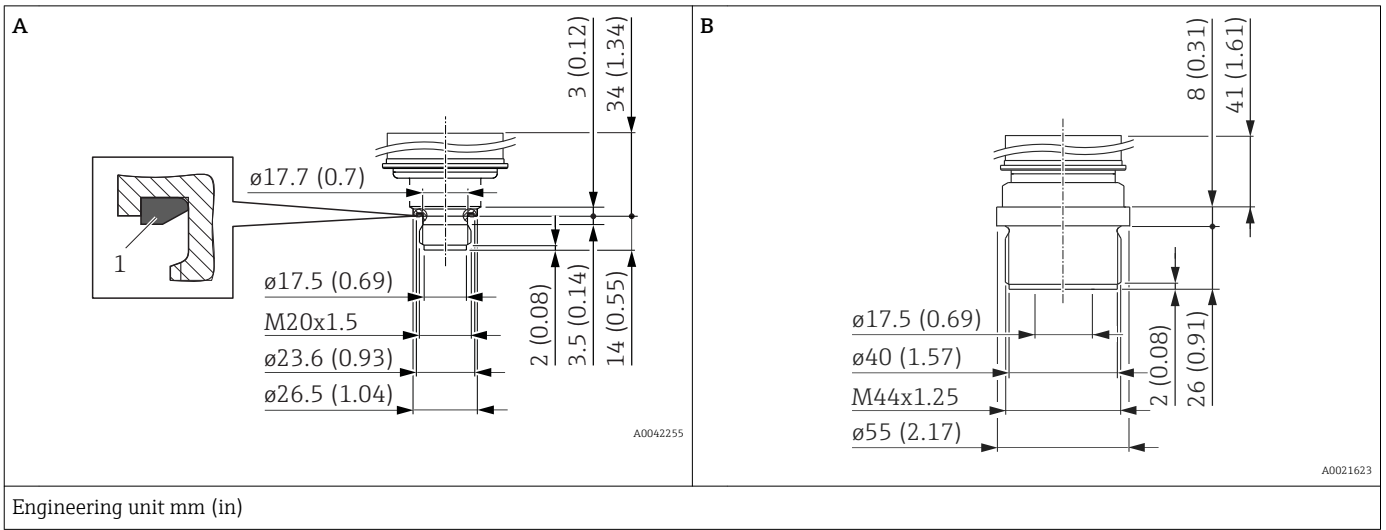
Process connections for  
PMP71 with flush-mounted  
process isolating diaphragm Threaded connection ISO 228 G



Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	Thread ISO 228 G 1/2" A, DIN 3852 FKM form seal (item 1) pre-installed	AISI 316L	0.4 (0.88)	1A
		Alloy C276 (2.4819)		1B
B	Thread ISO 228 G 1" A	AISI 316L	0.7 (1.54)	1D
		Alloy C276 (2.4819)		1E
C	Thread ISO 228 G 1 1/2" A	AISI 316L	1.1 (2.43)	1G
		Alloy C276 (2.4819)		1H
D	Thread ISO 228 G 2" A	AISI 316L	1.5 (3.31)	1K
		Alloy C276 (2.4819)		1L

1) Product Configurator, order code for "Process connection"

Threaded connection DIN

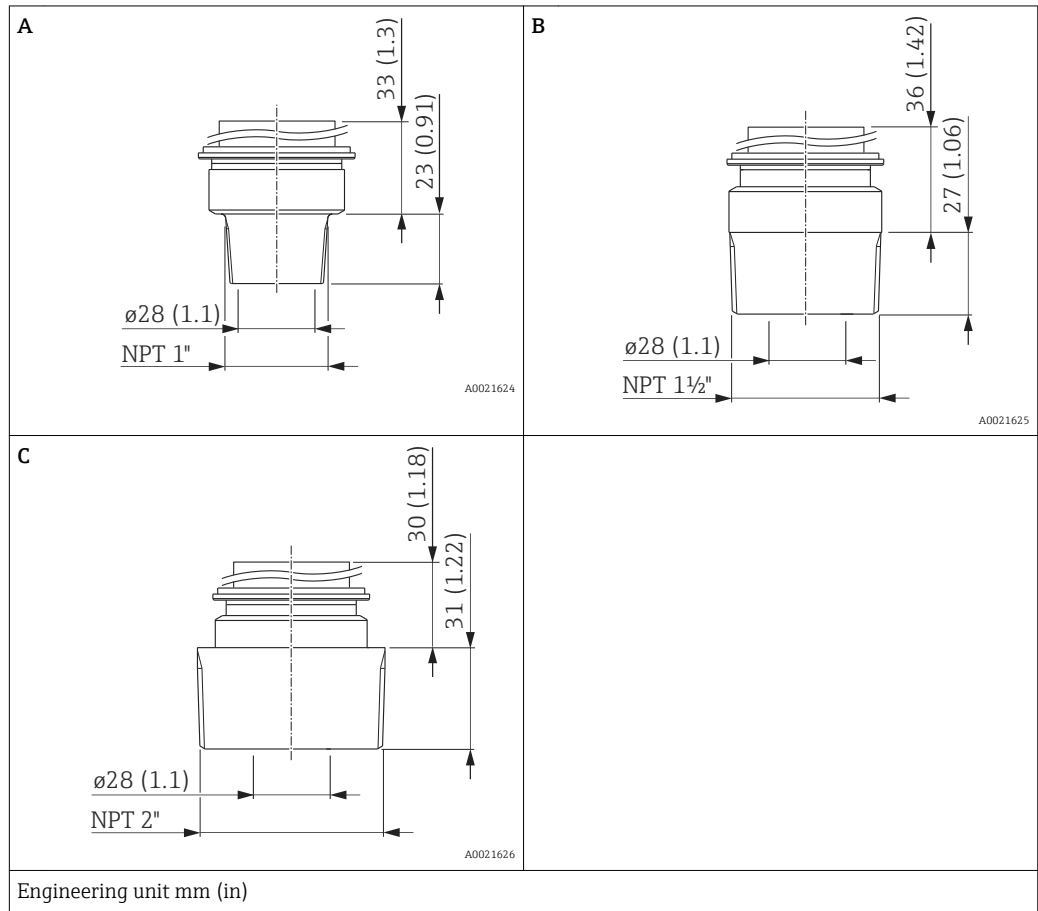


Item	Designation	Material	Weight	Option <sup>1)</sup>
			kg (lb)	
A	Thread DIN 16288 M20 x 1.5 FKM 80 flat seal (item 1) pre-installed	AISI 316L	0.4 (0.88)	1N
		Alloy C276 (2.4819)		1P
B	Thread DIN 13 M44 x 1.25	AISI 316L	1.1 (2.43)	1R
		Alloy C276 (2.4819)		1S

1) Product Configurator, order code for "Process connection"

Process connections for  
PMP71 with flush-mounted  
process isolating diaphragm

Threaded connection ANSI



Item	Description	Material	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)		
A	ANSI 1" MNPT	AISI 316L	0.7 (1.54)	CRN	2A
		Alloy C276 (2.4819)			2B
B	ANSI 1 1/2" MNPT	AISI 316L	1 (2.21)	CRN	2D
		Alloy C276 (2.4819)			2E
C	ANSI 2" MNPT	AISI 316L	1.3 (2.87)	CRN	2G
		Alloy C276 (2.4819)			2H

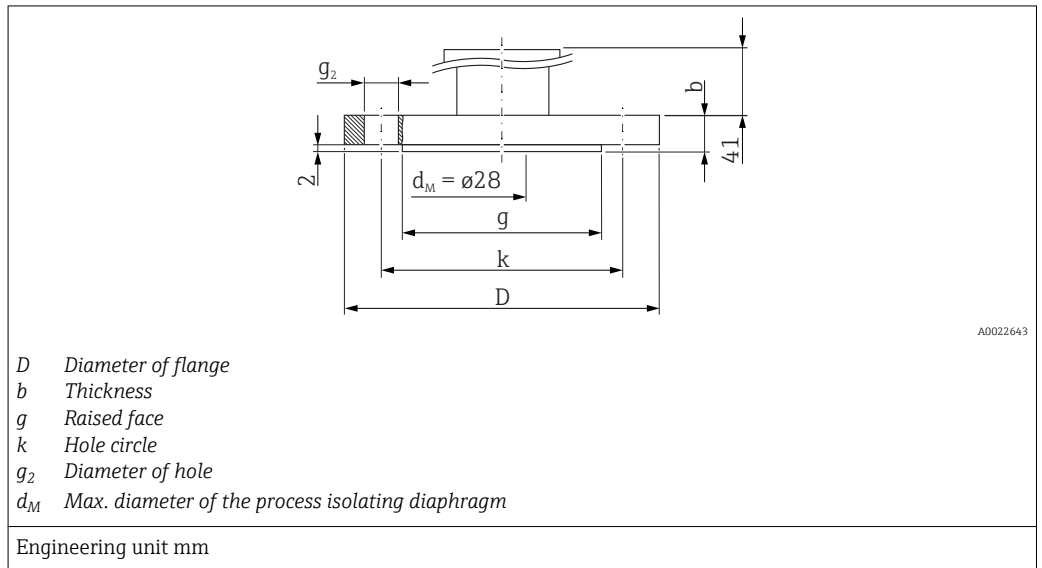
1) CSA approval: Product Configurator, order code for "Approval"

2) Product Configurator, order code for "Process connection"



Process connections for PMP71 with flush-mounted process isolating diaphragm

EN/DIN flanges, connection dimensions in accordance with EN 1092-1

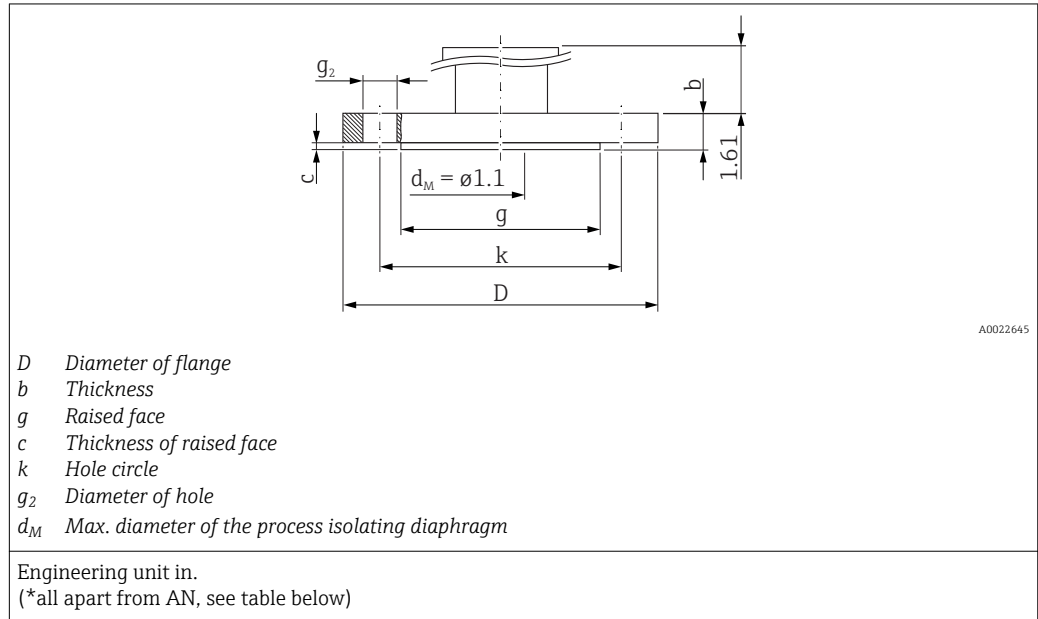


Flange <sup>1)</sup>			Boltholes						Weight Flange	Option <sup>2)</sup>
Nominal diameter	Nominal pressure	Shape	D	b	g	Number	g <sub>2</sub>	k		
			[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	
DN 25	PN 10-40	B1	115	18	68	4	14	85	1.2 (2.65)	CN
DN 32	PN 10-40	B1	140	18	78	4	18	100	1.9 (4.19)	CP
DN 40	PN 10-40	B1	150	18	88	4	18	110	2.2 (4.85)	CQ
DN 50	PN 10-40	B1	165	20	102	4	18	125	3.0 (6.62)	B3
DN 80	PN 10-40	B1	200	24	138	8	18	160	5.3 (11.69)	B4

- 1) Material: AISI 316L
- 2) Product Configurator, order code for "Process connection"

Process connections for PMP71 with flush-mounted process isolating diaphragm

ASME flanges, connection dimensions in accordance with ASME B 16.5, raised face RF\*

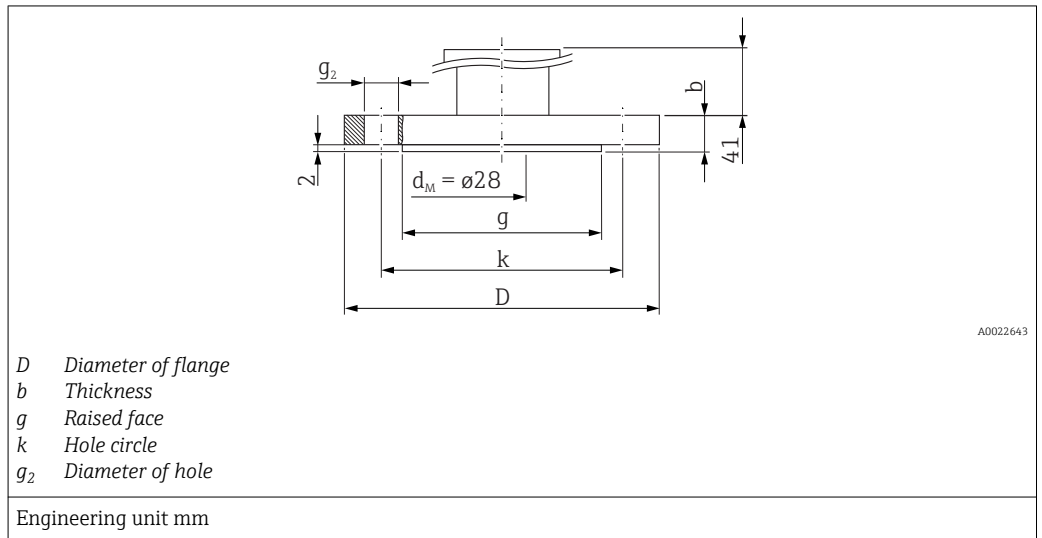


Flange <sup>1)</sup>						Boltholes			Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
Nominal diameter	Class/nominal pressure	D	b	g	c	Number	g <sub>2</sub>	k			
[in]	lb./sq.in	[in]	[in]	[in]	[in]		[in]	[in]	[kg]		
1	150										AA
1	300	4.88	0.69	2	0.06	4	0.75	3.5	1.3 (2.87)	CRN	AN
1 ½	150	5	0.69	2.88	0.08	4	0.62	3.88	1.5 (3.31)	CRN	AE
1 ½	300	6.12	0.81	2.88	0.08	4	0.88	4.5	2.6 (5.73)	CRN	AQ
2	150	6	0.75	3.62	0.08	4	0.75	4.75	2.4 (5.29)	CRN	AF
2	300	6.5	0.88	3.62	0.08	8	0.75	5	3.2 (7.06)	CRN	AR
3	150	7.5	0.94	5	0.08	4	0.75	6	4.9 (10.8)	CRN	AG
3	300	8.25	1.12	5	0.08	8	0.88	6.62	6.7 (14.77)	CRN	AS
4	150	9	0.94	6.19	0.08	8	0.75	7.5	7.1 (15.66)	CRN	AH
4	300	10	1.25	6.19	0.08	8	0.88	7.88	11.6 (25.88)	CRN	AT

- 1) Material: AISI 316/316L; Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"

Process connections for  
PMP71 with flush-mounted  
process isolating diaphragm

JIS flanges, connection dimensions in accordance with JIS B 2220 BL, raised face RF

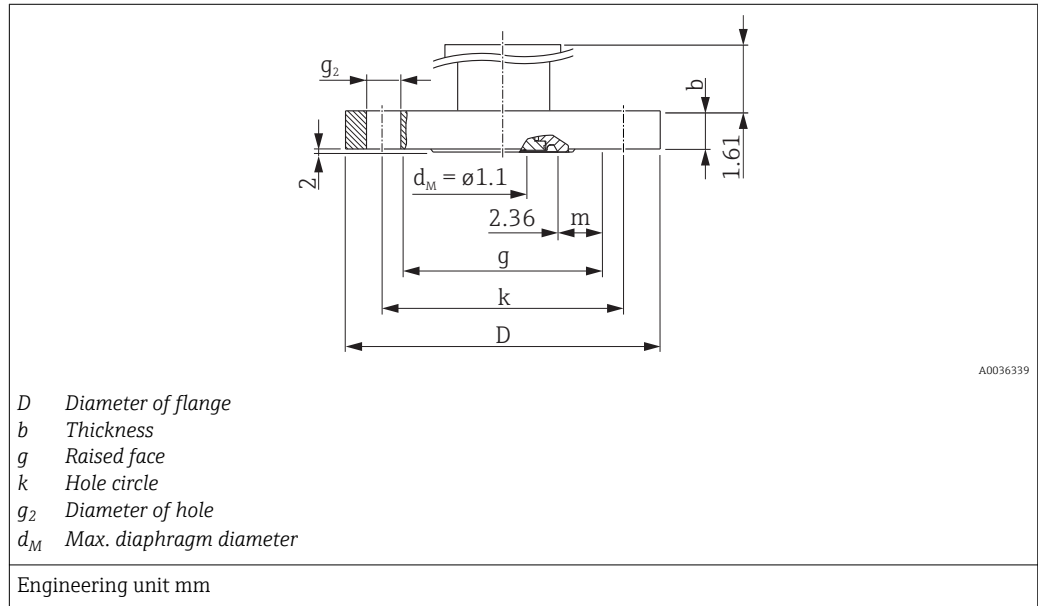


Flange						Boltholes			Weight Flange	Option <sup>1)</sup>
Material	Nominal diameter	Class/ Nominal pressure	D	b	g	Number	g <sub>2</sub>	k		
			[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[kg]
AISI 316L	25 A	20 K	125	16	67	4	19	90	1.5 (3.31)	KA
AISI 316L	50 A	10 K	155	16	96	4	19	120	2.0 (4.41)	CF
AISI 316L	80 A	10 K	185	18	127	8	19	150	3.3 (7.28)	KL
AISI 316L	100 A	10 K	210	18	151	8	19	175	4.4 (9.7)	KH

1) Product Configurator, order code for "Process connection"

PMP71: process connections with flush-mounted process isolating diaphragm

China standard flanges, connection dimensions HG/T 20592-2009 (DN-flanges) or HG/T 20615-2009 ("-flanges), raised face RF



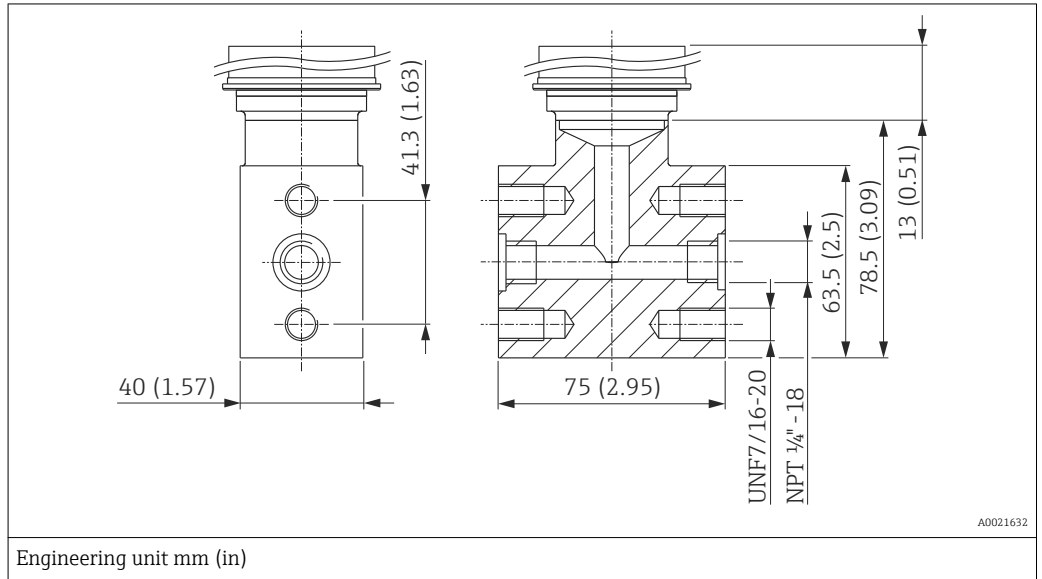
Flange <sup>1)</sup>						Boltholes			Weight	Option <sup>2)</sup>
Nominal diameter	Class/nominal pressure	D	b	g	m	Number	g <sub>2</sub>	k		
		[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[kg (lb)]	
DN										
DN50	40 bar	165	20	102	27.5	4	18	125	3 (6.6)	7H
DN80	40 bar	200	24	138	45.5	8	18	160	5.5 (12.13)	7K
[in]										
2"	150lb./sq.in	150	17.5	92.1	22.55	4	18	120.7	2.2 (4.85)	7P
2"	300 lb./sq.in	165	20.7	92.1	22.55	8	18	127	3 (6.62)	7R
3"	150 lb./sq.in	190	22.3	127	40	4	18	152.4	4.7 (10.36)	7V
3"	300 lb./sq.in	210	27	127	40	8	22	168.3	6.6 (14.55)	7X

1) Material: AISI 316L

2) Product Configurator, order code for "Process connection"

Process connections for PMP71

Oval flange

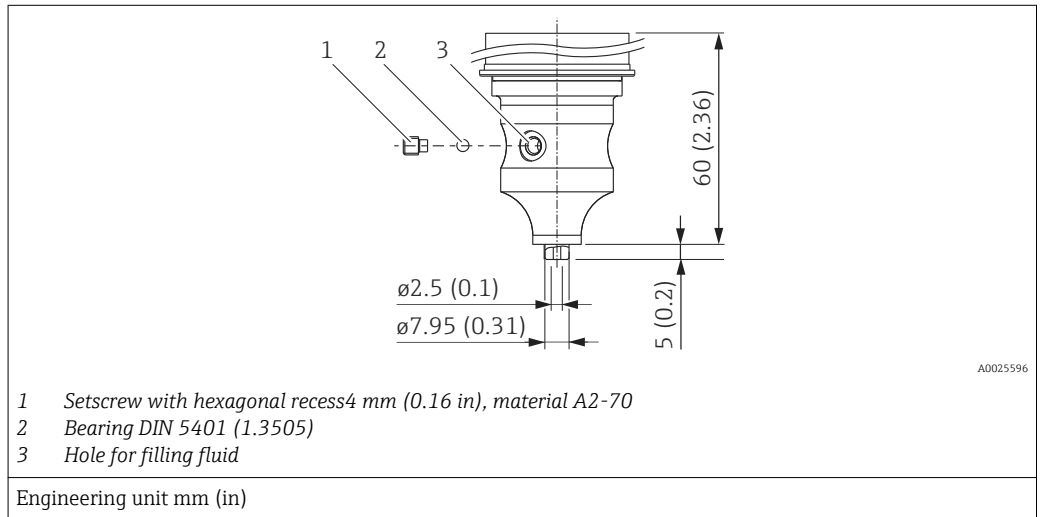


Material	Description	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
		kg (lb)		
AISI 316L (1.4404)	Oval flange adapter 1/4-18 NPT as per IEC 61518 Mounting: 7/16-20 UNF	1.9 (4.19)	CRN	UR

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"

Process connections for PMP71

Prepared for diaphragm seal mount

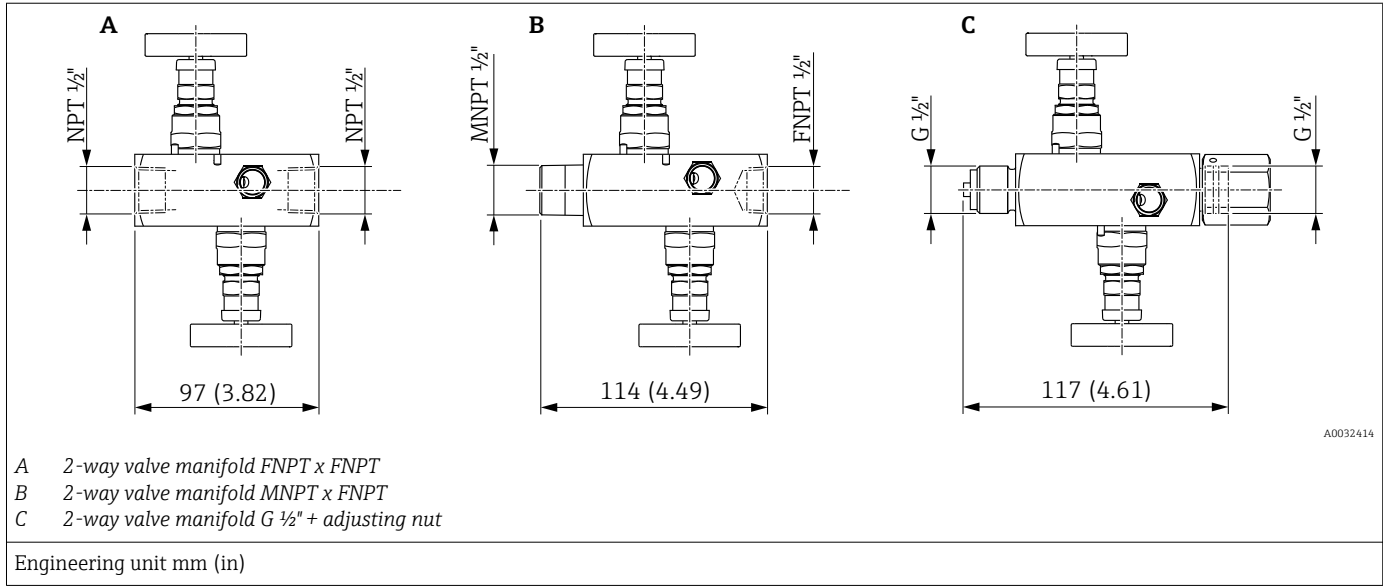


Material	Description	Weight in kg (lb)	Approval <sup>1)</sup>	Option <sup>2)</sup>
AISI 316L (1.4404)	Prepared for diaphragm seal mount	1.9 (4.19)	CRN	U1

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"

**Valve manifold DA63M-  
(optional)**

Endress+Hauser supplies milled valve manifolds via the transmitter's product structure in the following versions:



2-way valve manifolds in 316L or AlloyC can be

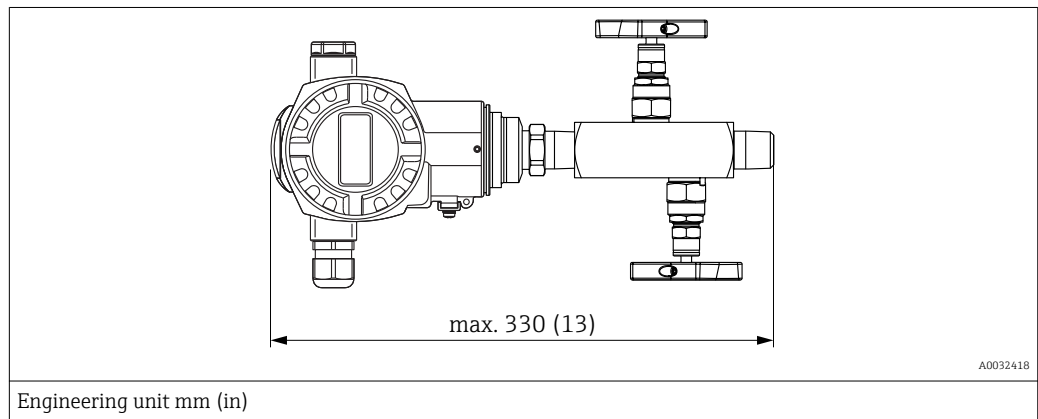
- ordered as an **enclosed** accessory (seal for mounting is enclosed)
- ordered as a **mounted** accessory (mounted valve manifolds are supplied with a documented leakage test).

Certificates ordered with the equipment (e.g. 3.1 material certificate and NACE) and tests (e.g. PMI and pressure test) apply to the transmitter and the valve manifold.

For other details (order option, dimension, weight, materials), see SD01553P/00/EN "Mechanical accessories for pressure measuring devices".

During the operating life of the valves, it may be necessary to re-tighten the packing.

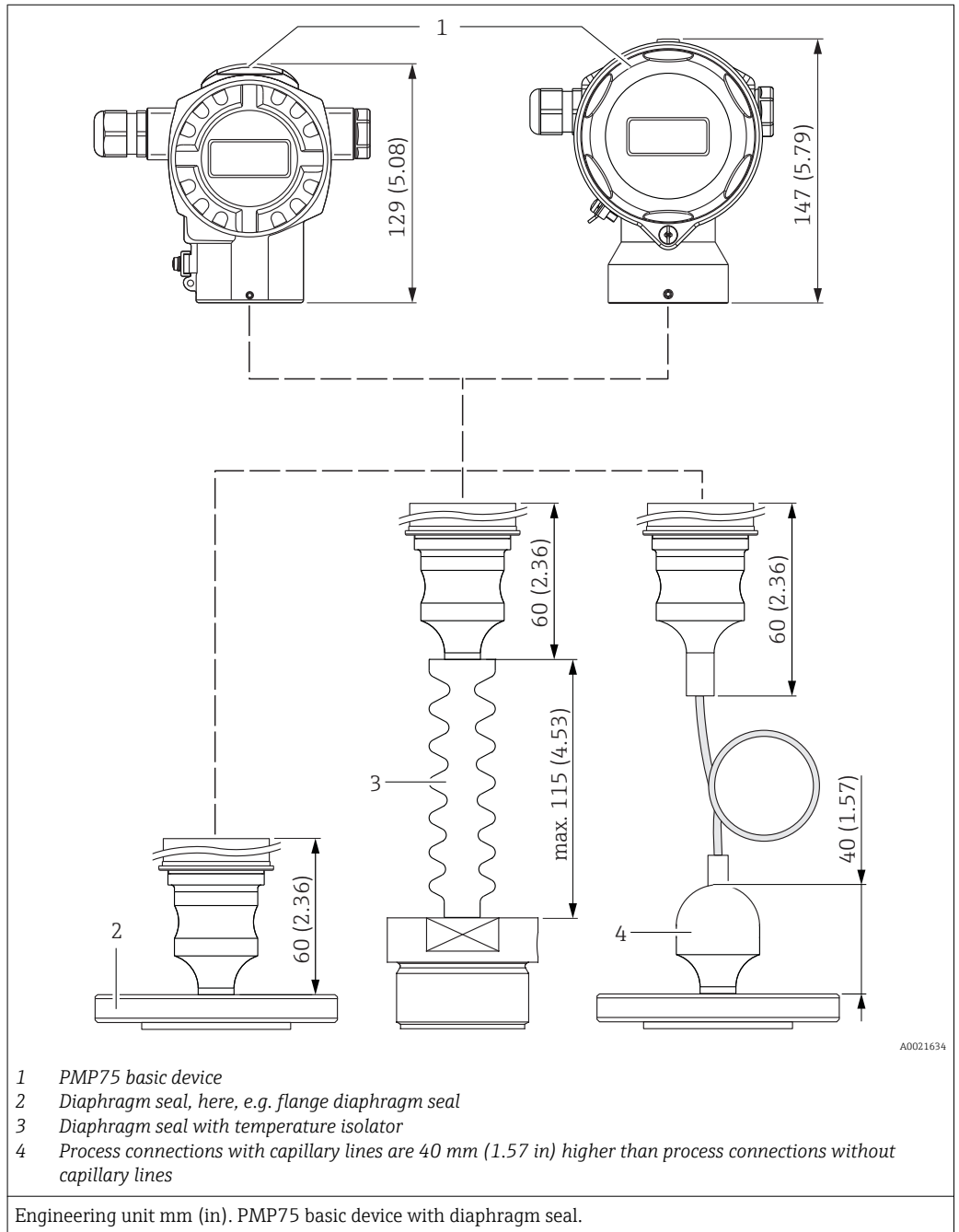
**Mounting on valve manifold**



Ordering information:

Product Configurator, order code for "Accessories mounted"

PMP75 basic device



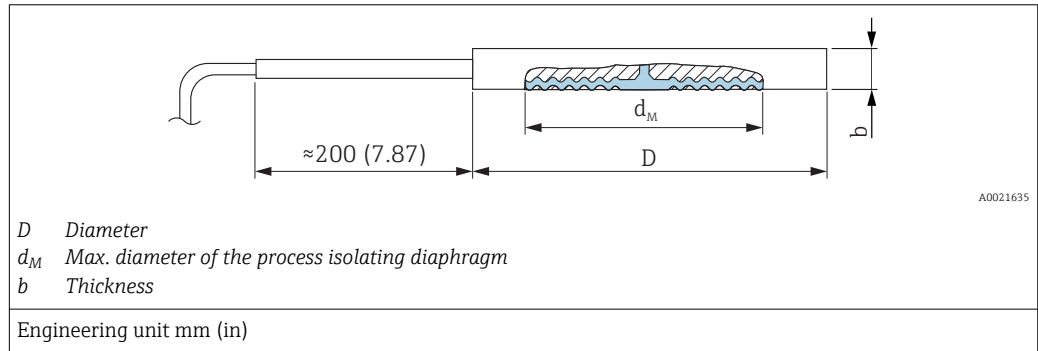
A0021634

**Process connections for PMP75 with flush-mounted process isolating diaphragm**



- The weights of the diaphragm seals are given in the tables. For weight of housing, see → 53
- 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.
- Observe the information in the "Planning instructions for diaphragm seal systems" section → 112
- For further information please contact your local Endress+Hauser Sales Center.

**Diaphragm seal cell structure**



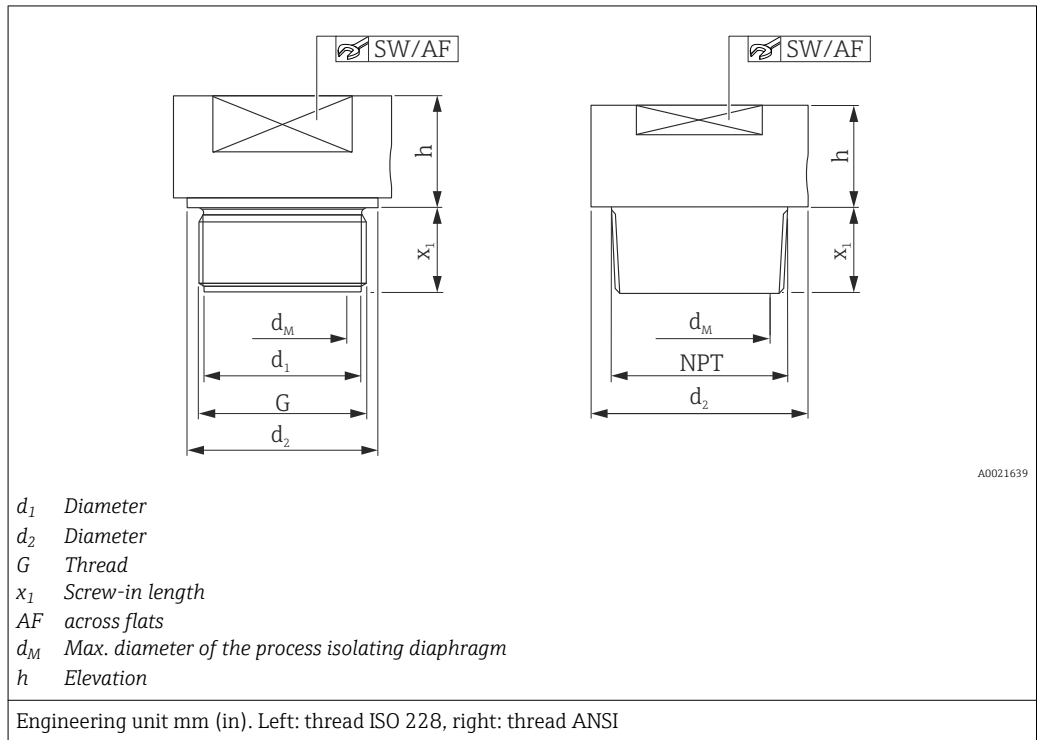
Flange			Diaphragm seal				Approval <sup>1)</sup>	Option <sup>2)</sup>
Material	Nominal diameter	Nominal pressure <sup>3)</sup>	D	b	d <sub>M</sub>	Weight		
			[mm]	[mm]	[mm]	[kg (lb)]		
AISI 316L	DN 50	PN 16-400	102	20	59	1.3 (2.87)	-	UI <sup>4)</sup>
	DN 80	PN 16-400	138	20	89	2.3 (5.07)	-	UJ <sup>4)</sup>
	DN 100	PN 16-400	162	20	89	3.1 (6.84)	-	UK
	[in]	[lb/sq.in]	[in (mm)]	[in (mm)]	[in (mm)]			
	2	150-2500	3.89 (99)	0.79 (20)	2.32 (59)	1.3 (2.87)	CRN	UL <sup>4)</sup>
	3	150-2500	5.00 (127)	0.79 (20)	3.50 (89)	2.3 (5.07)	CRN	UM <sup>4)</sup>
	4	150-2500	6.22 (158)	0.79 (20)	3.50 (89)	3.1 (6.84)	CRN	UR

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"
- 3) The specified nominal pressure applies to the diaphragm seal. The maximum pressure for the measuring device is dependent on the lowest-rated element, with regard to pressure, of the selected components → 51.
- 4) With TempC Membrane



Process connections for PMP75 with flush-mounted process isolating diaphragm

Thread ISO 228 and ANSI



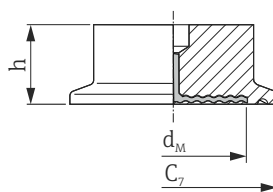
A0021639

Threaded connection							Diaphragm seal			Approval <sup>1)</sup>	Option <sup>2)</sup>
Material	G	Nominal pressure	$d_1$	$d_2$	$x_1$	SW/AF	$d_M$	h	Weight		
		PN	[mm]	[mm]	[mm]		[mm]	[mm]	[kg (lb)]		
AISI 316L	G 1" A	400	30	39	21 <sup>3)</sup>	32	30	19	0.4 (0.88)	-	1D
Alloy C276									0.5 (1.1)	-	1E
AISI 316L	G 1 ½" A	400	44	55	30	50	42	20	0.9 (1.98)	-	1G
Alloy C276									1.0 (2.21)	-	1H
AISI 316L	G 2"	400	56	68	30	65	50	20	1.9 (4.19)	-	1K
Alloy C276									2.1 (4.63)	-	1L
AISI 316L	1" MNPT	400	-	45	28	41	24	17	0.6 (1.32)	CRN	2A
Alloy C276									0.7 (1.54)	CRN	2B
AISI 316L	1 ½" MNPT	400	-	60	30	41	36	20	0.9 (1.98)	CRN	2D
Alloy C276				52	30	46	32	20	1.0 (2.21)	CRN	2E
AISI 316L	2" MNPT	400	-	78	30	65	38	25	1.8 (3.97)	CRN	2G
Alloy C276									2.0 (4.41)	CRN	2H

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"
- 3) 28 mm (1.1 in) in conjunction with high-temperature oil

Process connections for  
PMP75 with flush-mounted  
process isolating diaphragm

Tri-Clamp ISO 2852




A0021644

$C_7$  Diameter of flange  
 $h$  Elevation  
 $d_M$  Max. diameter of the process isolating diaphragm

Engineering unit mm (in)

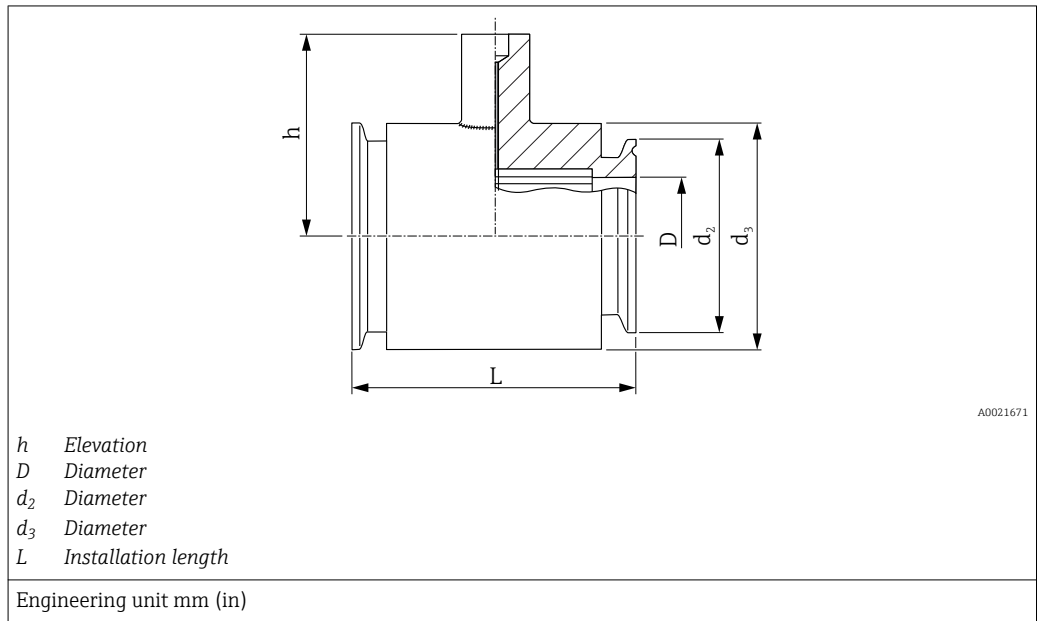
Material <sup>1)</sup>	Nominal diameter ISO 2852	Nominal diameter DIN 32676	Nominal diameter	$C_7$	$d_M$		$h$	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
					Standard	with TempC Membrane				
					[in]	[mm]				
AISI 316L	ND 25 / 33.7	DN 25	1	50.5	24	-	37	0.32 (0.71)	EHEDG, 3A, CRN	TB
	ND 38	DN 40	1 ½	50.5	36	36	30	1 (2.21)	EHEDG, 3A, CRN	TC <sup>4) 5)</sup>
	ND 51 / 40	DN 50	2	64	48	41	30	1.1 (2.43)	EHEDG, 3A, CRN	TD <sup>4) 5)</sup>
	ND 63.5	DN 50	2 ½	77.5	61	61	30	0.7 (1.54)	EHEDG, 3A	TE <sup>6)</sup>
	ND 76.1	-	3	91	73	61	30	1.2 (2.65)	EHEDG, 3A, CRN	TF <sup>5)</sup>

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard. Lower surface roughness available on request.
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Optionally available as an ASME-BPE-compliant diaphragm seal version for use in biochemical processes, surfaces in contact with medium  $R_a < 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; order using order code for "Additional options", option "P".
- 5) Alternatively available with TempC Membrane.
- 6) With TempC Membrane

 PN max. = 40 bar (580 psi). The maximum PN depends on the clamp used.

Process connections for  
PMP75 with flush-mounted  
process isolating diaphragm

Tri-Clamp pipe diaphragm seal ISO 2852

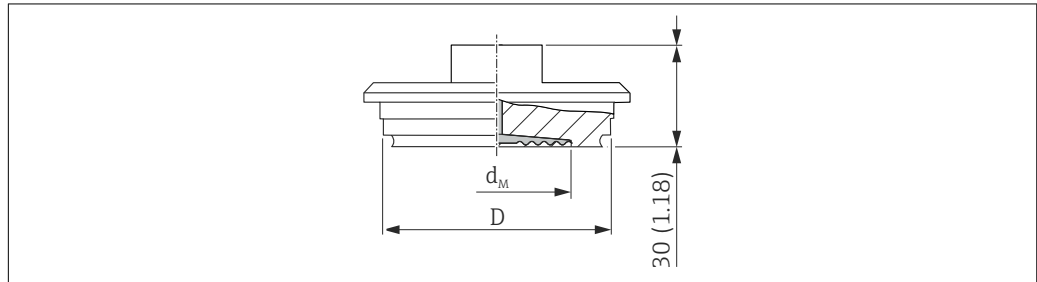


Material <sup>1)</sup>	Nominal diameter ISO 2852	Nominal diameter	Nominal pressure	D	d <sub>2</sub>	d <sub>3</sub>	h	L	Weight [kg (lb)]	Approval <sup>2)</sup>	Option <sup>3)</sup>
		[in]		[mm]	[mm]	[mm]	[mm]	[mm]			
AISI 316L	DN 25	1	PN 40	22.5	50.5	54	67	126	1.7 (3.75)	3A, CRN	SB
	DN 38	1 ½	PN 40	35.5	50.5	69	67	126	1.0 (2.21)	3A, CRN	SC <sup>4)</sup>
	DN 51	2	PN 40	48.6	64	78	79	100	1.7 (3.75)	3A, CRN	SD <sup>4)</sup>

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) incl. 3.1 and pressure test according to Pressure Equipment Directive, Category II

**Hygienic process connections for PMP75 with flush mount process isolating diaphragm**

**Varivent for pipes**



A0021672

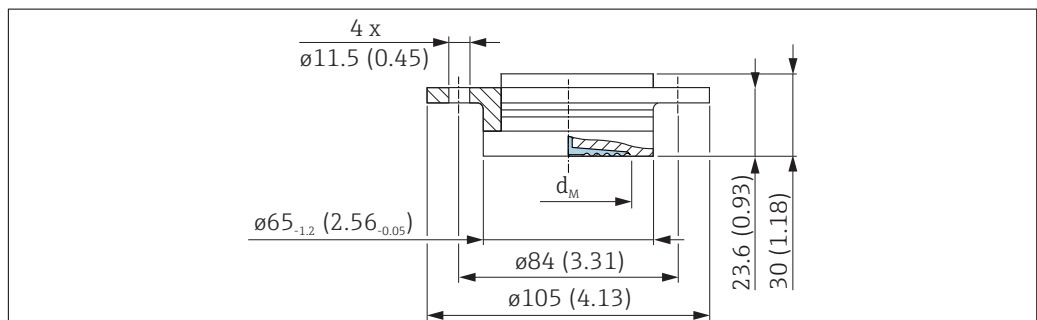
$D$  Diameter  
 $d_M$  Max. diameter of the process isolating diaphragm

Engineering unit mm (in)

Material <sup>1)</sup>	Designation	Nominal pressure	D	$d_M$		Weight	Approval	Option <sup>2)</sup>
				Standard	With TempC Membrane			
				[mm]	[mm]			
AISI 316L	Type F for pipes DN 25 - DN 32	PN 40	50	34	36	0.4 (0.88)	EHEDG, 3A	TU <sup>3)</sup>
AISI 316L	Type N for pipes DN 40 - DN 162	PN 40	68	58	61	0.8 (1.76)	EHEDG, 3A	TR <sup>4) 5)</sup>

- 1) Surface roughness of the surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"
- 3) With TempC Membrane
- 4) Optionally available as an ASME-BPE-compliant diaphragm seal version for use in biochemical processes, surfaces in contact with medium  $R_a < 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ) , electropolished; order using order code for "Additional options", option "P". Lower surface roughness on request.
- 5) Alternatively available with TempC Membrane.

**DRD DN50 (65 mm)**



A0021673

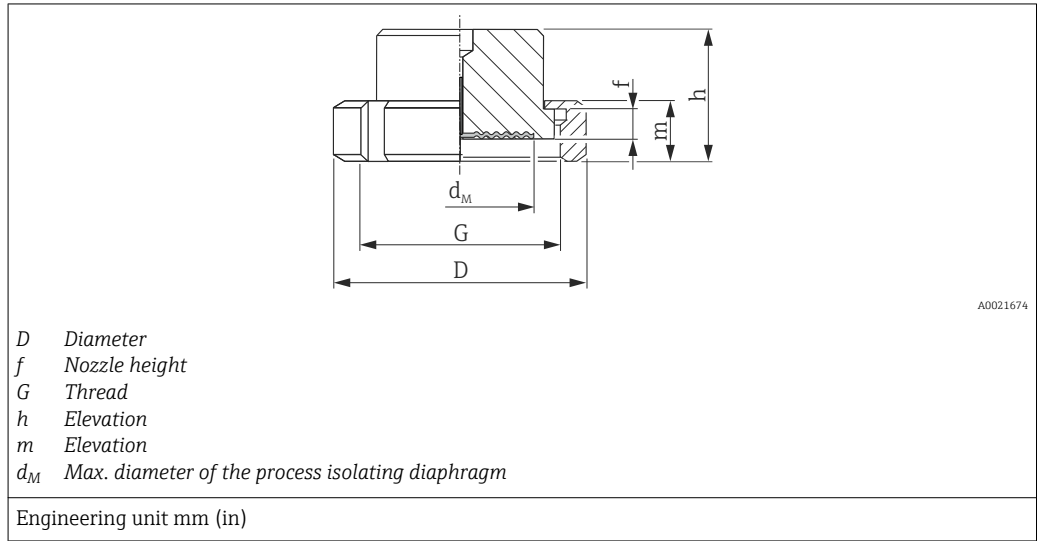
$d_M$  Max. diameter of the process isolating diaphragm

Engineering unit mm (in)

Material <sup>1)</sup>	Nominal pressure	$d_M$		Weight	Option <sup>2)</sup>
		Standard	With TempC Membrane		
		[mm]	[mm]		
AISI 316L	PN 25	50	48	0.75 (1.65)	TK <sup>3) 4)</sup>

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"
- 3) Alternatively available with TempC Membrane.
- 4) Including slip-on flange.

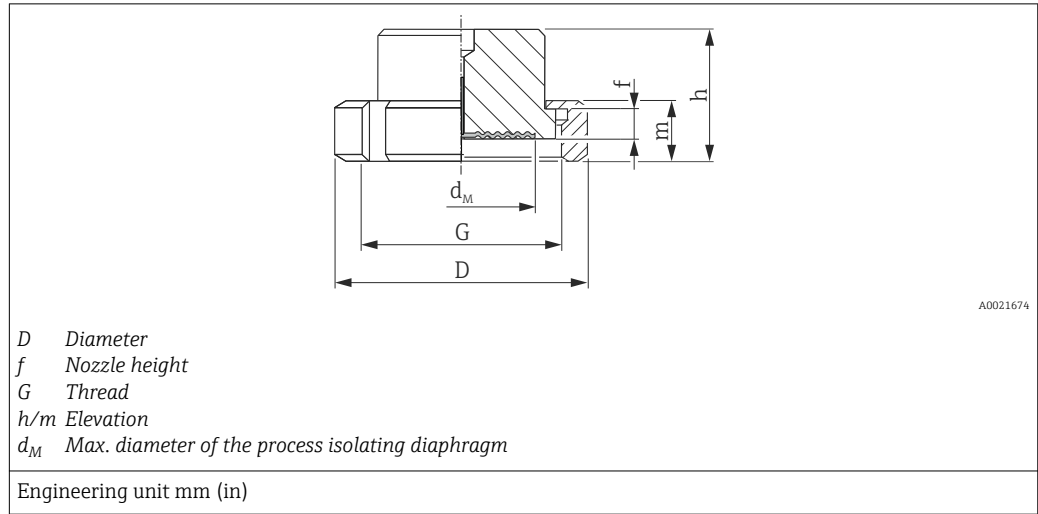
**Hygienic process connections for PMP75 with flush-mounted process isolating diaphragm**     **SMS nozzles with coupling nut**



Material <sup>1)</sup>	Nominal diameter	Nominal pressure	D	f	G	m	h	d <sub>M</sub>	Weight [kg (lb)]	Approval	Option <sup>2)</sup>
			[mm]	[mm]		[mm]	[mm]	[mm]			
AISI 316L	1	PN 25	54	3.5	Rd 40 - 1/6	20	42.5	24	0.25 (0.55)	3A	TG
	1 ½	PN 25	74	4	Rd 60 - 1/6	25	57	36	0.65 (1.43)	3A	TH <sup>3)</sup>
	2	PN 25	84	4	Rd 70 - 1/6	26	62	48	1.05 (2.32)	3A	TI <sup>3)</sup>

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"
- 3) Alternatively available with TempC Membrane.

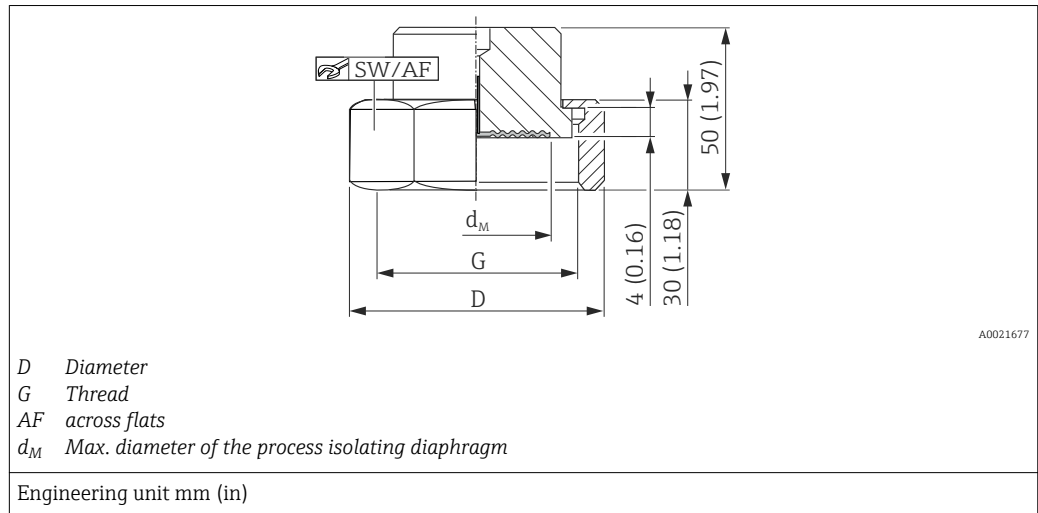
**APV-RJT nozzles with coupling nut**



Material <sup>1)</sup>	Nominal diameter	Nominal pressure	D	f	G	m	h	d <sub>M</sub>	Weight	Option <sup>2)</sup>
	[in]	[bar]								
AISI 316L	1	PN 40	77	6.5	1 13/16 - 1/8"	22	42.6	21	0.45 (0.99)	TL
	1 ½	PN 40	72	6.4	2 5/16 - 1/8"	22	42.6	28	0.75 (1.65)	TM
	2	PN 40	86	6.4	2 7/8 - 1/8"	22	42.6	38	1.2 (2.65)	TN

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"

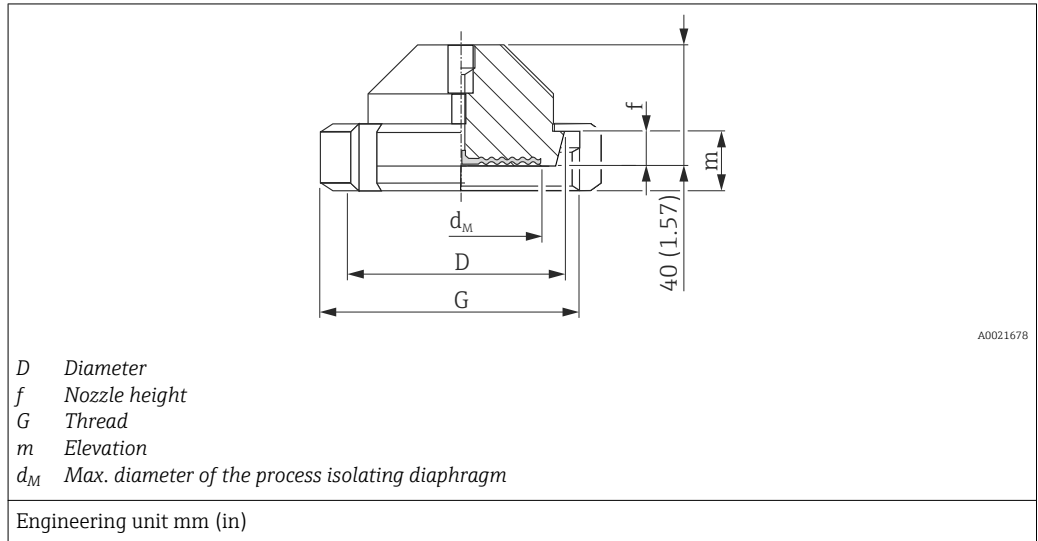
**APV-ISS nozzles with coupling nut**



Material <sup>1)</sup>	Nominal diameter	Nominal pressure	D	G	SW/AF	d <sub>M</sub>	Weight	Option <sup>2)</sup>
	[in]	[bar]						
AISI 316L	1	PN 40	54.1	1 ½" - 1/8"	46.8	24	0.4 (0.88)	TP
	1 ½	PN 40	72	2" - 1/8"	62	34	0.6 (1.32)	TQ
	2	PN 40	89	2 ½" - 1/8"	77	45	1.1 (2.43)	TS

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"

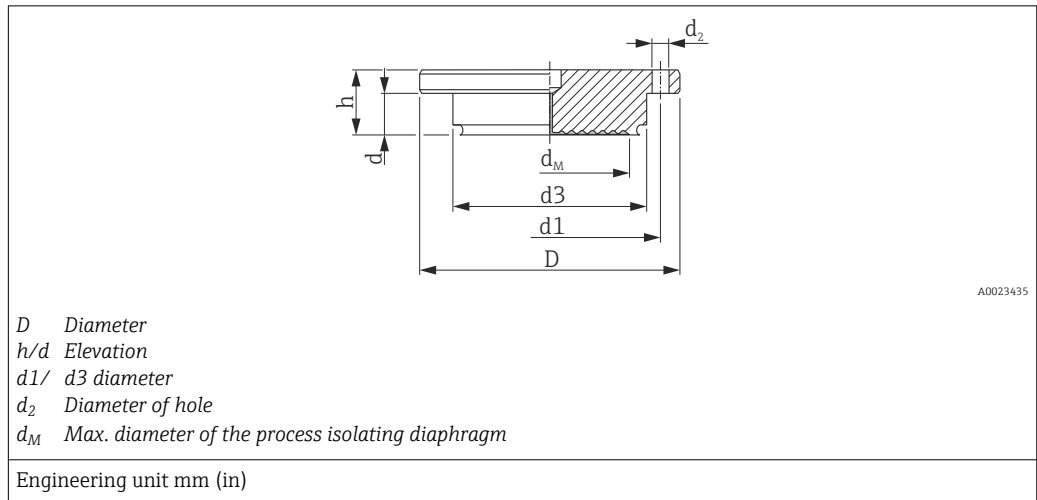
**Hygienic process connections for PMP75 with flush-mounted process isolating diaphragm**      **Conical coupling with union nut, DIN 11851**



Material <sup>1)</sup>	Conical coupling				Slotted nut		Diaphragm seal			Approval	Option <sup>2)</sup>
	Designation	Nominal pressure [bar]	D [mm]	f [mm]	G	m [mm]	d <sub>M</sub>		Weight [kg (lb)]		
							Standard [mm]	With TempC Membrane [mm]			
AISI 316L	DN 32	PN 40	50	10	Rd 58 x 1/6"	21	32	28	0.45 (0.99)	3A, EHEDG	MI <sup>3)</sup>
	DN 40	PN 40	56	10	Rd 65 x 1/6"	21	38	36	0.45 (0.99)	3A, EHEDG	MZ <sup>3)</sup>
	DN 50	PN 25	68.5	11	Rd 78 x 1/6"	19	52	48	1.1 (2.43)	3A, EHEDG	MR <sup>4)</sup>
	DN 65	PN 25	86	12	Rd 95 x 1/6"	21	66	61	2.0 (4.41)	3A, EHEDG	MS <sup>4)</sup>
	DN 80	PN 25	100	12	Rd 110 x 1/4"	26	81	61	2.55 (5.62)	3A, EHEDG	MT <sup>4)</sup>

- 1) Surface roughness of the wetted surfaces  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"
- 3) With TempC Membrane
- 4) Alternatively available with TempC Membrane.

NEUMO BioControl

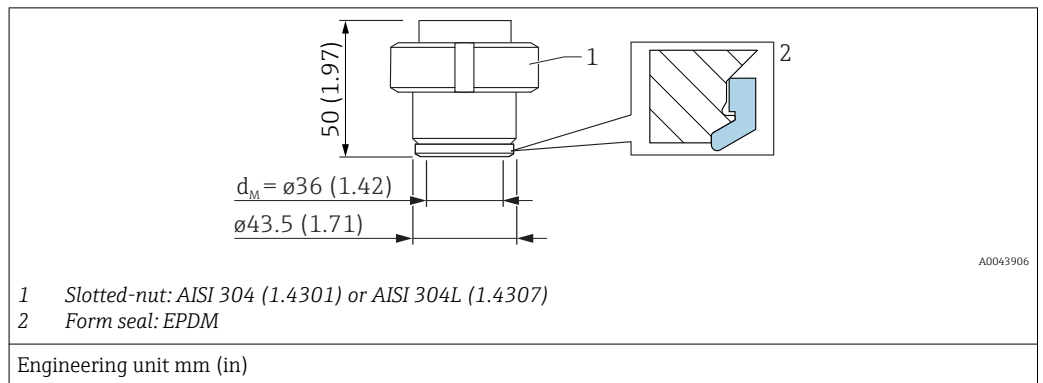


Material <sup>1)</sup>	NEUMO BioControl <sup>2)</sup>								Diaphragm seal			Approval	Option <sup>3)</sup>
									d <sub>M</sub>		Weight		
	Nominal diameter	Nominal pressure	D	d	d <sub>2</sub>	d <sub>3</sub>	d <sub>1</sub>	m	Standard	With TempC Membrane			
		[bar]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
AISI 316L	DN 50	PN 16	90	17	4 x Ø 9	50	70	27	40	36	1.1 (2.43)	3A	S4 <sup>4)</sup>
	DN 80	PN 16	140	25	4 x Ø 11	87.4	115	37	61	61	2.6 (5.73)	3A	S6 <sup>4)</sup>

- 1) Surface roughness of the surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) (Process temperature range: -10 to +200 °C (+14 to +392 °F))
- 3) Product Configurator, order code for "Process connection"
- 4) With TempC Membrane



**Universal process adapter**



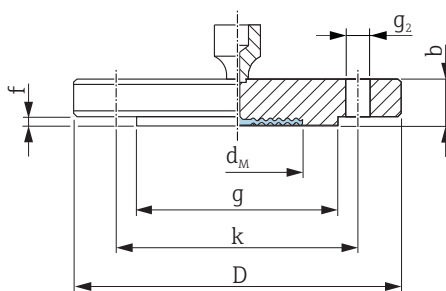
- The roughness of the surface in contact with the medium  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ )
- Temperature operating range:  $-60$  to  $+150 \text{ }^\circ\text{C}$  ( $-76$  to  $+302 \text{ }^\circ\text{F}$ )
- EPDM form seal:  
 FDA (177.2600), USP Class VI; 5 pcs, order number: 71100719

Designation	Nominal pressure	Material	Weight	Approval	Option <sup>1)</sup>
	bar (psi)		[kg (lb)]		
Universal process adapter EPDM form seal (2)	10	AISI 316L (1.4435)	0.8 (1.76)	3A	00 <sup>2)</sup>

1) Product Configurator, order code for "Process connection"  
 2) Alternatively available with TempC Membrane.

Process connections for  
PMP75 with flush-mounted  
process isolating diaphragm

EN/DIN flanges, connection dimensions in accordance with EN 1092-1



A0021680

$D$  Diameter of flange  
 $b$  Thickness  
 $g$  Raised face  
 $f$  Raised face  
 $k$  Hole circle  
 $g_2$  Diameter of hole  
 $d_M$  Max. diameter of the process isolating diaphragm

Engineering unit mm

Flange <sup>1) 2) 3)</sup>							Boltholes			Diaphragm seal		Option <sup>4)</sup>
Nominal diameter	Nominal pressure	Shape	D	b	g	f	Number	g <sub>2</sub>	k	d <sub>M</sub>	Weight	
			[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	
DN 25	PN 10-40	B1	115	18	68	3	4	14	85	32	2.1 (4.63)	CN <sup>5) 6)</sup>
DN 25	PN 63-160	B2	140	24	68	2	4	18	100	28	2.5 (5.51)	DN
DN 25	PN 250	B2	150	28	68	2	4	22	105	28	3.7 (8.16)	EN
DN 25	PN 400	B2	180	38	68	2	4	26	130	28	7.0 (15.44)	E1
DN 32	PN 10-40	B1	140	18	77	2.6	4	18	100	34	1.9 (4.19)	CP
DN 40	PN 10-40	B1	150	18	87	2.6	4	18	110	48	2.2 (4.85)	CQ
DN 50	PN 10-40	B1	165	20	102	3	4	18	125	59	3.0 (6.62)	B3 <sup>5) 6)</sup>
DN 50	PN 63	B2	180	26	102	3	4	22	135	59	4.6 (10.14)	C3
DN 50	PN 100-160	B2	195	30	102	3	4	26	145	59	6.2 (13.67)	EF
DN 50	PN 250	B2	200	38	102	3	8	26	150	59	7.7 (16.98)	ER
DN 50	PN 400	B2	235	52	102	3	8	30	180	59	14.7 (32.41)	E3
DN 80	PN 10-40	B1	200	24	138	3.5	8	18	160	89	5.3 (11.69)	B4 <sup>5) 6)</sup>
DN 80	PN 100	B2	230	32	138	4	8	24	180	89	8.9 (19.62)	C4
DN 100	PN 100	B2	265	36	175	5	8	30	210	89	13.7 (30.21)	C5

1) Material: AISI 316L

2) The roughness of the surface in contact with the medium including the raised face of the flanges (all standards) made of Alloy C276, Monel, tantalum, gold > 316L or PTFE is  $R_a < 0.8 \mu\text{m}$  ( $31.5 \mu\text{in}$ ). Lower surface roughness on request.

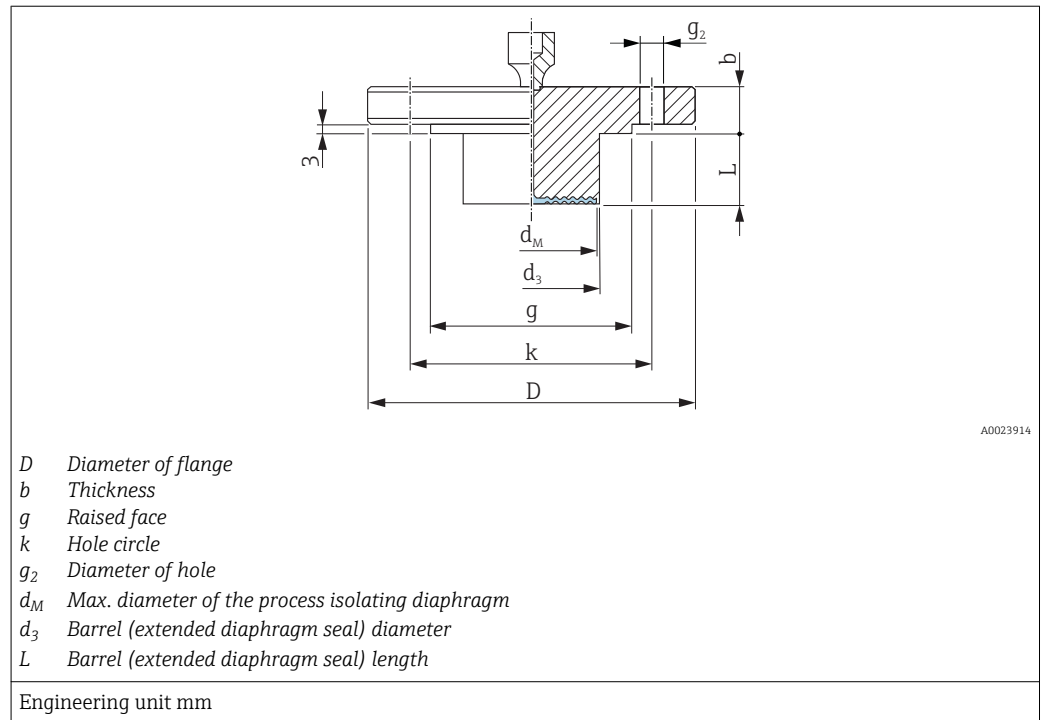
3) The flange raised face is made of the same material as the process isolating diaphragm.

4) Product Configurator, order code for "Process connection"

5) Alternatively available with TempC Membrane. Diameter of process isolating diaphragm changes with TempC version: DN25: 28 mm; DN50: 61 mm.

6) Alternatively available with gold-coated TempC Membrane (Product Configurator order code for "Membrane material" option "G").

EN/DIN flanges with extended diaphragm seal, connection dimensions in accordance with EN 1092-1



Flange <sup>1) 2)</sup>						Boltholes			Diaphragm seal		Option <sup>3)</sup>
Nominal diameter	Nominal pressure	Shape	D	b	g	Number	g <sub>2</sub>	k	d <sub>M</sub>	Weight	
			[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	
DN 50	PN 10-40	B1	165	20	102	4	18	125	47	<sup>4)</sup>	D3 <sup>4)</sup>
DN 80	PN 10-40	B1	200	24	138	8	18	160	72	<sup>4)</sup>	D4 <sup>4)</sup>

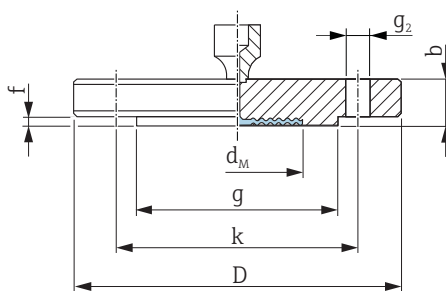
- 1) Material: AISI 316L
- 2) In the case of process isolating diaphragms made of Alloy C276, Monel or tantalum, the raised face of the flange and the barrel pipe are made of 316L
- 3) Product Configurator, order code for "Process connection"
- 4) Available with 50 mm (1.97 in), 100 mm (3.94 in) and 200 mm (7.87 in) barrel, (extended diaphragm seal), for barrel (extended diaphragm seal) diameter and weight see the following table

Option <sup>1)</sup>	Nominal diameter	Nominal pressure	L	d <sub>3</sub>	Weight
			[mm]	[mm]	[kg (lb)]
D3	DN 50	PN 10-40	50/100/200	48.3	3.2 (7.1)/ 3.8 (8.4)/ 4.4 (9.7)
D4	DN 80	PN 10-40	50 /100/200	76	6.2 (13.7)/ 6.7 (14.8)/ 7.8 (17.2)

- 1) Product Configurator, order code for "Process connection"

Process connections for  
PMP75 with flush-mounted  
process isolating diaphragm

ASME flanges, in accordance with connection dimensions ASME B 16.5, raised face RF



A0023913

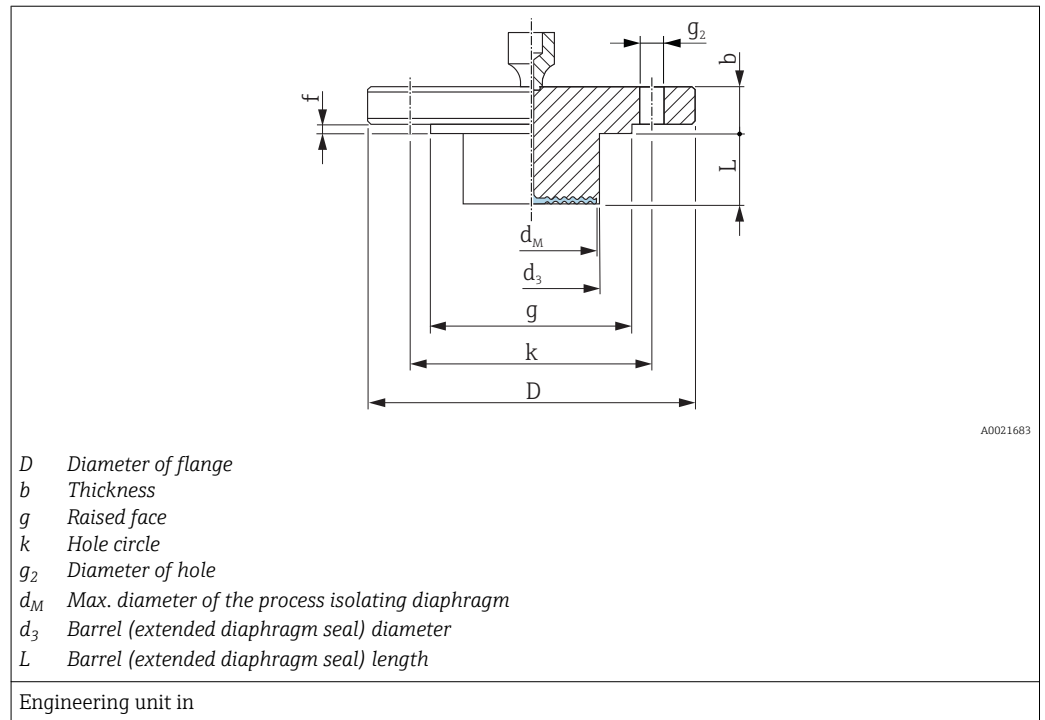
*D* Diameter of flange  
*b* Thickness  
*g* Raised face  
*f* Raised face  
*k* Hole circle  
*g<sub>2</sub>* Diameter of hole  
*d<sub>M</sub>* Max. diaphragm diameter

Engineering unit in

Flange <sup>1) 2) 3)</sup>						Boltholes			Diaphragm seal		Approval <sup>4)</sup>	Option <sup>5)</sup>
Nominal diameter	Class	D	b	g	f	Number	g <sub>2</sub>	k	d <sub>M</sub>	Weight		
[in]	[lb./sq.in]	[in]	[in]	[in]	[in]		[in]	[in]	[in]	[kg (lb)]		
1	150	4.25	0.56	2	0.08	4	0.62	3.12	1.26	1.2 (2.65)	CRN <sup>6)</sup>	AC <sup>7) 8)</sup>
1	300	4.88	0.69	2	0.08	4	0.75	3.5	1.26	1.3 (2.87)	CRN	AN <sup>7) 8)</sup>
1	400/600	4.88	0.69	2	0.25	4	0.75	3.5	1.26	1.4 (3.09)	CRN	HC
1	900/1500	5.88	1.12	2	0.25	4	1	4	1.26	3.2 (7.06)	CRN	HN
1	2500	6.25	1.38	2	0.25	4	1	4.25	1.26	4.6 (10.14)	CRN	HO
1 ½	150	5	0.69	2.88	0.06	4	0.62	3.88	1.89	1.5 (3.31)	CRN	AE
1 ½	300	6.12	0.81	2.88	0.06	4	0.88	4.5	1.89	2.6 (5.73)	CRN	AQ
2	150	6	0.75	3.62	0.06	4	0.75	4.75	2.32	2.2 (4.85)	CRN	AF <sup>7) 8)</sup>
2	300	6.5	0.88	3.62	0.06	8	0.75	5	2.32	3.4 (7.5)	CRN	AR <sup>7) 8)</sup>
2	400/600	6.5	1	3.62	0.25	8	0.75	5	2.32	4.3 (9.48)	CRN	HF
2	900/1500	8.5	1.5	3.62	0.25	8	1	6.5	2.32	10.3 (22.71)	CRN	HR
2	2500	9.25	2	3.62	0.25	8	1.12	6.75	2.32	15.8 (34.84)	-	H3
3	150	7.5	0.94	5	0.06	4	0.75	6	3.5	5.1 (11.25)	CRN	AG <sup>7) 8)</sup>
3	300	8.25	1.12	5	0.06	8	0.75	6	3.5	7.0 (15.44)	CRN	AS <sup>7) 8)</sup>
4	150	9	0.94	6.19	0.06	8	0.75	7.5	3.5	7.2 (15.88)	CRN	AH
4	300	10	1.25	6.19	0.06	8	0.88	7.88	3.5	11.7 (25.8)	CRN	AT

- 1) Material AISI 316/316L: Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 2) The roughness of the surface in contact with the medium including the raised face of the flanges (all standards) made of Alloy C276, Monel, tantalum, gold or PTFE is  $R_a < 0.8 \mu\text{m}$  (31.5  $\mu\text{in}$ ). Lower surface roughness on request.
- 3) The flange raised face is made of the same material as the process isolating diaphragm.
- 4) CSA approval: Product Configurator, order code for "Approval"
- 5) Product Configurator, order code for "Process connection"
- 6) CRN approval not for TempC Membrane.
- 7) Alternatively available with TempC Membrane. Diameter of process isolating diaphragm changes with TempC version: nominal diameter 1": 1.1 in; 2": 2.40 in.
- 8) Alternatively available with gold-coated TempC Membrane (Product Configurator order code for "Membrane material" option "G").

ASME flanges with barrel (extended diaphragm seal), connection dimensions in accordance with ASME B 16.5, raised face RF



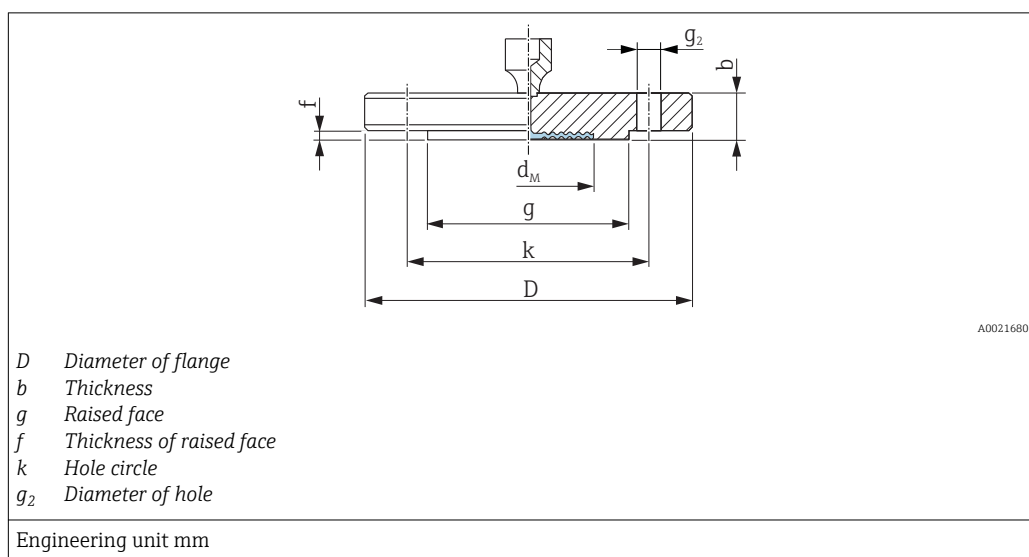
Flange <sup>1) 2)</sup>						Boltholes			Diaphragm seal		Approval <sup>3)</sup>	Option <sup>4)</sup>
Nominal diameter	Class	D	b	g	f	Number	g <sub>2</sub>	k	d <sub>M</sub>	Weight		
[in]	[lb./sq.in]	[in]	[in]	[in]	[in]		[in]	[in]	[in]	[kg (lb)]		
2	150	6	0.75	3.62	0.06	4	0.75	4.75	1.85	<sup>5)</sup>	CRN	J3 <sup>5)</sup>
3	150	7.5	0.94	5	0.06	4	0.75	6	2.83	<sup>5)</sup>	CRN	J4 <sup>5)</sup>
3	300	8.25	1.12	5	0.06	8	0.88	6.62	2.83	<sup>5)</sup>	CRN	J7 <sup>5)</sup>
4	150	9	0.94	6.19	0.06	8	0.75	7.5	3.5	<sup>5)</sup>	CRN	J5 <sup>5)</sup>
4	300	10	1.25	6.19	0.06	8	0.88	7.88	3.5	<sup>5)</sup>	CRN	J8 <sup>5)</sup>

- 1) Material: AISI 316/316L. Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 2) In the case of process isolating diaphragms made of Alloy C276, Monel or tantalum, the raised face of the flange and the barrel pipe are made of 316L.
- 3) CSA approval: Product Configurator, order code for "Approval"
- 4) Product Configurator, order code for "Process connection"
- 5) Choice of 2", 4", 6" or 8" barrel (extended diaphragm seal), for diameter and weight of barrel (extended diaphragm seal) see the following table

Option <sup>1)</sup>	Nominal diameter	Class	(L)	d <sub>3</sub>	Weight
	[in]	[lb./sq.in]	in (mm)	in (mm)	[kg (lb)]
J3	2	150	2 (50.8)/4 (101.6)/6 (152.4)/8 (203.2)	1.9 (48.3)	3.0 (6.6)/ 3.4 (7.5)/ 3.9 (8.6)/ 4.4 (9.7)
J4	3	150	2 (50.8)/4 (101.6)/6 (152.4)/8 (203.2)	2.99 (76)	6.0 (13.2)/6.6 (14.5)/7.1 (15.7)/7.8 (17.2)
J7	3	300	2 (50.8)/4 (101.6)/6 (152.4)/8 (203.2)	2.99 (76)	7.9 (17.4)/8.5 (18.7)/9.0 (19.9)/9.6 (21.2)
J5	4	150	2 (50.8)/4 (101.6)/6 (152.4)/8 (203.2)	3.7 (94)	8.6 (19)/9.9 (21.8)/11.2 (24.7)/12.4 (27.3)
J8	4	300	2 (50.8)/4 (101.6)/6 (152.4)/8 (203.2)	3.7 (94)	13.1 (28.9)/ 14.4 (31.6)/ 15.7 (34.6)/ 16.9 (37.3)

- 1) Product Configurator, order code for "Process connection"

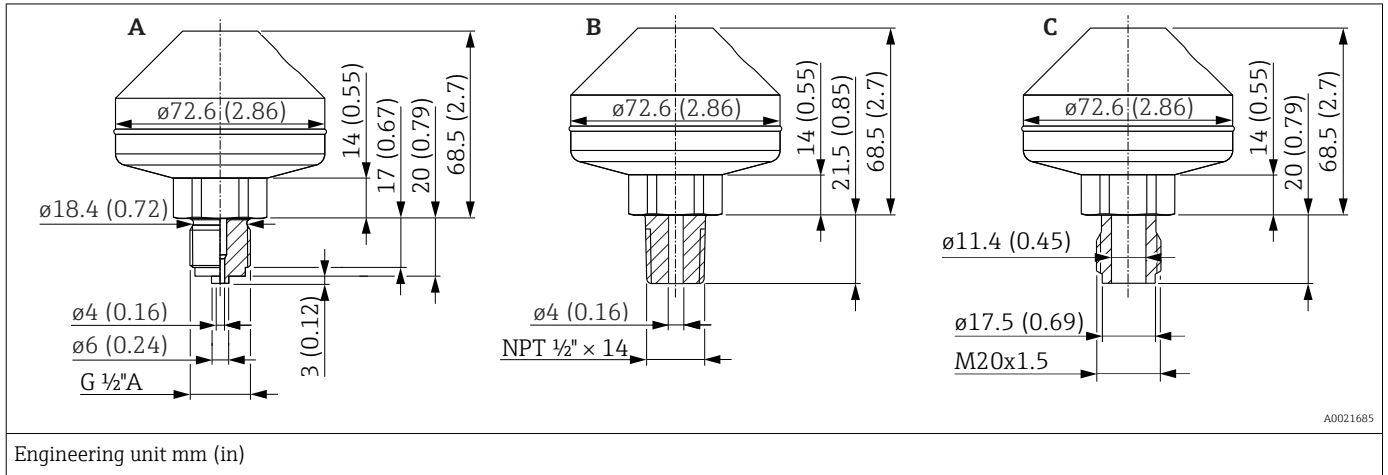
JIS flanges, connection dimensions in accordance with JIS B 2220 BL, raised face RF



Flange <sup>1) 2) 3)</sup>						Boltholes			Diaphragm seal		Option <sup>4)</sup>
Nominal diameter	Nominal pressure	D	b	g	f	Number	g <sub>2</sub>	k	d <sub>M</sub>	Weight	
		[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	
25 A	10 K	125	14	67	1	4	19	90	32	1.5 (3.31)	KC
50 A	10 K	155	16	96	2	4	19	120	59	2.3 (5.07)	CF
80 A	10 K	185	18	127	2	8	19	150	89	3.3 (7.28)	KL
100 A	10 K	210	18	151	2	8	19	175	89	4.4 (9.7)	KH

- 1) Material: AISI 316L
- 2) The roughness of the surface in contact with the medium including the raised face of the flanges (all standards) made of Alloy C276, Monel, tantalum, gold or PTFE is  $R_a < 0.8 \mu\text{m}$  (31.5  $\mu\text{in}$ ). Lower surface roughness on request.
- 3) The flange raised face is made of the same material as the process isolating diaphragm.
- 4) Product Configurator, order code for "Process connection"

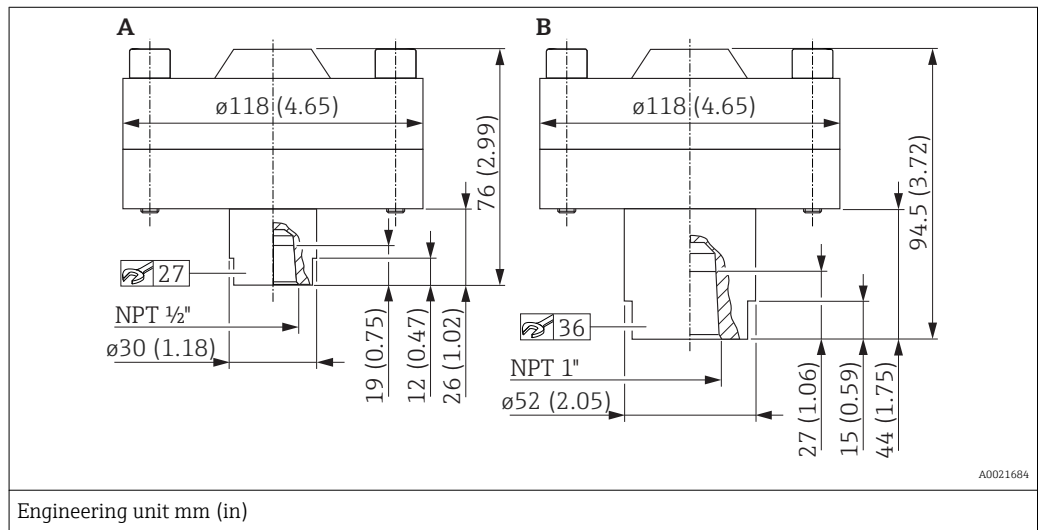
**Process connections for PMP75**      **Welded separators**



Item	Designation	Material	Measuring range [bar (psi)]	Nominal pressure	Approval	Weight [kg (lb)]	Option <sup>1)</sup>
A	Welded, ISO 228 G 1/2 A EN837	AISI 316L	≤ 160 (2320)	PN 160	-	1.43 (3.15)	UA
B	Welded, ANSI 1/2 MNPT						UB
C	Welded, thread DIN13 M20x1.5						UF

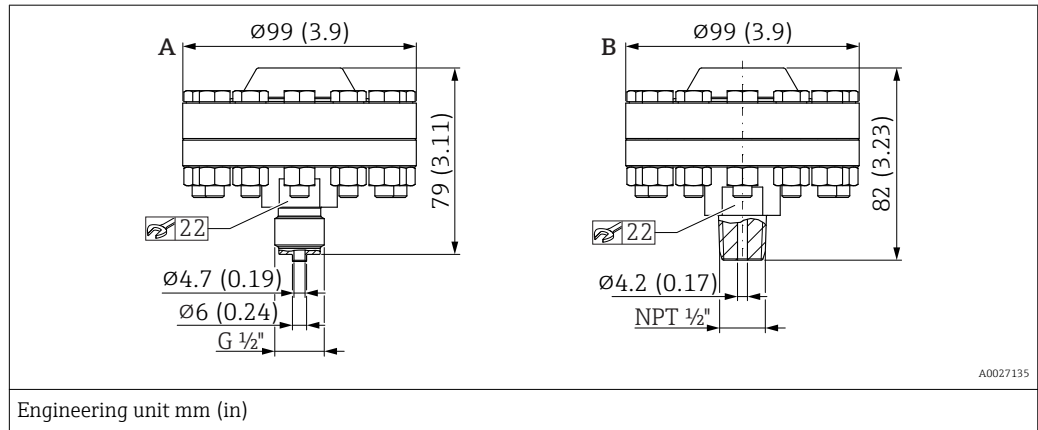
- 1) Product Configurator, order code for "Process connection"
- 2) CSA approval: Product Configurator, order code for "Approval"

**Threaded separators**



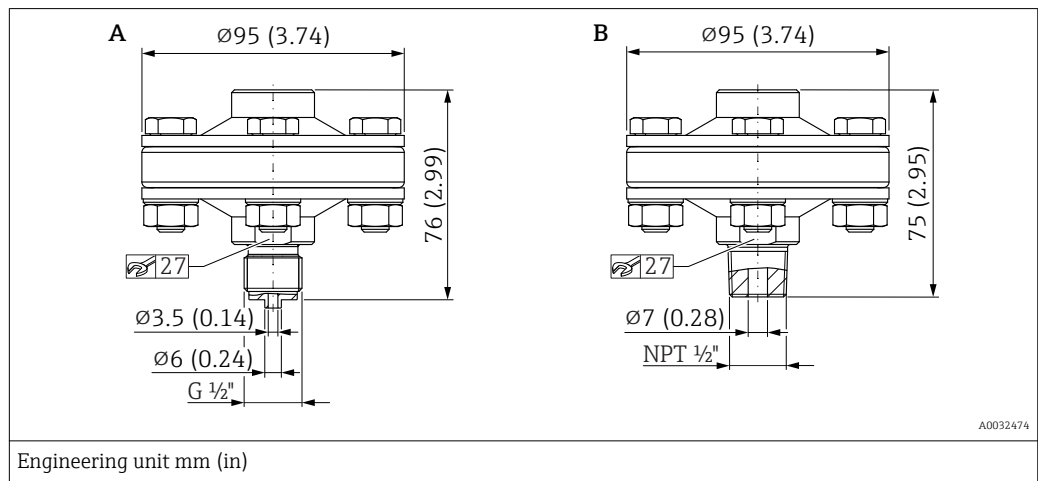
Item	Designation	Material	Measuring range [bar (psi)]	Nominal pressure	Weight [kg (lb)]	Option <sup>1)</sup>
A	Threaded, 1/2" NPT with FKM Viton seal -20 to +200 °C (-4 to +392 °F)	AISI 316L screws made of A4	≤ 250 (3625)	PN 250	4.75 (10.47)	UG
B	Threaded, 1" NPT with FKM Viton seal -20 to +200 °C (-4 to +392 °F)				5.0 (11.03)	UH

- 1) Product Configurator, order code for "Process connection"



Item	Designation	Material	Measuring range	Nominal pressure	Weight	Option <sup>1)</sup>
			[bar (psi)]		[kg (lb)]	
A	Threaded, ISO 228 G 1/2 A EN837 with PTFE seal -40 to +260 °C (-40 to +500 °F)	AISI 316L, screws made of A4	≤ 40 (580)	PN 40	1.43 (3.15)	UC <sup>2)</sup>
B	Threaded, ANSI 1/2 MNPT with PTFE seal -40 to +260 °C (-40 to +500 °F)					UD <sup>2)</sup>

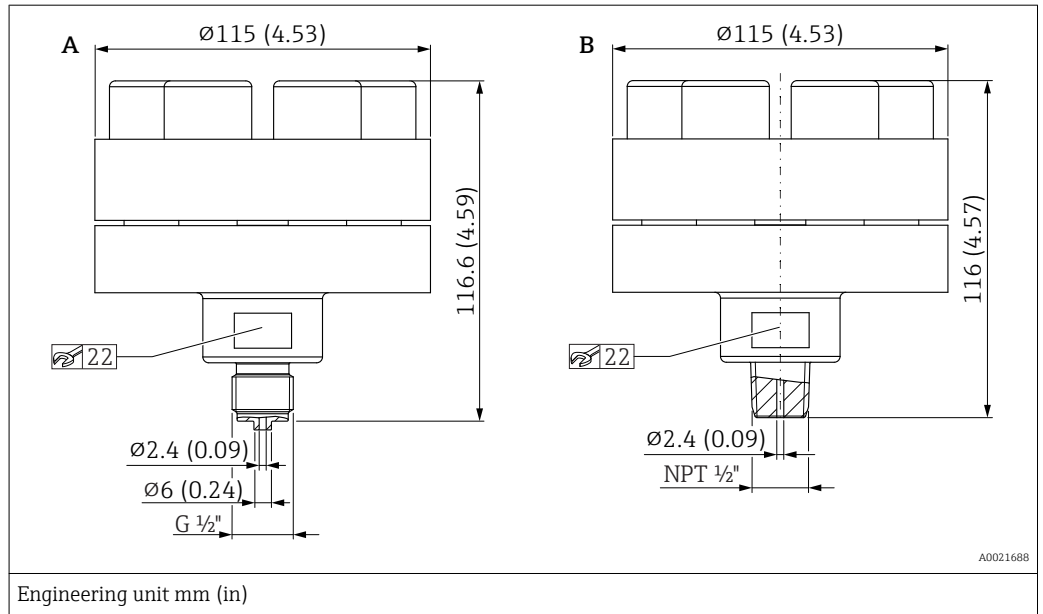
- 1) Product Configurator, order code for "Process connection"
- 2) In combination with silicone oil, inert oil and plant oil.



Item	Designation	Material	Measuring range	Nominal pressure	Weight	Option <sup>1)</sup>
			[bar (psi)]		[kg (lb)]	
A	Threaded, ISO 228 G 1/2 A EN837 with metal seal (silver-plated) -60 to +400 °C (-76 to +752 °F)	AISI 316L, screws made of A4	≤ 40 (580)	PN 40	1.38 kg (3.04 lb)	UC <sup>2)</sup>
B	Threaded, ANSI 1/2 MNPT with metal seal (silver-plated) -60 to +400 °C (-76 to +752 °F)					UD <sup>2)</sup>

- 1) Product Configurator, order code for "Process connection"
- 2) In combination with high-temperature oil.

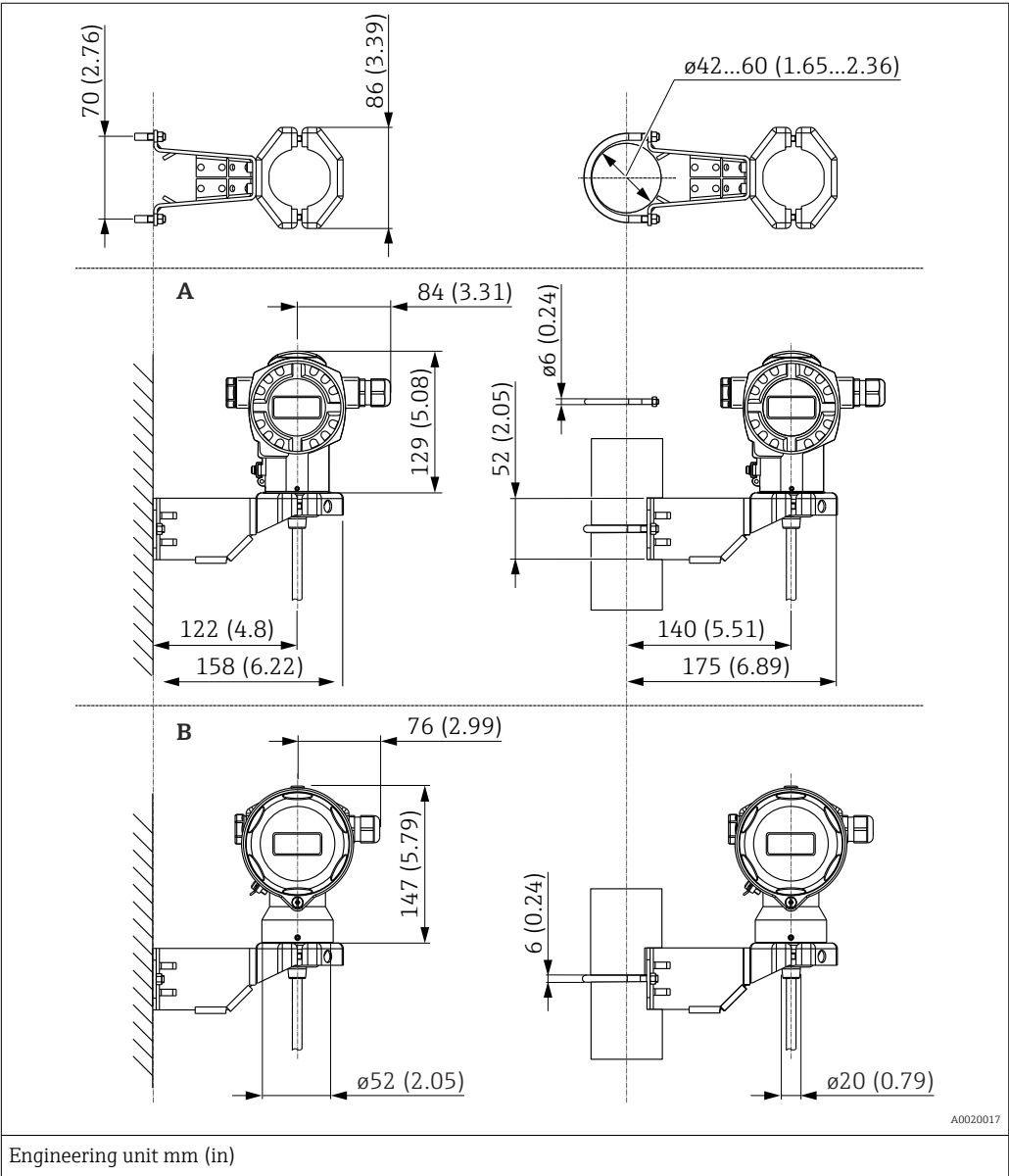




Item	Designation	Material	Measuring range	Nominal pressure <sup>1)</sup>	Weight	Option <sup>2)</sup>
			[bar (psi)]		[kg (lb)]	
A	Threaded, ISO 228 G 1/2 A EN837, with integrated seal lip -60 to +400 °C (-76 to +752 °F)	AISI 316L, screws made of A4	> 40 bar (580)	PN 400	4.75 (10.47)	UC
B	Threaded, ANSI 1/2 MNPT, with integrated seal lip -60 to +400 °C (-76 to +752 °F)					UD

- 1) This separator is assembled prior to delivery and must not be disassembled!
- 2) Product Configurator, order code for "Process connection"

Separate housing: Wall and pipe mounting with mounting bracket

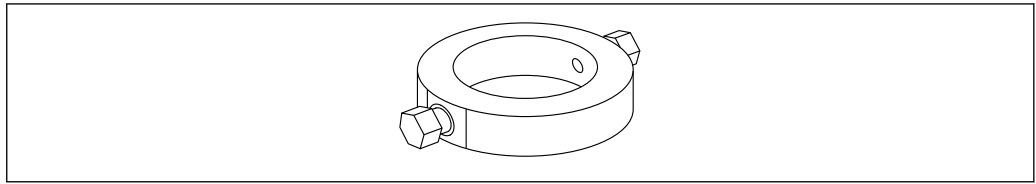


Item	Designation	Weight in kg (lb)		Option <sup>1)</sup>
		Housing (T14 or T17)	Mounting bracket	
A	Dimensions with T14 housing, optional side display	→ 53	0.5 (1.10)	U
B	Dimensions with T17 housing, optional side display			

1) Product Configurator, order code for "Additional options 2", version "G"

Also available for order as a separate accessory: part number 71102216

**Flushing rings**



A0028007

Use flushing rings if there is a risk of medium buildup or clogging at the process connection. The flushing ring is fitted between the process connection and the process connection provided by the customer.

Using the two lateral flushing holes, medium buildup or clogging in front of the process isolating diaphragm can be rinsed away and the pressure chamber vented.

Various nominal widths and forms allow adaption to the respective process flange.

For other details (dimension, weight, materials), see SD01553P/00/EN "Mechanical accessories for pressure measuring devices".

**Order options**

Flushing rings can be ordered as a separate accessory or as an order option for the device.

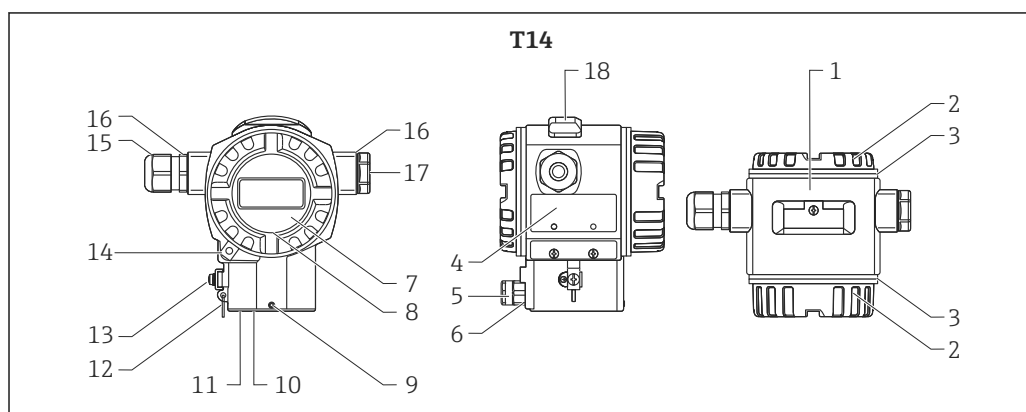
Material	Nominal diameter	Approval <sup>1)</sup>	Accessory <sup>2)</sup> Part number	Order option <sup>3) 4)</sup>
				PMP75
AISI 316L	EN1092-1			
	DN25	-	71377379	PO
	DN50	-	71377380	PP
	DN80	-	71377383	PQ
	ASME B16.5			
	NPS 1"	-	71377369	PK
	NPS 2"	CRN	71377370	PL
	NPS 3"	CRN	71377371	PM

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Inspection certification according to EN10204-3.1 material
- 3) Product Configurator order code for "Accessories enclosed"
- 4) Certificates ordered with the equipment (3.1 material certificate and NACE declaration of conformity and PMI tests) apply to the transmitters and flushing rings listed in the table.

Endress+Hauser offers additional flushing rings as **Technical Special Products (TSP)**.

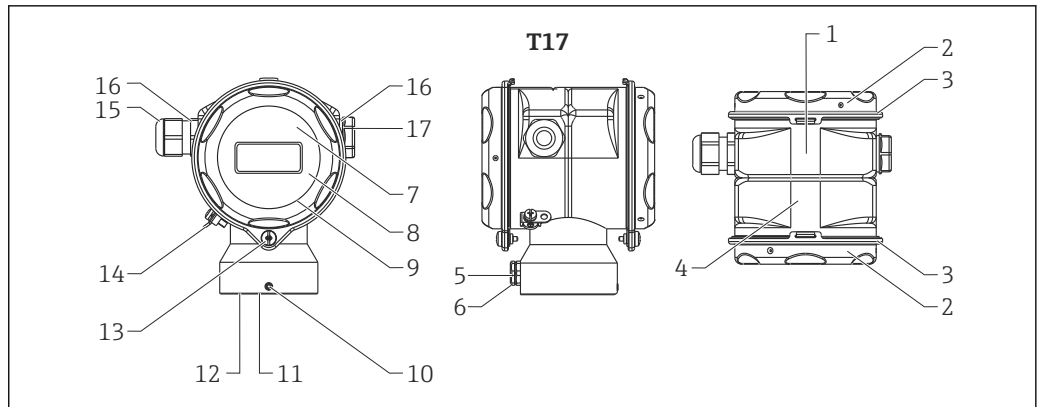
**Weight**

Component part	Weight
Housing	See "Housing" section
Process connection	See "Process connections" section
Capillary with armoring made of AISI 316L (1.4404)	0.16 kg/m (0.35 lb/m) + 0.35 kg (0.77 lb)
Capillary with armoring made of AISI 316L (PVC)	0.21 kg/m (0.46 lb/m) + 0.35 kg (0.77 lb)
Capillary with armoring made of AISI 316L (PTFE)	0.29 kg/m (0.64 lb/m) + 0.35 kg (0.77 lb)

**Materials not in contact with process Transmitter housing**


A0020019

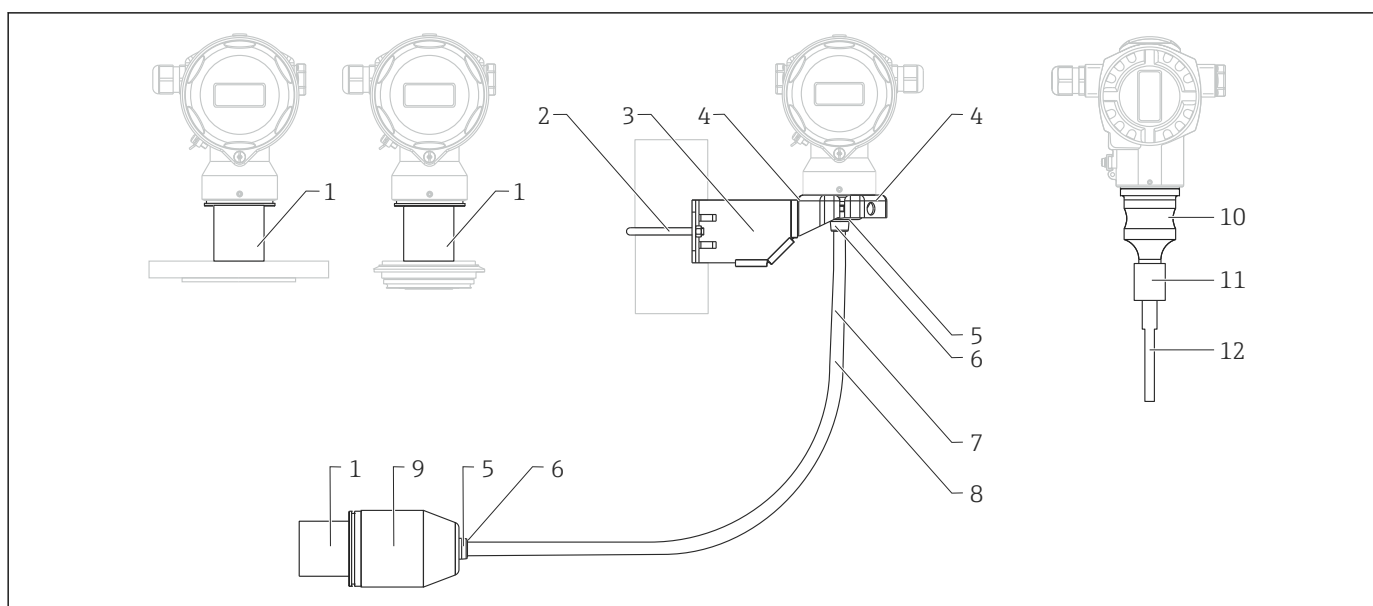
Item number	Component part	Material
1	T14 housing, RAL 5012 (blue)	<ul style="list-style-type: none"> <li>Die-cast aluminum with protective powder-coating on polyester base</li> <li>Thread coating: Heat-curing lubricant varnish</li> </ul>
1	T14 housing	<ul style="list-style-type: none"> <li>Precision casting AISI 316L (1.4435)</li> <li>Thread coating: Heat-curing lubricant varnish</li> </ul>
2	Cover, RAL 7035 (gray)	Die-cast aluminum with protective powder-coating on polyester base Precision cast AISI 316L (1.4435) (cover made of 316L if T14 housing made of 316L)
4	Nameplates	<ul style="list-style-type: none"> <li>AISI 316L (1.4404), if T14 housing is precision-cast</li> <li>Anodized aluminum, if housing T14/T15 of die-cast aluminum</li> </ul>
5	Pressure compensation filter	AISI 316L (1.4404) and PBT-FR
6	Pressure compensation filter, O-ring	VMQ or EPDM
7	Sight glass	Mineral glass
8	Sight glass seal	Silicone (VMQ)
9	Screw	A4
10	Sealing ring	EPDM
11	Snap ring	PA66-GF25
12	Snap ring for nameplates	AISI 304 (1.4301)/AISI 316 (1.4401)
13	External ground terminal	AISI 316L (1.4404)
14	Cover clamp	Clamp AISI 316L (1.4435), screw A4
15	Cable entry	Polyamide (PA) or CuZn nickel-plated
16	Seal of cable entry and plug	Silicone (VMQ)
17	Blind plug	PBT-GF30 FR, for dust ignition-proof and Exd: AISI 316L (1.4435)
18	External operation (keys and key cover), RAL 7035 (gray)	Polycarbonate PC-FR, screw A4
Devices with MID parts certificate	Seal wire	DIN 1367-0 St/Zn (soft galvanized steel)
Devices with MID parts certificate	Seals	Pb (lead)



A0020021

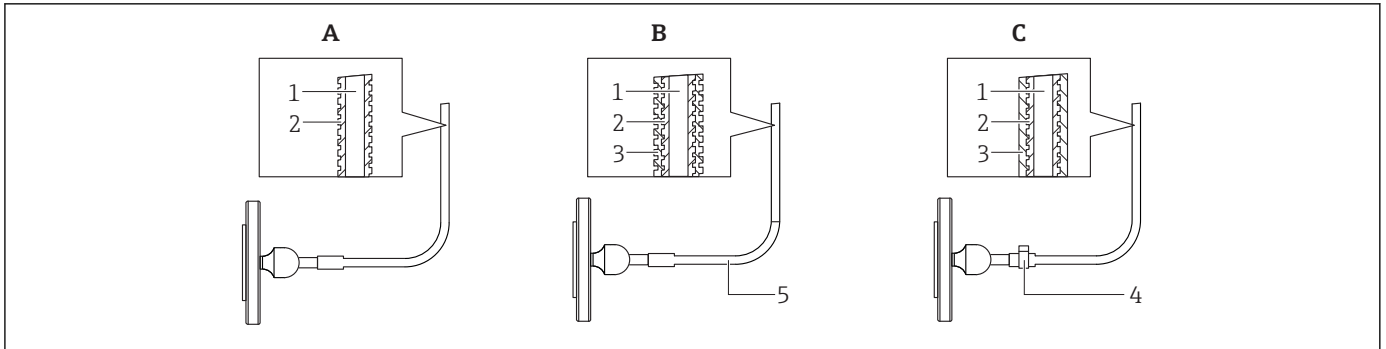
Item number	Component part	Material
1	T17 housing	AISI 316L (1.4404)
2	Cover	
3	Cover seal	EPDM
4	Nameplates	Lasered on
5	Pressure compensation filter	AISI 316L (1.4404) and PBT-FR
6	Pressure compensation filter, O-ring	VMQ or EPDM
7	Sight glass for non-hazardous area, ATEX Ex ia, NEPSI Zone 0/1 Ex ia, IECEx Zone 0/1 Ex ia, FM NI, FM IS, CSA IS	Polycarbonate (PC)
8	Sight glass for ATEX 1/2 D, ATEX 1/3 D, ATEX 1 GD, ATEX 1/2 GD, ATEX 3 G, FM DIP, CSA dust ignition-proof	Mineral glass
9	Sight glass seal	EPDM
10	Screw	A2-70
11	Sealing ring	EPDM
12	Snap ring	PA6
13	Screw	A4-50 Thread coating: Heat-curing lubricant varnish
14	External ground terminal	AISI 316L (1.4404)
15	Cable entry	Polyamide (PA), for dust ignition-proof: CuZn nickel-plated
16	Seal of cable entry and plug	Silicone (VMQ)
17	Blind plug	PBT-GF30 FR, for dust ignition-proof: AISI 316L (1.4435)
Devices with MID parts certificate	Seal wire	DIN 1367-0 St/Zn (soft galvanized steel)
Devices with MID parts certificate	Seals	Pb (lead)

## Connecting parts



A0028222

Item number	Component part	Material
1	Connection between the housing and process connection	AISI 316L (1.4404)
2	Mounting bracket	Bracket AISI 316L (1.4404)
3		Screw and nuts A4-70
4		Half-shells: AISI 316L (1.4404)
5	Seal for cable from separate housing	EPDM
6	Gland for cable from separate housing	AISI 316L (1.4404)
7	PE cable for separate housing	Abrasion-proof cable with strain-relief Dynema members; shielded using aluminum-coated foil; insulated with polyethylene (PE-LD), black; copper wires, twisted, UV-resistant
8	FEP cable for separate housing	Abrasion-proof cable; shielded using galvanized steel wire netting; insulated with fluorinated ethylene propylene (FEP), black; copper cores, twisted, UV-resistant
9	Process connection adapter for separate housing	AISI 316L (1.4404)
10	Cell body	AISI 316L (1.4404)
11	Connection between body of measuring cell and capillary	AISI 316L (1.4404)
12	Heat-shrink tube (available only if capillary has PTFE or PVC sheath)	Polyolefin



A0028087

Position	Component part	A Standard <sup>1)</sup> Armor for capillary	B PVC-coated Armor for capillary	C PTFE hose Armor for capillary
1	Capillary	AISI 316 Ti (1.4571)	AISI 316 Ti (1.4571)	AISI 316 Ti (1.4571)
2	Protective hose for capillary	AISI 316L (1.4404) <sup>2)</sup>	AISI 316L (1.4404)	AISI 316L (1.4404)
3	Coating/armor	-	PVC <sup>3)</sup>	PTFE <sup>4)</sup>
4	Single-ear clamp	-	-	1.4301
5	Shrink tubing at capillary junction	-	Polyolefin	-

- 1) If no option is specified when ordering, order option "SA" is supplied.
- 2) Product Configurator, order code for "Armor for capillary:" option "SA"
- 3) Product Configurator, order code for "Armor for capillary:" option "SB"
- 4) Product Configurator, order code for "Armor for capillary:" option "SC"

**Materials in contact with process**

**NOTICE**

- ▶ The device components in contact with the process are specified in the "Mechanical construction" → 📖 52 and "Ordering information" → 📖 126 sections.

**Delta-ferrite content**

A delta-ferrite content of  $\leq 3\%$  can be guaranteed and certified for the wetted parts if option "8" is selected in the "Additional options 1" or "Additional options 2" order code in the Product Configurator.

If the PMC71 with hygienic process connections is selected, a delta-ferrite content of  $\leq 1\%$  can be guaranteed and certified if option "8" is selected in the "Additional options 1" or "Additional options 2" order code in the Product Configurator.

**TSE Certificate of Suitability (Transmissible Spongiform Encephalopathy)**

The following applies to all device components in contact with the process:

- They do not contain any materials derived from animals.
- No additives or operating materials derived from animals are used in production or processing.

**Process connections**

- "Clamp connections" and "Hygienic process connections": AISI 316L (DIN/EN material number 1.4435)
- Endress+Hauser supplies process connections with a threaded connection as well as DIN/ EN flanges made of stainless steel as per AISI 316L (DIN/EN material number 1.4404 or 1.4435). With regard to their stability-temperature property, the materials 1.4404 and 1.4435 are grouped together under 13EO in EN 1092-1: 2001 Tab. 18. The chemical composition of the two materials can be identical.
- Some process connections are also available in alloy C276 (DIN/EN material number 2.4819). For this purpose see the information in the "Mechanical construction" section.

## Process isolating diaphragm

Sensor	Designation	Option <sup>1)</sup>
PMC71	Al <sub>2</sub> O <sub>3</sub> aluminum-oxide ceramic FDA, ultra-pure 99.9 % <sup>2)</sup> Ceraphire® (see also <a href="http://www.endress.com/ceraphire">www.endress.com/ceraphire</a> )	Standard
PMP71	AISI 316L	1
	AISI 316L with gold-rhodium coating	6
	Alloy C276 (2.4819)	2
PMP75	AISI 316L with gold coating (25 µm), TempC <sup>3)</sup>	G
	AISI 316L	1
	AISI 316L, TempC <sup>3)</sup>	E
	AISI 316L with gold-rhodium coating	6
	AISI 316L with 0.25 mm (0.01 in) PTFE coating	8
	Alloy C276 (2.4819)	2 <sup>4)</sup>
	Monel (2.4360)	3 <sup>4)</sup>
	AISI 316L with gold coating	4
Tantalum (UNS R05200)	5 <sup>4)</sup>	

- 1) Product Configurator, order code for "Membrane material"
- 2) The US Food & Drug Administration (FDA) has no objections to the use of ceramics made of aluminum oxide as a surface material in contact with foodstuffs. This declaration is based on the FDA certificates of our ceramic suppliers
- 3) The TempC gold-plated membrane does not offer corrosion protection!
- 4) The material of the flange raised face is the same material as is used for the process isolating diaphragm. For devices with a barrel (extended diaphragm seal), the flange raised face and the barrel pipe are made of 316L.

## Seals

Device	Designation	Option <sup>1)</sup>
PMC71	FKM Viton	A
	FKM Viton, FDA	G
	EPDM	B
	FFKM Perlast G75LT	C
	Kalrez	D
	Chemraz	E
	NBR (FDA)/3A: HNBR (FDA)	F
	FKM Viton, cleaned for PWIS-free applications	L
	Kalrez, cleaned for PWIS-free applications	M
	FKM Viton, cleaned from oil and grease	1
	FKM Viton, cleaned for oxygen service, observe pressure and temperature application limits	2

- 1) Product Configurator, order code for "Seal"



**Fill fluid**

**PMP71**

Designation	Option <sup>1)</sup>
Silicone oil	A
Inert oil	F
Inert oil, cleaned from oil and grease	K
Inert oil, cleaned for oxygen service (observe application limits pressure/temperature)	N

1) Product Configurator, order code for "Fill fluid"

**PMP75**

Designation	Option <sup>1) 2)</sup>
Silicone oil (food-safe FDA 21 CFR 175.105)	A
...m capillary, inert oil	B
...ft capillary, inert oil	C
Vegetable oil (food-safe FDA 21 CFR 172.856)	D
Inert oil	F
High-temperature oil, temperature isolator	G
Silicone oil, temperature isolator (food-safe FDA 21 CFR 175.105)	H
Vegetable oil, temperature isolator	J
Inert oil, cleaned from oil and grease	K
Inert oil, cleaned for oxygen service	N
...m capillary, silicone oil (food-safe FDA 21 CFR 175.105)	1
...ft capillary, silicone oil (food-safe FDA 21 CFR 175.105)	2
...m capillary, high-temperature oil	3
...ft capillary, high-temperature oil	4
...m capillary, vegetable oil (food-safe FDA 21 CFR 172.856)	5
...ft capillary, vegetable oil (food-safe FDA 21 CFR 172.856)	6
...m capillary, low-temperature oil	7
...ft capillary, low-temperature oil	8

1) Product Configurator, order code for "Fill fluid"

2) For diaphragm seal devices with 3-A and EHEDG certificates, only select filling oils with FDA approval!

## Operability

### Operating concept

#### Operator-oriented menu structure for user-specific tasks

- Commissioning
- Operation
- Diagnosis

#### Quick and safe commissioning

Guided menus for applications

#### Reliable operation

- Local operation possible in several languages
- Standardized operation at the device and in the operating tools
- Parameters relating to measured values can be locked/unlocked using the device's write protection switch, using the device software or via remote operation

#### Efficient diagnostics increase measurement availability

- Remedial measures are integrated in plain text
- Diverse simulation options

### Local operation

#### Functions

Function	External operation (operating keys, optional, not T17 housing)	Internal operation (electronic insert)	Onsite display (optional)
Position adjustment (zero point correction)	✓	✓	✓
Setting lower range value and upper range value - reference pressure present at the device	✓ (HART only)	✓ (HART only)	✓
Device reset	✓	✓	✓
Locking and unlocking parameters relevant to the measured value	—	✓	✓
Value acceptance indicated by the green LED	✓	✓	✓
Switching damping on and off	✓ (only if display is connected)	✓ (HART and PA only)	✓
Configuring the bus address of the device (PA)	—	✓	✓
Switching simulation mode on and off (FOUNDATION Fieldbus)	—	✓	✓

#### Operating the device using onsite display (optional)

A 4-line liquid crystal display (LCD) is used for display and operation. The onsite 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 display can be removed for easy operation.

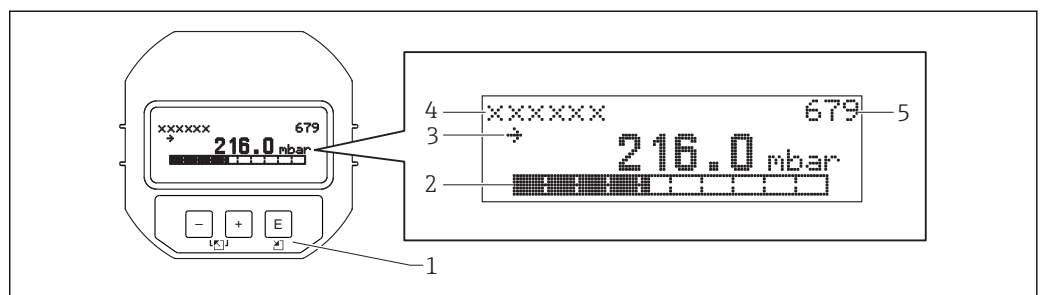
The device display can be turned in 90° steps.

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 and bar graph for
  - 4 to 20 mA HART (bar graph from 4 to 20 mA)
  - 1-5V DC (bar graph from 1 to 5 volt)
  - PROFIBUS PA (bar graph as graphic display of standardized value of AI block)
  - FOUNDATION Fieldbus (bar graph as graphic display of transducer output).
- 
- Simple and complete menu guidance due to breakdown of parameters into several levels and groups.
- Menu guidance in up to 8 languages
- Each parameter is given a 3-digit ID number for easy navigation.
- Option for configuring the display according to individual requirements and preferences, 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

Overview

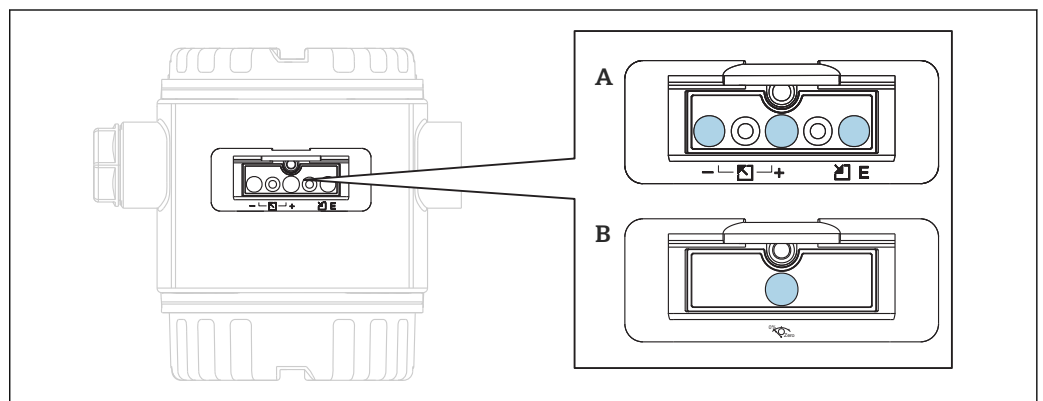


A0016498

- 1 Operating keys
- 2 Bargraph
- 3 Symbol
- 4 Header
- 5 Parameter ID number

Operating keys on the exterior of the device

With the aluminum housing (T14), the operating keys are located either outside on the housing, under the protection cap or inside on the electronic insert. With the stainless steel housing (T17), the operating keys are always located inside the housing on the electronic insert.



A0020030

- A 1-5V DC and 4 to 20 mA HART
- B PROFIBUS PA and FOUNDATION Fieldbus

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.

Ordering information:

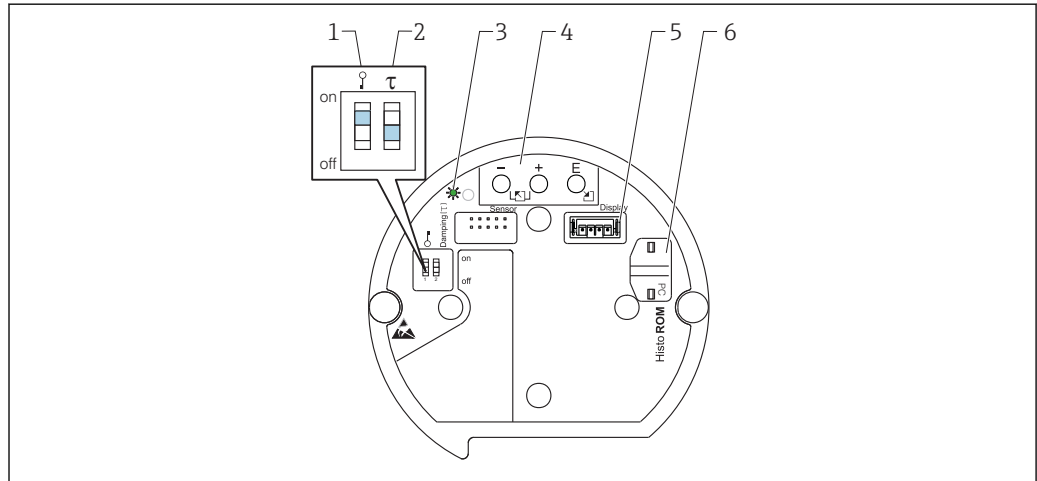
Product Configurator, order code for "Output, operation"

**Operating keys and elements located internally on the electronic insert**

Ordering information:

Product Configurator, order code for "Output, operation"

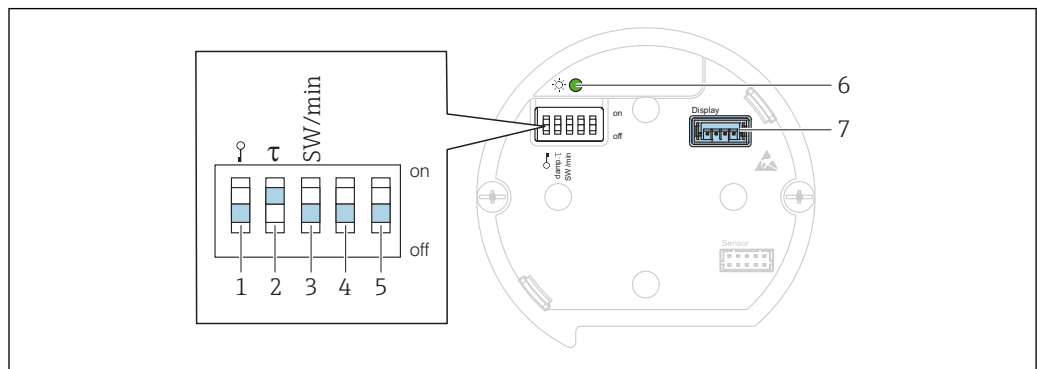
*HART*



A0020031

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

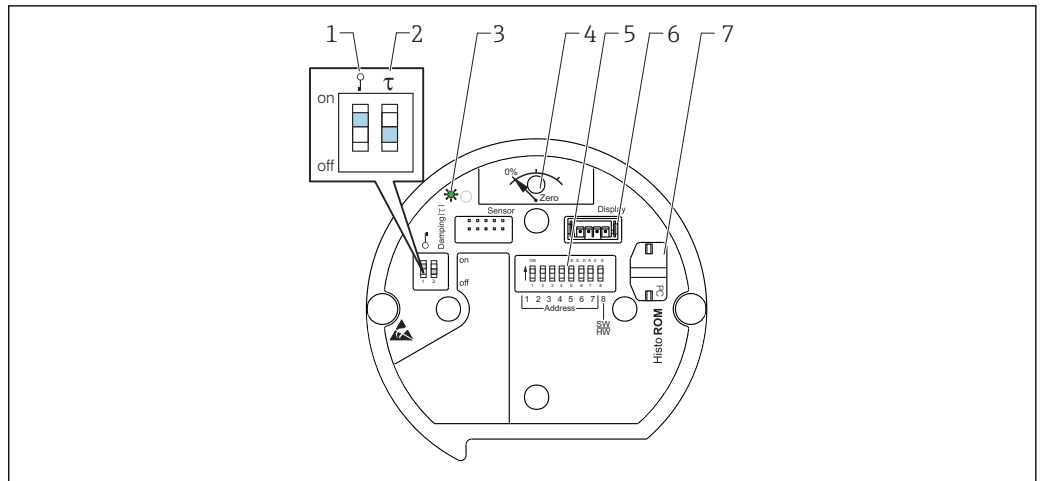
*1-5V DC*



A0031800

- 1 *DIP switch for locking/unlocking parameters relevant to the measured value*
- 2 *DIP switch for switching damping on/off*
- 3 *DIP switch for alarm voltage/alarm current SW / alarm min (0.9 V/~3.6 mA)*
- 4...5 *Not assigned*
- 6 *Green LED to indicate value being accepted*
- 7 *Slot for display*

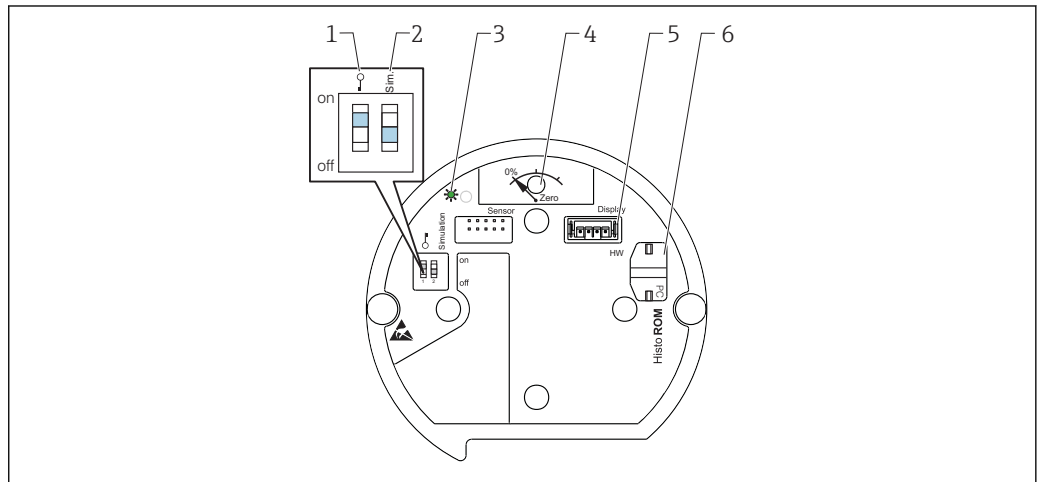
PROFIBUS PA



A0020032

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

FOUNDATION Fieldbus



A0020033

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

Remote operation

All software parameters are accessible depending on the position of the write protection switch on the device.

Hardware and software for remote operation 1)	HART	PROFIBUS PA	FOUNDATION Fieldbus
FieldCare	✓	✓	✓
FieldXpert SFX100	✓	—	✓

Hardware and software for remote operation 1)	HART	PROFIBUS PA	FOUNDATION Fieldbus
NI-FBUS Configurator	–	–	✓
HistoROM®/M-DAT	✓	✓	✓

1) Not for 1-5V DC

### FieldCare

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

FieldCare supports the following functions:

- Configuration of transmitters in offline and online mode
- Device data upload/download (not for 1-5V DC)
- HistoROM®/M-DAT analysis
- Documentation of the measuring point

Connection options:

- HART via Commubox FXA195 and USB interface of a computer
- PROFIBUS PA via segment coupler and PROFIBUS interface card
- Service interface with Commubox FXA291 and ToF adapter FXA291 (USB).



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

### Field Xpert SFX100

Field Xpert is an industrial PDA with integrated 3.5" touchscreen from Endress+Hauser based on Windows Mobile. It offers wireless communication via the optional VIATOR Bluetooth modem from Endress+Hauser. Field Xpert also works as a stand-alone device for asset management applications. For details, refer to BA00060S/04/EN.

### Commubox FXA195

For intrinsically safe HART communication with FieldCare via the USB interface. For details refer to TI00404F/00/EN.

### Commubox FXA291

The Commubox FXA291 connects Endress+Hauser field devices with a CDI interface (=Endress+Hauser Common Data Interface) to the USB interface of a personal computer or a notebook. For details refer to TI00405C/07/EN.



For the following Endress+Hauser devices 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 devices of the ToF platform, pressure equipment and Gammapilot via the USB interface of a personal computer or a notebook. For details refer to KA00271F.

### Profiboard

For connecting a PC to the PROFIBUS.

### Proficard

For connecting a laptop to the PROFIBUS.

### FF configuration program

FF configuration program, such as NI-FBUS Configurator, to

- connect devices with "FOUNDATION Fieldbus signal" into an FF-network
- set FF-specific parameters

*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 concepts.

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 methods specified in the manufacturer-specific DD (e.g. basic device settings)
- Display DD menus (e.g. tab for calibration data)
- Download a configuration
- Verify a configuration and compare it to a saved configuration
- Monitor a downloaded configuration
- Replace devices
- Save and print a configuration

**HistoROM®/M-DAT (optional)**

The HistoROM®/M-DAT is a memory module that can be attached to any electronic insert (not for 1-5V DC). 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 diagnosis 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).

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, 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.

Ordering information:

Product Configurator, order code for "Additional options:", version "N" or

Product Configurator, order code for "Application package:", option "EN" or

as a separate accessory (part no.: 52027785).



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

**System integration**

The device can be given a tag name (max. 8 alphanumeric characters).

Designation	Option <sup>1)</sup>
Measuring point (TAG), see additional specifications	Z1
Bus address, see additional spec.	Z2

1) Product Configurator, order code for "Identification"

## Planning instructions for diaphragm seal systems


### NOTICE

#### Diaphragm seal systems sized/ordered incorrectly

The performance and the permitted range of application of a diaphragm seal system depend on the process isolating diaphragm used, the filling oil, the coupling, the unit design and on the specific process and ambient conditions present in the individual application.

- ▶ To help you select the right diaphragm seal systems for your particular applications, Endress+Hauser provides its customers with the "Applicator Sizing Diaphragm Seal" selection tool, which is available free of charge at "[www.endress.com/applicator](http://www.endress.com/applicator)" or as a download.

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 For further details, or for information on an optimum diaphragm seal solution, please contact your local Endress+Hauser Sales Center.

### Applications

Diaphragm seal systems should be used if the process and the device need to be separated. Diaphragm seal systems offer clear advantages in the following instances:

- In the case of extreme process temperatures
- For aggressive media
- In the case of process media that crystallize
- In the case of corrosive or highly various process media or process media with solids content
- In the case of heterogeneous and fibrous process media
- If extreme measuring point cleaning is necessary, or in the event of very damp mounting locations
- If the measuring point is exposed to severe vibrations
- For mounting locations that are difficult to access



**Function and design**

Diaphragm seals separate the measuring system from the process.

A diaphragm seal system consists of:

- A diaphragm seal
- A capillary tube or a temperature isolator if necessary
- 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 to the sensor of the pressure transmitter.

Endress+Hauser delivers all diaphragm seal systems as welded versions. The system is hermetically sealed, which ensures greater reliability.

The diaphragm seal determines the application range of the system on the basis of

- The diameter of the process isolating diaphragm
- The stiffness and material of the process isolating diaphragm
- The design (oil volume)

**Diameter of the process isolating diaphragm**

The greater the diameter of the process isolating diaphragm (less stiff), the smaller the temperature effect on the measurement result.

**Stiffness of the process isolating diaphragm**

The stiffness depends on the diameter of the process isolating diaphragm, the material, any existing coating, the thickness and shape of the process isolating diaphragm. The thickness of the process isolating diaphragm and the shape are determined by the design. The stiffness of a process isolating diaphragm of a diaphragm seal influences the temperature application range and the measuring error caused by temperature effects.

*The Endress+Hauser TempC Membrane: Highest accuracy and process safety when measuring pressure and differential pressure using diaphragm seals*

To measure with even greater accuracy in these applications and increase process safety, Endress +Hauser has developed the TempC Membrane which is based on a completely revolutionary technology. This diaphragm guarantees the utmost level of accuracy and process safety in diaphragm seal applications.

- The very low temperature effect minimizes the effect of process and ambient temperature fluctuations, thereby guaranteeing accurate and reliable measurements. Measurement inaccuracies caused by temperature are reduced to a minimum.
- The TempC Membrane can be used at temperatures between  $-70\text{ °C}$  ( $-94\text{ °F}$ ) and  $+400\text{ °C}$  ( $+752\text{ °F}$ ). This guarantees maximum process safety even for very long sterilization and cleaning cycles (SIP/CIP) in tanks and pipes at high temperatures.
- Smaller instrumentation dimensions are possible thanks to the TempC Membrane. With a smaller process connection, the new membrane measures at least as accurately as a conventional membrane with a larger diameter.
- Due to the geometry of the membrane, an overshoot occurs initially immediately following a temperature shock. This results in a transient response, the duration and deviation of which are significantly less compared to traditional membrane types. In the case of batch processes, these shorter recovery times mean a far higher level of availability of the production facilities. For TempC Membranes, the effect of the overshoot on the output signal can be reduced by adjusting the damping.

Ordering information:

See the Product Configurator for the individual process connection and the choice of process isolating diaphragm.

Selection in the Applicator:

Under "Transmitter data" in the "Membrane material" field.

**Capillary**

As standard, capillaries with an internal diameter of 1 mm (0.04 in) are used.

The capillary tube influences the thermal change, the ambient temperature operating range and the response time of a diaphragm seal system as a result of its length and internal diameter.

**Filling oil**

The medium and ambient temperatures as well as the process pressure are very important factors that must be considered when selecting the filling oil. Pay attention to the temperatures and pressures during commissioning and cleaning. Another selection criterion is the compatibility of the filling oil with the requirements of the medium. For example, only filling oils that do not present a health hazard may be used in the food industry, e.g. vegetable oil or silicone oil (see also the following section "Diaphragm seal filling oils").

The filling oil used influences the thermal change, the temperature application range of a diaphragm seal system and the response time. A temperature change results in a volume change in the filling oil. The volume change is dependent on the expansion coefficient and on the volume of the filling oil at calibration temperature (constant in range: +21 to +33 °C (+70 to +91 °F)). The application range can be extended by a filling oil with a lower expansion coefficient and a shorter capillary.

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 together with the process pressure on the measuring cell, thus shifting the zero point.

**Pressure transmitter**

The pressure transmitter influences the temperature operating range, the TK zero point and the response time as a result of its volume change. The volume change is the volume that has to be shifted in order to pass through the complete measuring range.

Pressure transmitters from Endress+Hauser are optimized with regard to minimum volume change.

**Diaphragm seal filling oils**

Medium	$P_{abs} = 0.05 \text{ bar (0.725 psi)}^{1)}$	$P_{abs} \geq 1 \text{ bar (14.5 psi)}^{2)}$
Silicone oil	-40 to +180 °C (-40 to +356 °F)	-40 to +250 °C (-40 to +482 °F)
High-temperature oil	-20 to +200 °C (-4 to +392 °F)	-20 to +400 °C (-4 to +752 °F) <sup>3) 4) 5)</sup>
Low-temperature oil	-70 to +120 °C (-94 to +248 °F)	-70 to +180 °C (-94 to +356 °F)
Vegetable oil	-10 to +160 °C (+14 to +320 °F)	-10 to +220 °C (+14 to +428 °F)
Inert oil	-40 to +100 °C (-40 to +212 °F)	-40 to +175 °C (-40 to +347 °F) <sup>6) 7)</sup>

- 1) Permitted temperature range at  $p_{abs} = 0.05 \text{ bar (0.725 psi)}$  (observe temperature limits of the device and the system!)
- 2) Permitted temperature range at  $p_{abs} \geq 1 \text{ bar (14.5 psi)}$  (observe temperature limits of the device and the system!)
- 3) 325 °C (617 °F) at  $\geq 1 \text{ bar (14.5 psi)}$  absolute pressure.
- 4) 350 °C (662 °F) at  $\geq 1 \text{ bar (14.5 psi)}$  absolute pressure (max. 200 hours).
- 5) 400 °C (752 °F) at  $\geq 1 \text{ bar (14.5 psi)}$  absolute pressure (max. 10 hours).
- 6) 150 °C (302 °F) at  $\geq 1 \text{ bar (14.5 psi)}$  absolute pressure.
- 7) 175 °C (347 °F) at  $\geq 1 \text{ bar (14.5 psi)}$  absolute pressure (max. 200 hours).


The calculation of the operating temperature range of a diaphragm seal system depends on the fill fluid, capillary length and capillary internal diameter, process temperature and oil volume of the diaphragm seal. Detailed calculations, e.g. for temperature ranges, vacuum pressure ranges and temperature ranges, are done separately in the Applicator "[Sizing Diaphragm Seal](#)".



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**Cleaning instructions**

Endress+Hauser offers flushing rings as accessories to clean process isolating diaphragms without taking the transmitters out of the process.

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

We recommend you perform CIP (cleaning in place (hot water)) before SIP (sterilization in place (steam)) for pipe diaphragm seals. The frequent use of sterilization in place (SIP) will increase the stress on the process isolating diaphragm. Under unfavorable circumstances, frequent temperature changes can lead - on the long term - to material fatigue of the process isolating diaphragm and possibly to a leakage.

**Installation instructions**

**Diaphragm seal systems**

- A diaphragm seal together with the transmitter form a closed, calibrated system, which is filled through openings in the diaphragm seal and in the transmitter's measurement system. These openings are sealed and must not be opened.
- For devices with a temperature isolator or capillary, a suitable fastening device (mounting bracket) is recommended.
- When mounting, sufficient strain relief must be provided for the capillary line to prevent the capillary from bending (capillary bending radius  $\geq 100 \text{ mm (3.94 in)}$ )
- For more detailed installation instructions, Endress+Hauser provides its customers with the free "Applicator Sizing Diaphragm Seal" selection tool, which is available online at "[www.endress.com/applicator](http://www.endress.com/applicator)" or as a download.

### Capillary

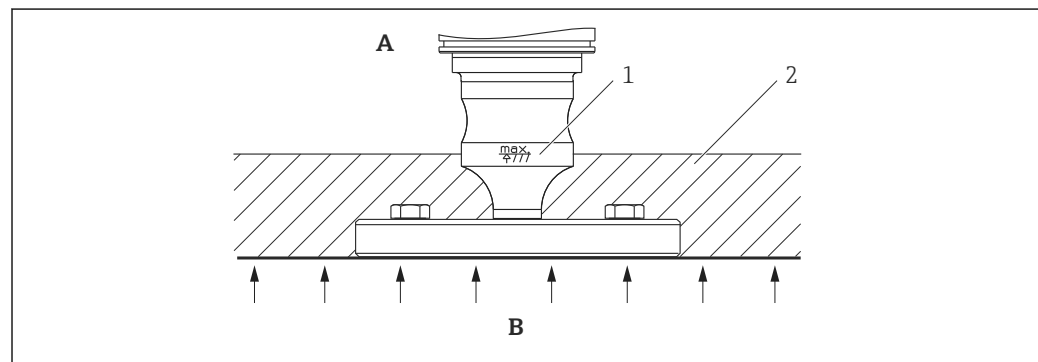
In order to obtain more precise measurement results and to avoid a defect in the device, mount the capillaries as follows:

- 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 or above the reference temperature
- With a bending radius  $\geq 100$  mm (3.94 in)
- When using diaphragm seal systems with a capillary, sufficient strain relief must be provided to prevent the capillary from bending (capillary bending radius  $\geq 100$  mm (3.94 in)).
- 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 range violation.

### Thermal insulation

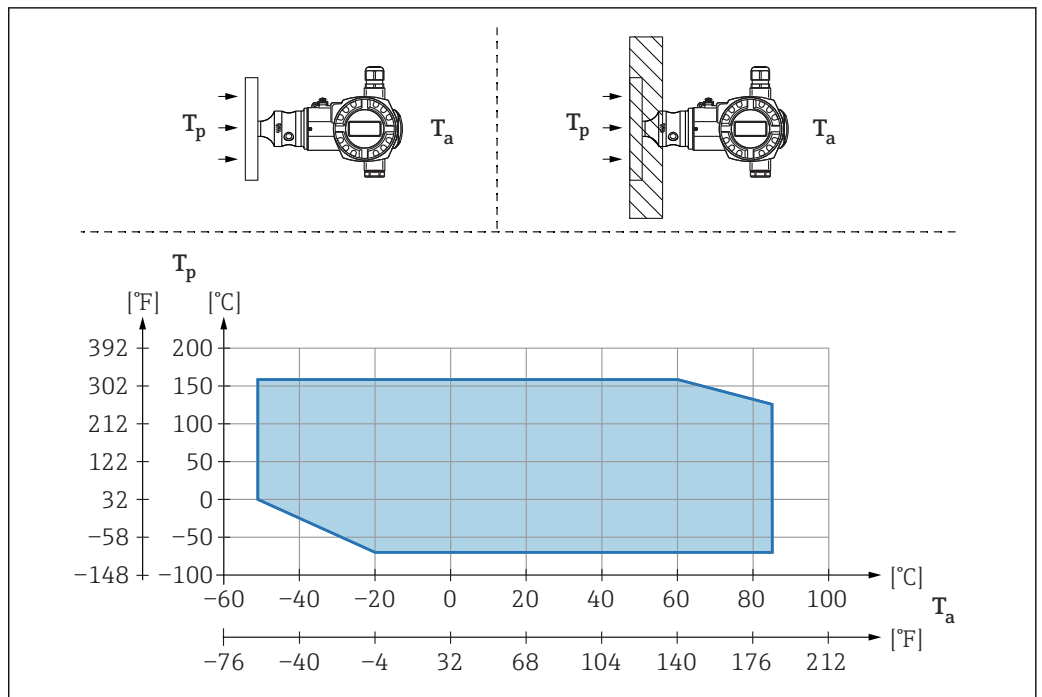
#### *Thermal insulation with diaphragm seal directly mounted*

The PMP75 must only be insulated up to a certain height. The maximum permitted insulation height is indicated on the devices and applies to an insulation material with a heat conductivity  $\leq 0.04$  W/(m x K) and to the maximum permitted ambient and process temperature. The data were determined under the most critical application "quiescent air". Maximum permitted insulation height, here indicated on a PMP75 with a flange:



- A Ambient temperature  
 B Process temperature  
 1 Maximum permitted insulation height  
 2 Insulation material

Installation with direct mounting



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$T_a$  Ambient temperature at transmitter  
 $T_p$  Maximum process temperature

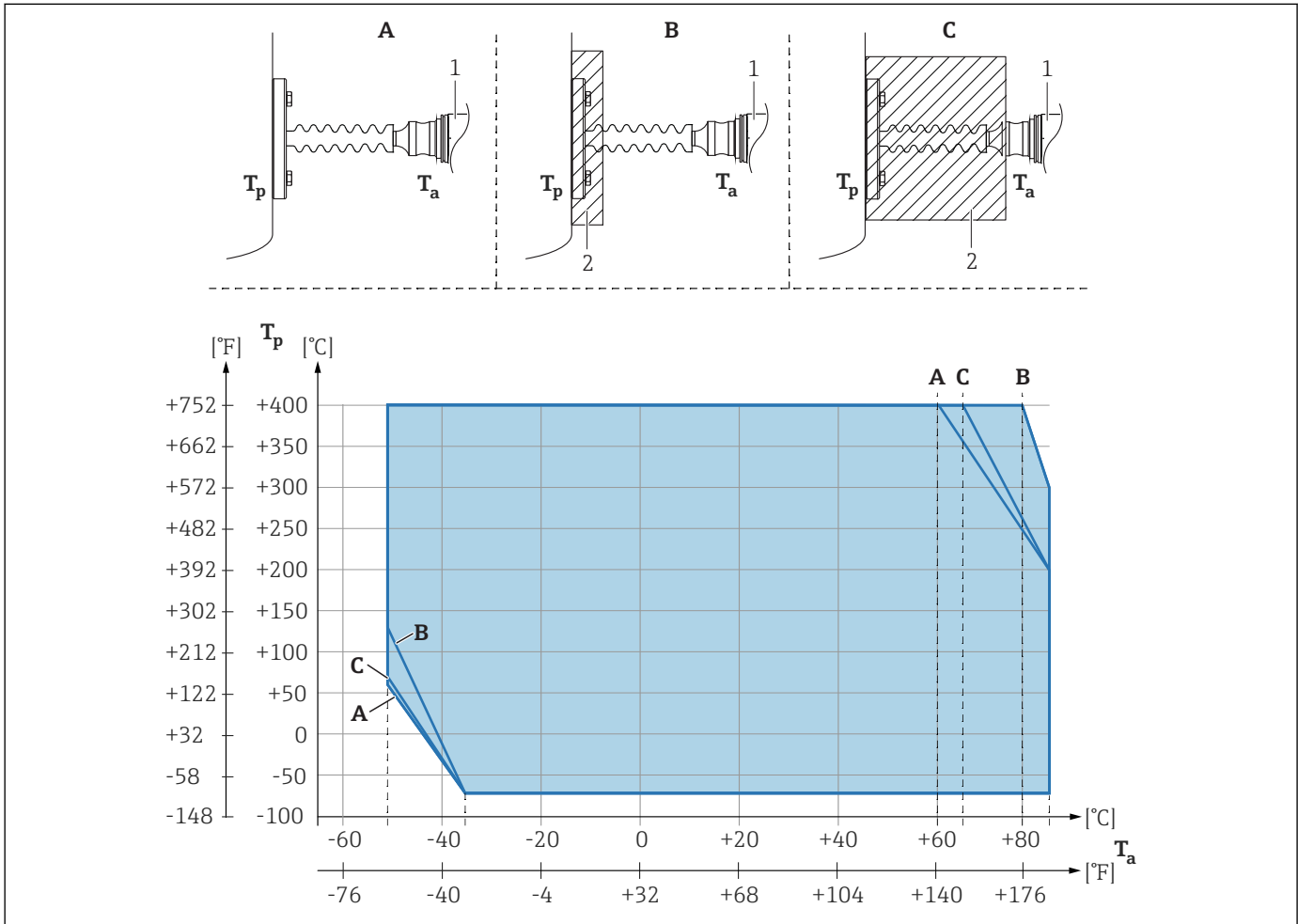
$T_a$	$T_p$
+85 °C (+185 °F)	-70 to +120 °C (-94 to +248 °F)
+60 °C (+140 °F)	-70 to +160 °C (-94 to +320 °F)
-20 °C (-4 °F)	-70 to +160 °C (-94 to +320 °F)
-52 °C (-62 °F)	0 to +160 °C (+32 to +320 °F)

**Mounting with temperature isolator**

Use of temperature isolators in the event of constant extreme medium temperatures which cause the maximum permissible electronics temperature of +85 °C (+185 °F) to be exceeded. Diaphragm seal systems with temperature isolators can be used up to a maximum temperature of +400 °C (+752 °F) depending on the filling oil used. . To minimize the influence of rising heat, mount the device horizontally or with the housing pointing downwards. The additional installation height also brings about a zero point shift of maximum 21 mbar (0.315 psi) due to the hydrostatic column in the temperature isolator. This zero point shift can be corrected on the device.

The maximum ambient temperature  $T_a$  at the transmitter depends on the maximum process temperature  $T_p$ .

The maximum process temperature depends on the diaphragm seal filling oil used.



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- A No insulation
- B Insulation 30 mm (1.18 in)
- C Maximum insulation
- 1 Transmitter
- 2 Insulation material

Item	$T_a^{1)}$	$T_p^{2)}$
A	60 °C (140 °F)	400 °C (752 °F) <sup>3)</sup>
	85 °C (185 °F)	200 °C (392 °F)
	-50 °C (-58 °F)	60 °C (140 °F)
	-35 °C (-31 °F)	-70 °C (-94 °F)
B	80 °C (176 °F)	400 °C (752 °F) <sup>3)</sup>
	85 °C (185 °F)	300 °C (572 °F)

Item	T <sub>a</sub> <sup>1)</sup>	T <sub>p</sub> <sup>2)</sup>
	-50 °C (-58 °F)	130 °C (266 °F)
	-35 °C (-31 °F)	-70 °C (-94 °F)
<b>C</b>	67 °C (153 °F)	400 °C (752 °F) <sup>3)</sup>
	85 °C (185 °F)	200 °C (392 °F)
	-50 °C (-58 °F)	70 °C (158 °F)
	-35 °C (-31 °F)	-70 °C (-94 °F)

- 1) Maximum ambient temperature at transmitter
- 2) Maximum process temperature
- 3) Process temperature: max.+400 °C (+752 °F), depending on the diaphragm seal filling oil used

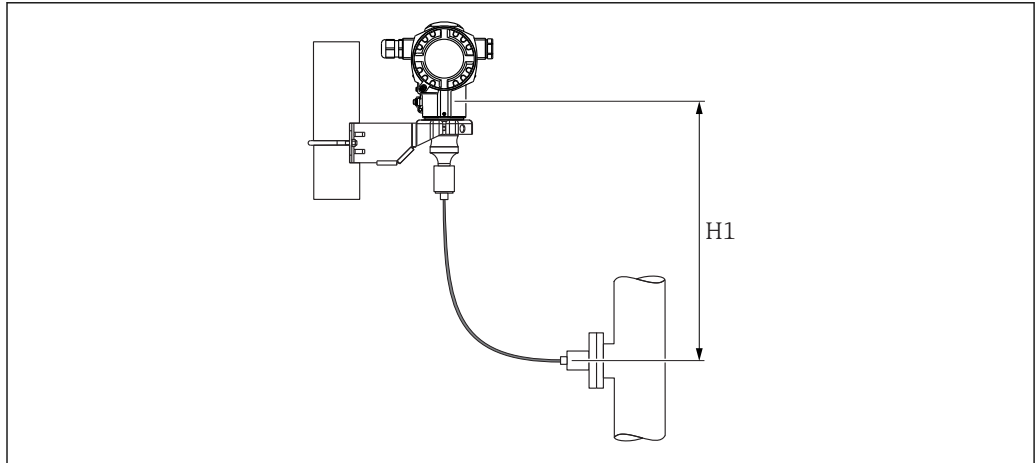
**Vacuum applications**

**Mounting instructions**

For vacuum applications, pressure transmitters with a ceramic measuring membrane (oil-free) are preferable.

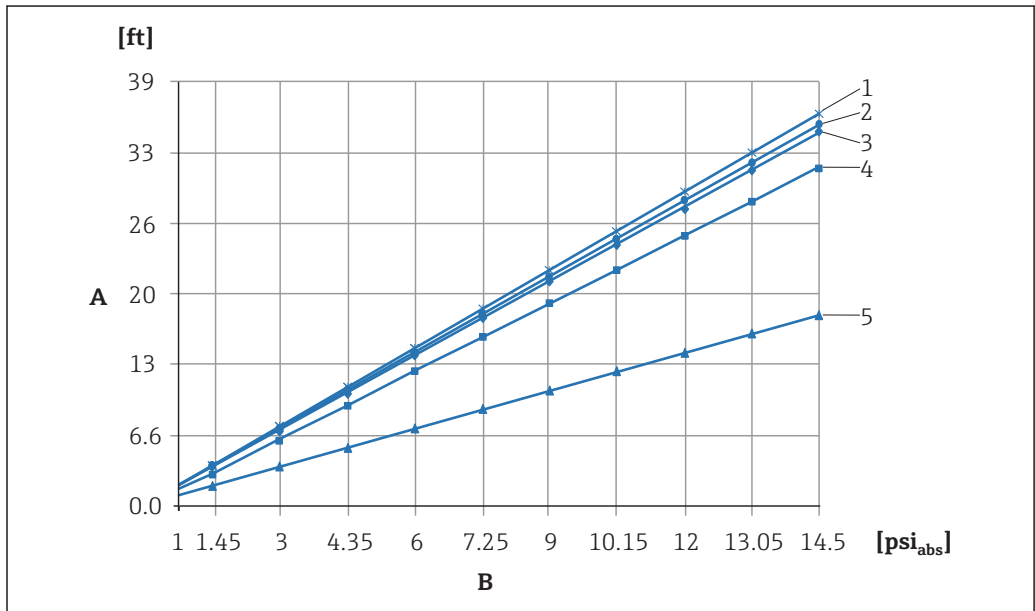
For applications under vacuum, Endress+Hauser recommends mounting the pressure transmitter below the diaphragm seal. This prevents vacuum loading of the diaphragm seal caused by the presence of fill fluid in the capillary.

When the pressure transmitter is mounted above the diaphragm seal, the maximum height difference H1 in accordance with the illustrations below must not be exceeded. The following diagram depicts installation above the lower diaphragm seal:



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The maximum height difference depends on the density of the filling oil and the smallest ever pressure that is permitted to occur at the diaphragm seal (empty vessel), see illustration below. The following diagram depicts the maximum installation height above the diaphragm seal for vacuum applications.





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- A Height difference H1
- B Pressure at diaphragm seal
- 1 Low-temperature oil
- 2 Vegetable oil
- 3 Silicone oil
- 4 High-temperature oil
- 5 Inert oil



## Certificates and approvals

<b>CE mark</b>	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.
<b>RoHS</b>	The measuring system complies with European Directive 2002/96/EC.
<b>RCM-Tick marking</b>	<p>The supplied product or measuring system meets the ACMA (Australian Communications and Media Authority) requirements for network integrity, interoperability, performance characteristics as well as health and safety regulations. Here, especially the regulatory arrangements for electromagnetic compatibility are met. The products bear the RCM-Tick marking on the nameplate.</p> <div data-bbox="499 600 1533 734" style="border: 1px solid black; text-align: center; padding: 10px;">  </div> <p style="text-align: right; font-size: small;">A0029561</p>
<b>Ex approvals</b>	<ul style="list-style-type: none"> <li>■ ATEX</li> <li>■ FM</li> <li>■ CSA</li> <li>■ NEPSI</li> <li>■ IECEX</li> <li>■ TIIS</li> <li>■ Also combinations of different approvals</li> </ul> <p>All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all Ex-systems →  130.</p>
<b>EAC conformity</b>	<p>The measuring system meets the legal requirements of the applicable EAC guidelines. These are listed in the corresponding EAC Declaration of Conformity along with the standards applied.</p> <p>Endress+Hauser confirms successful testing of the device by affixing to it the EAC mark.</p>
<b>Suitable for hygiene applications</b>	<p>For information on installation and approvals, see documentation SD02503F "Hygiene approvals".</p> <p>For information on 3-A and EHEDG-tested adapters, see documentation TI00426F "Weld-in adapter, process adapter and flanges".</p>
<b>Certificate of current Good Manufacturing Practices (cGMP)</b>	<p>Product Configurator, order code for "Test, Certificate" option "JG"</p> <ul style="list-style-type: none"> <li>■ The certificate is only available in English</li> <li>■ Materials of construction of product wetted parts</li> <li>■ TSE compliance</li> <li>■ Polishing and surface finish</li> <li>■ Material/ compound compliance table (USP Class VI, FDA conformity)</li> </ul>
<b>Functional safety SIL/ IEC 61508 Declaration of Conformity (optional)</b>	<p>The Cerabar S with 4 to 20 mA output signal has been developed in accordance with the IEC 61508 standard. These devices can be used to monitor the process level and pressure up to SIL 3. For a detailed description of safety functions with the Cerabar S, settings and functional safety data, see the "Functional safety manual - Cerabar S" SD00190P/00.</p> <p>For devices up to SIL 3 / IEC 61508 Declarations of Conformity see:</p> <p>Ordering information:</p> <p>Product Configurator, order code for "Additional options 1" and "Additional options 2", version "E".</p>
<b>Overfill prevention</b>	<p>WHG (see document ZE00260P/00/EN)</p> <p>Ordering information:</p> <p>Product Configurator, order code for "Approval", option "6".</p>

**CRN approval**

A CRN approval is available for some device versions. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. These devices are fitted with a separate plate bearing the registration number CRN OF10525.5C.

PMP75 devices with a capillary are not CRN-approved.

Ordering information:

Product Configurator, order code for "Process connection; material" and

Product Configurator, order code for "Approval" (only in conjunction with an approved process connection)

**Other standards and guidelines**

The applicable European guidelines and standards can be found in the relevant EU Declarations of Conformity. The following standards were also applied:

**IEC 62828-1 / DIN EN 60770 and IEC 62828-2 / DIN EN 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 on data sheets

**EN 61326-X:**

EMC product family standard for electrical equipment for measurement, control and laboratory use.

**EN 60529:**

Degrees of protection provided by enclosures (IP code)

**WELMEC guide 8.8:**

General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments under the MID.

**OIML R117-1 Edition 2007 (E):**

Dynamic measuring systems for liquids other than water.

**EN 12405-1/A1 Edition 2006:**

Gas meters – Conversion devices – Part 1: Volume conversion

**Pressure Equipment Directive 2014/68/EU (PED)****Pressure equipment with allowable pressure  $\leq$  200 bar (2 900 psi)**

Pressure equipment (with a maximum allowable pressure  $PS \leq 200$  bar (2 900 psi)) can be classified as pressure accessories in accordance with Pressure Equipment Directive 2014/68/EU. If the maximum allowable pressure is  $\leq 200$  bar (2 900 psi) and the pressurized volume of the pressure equipment is  $\leq 0.1$  l, the pressure equipment is subject to the Pressure Equipment Directive (cf. Pressure Equipment Directive 2014/68/EU, Article 4, point 3). The Pressure Equipment Directive only requires that the pressure equipment shall be designed and manufactured in accordance with the "sound engineering practice of a Member State".

*Reasons:*

- Pressure Equipment Directive (PED) 2014/68/EU Article 4, point 3
- Pressure Equipment Directive 2014/68/EU, Commission's Working Group "Pressure", Guideline A-05 + A-06

*Note:*

A partial examination shall be performed for pressure instruments that are part of safety equipment for the protection of a pipe or vessel from exceeding allowable limits (safety accessory in accordance with Pressure Equipment Directive 2014/68/EU, Article 2, point 4).

**Pressure equipment with allowable pressure > 200 bar (2 900 psi)**

Pressure equipment designated for application in every process fluid having a pressurized volume of <0.1 l and a max. allowable pressure PS > 200 bar (2 900 psi) must satisfy the essential safety requirements set out in Annex I of the Pressure Equipment Directive 2014/68/EU. According to Article 13 pressure equipment shall be classified by category in accordance with Annex II. Taking into account the low pressurized volume discussed above, the pressure devices can be classed as category I pressure equipment. These devices must then bear the CE marking.

*Reasons:*

- Pressure Equipment Directive 2014/68/EU, Article 13, Annex II
- Pressure Equipment Directive 2014/68/EU, Commission's Working Group "Pressure", Guideline A-05

*Note:*

A partial examination shall be performed for pressure instruments that are part of safety equipment for the protection of a pipe or vessel from exceeding allowable limits (safety accessory in accordance with Pressure Equipment Directive 2014/68/EU, Article 2, point 4).

*The following also 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, module A
- PMP75 with pipe diaphragm seal ≥ 1.5"/PN40:  
Suitable for stable gases in group 1, category II, module A2
- PMP75 with barriers PN > 200 ≥ 1.5"/PN40:  
Suitable for stable gases in group 1, category I, module A
- PMP75 with threaded connection PN > 200:  
Suitable for stable gases in group 1, category I, module A

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**Manufacturer declarations**

Depending on the desired configuration, the following documents can be ordered additionally with the device:

- FDA conformity
- TSE-free: materials free from animal origin
- Regulation (EC) No. 2023/2006 (GMP)
- Regulation (EC) No. 1935/2004 on materials and articles intended to come into contact with food

**Downloading the Declaration of Conformity**

[www.endress.com](http://www.endress.com) → Download

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**Marine approval**

- GL (German Lloyd)
- ABS

Ordering information:

Product Configurator, order code for "Additional options 1" or "Additional options 2", version "S".

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**Drinking water approval**

PMC71/PMP71: NSF 61 approval

PMC71/PMP71: UBA/W270 approval (ordering information as for NSF approval: Product Configurator, order code for "Additional options 1" or "Additional options 2" option "F".)

Ordering information:

Product Configurator, order code for "Additional options 1" or Additional options 2", version "F".

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**Approvals for custody transfer**

All aspects of OIML R117-1 Edition 2007 (E) and EN 12405-1/A1 Edition 2006 are fulfilled.

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**MID Parts Certificate**

TC7975

**Classification of process sealing between electrical systems and (flammable or combustible) process fluids in accordance with ANSI/ISA 12.27.01**

Endress+Hauser devices are designed in accordance with ANSI/ISA 12.27.01, allowing the user to waive the use of - and save the cost of installing - external secondary process seals in the conduit as required by the process sealing sections of ANSI/NFPA 70 (NEC) and CSA 22.1 (CEC). These instruments comply with the North-American installation practice and provide a very safe and cost-saving installation for pressurized applications with hazardous fluids. Please refer to the following table for the seal class assigned (single seal or dual seal):

Device	Approval	Remark	Single seal MWP	Dual seal MWP
PMC71	CSA C/US IS, XP	W/o separate housing	-	60 bar (900 psi)
	CSA C/US IS	With separate housing	40 bar (600 psi)	-
PMP71	CSA C/US XP, XP+IS	W/o separate housing	400 bar (6 000 psi)	-
	CSA C/US IS	W/o separate housing	>200 to 400 bar (3 000 to 6 000 psi)	≤200 bar (3 000 psi)
	CSA C/US IS	With separate housing	400 bar (6 000 psi)	-
PMP75	XP, XP+IS	W/o separate housing	400 bar (6 000 psi)	-
	CSA C/US IS	W/o separate housing	>200 to 400 bar (3 000 to 6 000 psi)	≤200 bar (3 000 psi)
	CSA C/US IS	With separate housing	400 bar (6 000 psi)	-

Further information can be found in the control drawings of the relevant devices.

**Inspection certificate**

Designation	PMC71	PMP71	PMP75	Option
3.1 Material documentation, wetted metal parts, EN10204-3.1 inspection certificate	✓	✓	✓	B <sup>1) 3)</sup>
Conformity to NACE MR0175, wetted metallic parts	—	✓	✓	C <sup>1) 3)</sup>
EN10204-3.1 material, NACE MR0175, wetted metal parts, inspection certificate	—	✓	✓	D <sup>1) 3)</sup>
Individual test, test report	✓	✓	✓	3 <sup>1)</sup>
Pressure test, internal procedure, test report	✓	✓	✓	4 <sup>1)</sup>
Helium leak test, internal procedure, test report	✓	✓	—	5 <sup>1)</sup>
EN10204-3.1 material wetted parts +Ra, Ra= surface roughness, dimensional check, inspection certificate	✓	—	—	6 <sup>1)</sup>
Delta-Ferrite measurement, internal procedure, wetted metallic parts, inspection certificate	✓	—	—	8 <sup>1)</sup>
3.1 Material documentation, wetted metal parts, EN10204-3.1 inspection certificate	✓	✓	✓	JA <sup>2) 3)</sup>
Conformity to NACE MR0175, wetted metallic parts	✓	✓	✓	JB <sup>2) 3)</sup>
Conformity to NACE MR0103, wetted metallic parts	✓	✓	✓	JE <sup>2) 3)</sup>
Surface finish measurement ISO4287/Ra, wetted metal parts, inspection certificate	✓	—	✓	KB <sup>2)</sup>
Helium leak test, internal procedure, inspection certificate	✓	✓	✓	KD <sup>2)</sup>
Pressure test, internal procedure, inspection certificate	✓	✓	✓	KE <sup>2)</sup>
Delta-Ferrite measurement, internal procedure, wetted metallic parts, inspection certificate	✓	—	✓	KF <sup>2)</sup>
PMI test (XRF), internal procedure, metal parts in contact with the medium	✓	✓	✓	KG <sup>2)</sup>
Welding documentation, wetted/pressurized seams	—	✓	—	KS <sup>2)</sup>

- 1) Product Configurator, order code for "Additional options 1" and "Additional options 2"
- 2) Product Configurator, order code for "Test, Certificate"
- 3) The choice of this feature for coated process isolating diaphragms/process connections refers to the metal base material.

**Calibration**

Designation	PMC71	PMP71	PMP75	Option <sup>1)</sup>
Sensor range; mbar/bar	✓	✓	✓	1
Sensor range; kPa/MPa	✓	✓	✓	2
Sensor range; mmH2O/mH2O	✓	✓	✓	3
Sensor range; inH2O/ftH2O	✓	✓	✓	4
Sensor range; psi	✓	✓	✓	6
Factory calibration certificate, 5-point; see additional specification	✓	✓	✓	C
DKD/DAkkS certificate; see additional specification	✓	✓	✓	D
Customized pressure; see additional specification	✓	✓	✓	E
Customized level; see additional specification	✓	✓	✓	F
Customized pressure + 5-point factory calibration certificate; see additional specification	✓	✓	✓	H
Customized level + 5-point factory calibration certificate; see additional specification	✓	✓	✓	I
Platinum; see additional specification	✓	✓	—	K
Platinum + factory calibration certificate 5-point; see additional specification	✓	✓	—	L
Platinum + DKD/DAkkS certificate; see additional specification	✓	✓	—	M

1) Product Configurator, order code for "Calibration; unit"

**Service**

Designation	Option <sup>1)</sup> (not for 1-5V DC)
Cleaned of oil+grease <sup>2)</sup>	HA
Cleaned for oxygen service <sup>2)</sup>	HB
Cleaned of PWIS (paint-wetting impairment substances) <sup>2)</sup>	HC

- 1) Product Configurator, order code for "Service"
- 2) Device only, not accessories or enclosed accessories.

## Ordering information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: [www.endress.com](http://www.endress.com) -> Click "Corporate" -> Select your country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.
- From your Endress+Hauser Sales Center: [www.addresses.endress.com](http://www.addresses.endress.com)

### Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
  - Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
  - Automatic verification of exclusion criteria
  - Automatic creation of the order code and its breakdown in PDF or Excel output format
  - Ability to order directly in the Endress+Hauser Online Shop

### Special device versions

Endress+Hauser offers special device versions as **Technical Special Products (TSP)**.

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

### Scope of delivery

- Measuring device
- Optional accessories
- Brief Operating Instructions
- Calibration certificates
- Optional certificates

### Measuring point (TAG)

<b>Order code</b>	895: Marking
<b>Option</b>	Z1: Tagging (TAG), see additional spec.
<b>Position of the measuring point marking</b>	To be selected in the additional specifications: <ul style="list-style-type: none"> <li>▪ Tag plate Stainless Steel</li> <li>▪ Self-adhesive paper label</li> <li>▪ Supplied label/plate</li> <li>▪ RFID TAG</li> <li>▪ RFID TAG + Tag plate Stainless Steel</li> <li>▪ RFID TAG + Self-adhesive paper label</li> <li>▪ RFID TAG + Supplied label/plate</li> </ul>
<b>Definition of the measuring point designation</b>	To be defined in the additional specifications: 3 lines containing up to 18 characters each  The measuring point designation appears on the selected label and/or the RFID TAG.
<b>Identification on electronic nameplate (ENP)</b>	32 characters

**Configuration data sheet**

**Pressure**

The following configuration data sheet must be completed and included with the order if the option "E" or "H" has been selected in the Product Configurator, order code for "Calibration; Unit".


Pressure unit				
<input type="checkbox"/> mbar	<input type="checkbox"/> mmH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> mmHg <sup>2)</sup>	<input type="checkbox"/> Pascal	<input type="checkbox"/> torr
<input type="checkbox"/> bar	<input type="checkbox"/> mH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> inHg <sup>2)</sup>	<input type="checkbox"/> hPa	<input type="checkbox"/> g/cm <sup>2</sup>
<input type="checkbox"/> psi	<input type="checkbox"/> ftH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> gf/cm <sup>2</sup>	<input type="checkbox"/> kPa	<input type="checkbox"/> kg/cm <sup>2</sup>
	<input type="checkbox"/> inH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> kgf/cm <sup>2</sup>	<input type="checkbox"/> MPa	<input type="checkbox"/> lb/ft <sup>2</sup>
				<input type="checkbox"/> atm

- 1) The conversion factor for the pressure unit is based on a reference temperature of 4 °C (39.2 °F).
- 2) The conversion factor of the pressure unit refers to a reference temperature of 0 °C (32 °F).

Calibration Range / Output	
Low range value (LRV):	_____ [Pressure engineering unit]
Upper range value (URV):	_____ [Pressure engineering unit]

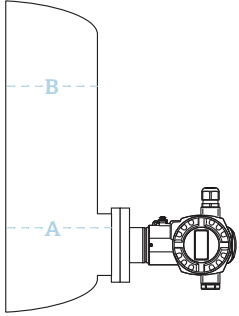
Display
Display of the content of the main line (option depends on sensor and communication variant)
<input type="checkbox"/> Primary value [PV] (default)
<input type="checkbox"/> Main Value [%]
<input type="checkbox"/> Pressure
<input type="checkbox"/> Current [mA] (HART only)
<input type="checkbox"/> Temperature
<input type="checkbox"/> Error number
<input type="checkbox"/> Alternating display

Damping
Damping: _____ sec (Default 2 sec)

Smallest calibratable span (preset at factory) →  13

**Level**

The following configuration data sheet must be completed and included with the order if the option "F" or "T" has been selected in the Product Configurator, order code for "Calibration; Unit".

Pressure unit				Output unit (scaled unit)							
<input type="checkbox"/> mbar	<input type="checkbox"/> mmH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> mmHg <sup>2)</sup>	<input type="checkbox"/> Pascal	<input type="checkbox"/> torr	Mass	Lengths	Volume	Volume	Percent		
<input type="checkbox"/> bar	<input type="checkbox"/> mH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> inHg <sup>2)</sup>	<input type="checkbox"/> hPa	<input type="checkbox"/> g/cm <sup>2</sup>	<input type="checkbox"/> kg	<input type="checkbox"/> m	<input type="checkbox"/> l	<input type="checkbox"/> USgal	<input type="checkbox"/> %		
<input type="checkbox"/> psi	<input type="checkbox"/> ftH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> gf/cm <sup>2</sup>	<input type="checkbox"/> kPa	<input type="checkbox"/> kg/cm <sup>2</sup>	<input type="checkbox"/> t	<input type="checkbox"/> dm	<input type="checkbox"/> hl	<input type="checkbox"/> impgal			
	<input type="checkbox"/> inH <sub>2</sub> O <sup>1)</sup>	<input type="checkbox"/> kgf/cm <sup>2</sup>	<input type="checkbox"/> MPa	<input type="checkbox"/> lb/ft <sup>2</sup>	<input type="checkbox"/> lb	<input type="checkbox"/> cm	<input type="checkbox"/> m <sup>3</sup>	<input type="checkbox"/> USbbiPE			
				<input type="checkbox"/> atm		<input type="checkbox"/> mm	<input type="checkbox"/> ft <sup>3</sup>	TR			
						<input type="checkbox"/> ft					
						<input type="checkbox"/> inch					
Empty calibration [a]: Low pressure value (empty) _____ [Pressure engineering unit]				Empty calibration [a]: Low level value (empty) _____ [Scaled Unit]					<p><b>Example</b></p>  <p style="font-size: small; margin-top: 10px;">A0020477</p> <p>A 0 mbar / 0m B 300 mbar (4.5 psi) / 3 m (9.8 ft)</p>		
Full calibration [b]: High pressure value (full) _____ [Pressure engineering unit]				Full calibration [b]: High level value (full) _____ [Scaled Unit]							

- 1) The conversion factor for the pressure unit is based on a reference temperature of 4 °C (39.2 °F).
- 2) The conversion factor of the pressure unit refers to a reference temperature of 0 °C (32 °F).

Display
<p>Display of the content of the main line (option depends on sensor and communication variant)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Primary value [PV] (default)</li> <li><input type="checkbox"/> Main Value [%]</li> <li><input type="checkbox"/> Pressure</li> <li><input type="checkbox"/> Current [mA] (HART only)</li> <li><input type="checkbox"/> Temperature</li> <li><input type="checkbox"/> Level before Lin.</li> <li><input type="checkbox"/> Tank content</li> <li><input type="checkbox"/> Error number</li> <li><input type="checkbox"/> Alternating display</li> </ul>


Damping
<p>Damping: _____ sec (Default 2 sec)</p>



## Accessories




**HistoROM®/M-DAT** The HistoROM®/M-DAT is a memory module that can be attached to any electronic insert (not for 1-5V DC).  
 Ordering information:  
 Product Configurator, order code for "Additional options 1" or Additional options 2", version "N" or as a separate accessory (part no.: 52027785).

**Welding flanges and weld-in adapters** For details, refer to TI00426F/00/EN "Weld-in adapters, process adapters and flanges".

**Manifolds** See the →  78.  
 For further details, see SD01553P/00/EN "Mechanical accessories for pressure measuring devices".

**Additional mechanical accessories** Oval flange adapters, pressure gauge valves, shutoff valves, siphons, condensate pots, cable shortening kits, test adapters, mounting brackets, flushing rings, block&bleed valves and protective roofs.  
 For details see SD01553P/00/EN "Mechanical accessories for pressure measuring devices".

**Service-specific accessories**

Accessories	Description
DeviceCare SFE100	Configuration tool for HART, PROFIBUS and FOUNDATION Fieldbus field devices  Technical Information TI01134S  DeviceCare is available for download at <a href="http://www.software-products.endress.com">www.software-products.endress.com</a> . You need to register in the Endress+Hauser software portal to download the application.
FieldCare SFE500	FDT-based plant asset management tool FieldCare can configure all smart field units in your plant and helps you manage them. By using the status information, FieldCare is also a simple but effective way of checking the status and condition of the field devices.  Technical Information TI00028S

## Supplementary documentation

<b>Field of Activities</b>	Pressure measurement, powerful instruments for process pressure, differential pressure, level and flow: FA00004P/00/EN
<b>Technical Information</b>	<ul style="list-style-type: none"> <li>■ Cerabar S: TI00383P/00/EN</li> <li>■ EMC test procedures: TI00241F/00/EN</li> <li>■ Weld-in adapter, adapter and flanges: TI00426F/00/EN</li> </ul>
<b>Special Documentation</b>	Mechanical accessories for pressure measuring devices: SD01553P/00/EN
<b>Operating Instructions</b>	<p>4 to 20 mA HART:</p> <ul style="list-style-type: none"> <li>■ Cerabar S: BA00271P/00/EN</li> <li>■ Description of Device Functions Cerabar S/Deltabar S/Deltapilot S: BA00274P/00/EN</li> </ul> <p>4 to 20 mA HART with MID parts certificate:</p> <ul style="list-style-type: none"> <li>■ BA00412P/00/EN</li> <li>■ Description of Device Functions: BA00413P/00/EN</li> </ul> <p>1-5V DC: Cerabar S PMP71: BA01633P/00/EN</p> <p>PROFIBUS PA:</p> <ul style="list-style-type: none"> <li>■ Cerabar S: BA00295P/00/EN</li> <li>■ Description of Device Functions Cerabar S/Deltabar S/Deltapilot S: BA00296P/00/EN</li> </ul> <p>FOUNDATION Fieldbus:</p> <ul style="list-style-type: none"> <li>■ Cerabar S: BA00302P/00/EN</li> <li>■ Description of Device Functions Cerabar S/Deltabar S/Deltapilot S: BA00303P/00/EN</li> </ul>
<b>Brief Operating Instructions</b>	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART, Cerabar S: KA01019P/00/EN</li> <li>■ 1-5V DC, Cerabar S PMP71: KA01258P/00/EN</li> <li>■ PROFIBUS PA, Cerabar S: KA01022P/00/EN</li> <li>■ FOUNDATION Fieldbus, Cerabar S: KA01025P/00/EN</li> </ul>
<b>Functional safety manual (SIL)</b>	Cerabar S (4 to 20 mA): SD00190P/00/EN
<b>Overfill prevention</b>	WHG: ZE00260P/00/DE
<b>Safety Instructions (XA)</b>	Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

### HART, PROFIBUS PA, FOUNDATION Fieldbus

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
ATEX II 1/2 G Ex ia IIC T6 Ga/Gb	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00244P	1
ATEX II 1/2 D Ex ta/tb IIIC Da/Db	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	<ul style="list-style-type: none"> <li>■ XA00246P</li> <li>■ XA00289P</li> </ul>	2
ATEX II 1/2D Ex ia IIIC Da/Db	PMC71	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	<ul style="list-style-type: none"> <li>■ XA00247P</li> <li>■ XA00290P</li> </ul>	2
ATEX II 1/3D Ex ta/tc IIIC Da/Dc	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	<ul style="list-style-type: none"> <li>■ XA00248P</li> <li>■ XA00291P</li> </ul>	4
ATEX II 2G Ex d IIC T6 Gb	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00249P	5
ATEX II 2G Ex d ia IIC T6 Gb	PMC71	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00250P	5
ATEX II 1/2G Ex ia IIC T6, WHG (German Water Resources Act)	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00244P	6

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
ATEX II 3 G Ex nA II T6	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00251P	7
ATEX II 1/2G Ex ia IIC T6 Ga/Gb + ATEX II 1/2D Ex ia IIIC Da/Db	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00253P	3
ATEX II 1G Ex ia IIC Ga + II 1D Ex ia IIIC Da	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00276P	8
ATEX II 1/2G Ex ia IIC T6 + II 2G Ex d IIC T6	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00252P	B
ATEX II Ex ia + FM IS + CSA IS ATEX II 1/2G Ex ia IIC T6 + FM/CSA IS Cl.I,II,III Div.1 Gr.A-G, FM/CSA: Zone 0,1,2	PMC71	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus</li> <li>■ HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA00244P</li> <li>■ XA00593P + XA01059P</li> <li>■ XA00596P + XA01060P</li> </ul>	E
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,II Div.1 Gr.A-G/B-G FM: Zone 1.2/CSA: Zone 1,2	PMP71, PMP75	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus</li> <li>■ HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA00252P</li> <li>■ XA00592P + XA01197P</li> <li>■ XA00590P + XA01198P</li> </ul>	F

1) Product Configurator, order code for "Approval"

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
IECEx Ex ia IIC T6 Ga/Gb	PMC71, PMP71, PMP75	4 to 20 mA HART	XB00005P	I
IEC Ex d ia IIC T6 Gb	PMC71	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00511P	B
IEC Ex d IIC T6 Gb	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00510P	M

1) Product Configurator, order code for "Approval"

1-5V DC

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
CSA C/US XP Cl.I Div.1 Gr.B-D, Ex d, Zone 1,2	PMP71	1-5V DC	XA00599P	V

1) Product Configurator, order code for "Approval"

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
NEPSI Ex ia IIC T6	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00549P	H
NEPSI Ex d IIC T6	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00551P	G
NEPSI Ex d ia IIC T6	PMC71	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA00551P	G

1) Product Configurator, order code for "Approval"

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
JPN Ex d [ia] IIC T6	PMC71	4 to 20 mA HART	TC17436	L
JPN Ex d[ia] IIC T4	PMC71	4 to 20 mA HART	TC17398, TC17399	M
JPN Ex d IIC T6	PMP71 (700 bar version)	4 to 20 mA HART	TC17445	L
JPN Ex d IIC T6	PMP71, PMP75	4 to 20 mA HART	TC17446	L

1) Product Configurator, order code for "Approval"

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
INMETRO Ex ia IIC T6 Ga/Gb	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01315P	J
INMETRO Ex d IIC T6 Gb	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01279P	O
INMETRO Ex ta IIIC Da/Db	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01313P	Z
INMETRO Ex d ia IIC T6 Gb	PMC71	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01280P	P
INMETRO Ex ia IIIC Da/Db	PMC71	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01314P	Z

1) Product Configurator, order code for "Approval"

### Installation/Control Drawings

Directive	Device	Electronics	Documentation	Option <sup>1)</sup>
FM IS Class I, II, III, Division 1, Groups A – G; NI, Class I Division 2, Groups A – D; AEx ia	PMC71, PMP71, PMP75	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA01059P</li> <li>■ XA01060P</li> </ul>	S
CSA IS Class I, II, III, Division 1, Groups A – G; Class I Division 2, Groups A – G	PMC71, PMP71, PMP75	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA00593P</li> <li>■ XA00596P</li> </ul>	U
FM IS + XP Class I, Division 1, Groups A – D	PMP71, PMP75	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA01197P</li> <li>■ XA01198P</li> </ul>	C
CSA IS + XP Class I Division 1, Groups A – D	PMP71, PMP75	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA00592P</li> <li>■ XA00590P</li> </ul>	D
FM/CSA IS + XP Class I Division 1, Groups A – D	PMP71, PMP75	<ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>	<ul style="list-style-type: none"> <li>■ XA00592P + XA01197P</li> <li>■ XA01198P + XA00590P</li> </ul>	E
FM NI Cl.I Div.2 Groups A - D, Zone 2	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01063P	R
FM XP Cl.I Div.1 Groups A - D, AEx d, Zone 1,2	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	XA01070P	T
FM DIP Cl.II,III Div.1 Gr.E-G, Zone 2,1,22	PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	FM3017778	Q
CSA C/US XP Cl.I Div.1 Gr.B-D, Ex d, Zone 1,2	PMC71, PMP71, PMP75	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	ZD00230P + XA00599P	V
CSA C/US General Purpose	PMD75, FMD77, FMD78	4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	-	X

1) Product Configurator, order code for "Approval"

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