

# Technical Information

## Cerabar M

### PMC51, PMP51, PMP55

Process pressure measurement

Pressure transmitter with ceramic and metal sensors



#### Application

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 measurement in liquids
- High process temperature
  - without diaphragm seals up to 130 °C (266 °F), for a maximum of 60 minutes 150 °C (302 °F)
  - with diaphragm seals up to 400 °C (752 °F)
- High pressure up to 400 bar (6 000 psi)
- International usage thanks to a wide range of approvals

#### Your benefits

- Very good reproducibility and long-term stability
- High reference accuracy up to  $\pm 0.10$  %  
as PLATINUM version:  $\pm 0.075$  %
- Turn down up to 100:1
- Uniform platform for differential pressure, hydrostatics and pressure (Deltabar M – Deltapilot M – Cerabar M)
- Simple, fast commissioning through a user interface designed for real-world applications
- Used for process pressure monitoring up to SIL 2, certified to IEC 61508 Edition 2.0 and IEC 61511 by TÜV NORD
- The patented TempC Membrane for the diaphragm seal reduces measured errors caused by environmental and process temperature influences to a minimum
- ASME-BPE-compliant device versions

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## Document information



<b>Document function</b>	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.
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### 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

Symbol	Meaning
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

**Documentation**

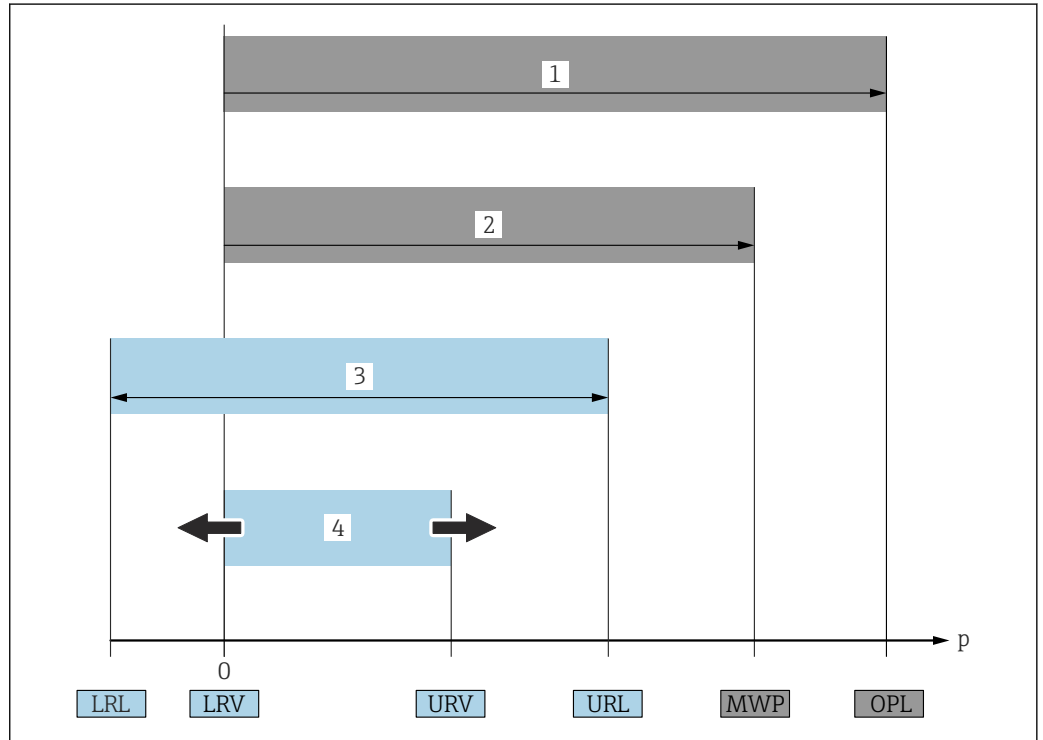
See chapter "Additional documentation" → 135



The document types listed are available:

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

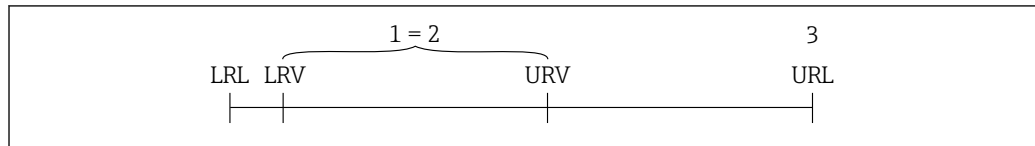
**Terms and abbreviations**



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Item	Term/abbreviation	Explanation
1	OPL	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. Observe pressure-temperature dependency.
2	MWP	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. Observe pressure-temperature dependency. The MWP may be applied at the device for an unlimited period of time. The MWP can be found on the nameplate.
3	Maximum sensor measuring range	Span between LRV 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



A0029545

- 1 Calibrated/adjusted span
- 2 Zero point-based span
- 3 Upper range limit

**Example**

- Sensor: 10 bar (150 psi)
- Upper range limit (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):

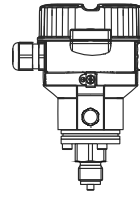
$$TD = \frac{URL}{|URV - LRV|}$$

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

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

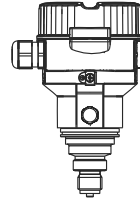
## Function and system design

### Device features



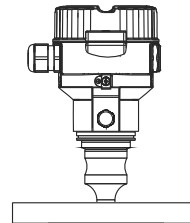
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PMC51 with capacitive measuring cell and ceramic process membrane (Ceraphire®)



A0023675

PMP51 with piezoresistive measuring cell and metallic welded process membrane



A0023676

PMP55 with diaphragm seal

### Field of application

- Gauge pressure and absolute pressure
- Level

### Process connections

PMC51:

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

PMP51:

- Thread
- EN flanges DN 25 – DN 80
- ANSI flanges 1" – 4"
- Prepared for diaphragm seal mounting
- Flush hygienic connections

PMP55:

Wide range of diaphragm seals

### Measuring ranges

- PMC51: From –100/0 to 100 mbar (–1.5/0 to 1.5 psi) to –1/0 to 40 bar (–15/0 to 600 psi)
- PMP51: From –400/0 to 400 mbar (–6/0 to 6 psi) to –1/0 to 400 bar (–15/0 to 6000 psi)
- PMP55: From –400/0 to 400 mbar (–6/0 to 6 psi) to –1/0 to 400 bar (–15/0 to 6000 psi)

**OPL**

- PMC51: Max. 60 bar (900 psi)
- PMP51: Max. 600 bar (9 000 psi)
- PMP55: Max. 600 bar (9 000 psi)

**Process temperature range**

- PMC51: -20 to +130 °C (-4 to +266 °F)  
For a maximum of 60 minutes: +150 °C (+302 °F)
- PMP51: -40 to +130 °C (-40 to +266 °F)  
For a maximum of 60 minutes: +150 °C (+302 °F)
- PMP55: -70 to +400 °C (-94 to +752 °F)  
(depending on the fill fluid)

**Operating temperature range**

- Without LCD display: -40 to +85 °C (-40 to +185 °F)
- With LCD display: -20 to +70 °C (-4 to +158 °F)  
(extended temperature application range -40 to +85 °C (-40 to +185 °F) with restrictions in optical properties such as display speed and contrast)
- Separate housing: -20 to +60 °C (-4 to +140 °F)
- PMP55: Diaphragm seal systems depending on the version

**Reference accuracy**

- PMC51: Up to ±0.10% of the set span  
PLATINUM version: Up to ±0.075% of the set span
- PMP51: Up to ±0.10% of the set span  
PLATINUM version: Up to ±0.075% of the set span
- PMP55: Up to ±0.10% of the set span

**Supply voltage**

- 11.5 to 45 V<sub>DC</sub> (versions with plug-in connector 35 V<sub>DC</sub>)
- For intrinsically safe device versions: 11.5 to 30 V<sub>DC</sub>
- IO-Link communication: 18 V<sub>DC</sub> required at least (11.5 to 30 V<sub>DC</sub> if IO-Link is not used but rather the current output)

**Output**

4 to 20 mA, 4 to 20 mA with superimposed HART protocol, IO-Link, PROFIBUS PA or FOUNDATION Fieldbus

**Options**

- Inspection certificate 2.2 or 3.1 or other certificates
- 3A approval and EHEDG approval
- Specific firmware versions
- Initial device settings
- Separate housing
- Broad range of accessories
- NACE-compliant materials

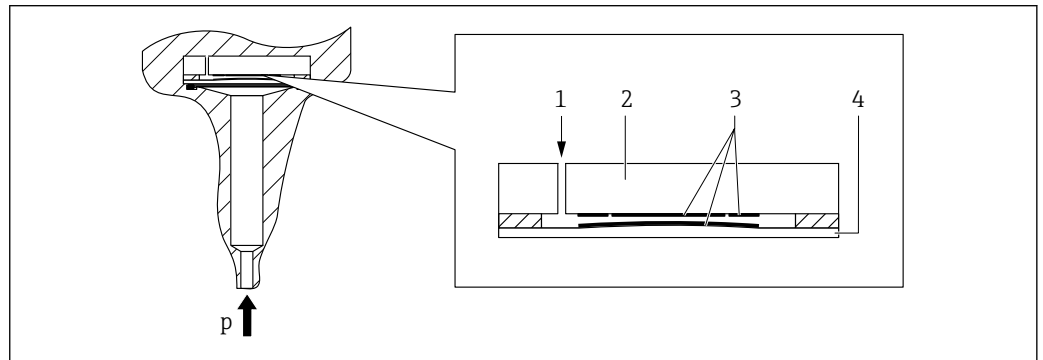
**Specialties**

- PMC51:
  - Metal-free measurement with PVDF connection
  - Special cleaning of the transmitter to remove paint-wetting impairment substances, for use in paint shops
- PMP51:
  - Process connections with minimum oil volume
  - Gas-tight, elastomer-free
- PMP55:
  - Wide range of diaphragm seals
  - For extreme medium temperatures
  - Process connections with minimum oil volume
  - Completely welded versions



Measuring principle

Ceramic process membrane used in PMC51 (Ceraphire®)



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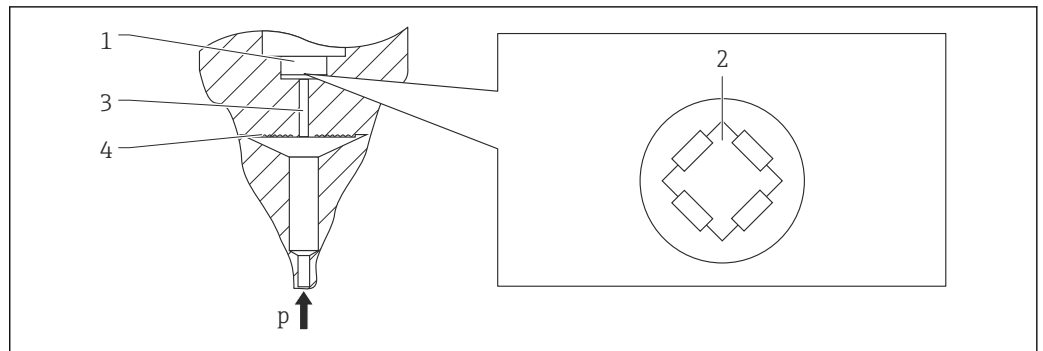
- 1 Air pressure (gauge pressure sensors)
- 2 Ceramic substrate
- 3 Electrodes
- 4 Ceramic process membrane

The ceramic measuring cell is oil-free, i.e., the pressure acts directly on the robust ceramic process membrane and causes it to deflect. A pressure-dependent change in capacitance is measured at the electrodes of the ceramic substrate and the process membrane. The measuring range is determined by the thickness of the ceramic process membrane.

**Advantages:**

- Guaranteed overload resistance up to 40 times the nominal pressure
- Thanks to ultrapure 99.9 % ceramic (Ceraphire®, see also "www.endress.com/ceraphire")
  - extremely high chemical stability, comparable with Alloy C
  - high mechanical stability
- Can be used in absolute vacuum

**Metallic process isolating diaphragm used in PMP51 and PMP55**



A0016448

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

*PMP51*

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

**Advantages:**

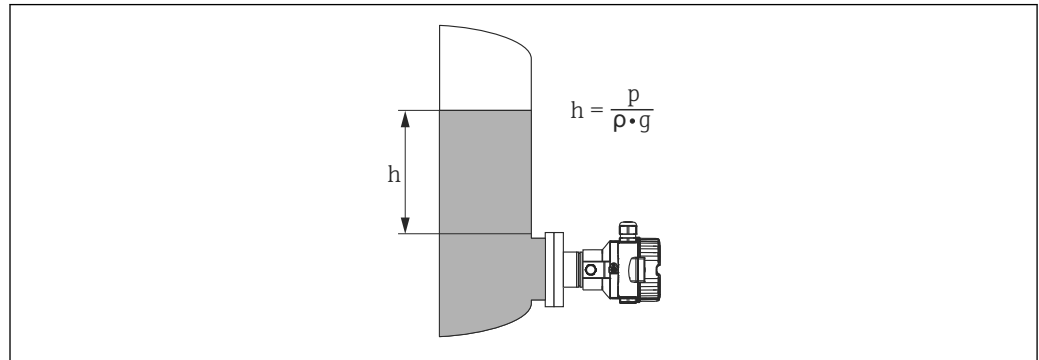
- Can be used for process pressure up to 400 bar (6 000 psi)
- High long-term stability
- Guaranteed overload resistance up to 4 times the nominal pressure
- Significantly less thermal effect compared to diaphragm seal systems

*PMP55*

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 bridge. The pressure-dependent change in the bridge output voltage is measured and evaluated.

**Advantages:**

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

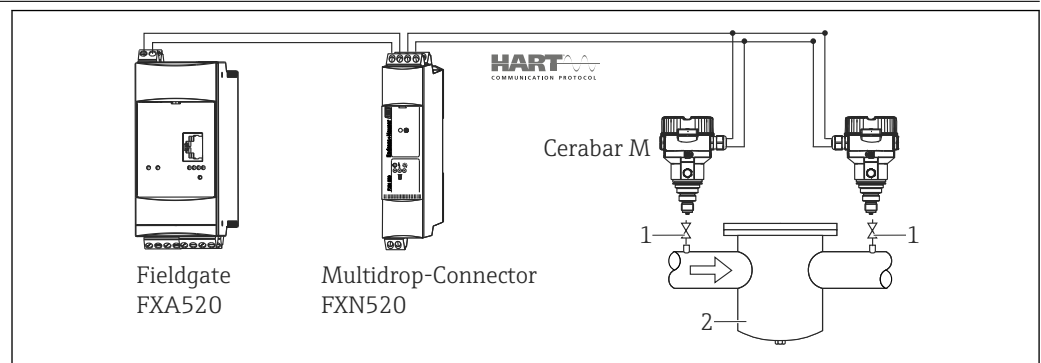
**Level measurement (level, volume and mass)**

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

**Your benefits**

- Choice of different level measuring modes in the device software
- Volume and mass measurements in any tank shapes by means of a freely programmable characteristic curve
- Choice of diverse level units
- Has a wide range of uses, even in the following cases:
  - in the event of foam formation
  - in tanks with agitators or screen fittings
  - in the event of liquid gases

**Electrical differential pressure measurement with gauge pressure sensors**

A0023680

- 1 Shut-off valves  
 2 e.g. filter

In the example given, two Cerabar M devices (each with a gauge pressure sensor) are interconnected. The pressure difference can thus be measured using two independent Cerabar M devices.

**⚠ WARNING**

**Risk of explosion!**

- ▶ If using intrinsically safe devices, strict compliance with the rules for interconnecting intrinsically safe circuits as stipulated in IEC60079-14 (proof of intrinsic safety) is mandatory.

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**Communication protocol**

- 4 to 20 mA without communication protocol (analog electronics)
- 4 to 20 mA with HART communication protocol
- 4 to 20 mA with IO-Link communication protocol
- PROFIBUS PA
  - The Endress+Hauser devices meet the requirements of the FISCO model.
  - Due to a low current consumption of  $11 \text{ mA} \pm 1 \text{ mA}$ , the following number of devices can be operated on one bus segment if installing as per FISCO: up to 8 devices for Ex ia, CSA IS and FM IS applications or up to 31 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
  - The Endress+Hauser devices meet the requirements of the FISCO model.
  - Due to a low current consumption of  $16 \text{ mA} \pm 1 \text{ mA}$ , 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 22 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

- Analog electronics: Absolute pressure and gauge pressure
- HART, PROFIBUS PA, FOUNDATION Fieldbus: Absolute and gauge pressure from which level (level, volume or mass) is derived
- IO-Link: Pressure and level

### Measuring range

### PMC51 – with ceramic process isolating diaphragm (Ceraphire®) for gauge pressure

Sensor	Maximum sensor measuring range		Smallest calibratable measuring span (preset at the factory) <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)	0.01 (0.15)	2.7 (40.5)	4 (60)	0.7 (10.5)	1C
250 mbar (3.75 psi)	-0.25 (-3.75)	+0.25 (+3.75)	0.01 (0.15)	3.3 (49.5)	5 (75)	0.5 (7.5)	1E
400 mbar (6 psi)	-0.4 (-6)	+0.4 (+6)	0.02 (0.3)	5.3 (79.5)	8 (120)	0	1F
1 bar (15 psi)	-1 (-15)	+1 (+15)	0.05 (1)	6.7 (100.5)	10 (150)	0	1H
2 bar (30 psi)	-1 (-15)	+2 (+30)	0.1 (1.5)	12 (180)	18 (270)	0	1K
4 bar (60 psi)	-1 (-15)	+4 (+60)	0.2 (3)	16.7 (250.5)	25 (375)	0	1M
10 bar (150 psi)	-1 (-15)	+10 (+150)	0.5 (7.5)	26.7 (400.5)	40 (600)	0	1P
40 bar (600 psi)	-1 (-15)	+40 (+600)	2 (30)	40 (600)	60 (900)	0	1S

1) Factory calibration turn down: Max 20:1, higher on request or configurable in the device.

2) Product Configurator, "Sensor range" ordering feature

### PMC51 – with ceramic process isolating diaphragm (Ceraphire®) for absolute pressure

Sensor	Maximum sensor measuring range		Smallest calibratable measuring span (preset at the factory) <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)	0.01 (0.15)	2.7 (40.5)	4 (60)	0	2C
250 mbar (3.75 psi)	0	+0.25 (+3.75)	0.01 (0.15)	3.3 (49.5)	5 (75)	0	2E
400 mbar (6 psi)	0	+0.4 (+6)	0.02 (0.3)	5.3 (79.5)	8 (120)	0	2F
1 bar (15 psi)	0	+1 (+15)	0.05 (1)	6.7 (100.5)	10 (150)	0	2H
2 bar (30 psi)	0	+2 (+30)	0.1 (1.5)	12 (180)	18 (270)	0	2K
4 bar (60 psi)	0	+4 (+60)	0.2 (3)	16.7 (250.5)	25 (375)	0	2M
10 bar (150 psi)	0	+10 (+150)	0.5 (7.5)	26.7 (400.5)	40 (600)	0	2P
40 bar (600 psi)	0	+40 (+600)	2 (30)	40 (600)	60 (900)	0	2S

1) Factory calibration turn down: Max 20:1, higher on request or configurable in the device.

2) Product Configurator, "Sensor range" ordering feature

**PMP51 and PMP55 – metallic process isolating diaphragm for gauge pressure**

Sensor	Maximum sensor measuring range		Lowest calibratable span (preset at factory) <sup>1)</sup>	MWP	OPL	Vacuum resistance <sup>2)</sup>	Option <sup>3)</sup>
	lower (LRL)	upper (URL)				Silicone oil/ Inert oil/ Synthetic oil	
	[bar (psi)]	[bar (psi)]				[bar <sub>abs</sub> (psi <sub>abs</sub> )]	
400 mbar (6 psi)	-0.4 (-6)	+0.4 (+6)	0.02 (0.3)	4 (60)	6 (90)	0.01/0.04/0.01 (0.15/0.6/0.15)	1F
1 bar (15 psi)	-1 (-15)	+1 (+15)	0.05 (1)	6.7 (100)	10 (150)		1H
2 bar (30 psi)	-1 (-15)	+2 (+30)	0.1 (1.5)	13.3 (200)	20 (300)		1K
4 bar (60 psi)	-1 (-15)	+4 (+60)	0.2 (3)	18.7 (280.5)	28 (420)		1M
10 bar (150 psi)	-1 (-15)	+10 (+150)	0.5 (7.5)	26.7 (400.5)	40 (600)		1P
40 bar (600 psi)	-1 (-15)	+40 (+600)	2 (30)	100 (1500)	160 (2400)		1S
100 bar (1 500 psi)	-1 (-15)	+100 (+1500)	5 (75)	100 (1500)	400 (6000)		1U
400 bar (6 000 psi)	-1 (-15)	+400 (+6000)	20 (300)	400 (6000)	600 (9000)		1W

- 1) Highest factory-configurable turn down: 20:1, higher available on request or can be set in device.
- 2) The vacuum resistance applies to the measuring cell at reference conditions. A ceramic process isolating diaphragm is recommended for applications in the limit range. The pressure and temperature application limits of the selected filling oil must also be observed for the PMP55 → 123.
- 3) Product Configurator, order code for "Sensor range"

**PMP51 and PMP55 – metallic process isolating diaphragm for absolute pressure**

Sensor	Maximum sensor measuring <sup>1)</sup>		Lowest calibratable span (preset at factory) <sup>2)</sup>	MWP	OPL	Vacuum resistance <sup>3)</sup>	Option <sup>4)</sup>
	lower (LRL)	upper (URL)				Silicone oil/ Inert oil/ Synthetic 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)	0.02 (0.3)	4 (60)	6 (90)	0.01/0.04/0.01 (0.15/0.6/0.15)	2F
1 bar (15 psi)	0	+1 (+15)	0.05 (1)	6.7 (100)	10 (150)		2H
2 bar (30 psi)	0	+2 (+30)	0.1 (1.5)	13.3 (200)	20 (300)		2K
4 bar (60 psi)	0	+4 (+60)	0.2 (3)	18.7 (280.5)	28 (420)		2M
10 bar (150 psi)	0	+10 (+150)	0.5 (7.5)	26.7 (400.5)	40 (600)		2P
40 bar (600 psi)	0	+40 (+600)	2 (30)	100 (1500)	160 (2400)		2S
100 bar (1 500 psi)	0	+100 (+1500)	5 (75)	100 (1500)	400 (6000)		2U
400 bar (6 000 psi)	0	+400 (+6000)	20 (300)	400 (6000)	600 (9000)		2W

- 1) PMP55: 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) Highest factory-configurable turn down: 20:1, higher available on request or can be set in device.
- 3) The vacuum resistance applies to the measuring cell at reference conditions. A ceramic process isolating diaphragm is recommended for applications in the limit range. The pressure and temperature application limits of the selected filling oil must also be observed for the PMP55 → 123.
- 4) Product Configurator, order code for "Sensor range"

## Output

### Output signal

- 4 to 20 mA analog, 2-wire
- 4 to 20 mA with superimposed digital communication protocol HART 6.0, 2-wire
- Digital communication signal IO-Link, 3-wire
- Digital communication signal PROFIBUS PA (Profile 3.02)
- Digital communication signal FOUNDATION Fieldbus

Output	Optional <sup>1)</sup>
4 to 20mA	1
4 to 20mA HART	2
4 to 20mA, IO-Link	7
PROFIBUS PA	3
FOUNDATION Fieldbus	4

1) Product Configurator, "Output" ordering feature

### Signal range 4 to 20 mA

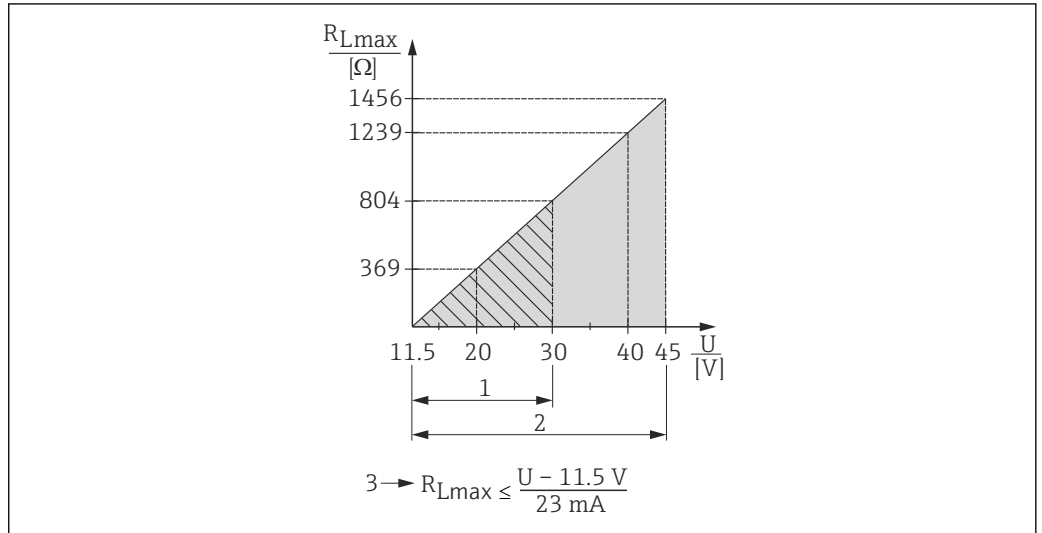
4 to 20 mA analog, 4 to 20 mA HART and IO-Link: 3.8 to 20.5 mA

### Signal on alarm

As per NAMUR NE 43

- 4 to 20 mA analog:
  - Signal over-range: > 20.5 mA
  - Signal under-range: < 3.8 mA
  - Min. alarm (3.6 mA)
- 4 to 20 mA HART:
  - Options:
    - 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
- IO-Link:
  - Max. alarm: permanently set to 22 mA
  - Min. alarm: 3.6 mA
  - Hold measured value: last measured value is held
- PROFIBUS PA: can be set in the Analog Input block
  - Options: Last Valid Out Value (factory setting), Fail-safe Value, Status Bad
- FOUNDATION Fieldbus: can be set in the Analog Input block
  - Options: Last Good Value, Fail-safe Value (factory setting), Wrong Value

**Load - 4 to 20 mA Analog  
4...20 mA HART**

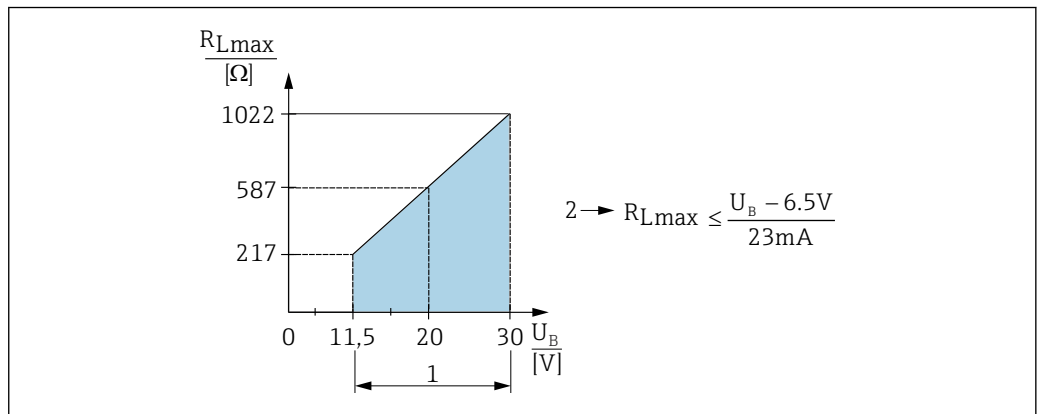


- 1 Supply voltage 11.5 to 30 V DC for intrinsically safe device versions (not for analog)
- 2 Supply voltage 11.5 to 45 V DC (versions with plug-in connector 35 V DC) for other types of protection and for uncertified device versions
- 3  $R_{Lmax}$  Maximum load resistance
- U Supply voltage

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

**Load for current output in the case of an IO-Link device**

In order to guarantee sufficient terminal voltage, a maximum load resistance  $R_L$  (including line resistance) must not be exceeded depending on the supply voltage  $U_B$  of the supply unit.



- 1 Power supply 11.5 to 30 V<sub>DC</sub>
- 2  $R_{Lmax}$  maximum load resistance
- $U_B$  Supply voltage

- Output of failure current and display of "M803" (Output: MIN alarm current)
- Periodic checking to establish if it is possible to quit fault state

**Damping**

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

- Via onsite display (not analog), handheld terminal or PC with operating program, continuous from 0 to 999 s
- Via DIP switch on the electronic insert (not IO-Link), "on" (= set value) and "off" (= damping switched off)
- Factory setting: 2 s

Firmware version	Designation	Option <sup>1)</sup>
	01.00.zz, FF, DevRev01	76
	01.00.zz, PROFIBUS PA, DevRev01	77
	01.00.zz, HART, DevRev01	78

1) Product Configurator, "Firmware version" ordering feature

HART protocol-specific data	
Manufacturer ID	17 (11 hex)
Device type ID	25 (19 hex)
Device revision	01 (01 hex) - SW version 01.00.zz
HART specification	6
DD revision	<ul style="list-style-type: none"> <li>▪ 01 (Dutch))</li> <li>▪ 02 (Russian))</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/registered-products">www.fieldcommgroup.org/registered-products</a></li> </ul>
HART load	Min. 250 Ω
HART device variables	The following measured values are assigned to the device variables: <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> <ul style="list-style-type: none"> <li>▪ Pressure</li> <li>▪ Level</li> </ul> <p><b>Measured values for QV (fourth device variable)</b></p> Temperature
Supported functions	<ul style="list-style-type: none"> <li>▪ Burst mode</li> <li>▪ Additional transmitter status</li> <li>▪ Device locking</li> <li>▪ Alternative modes of operation</li> </ul>

Wireless HART data	
Minimum starting voltage	11.5 V <sup>1)</sup>
Start-up current	12 mA (default) or 22 mA (customer setting)
Starting time	5 s
Minimum operating voltage	11.5 V <sup>1)</sup>
Multidrop current	4 mA
Time for connection setup	1 s

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

#### IO-Link protocol-specific data

IO-Link is a point-to-point connection for communication between the device and an IO-Link master. The IO-Link communication interface enables direct access to the process and diagnostic data. It also provides the option of configuring the device while in operation.

*The device supports the following features:*

IO-Link specification	Version 1.1
IO-Link Smart Sensor Profile 2nd Edition	Supported: <ul style="list-style-type: none"> <li>▪ Identification</li> <li>▪ Diagnosis</li> <li>▪ Digital measuring sensor (as per SSP 4.3.3)</li> </ul>
IO-Link transfer rate	COM2; 38.4 kBaud
Minimum cycle time	10 ms



Process data width	4 bytes process data 2 bytes diagnostic data
IO-Link data storage	Yes
Block configuration according to V1.1	Yes
Device operational	5 s after the supply voltage is applied, the device is operational (first valid measured value after 2 s)

**Device description**

In order to integrate field devices into a digital communication system, the IO-Link system requires a description of the device parameters such as output data, input data, data format, quantity of data and supported IO-Link transfer rate.

These data are contained in the device description (IODD <sup>1)</sup>) which is made available to the IO-Link master via generic modules during commissioning of the communication system.



The IODD can be downloaded as follows:

- Endress+Hauser: [www.endress.com](http://www.endress.com)
- IODDfinder: <https://ioddfinder.io-link.com/#/>

**Protocol-specific data  
PROFIBUS PA**

Manufacturer ID	17 (11 hex)
Ident number	1554 hex
Profile Version	3.02 SW Version 01.00.zz
GSD Revision	5
DD Revision	1
GSD File	Information and files can be found:
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 Simple device identification via control system and nameplate</li> <li>▪ Condensed status</li> <li>▪ Automatic ident number adaptation and switchable to following ident numbers: <ul style="list-style-type: none"> <li>▪ 9700: Profile-specific transmitter identification number with the "Classic" or "Condensed" status.</li> <li>▪ 151C: Compatibility mode for the old Cerabar M (PMC41, PMC45, PMP41, PMP45, PMP46, PMP48).</li> <li>▪ 1553: Identification number for the new Cerabar M (PMC51, PMP51, PMP55).</li> </ul> </li> <li>▪ Device locking: The device can be locked by hardware or software.</li> </ul>

**FOUNDATION Fieldbus  
protocol-specific data**

Device type	0x1019
Device revision	01 (hex)
DD revision	0x01021

1) IO Device Description

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/registered-products">www.fieldcommgroup.org/registered-products</a></li> </ul>
CFF revision	0x000102
ITK version	5.2.0
ITK certification driver no.	IT067700
Link Master functionality supported (LAS)	Yes
Link Master/Basic Device selectable	Yes; Factory setting: Basic Device
Number of VCRs	44
Number of link objects in VFD	50
Number of FB schedule objects	40

### Virtual communication references (VCRs)

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

### Link settings

Slot time	4
Min. inter PDU delay	12
Max. response delay	40

### Transducer Blocks

Block	Content	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> <li>▪ Measured pressure value (channel 3)</li> <li>▪ Max. pressure (channel 4)</li> <li>▪ Level before linearization (channel 5)</li> </ul>
Diagnostic Block	Contains diagnostic information	Error code via DI channels (channel 10 to 15)
Display Block	Contains parameters to configure the onsite display	No output values

**Function blocks**

Block	Content	Number of blocks	Execution time	Functionality
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
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	25 ms	Enhanced
Digital Input Block	This block contains the discrete data of the Diagnostic Block (selectable via a channel number 10 to 15) and provides them for other blocks at the output.	1	20 ms	Standard
Digital Output Block	This block converts the discrete input and thus initiates an action (selectable via a channel number) in the DP Flow Block or in the TRD1 Block. Channel 20 resets the counter for max. pressure transgressions value.	1	20 ms	Standard
PID Block	The PID Block serves as a proportional-integral-derivative controller and is used almost universally for closed-loop-control in the field including cascade and feedforward. Input IN can be indicated on the display. The selection is performed in the Display Block (DISPLAY_MAIN_LINE_CONTENT).	1	40 ms	Standard
Arithmetic Block	This block is designed to permit simple use of popular measurement math functions. The user does not have to know how to write equations. The math algorithm is selected by name, chosen by the user for the function to be performed.	1	35 ms	Standard
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 performs maximum, minimum, average and 'first good' signal selection. Inputs IN1 to IN4 can be indicated on the display. The selection is performed in the Display Block (DISPLAY_MAIN_LINE_1_CONTENT).	1	30 ms	Standard
Signal Characterizer Block	The Signal Characterizer Block has two sections, each with an output that is a non-linear function of the respective input. The non-linear function is generated by a single look-up table with 21 arbitrary x-y pairs.	1	40 ms	Standard
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 value or accumulated value is compared to pre-trip and trip settings, generating a binary signal when the setpoint is reached.	1	35 ms	Standard

*Additional function block information:*

Instantiate function blocks	Yes
Number of additional instantiate function blocks	20

## Power supply

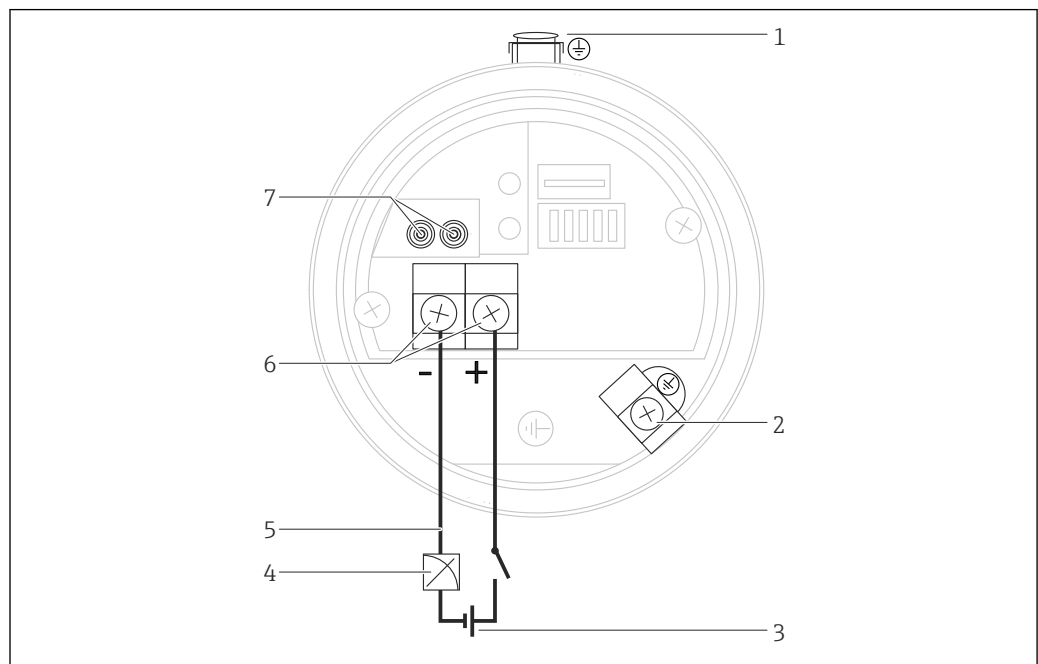
### ⚠ WARNING

#### Limitation of electrical safety due to incorrect connection!

- ▶ When using the measuring device in hazardous areas, installation must comply with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings .
- ▶ All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all Ex devices .
- ▶ In accordance with IEC/EN61010 a suitable circuit breaker must be provided for the device.
- ▶ HART: Overvoltage protection HAW569-DA2B for the non-hazardous area, ATEX II 2 (1) Ex ia IIC and IEC Ex ia can be ordered as an option (see "Ordering information" section).
- ▶ Protective circuits against reverse polarity, HF influences and overvoltage peaks are integrated.

### Terminal assignment

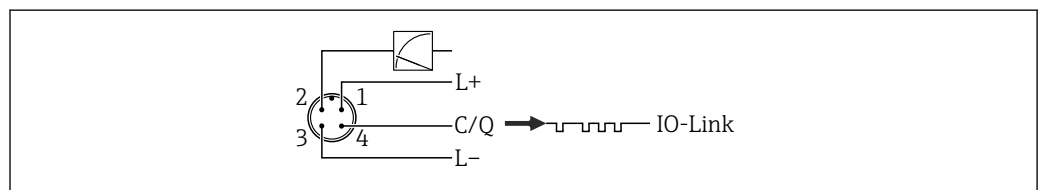
### Analog, HART, PROFIBUS PA, FOUNDATION Fieldbus



A0023505

- 1 External ground terminal (only for devices with certain approvals or if "Measuring point" (TAG) is ordered)
- 2 Internal ground terminal
- 3 Supply voltage → 21
- 4 4 to 20 mA for HART devices
- 5 For HART and FOUNDATION Fieldbus devices: With a handheld terminal, all the parameters can be configured anywhere along the bus line via menu operation.
- 6 Terminals
- 7 For HART devices: test terminals, see section "Taking 4 to 20 mA test signal" → 21

### IO-Link



A0045628

- 1 Supply voltage +
- 2 4-20 mA
- 3 Supply voltage -
- 4 C/Q (IO-Link communication)

**Supply voltage**

**4 to 20 mA HART**

Type of protection	Supply voltage
Intrinsically safe	11.5 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 plug-in connector 35 V DC)

*Taking 4 to 20 mA test signal*

A 4 to 20 mA test signal may be measured via the test terminals without interrupting the measurement.

**IO-Link**

- 11.5 to 30 V DC if only the analog output is used
- 18 to 30 V DC if IO-Link is used

**PROFIBUS PA**

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

**FOUNDATION Fieldbus**

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

**Current consumption**

- IO-Link < 60 mA
- PROFIBUS PA: 11 mA ±1 mA, switch-on current corresponds to IEC 61158-2, Clause 2.1
- FOUNDATION Fieldbus: 16 mA ±1 mA, switch-on current corresponds to IEC 61158-2, Clause 2.1

**Electrical connection**

Cable entry	Degree of protection	Option <sup>1)</sup>
M20 gland	IP66/68 NEMA 4X/6P	A
G ½" thread	IP66/68 NEMA 4X/6P	C
NPT ½" thread	IP66/68 NEMA 4X/6P	D
M12 plug	IP66/67 NEMA 4X/6P	I
7/8" plug	IP66/68 NEMA 4X/6P	M
HAN7D plug 90 deg.	IP65	P
PE cable 5m	IP66/68 NEMA4X/6P + pressure compensation via cable	S
M16 valve connector	IP64	V

1) Product Configurator, "Electrical connection" ordering feature

**PROFIBUS PA**

The digital communication signal is transmitted to the bus via a twin-core connecting cable. The bus line 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 twin-core connecting cable. The bus line 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)

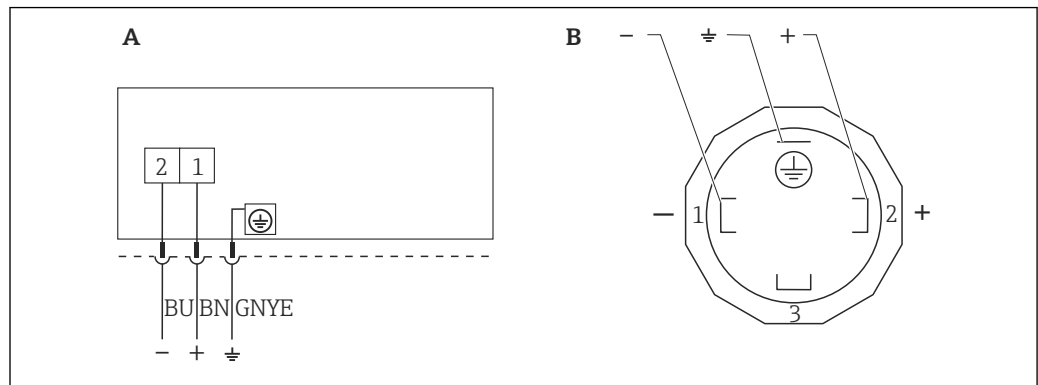
**Cable entry**

Approval	Type	Clamping area
Standard, CSA GP ATEX II1/2G or II2G Ex ia, IEC Ex ia Ga/Gb or Ex ia Gb, FM/ CSA IS	Plastic M20x1.5	5 to 10 mm (0.2 to 0.39 in)
ATEX II1/2D Ex t, II1/2GD Ex ia, II3G Ex nA, IEC Ex t Da/Db	Metal M20x1.5 (Ex e)	7 to 10.5 mm (0.28 to 0.41 in)

For other technical data, see the housing section → 50

**Connector**

**Devices with valve connector (HART)**



A0023097

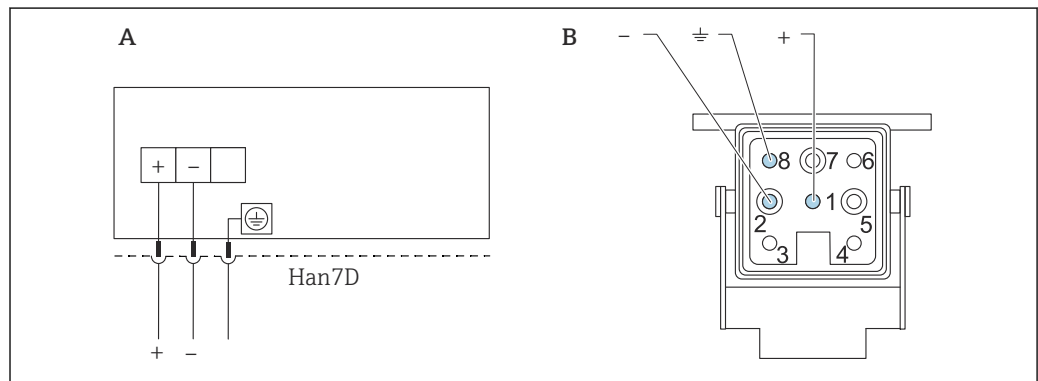
1 BN = brown, BU = blue, GNYE = green

A Electrical connection for devices with valve connector

B View of the plug connector at the device

Material: PA 6.6

**Connecting devices with Harting plug Han7D (HART)**



A0019990

A Electrical connection for devices with Harting plug Han7D

B View of the connection on the device

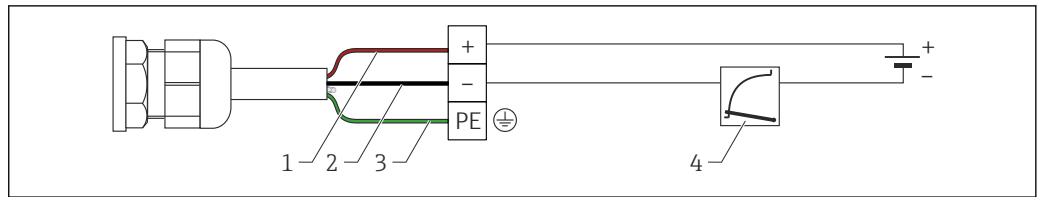
- Brown

Green/yellow

+ Blue

Material: CuZn, gold-plated contacts of plug-in jack and plug

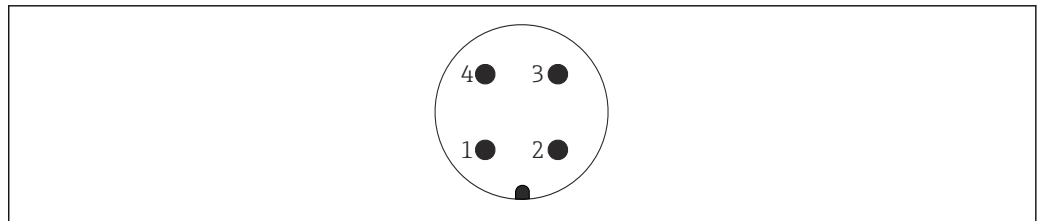
**Connecting the cable version (all device versions)**



A0019991

- 1 RD = red
- 2 BK = black
- 3 GNYE = green
- 4 4 to 20 mA

**Connecting devices with M12 plug (analog, HART, PROFIBUS PA)**



A0011175

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

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): IP66/67
- Order number: 52006263

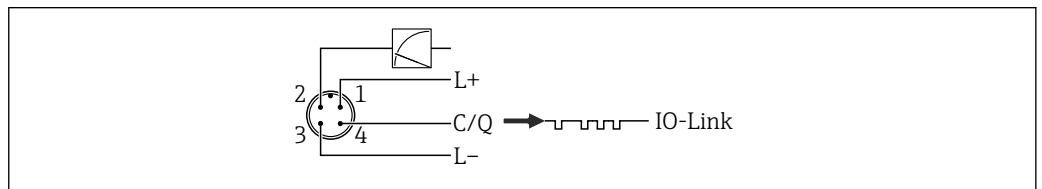
Plug-in jack M 12x1, elbowed

- Material: body PBT/PA; coupling nut GD-Zn, nickel-plated
- Degree of protection (fully locked): IP66/67
- Order number: 71114212

Cable 4 x 0.34 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): IP66/67
- Order number: 52010285

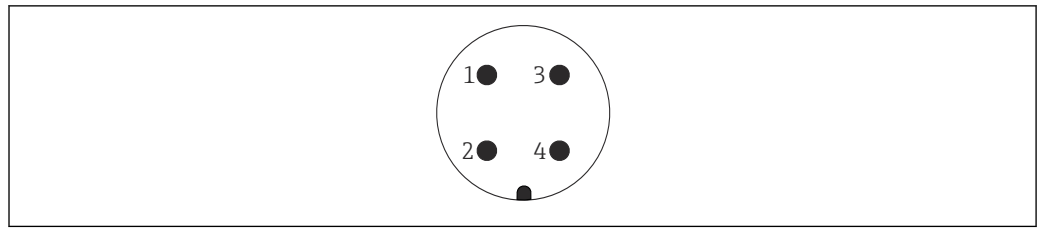
**Connecting devices with M12 plug (IO-Link)**



A0045628

- 1 Supply voltage +
- 2 4-20 mA
- 3 Supply voltage -
- 4 C/Q (IO-Link communication)

### Connecting devices with 7/8" plug (analog, HART, FOUNDATION Fieldbus)



A0011176

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

External thread: 7/8 - 16 UNC

- Material: 316L (1.4401)
- Degree of protection: IP66/68

#### Cable specification

##### Analog

- Endress+Hauser recommends using twisted, shielded twin-core cables.
- The cable outer diameter depends on the cable entry used.

##### HART

- Endress+Hauser recommends using twisted, shielded twin-core cables.
- The cable outer diameter depends on the cable entry used.

##### IO-Link

Endress+Hauser recommends using twisted, four-core cable.

##### PROFIBUS PA

Endress+Hauser recommends using twisted, shielded twin-core cable, preferably cable type A.



For further information regarding 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

- Analog electronics: 12 mA
- HART: 12 mA or 22 mA (selectable)
- IO-Link: 12 mA

#### Residual ripple

No influence on 4 to 20 mA signal up to  $\pm 5\%$  residual ripple within the permitted voltage range [according to HART hardware specification HCF\_SPEC-54 (DIN IEC 60381-1)].

#### Influence of power supply

$\leq 0.001\%$  of URL/V

#### Overvoltage protection (optional)

The device can be fitted with overvoltage protection. The overvoltage protection is mounted at the factory on the housing thread (M20x1.5) for the cable gland and is approx. 70 mm (2.76 in) in length (take additional length into account when installing). The device is connected as illustrated in the following graphic.

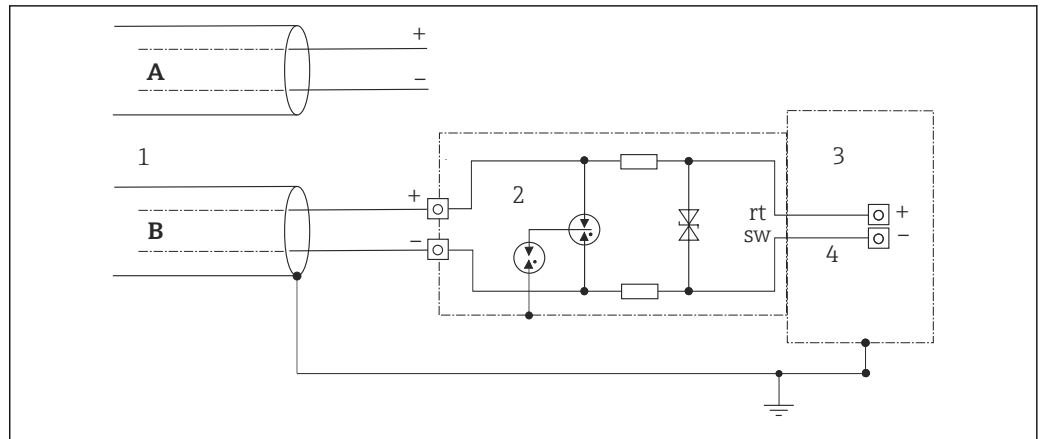
For details refer to TI01013KDE, XA01003KA3 and BA00304KA2.

Ordering information:

Product Configurator, "Mounted accessories" ordering feature, option NA



**Wiring**



A0023111

- A Without direct shield grounding
- B With direct shield grounding
- 1 Incoming connecting cable
- 2 HAW569-DA2B
- 3 Unit to be protected
- 4 Connecting cable

## Performance characteristics for measuring devices with ceramic process membrane

### Response time



When recording step responses, it is important to bear in mind that the response times of the sensor might be added to the specified times.

#### 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)

#### IO-Link

Cyclic: < 10 ms at 38.4 kbps

#### PROFIBUS PA

- Acyclic: approx. 23 ms to 35 ms (depending on Min. Slave Interval)
- Cyclic: approx. 8 ms to 13 ms (depending on Min. Slave Interval)

#### FOUNDATION Fieldbus

- Acyclic: typically 70 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 of +21 to +33 °C (+70 to +91 °F)
- Humidity  $\varphi$  = constant, in the range of: 5 to 80 % RH  $\pm$  5 %
- Atmospheric pressure  $p_U$  = constant, in the range of: 860 to 1 060 mbar (12.47 to 15.37 psi)
- Position of the measuring cell:  $\pm$ 1° horizontally
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Span based on zero point
- Material of the process membrane: Al<sub>2</sub>O<sub>3</sub> aluminum oxide ceramic FDA, ultrapure 99.9 %
- Supply voltage: 24 V DC  $\pm$ 3 V DC
- Load with HART: 250  $\Omega$
- Load in the case of IO-Link: 610 R<sub>L</sub>
- Turn down (TD) =  $|URL/|URV - LRV|$

### 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 = Temperature effect

Calculation of E2:

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 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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### Reference accuracy [E1]

The reference accuracy comprises the non-linearity according to the limit point method, pressure hysteresis and non-repeatability in accordance with [IEC62828-1/IEC 61298-2].

#### Gauge pressure sensors

100 mbar (1.5 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.15$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.0075$  % · TD

250 mbar (3.75 psi), 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi) and 10 bar (150 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.1$  %

40 bar (600 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.0075$  % · TD

#### Gauge pressure sensors with hygienic process connections

100 mbar (1.5 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.10$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.0075$  % · TD

250 mbar (3.75 psi), 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi) and 10 bar (150 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.1$  %

40 bar (600 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.0075$  % · TD

#### Absolute pressure sensors

100 mbar (1.5 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.15$  %; TD > 10:1 to 20:1 =  $\pm 0.015$  % · TD
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.015$  % · TD

250 mbar (3.75 psi), 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi) and 10 bar (150 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.1$  %

40 bar (600 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1$  %; TD > 10:1 to 20:1 =  $\pm 0.2$  %
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075$  %; TD > 10:1 to 20:1 =  $\pm 0.0075$  % · TD

*Absolute pressure sensors with hygienic process connections*

100 mbar (1.5 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.15\% \cdot \text{TD}$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.015\% \cdot \text{TD}$

250 mbar (3.75 psi), 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi) and 10 bar (150 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.1\%$

40 bar (600 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.0075\% \cdot \text{TD}$

**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.

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

- Standard:  $\pm(0.277\% \cdot \text{TD} + 0.275\%)$
- Platinum:  $\pm(0.277\% \cdot \text{TD} + 0.275\%)$

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

- Standard:  $\pm(0.157\% \cdot \text{TD} + 0.235\%)$
- Platinum:  $\pm(0.157\% \cdot \text{TD} + 0.235\%)$

*With hygienic process connections*

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

- Standard:  $\pm(0.277\% \cdot \text{TD} + 0.275\%)$
- Platinum:  $\pm(0.277\% \cdot \text{TD} + 0.275\%)$

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

- Standard:  $\pm(0.157\% \cdot \text{TD} + 0.235\%)$
- Platinum:  $\pm(0.157\% \cdot \text{TD} + 0.235\%)$

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

- Analog output (4 to 20 mA): 0.2 %
- Digital output (HART/IO-Link/PA/FF): 0 %

**Resolution**

- Current output: 1  $\mu\text{A}$
- Display: can be set (factory setting: presentation of the maximum accuracy of the transmitter)

**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).

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

- 1 year: ±0.20 %
- 5 years: ±0.40 %
- 10 years: ±0.50 %

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

- 1 year: ±0.10 %
- 5 years: ±0.25 %
- 10 years: ±0.40 %

With hygienic process connections

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

- 1 year: ±0.35 %
- 5 years: ±0.50 %
- 10 years: ±0.60 %

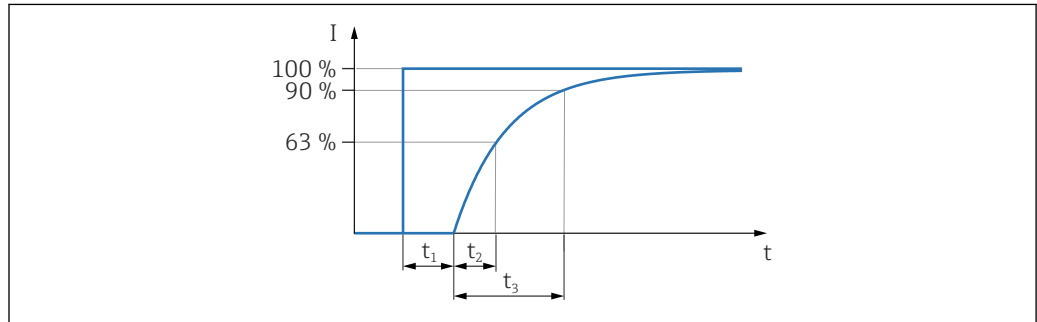
2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi) and 40 bar (600 psi) sensor

- 1 year: ±0.20 %
- 5 years: ±0.35 %
- 10 years: ±0.50 %

**Response time T63 and T90**

**Dead time, time constant**

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



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**Dynamic behavior, current output (analog electronics)**

	Dead time ( $t_1$ )	Time constant T63 (= $t_2$ )	Time constant T90 (= $t_3$ )
Max.	60 ms	40 ms	50 ms

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

	Dead time ( $t_1$ )	Time constant T63 (= $t_2$ )	Time constant T90 (= $t_3$ )
Max.	50 ms	85 ms	200 ms

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

	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 (= $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 (= $t_3$ )
Min.	210 ms	295 ms	360 ms
Max.	1010 ms	1095 ms	1160 ms

*Reading cycle*

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

**IO-Link**

	Dead time ( $t_1$ )	Time constant (T63) $t_2$	Time constant (T90) $t_3$
Min.	50 ms + cycle time	85 ms + cycle time	200 ms + cycle time

*Reading cycle*

- Acyclic: cyclic/n where n is dependent on the size of the acyclic data
- Cyclic: min. 100/s

*Cycle time (update time)*

Cyclic (Burst): min. 10 ms

**Dynamic behavior, PROFIBUS PA**

	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 (= $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 (= $t_3$ )
Min.	85 ms	170 ms	235 ms
Max.	1185 ms	1270 ms	1335 ms

*Reading cycle (PLC)*

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

*Cycle time (update time)*

Min. 100 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.

**Dynamic behavior, FOUNDATION Fieldbus**

	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 (= $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 (= $t_3$ )
Min.	95 ms	180 ms	245 ms
Max.	1095 ms	1180 ms	1245 ms

*Reading cycle*

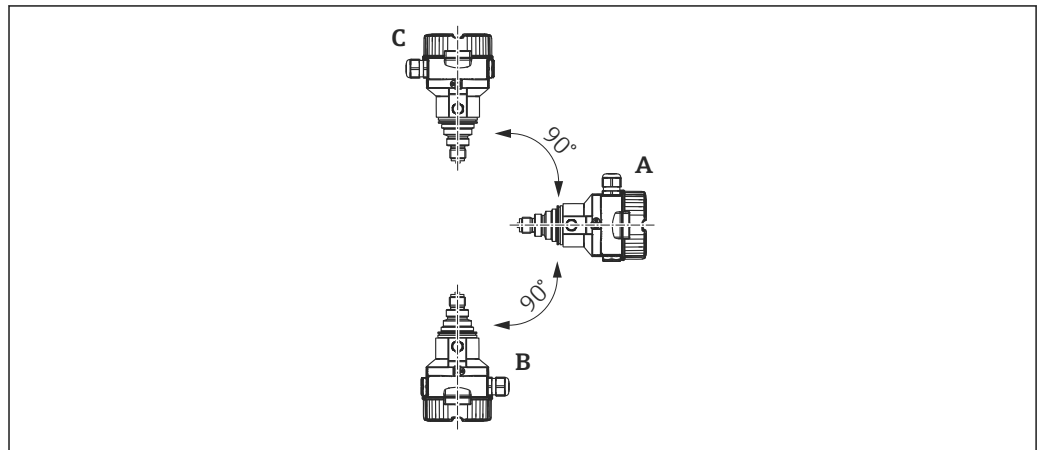
- Acyclic: typically 5/s
- Cyclic: max. 10/s (depending on the number and type of function blocks used in the closed-control loop)

*Cycle time (update time)*

Cyclic: min. 100 ms

## Installation factors

## Influence of installation position



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Measured error in mbar (psi)

Process membrane axis is horizontal (A)	Process membrane pointing upwards (B)	Process membrane pointing downwards (C)
Calibration position, no measured error	< +0.2 mbar (+0.003 psi)	< -0.2 mbar (-0.003 psi)

**i** Position-dependent zero point shift can be corrected at the device.

#### Warm-up time

- 4 to 20 mA analog: ≤ 1.5 s
- 4 to 20 mA HART: ≤ 5 s
- IO-Link: < 1 s
- PROFIBUS PA: ≤ 8 s
- FOUNDATION Fieldbus: ≤ 20 s (≤ 45 s after a TOTAL reset)



## Performance characteristics for measuring devices with a metallic process membrane

### Response time



When recording step responses, it is important to bear in mind that the response times of the sensor might be added to the specified times.

#### 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)

#### IO-Link

Cyclic: < 10 ms at 38.4 kbps

#### PROFIBUS PA

- Acyclic: approx. 23 ms to 35 ms (depending on Min. Slave Interval)
- Cyclic: approx. 8 ms to 13 ms (depending on Min. Slave Interval)

#### FOUNDATION Fieldbus

- Acyclic: typically 70 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 of +21 to +33 °C (+70 to +91 °F)
- Humidity  $\phi$  = constant, in the range of: 5 to 80 % RH
- Atmospheric pressure  $p_U$  = constant, in the range of: 860 to 1 060 mbar (12.47 to 15.37 psi)
- Position of the measuring cell: constant, in the range of:  $\pm 1^\circ$  horizontally
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Span based on zero point
- Material of the process membrane: AISI 316L
- Fill fluid PMP51: synthetic oil as per FDA 21 CFR 178.3620 (b)(1) and NSF H-1
- Supply voltage: 24 V DC  $\pm 3$  V DC
- Load in the case of HART: 250  $\Omega$
- Load in the case of IO-Link: 610  $R_L$

### 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  $\pm 28^\circ\text{C}$  ( $50^\circ\text{F}$ )

(corresponds to the range from  $-3$  to  $+53^\circ\text{C}$  ( $+27$  to  $+127^\circ\text{F}$ ))

$$E2 = E2_M + E2_E$$

$E2_M$  = Main temperature error

$E2_E$  = Electronics error

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

**Reference accuracy [E1]**

The reference accuracy comprises the non-linearity according to the limit point method, pressure hysteresis and non-repeatability in accordance with [IEC62828-1/IEC 61298-2].

*PMP51*

400 mbar (6 psi) sensor

- Standard: TD 1:1 =  $\pm 0.1\%$ ; TD > 1:1 to 20:1 =  $\pm 0.15\% \cdot \text{TD}$
- Platinum: -

1 bar (15 psi) sensor

- Standard: TD 1:1 to 5:1 =  $\pm 0.1\%$ ; TD > 5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$
- Platinum: TD 1:1 to 2.5:1 =  $\pm 0.075\%$ ; TD > 2.5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$

2 bar (30 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.015\% \cdot \text{TD}$
- Platinum: TD 1:1 to 5:1 =  $\pm 0.075\%$ ; TD > 5:1 to 20:1 =  $\pm 0.015\% \cdot \text{TD}$

4 bar (60 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.0075\% \cdot \text{TD}$

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

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.1\%$

100 bar (1500 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.15\%$

400 bar (6000 psi) sensor

- Standard: TD 1:1 to 5:1 =  $\pm 0.1\%$ ; TD > 5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$
- Platinum: TD 1:1 to 5:1 =  $\pm 0.1\%$ ; TD > 5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$

*PMP51 with hygienic process connections*

400 mbar (6 psi) sensor

- Standard: TD 1:1 =  $\pm 0.1\%$ ; TD > 1:1 to 10:1 =  $\pm 0.3\% \cdot \text{TD}$
- Platinum: -

1 bar (15 psi) sensor

- Standard: TD 1:1 =  $\pm 0.1\%$ ; TD > 1:1 to 10:1 =  $\pm 0.3\% \cdot \text{TD}$
- Platinum: TD 1:1 =  $\pm 0.1\%$ ; TD > 1:1 to 10:1 =  $\pm 0.2\% \cdot \text{TD}$

2 bar (30 psi) sensor

- Standard: TD 1:1 to 5:1 =  $\pm 0.1\%$ ; TD > 5:1 to 10:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 5:1 =  $\pm 0.075\%$ ; TD > 5:1 to 10:1 =  $\pm 0.1\%$

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

- Standard: TD 1:1 to 10:1 =  $\pm 0.1\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.1\%$

*PMP55*

400 mbar (6 psi) sensor

- Standard: TD 1:1 =  $\pm 0.15\%$ ; TD > 1:1 to 20:1 =  $\pm 0.15\% \cdot \text{TD}$
- Platinum: not available

1 bar (15 psi) sensor

- Standard: TD 1:1 to 5:1 =  $\pm 0.15\%$ ; TD > 5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$
- Platinum: TD 1:1 to 2.5:1 =  $\pm 0.075\%$ ; TD > 2.5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$

2 bar (30 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.15\%$ ; TD > 10:1 to 20:1 =  $\pm 0.015\% \cdot \text{TD}$
- Platinum: TD 1:1 to 5:1 =  $\pm 0.075\%$ ; TD > 5:1 to 20:1 =  $\pm 0.015\% \cdot \text{TD}$

4 bar (60 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.15\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.0075\% \cdot \text{TD}$

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

- Standard: TD 1:1 to 10:1 =  $\pm 0.15\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.1\%$

100 bar (1 500 psi) sensor

- Standard: TD 1:1 to 10:1 =  $\pm 0.15\%$ ; TD > 10:1 to 20:1 =  $\pm 0.2\%$
- Platinum: TD 1:1 to 10:1 =  $\pm 0.075\%$ ; TD > 10:1 to 20:1 =  $\pm 0.15\%$

400 bar (6 000 psi) sensor

- Standard: TD 1:1 to 5:1 =  $\pm 0.15\%$ ; TD > 5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$
- Platinum: TD 1:1 to 5:1 =  $\pm 0.15\%$ ; TD > 5:1 to 20:1 =  $\pm 0.03\% \cdot \text{TD}$

 Platinum only for direct diaphragm seal mounting.

### 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) sensor

$\pm(0.08\% \cdot \text{TD} + 0.16\%)$

1 bar (15 psi) sensor

$\pm(0.08\% \cdot \text{TD} + 0.16\%)$

2 bar (30 psi) sensor

$\pm(0.08\% \cdot \text{TD} + 0.16\%)$

4 bar (60 psi) sensor

$\pm(0.08\% \cdot \text{TD} + 0.16\%)$

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

$\pm(0.06\% \cdot \text{TD} + 0.06\%)$

100 bar (1 500 psi) sensor

$\pm(0.03\% \cdot \text{TD} + 0.12\%)$

400 bar (6 000 psi) sensor

$\pm(0.03\% \cdot \text{TD} + 0.12\%)$

*PMP51 with hygienic process connections*

400 mbar (6 psi) sensor with clamp ½"

- Standard:  $\pm(0.4\% \cdot \text{TD} + 0.1\%)$
- Platinum: -

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

- Standard:  $\pm(0.25\% \cdot \text{TD} + 0.1\%)$
- Platinum:  $\pm(0.25\% \cdot \text{TD} + 0.1\%)$

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

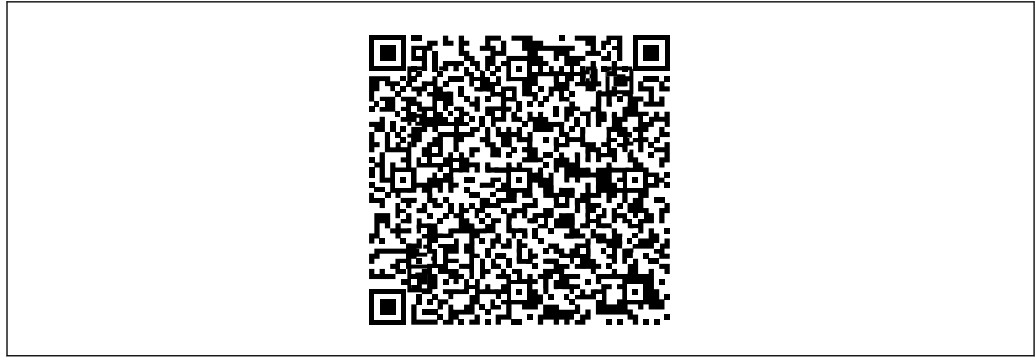
- Standard:  $\pm(0.2\% \cdot \text{TD} + 0.1\%)$
- Platinum:  $\pm(0.2\% \cdot \text{TD} + 0.1\%)$

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

- Analog output (4 to 20 mA): 0.2 %
- Digital output (HART/IO-Link/PA/FF): 0 %

### 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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### Resolution

- Current output: 1  $\mu\text{A}$
- Display: can be set (factory setting: presentation of the maximum accuracy of the transmitter)

### 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](#)".



A0038925

**Long-term stability**

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

- 1 year: ±0.10 %
- 5 years: ±0.20 %
- 10 years: ±0.25 %

**PMP51 with hygienic process connections**

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

- 1 year: ±0.25 %
- 5 years: ±0.48 %
- 10 years: ±0.58 %

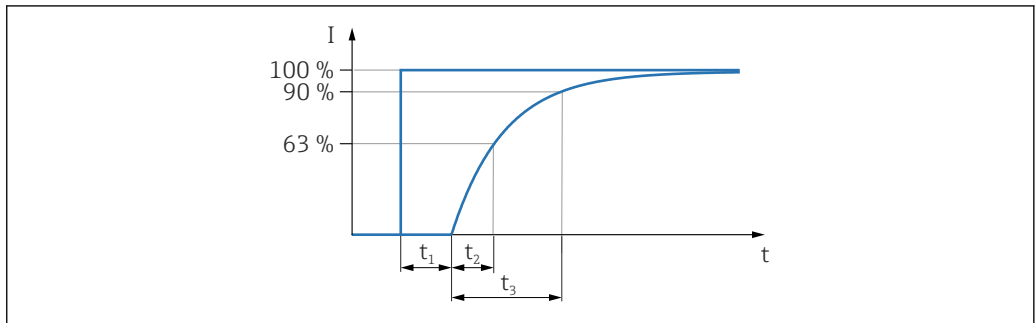
2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi) and 40 bar (600 psi) sensor

- 1 year: ±0.10 %
- 5 years: ±0.33 %
- 10 years: ±0.43 %

**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 (analog electronics)**

	Device	Dead time ( $t_1$ )	Time constant T63 (= $t_2$ )	Time constant T90 (= $t_3$ )
Max.	PMP51	40 ms	40 ms	50 ms
Max.	PMP55	PMP51 + influence of the diaphragm seal		

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

	Device	Dead time ( $t_1$ )	Time constant T63 (= $t_2$ )	Time constant T90 (= $t_3$ )
Max.	PMP51	70 ms	80 ms	185 ms
Max.	PMP55	PMP51 + influence of the diaphragm seal		

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

	Device	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 (= $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 (= $t_3$ )
Min.	PMP51	210 ms	285 ms	345 ms
Max.		1010 ms	1085 ms	1145 ms
Max.	PMP55	PMP51 + influence of the diaphragm seal		

*Reading cycle*

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

**IO-Link**

	Device	Dead time ( $t_1$ )	Time constant (T63) $t_2$	Time constant (T90) $t_3$
Min.	PMP51	70 ms + cycle time	80 ms + cycle time	185 ms + cycle time
	PMP55	PMP51 + influence of the diaphragm seal		

*Reading cycle*

- Acyclic: cyclic/n where n is dependent on the size of the acyclical data
- Cyclic: min. 100/s

*Cycle time (update time)*

Cyclic (Burst): min. 10 ms

**Dynamic behavior, PROFIBUS PA**

	Device	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 (= $t_2$ )	Dead time ( $t_1$ ) + Time constant T90 (= $t_3$ )
Min.	PMP51	85 ms	160 ms	220 ms
Max.		1185 ms	1260 ms	1320 ms
Max.	PMP55	PMP51 + influence of the diaphragm seal		

*Reading cycle (PLC)*

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

*Cycle time (update time)*

Min. 100 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.

**Dynamic behavior, FOUNDATION Fieldbus**

	Device	Dead time ( $t_1$ )	Dead time ( $t_1$ ) + Time constant T63 ( $= t_2$ )	Dead time ( $t_1$ ) + Time constant T90 ( $= t_3$ )
Min.	PMP51	95 ms	170 ms	230 ms
Max.		1095 ms	1170 ms	1230 ms
Max.	PMP55	PMP51 + influence of the diaphragm seal		

*Reading cycle*

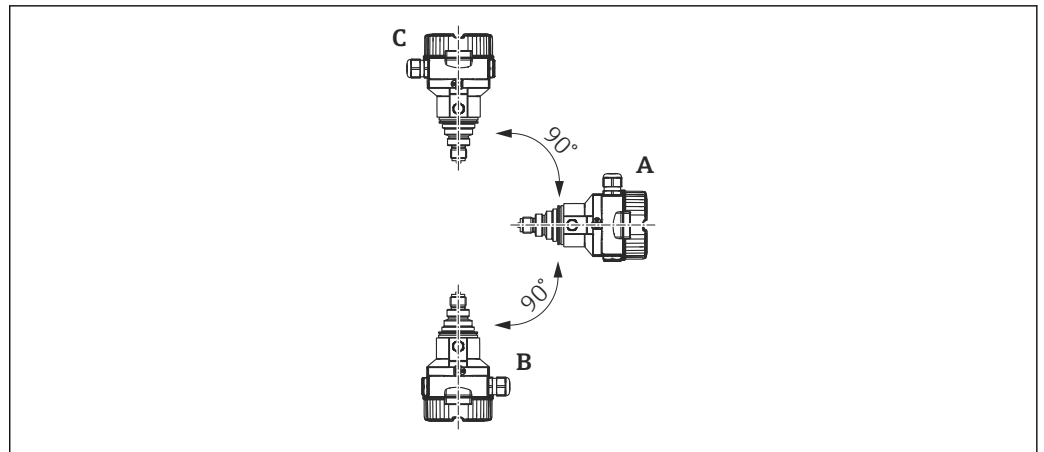
- Acyclic: typically 5/s
- Cyclic: max. 10/s (depending on the number and type of function blocks used in the closed-control loop)

*Cycle time (update time)*

Cyclic: min. 100 ms

**Installation factors**

**Influence of installation position**



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*Measured error in mbar (psi)*

	Process membrane axis is horizontal (A)	Process membrane pointing upwards (B)	Process membrane pointing downwards (C)
PMP51 with 1/2" thread and silicone oil	Calibration position, no measured error	< +4 mbar (+0.06 psi)	< -4 mbar (-0.06 psi)
PMP51 with thread > 1/2" and flanges		< +10 mbar (+0.145 psi) The value is doubled for inert oil.	< -10 mbar (-0.145 psi) The value is doubled for inert oil.



Position-dependent zero point shift can be corrected at the device.

**Warm-up time**

- 4 to 20 mA analog: ≤ 1.5 s
- 4 to 20 mA HART: ≤ 5 s
- IO-Link: < 1 s
- PROFIBUS PA: ≤ 8 s
- FOUNDATION Fieldbus: ≤ 20 s (≤ 45 s after a TOTAL reset)

## Mounting

### General installation instructions

The position-dependent zero point shift can be corrected:

- directly at the device via operating keys on the electronic insert
- directly at the device via operating keys on the display (except analog electronics)
- via digital communication if the cover is not open (except analog electronics).
- Endress+Hauser offers a mounting bracket for installing the device on pipes or walls.
- Use flushing rings for flange and cell diaphragm seals if medium buildup or clogging can be expected at the diaphragm seal connection. The flushing ring can be inserted between the process connection and the diaphragm seal. Thanks to the two lateral flushing bore holes, material buildup in front of the process isolating diaphragm can be rinsed away and the pressure chamber can be ventilated.
- To guarantee the leak-tightness of the transmitter, Endress+Hauser recommends that only genuine cable glands be used (also available as spare parts).

### Measuring arrangement for devices without diaphragm seal – PMC51, PMP51

Cerabar M transmitters without diaphragm seals are mounted as per the norms for 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 Cerabar M with shutoff device above the tapping point so that any condensate can flow into the process.

#### Pressure measurement in steams

Use a siphon if measuring pressure in steams. The siphon reduces the temperature to almost the ambient temperature. Fill the siphon with liquid before commissioning. Preferably mount the Cerabar M with a siphon below the tapping point.

Advantages:

- Defined water column only causes minimal/negligible measured errors
- Only minimal/negligible thermal effects on the device  
The device may also be mounted above the tapping point. Pay attention to the maximum permitted ambient temperature of the transmitter!
- Fill the siphon with liquid before commissioning.


#### Pressure measurement in liquids

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

#### Level measurement

- Mount Cerabar M below the lowest measuring point (zero point of the measurement).
- Do not mount the device at 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 of a shutoff device.

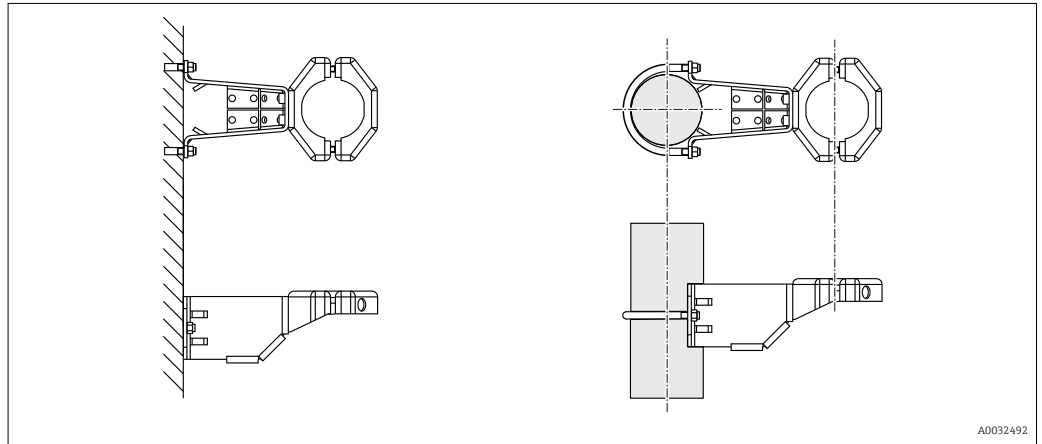
### Measuring arrangement for devices with diaphragm seal – PMP55

→  121



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

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

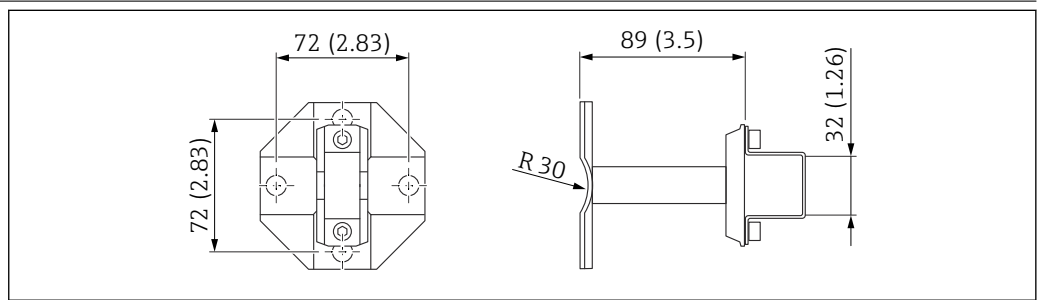


Ordering information:

- Product configurator "Accessory Enclosed" ordering feature, option PA.
- included in the delivery for devices with a separate housing (available for order via feature "Separate housing")
- available for order as a separate accessory (Part No.: 71102216).

Further details → 105.

**Wall and pipe-mounting manifold (optional)**



Technical data (e.g. dimensions or order numbers for screws) see accessory document SD01553P/00/EN.

Ordering information:

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

**"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 allows for 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
- If the measuring point is exposed to vibrations

You can choose between different cable versions:

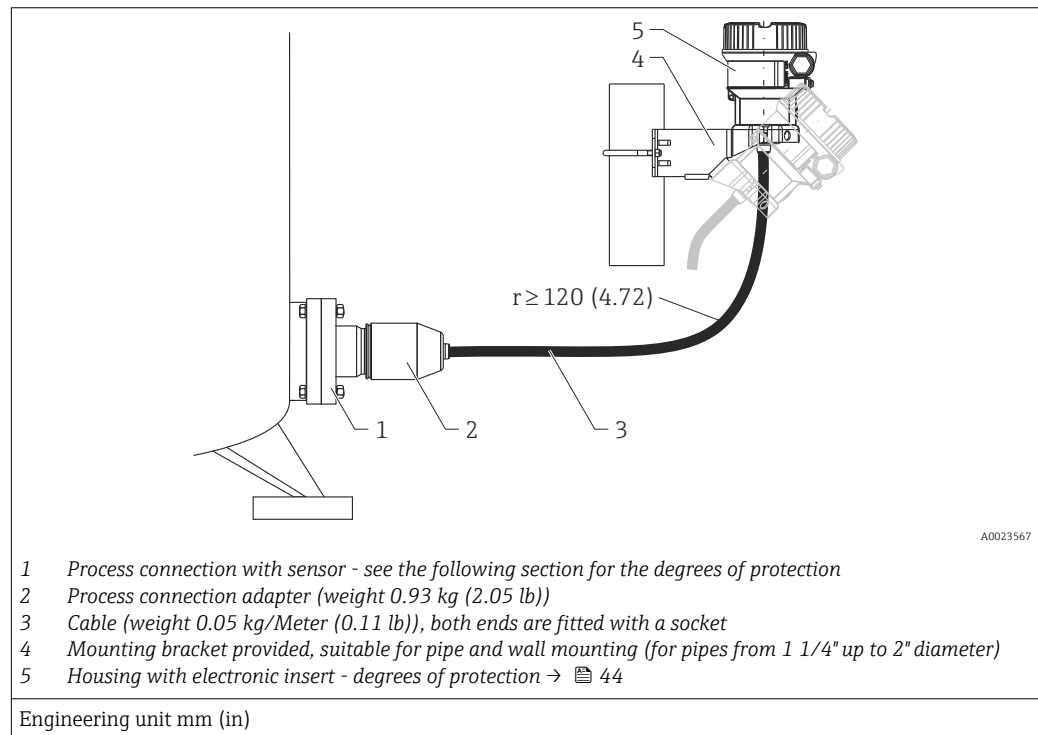
- PE: 2 m (6.6 ft), 5 m (16 ft) and 10 m (33 ft)
- FEP: 5 m (16 ft).

Ordering information:

- Product Configurator, "Separate housing" ordering feature
- Product Configurator, "Enclosed accessories" ordering feature, option PA

For the dimensions →  105

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-cabel:
  - IP 69<sup>2)</sup>
  - IP 66 NEMA 4/6P
  - IP 68 (1,83 mH<sub>2</sub>O für 24 h) NEMA 4/6P
- PE-cabel:
  - IP 66 NEMA 4/6P
  - IP 68 (1,83 mH<sub>2</sub>O für 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

2) Identification of IP protection category according to DIN EN 60529. The earlier designation "IP69K" according to DIN 40050 Part 9 is no longer valid (the standard was withdrawn on November 1, 2012). The tests required for both standards are identical.

Use in hazardous area:

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

**Oxygen applications**

Oxygen and other gases can react explosively to oils, grease and plastics, such that, among other things, the following precautions must be taken:

- All components of the system, such as measuring devices, must be cleaned in accordance with the BAM (DIN 19247) requirements.
- 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  $p_{max}$ .

Order code for devices <sup>1)</sup> , cleaned for oxygen applications	$p_{max}$ for oxygen applications	$T_{max}$ for oxygen applications
PMC51 <sup>2)</sup> – devices with sensors, nominal value < 10 bar (150 psi)	Over pressure limit (OPL) of the sensor <sup>3)</sup> <sup>4)</sup>	60 °C (140 °F)
PMC51 <sup>2)</sup> – devices with sensors, nominal value ≥ 10 bar (150 psi)	40 bar (600 psi)	60 °C (140 °F)
PMP51, PMP55 <sup>5)</sup>	Depends on the lowest-rated element, with regard to pressure, of the selected components: over pressure limit (OPL) of the sensor <sup>3)</sup> , 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, "Service" ordering feature, option "HB"
- 3) Product Configurator, "Sensor range" ordering feature
- 4) PMC51 with PVDF thread or PVDF flange  $p_{max} = 15 \text{ bar (225 psi)}$
- 5) Product Configurator, "Service" ordering feature, option "HB"

**PWIS cleaning**

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

Ordering information:

Ordering information: Product Configurator, "Service" ordering feature, option HC

The stability of the materials used must be checked before using them in the medium.

**Ultrapure gas applications (PMC51 und PMP51)**

Endress+Hauser also provides devices which have been cleaned of oil and grease for special applications, such as for ultrapure gas. No special restrictions regarding the process conditions apply to these devices.

Ordering information:

Product Configurator, "Service" ordering feature, option "HA"

**Applications with hydrogen**

A **ceramic** process isolating diaphragm or a **gold-plated** 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-plated** metal process isolating diaphragm (AU/Rh) offers effective protection against hydrogen diffusion.

## Environment

### Operating temperature range Device

- Without LCD display: -40 to +85 °C (-40 to +185 °F) (-25 to +85 °C (-13 to +185 °F) under static conditions with IO-Link)
- Without LCD in the case of IO-Link **with** current output: +70 °C (+158 °F)
- Without LCD in the case of IO-Link **without** current output: +80 °C (+176 °F)
- With LCD display: -20 to +70 °C (-4 to +158 °F)  
Extended temperature application range (-40 to +85 °C (-40 to +185 °F)) with restrictions in optical properties such as display speed and contrast
- With separate housing (not for diaphragm seal): -20 to +60 °C (-4 to +140 °F) (installation without insulation)


For applications with very high temperatures, a diaphragm seal with a temperature isolator can be used. Use a mounting bracket!

If vibrations also occur in the application, Endress+Hauser recommends you use a diaphragm seal with a capillary.

### Optional, enclosed accessories

M12 plug-in jack, 90 deg. elbowed and 5-meter cable: -25 to +70 °C (-13 to +158 °F)

### Storage temperature range



Version	PMC51	PMP51	PMP55
Without LCD display	-40 to +90 °C (-40 to +185 °F)		
With LCD display	-40 to +85 °C (-40 to +185 °F)		
With M12 plug, elbowed	-25 to +70 °C (-13 to +158 °F)		
With separate housing	-40 to +60 °C (-40 to +140 °F)		—
Diaphragm seal systems <sup>1)</sup>	—	—	→  121

1) Devices with PVC-armored capillary: -25 to +80 °C (-13 to +176 °F)

### Climate class

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

### Degree of protection


- Depending on the used electrical connection →  21  
Ordering information:  
Product Configurator, "Electrical connection" ordering feature
- Separate housing →  42

### Vibration resistance

Device/accessory	Test standard	Vibration resistance
Devices without mounting bracket	GL VI-7-2 <ul style="list-style-type: none"> <li>■ Part 7: Guidelines for the Performance of Type Approvals</li> <li>■ Chapter 2: Test Requirements for Electrical / Electronic Equipment and Systems</li> </ul>	Guaranteed for 5 to 25 Hz: ±1.6 mm (0.06 in); 25 to 100 Hz: 4 g in all 3 axes
	IEC 62828-1 / IEC 61298-3 IEC 60068-2-6	Guaranteed for 10 to 60 Hz: ±0.35 mm (0.01 in); 60 to 2000 Hz: 5 g in all 3 axes
Devices with mounting bracket	IEC 62828-1 / IEC 61298-3 IEC 60068-2-6	Guaranteed for 10 to 60 Hz: ±0.15 mm (0.01 in); 60 to 500 Hz: 2 g in all 3 axes

**NOTICE**

**Strong vibrations can destroy the device!**

- ▶ For applications with strong vibrations, use PMC51/ PMP51 with a separate housing.
- ▶ For applications with strong vibrations, use PMP55 with a capillary.
- ▶ We recommend the use of a suitable bracket for mounting (→  41).

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**Electromagnetic compatibility**

- Electromagnetic compatibility as per all the relevant requirements of the EN 61326 series and NAMUR Recommendation EMC (NE21).
- Max. deviation : < 0.5 % of the span

Further details can be found in the manufacturer declaration.

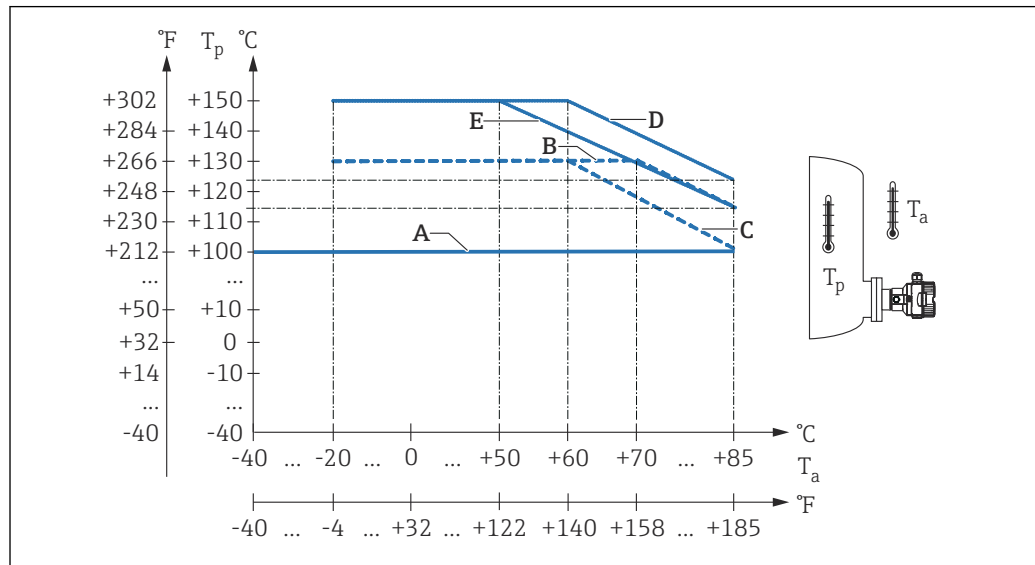
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**Operation in very corrosive environment**

PMP55: For corrosive environments (e.g., maritime environment/coastal areas), Endress+Hauser recommends the use of a PVC or PTFE armor for the capillaries. The transmitter can also be protected by a special coating (**T**echnical **S**pecial **P**roduct (TSP)).

## Process

### Process temperature range PMC51



A, B, C, D and E, see following section. T<sub>a</sub> = Ambient temperature. T<sub>p</sub> = Process temperature

### Process temperature limits

For oxygen applications → 43

#### PMC51 (with ceramic process membrane)

- A: -40 to +100 °C (-40 to +212 °F) for process connections with threaded connection or flange
- B: -20 to +130 °C (-4 to +266 °F) for hygienic process connections
- C (devices with IO-Link): -20 to +130 °C (-4 to +266 °F) for hygienic process connections
- D: for a maximum of 60 minutes: +150 °C (+302 °F) for hygienic process connections
- E (devices with IO-Link): +150 °C (+302 °F) for hygienic process connections
- For saturated steam applications, use a device with a metallic process membrane, or provide a siphon for temperature isolation when installing
- Observe the process temperature range of the seal. See the following table

Seal	Notes	Process temperature range		Option <sup>1)</sup>
		Thread/flange	Hygienic process connections	
FKM	-	-20 to +100 °C (-4 to +212 °F)	-	A
FKM	Cleaned for O <sub>2</sub> application	-5 to +60 °C (+23 to +140 °F)	-	A <sup>2)</sup>
FKM	FDA, 3A Class I, USP Class VI	-5 to +100 °C (+23 to +212 °F)	-5 to +150 °C (+23 to +302 °F)	B
FFKM Perlast G75LT	-	-20 to +100 °C (-4 to +212 °F)	-20 to +150 °C (-4 to +302 °F)	C
NBR	FDA 21 CFR 177.2600	-10 to +100 °C (+14 to +212 °F)	-	F
NBR, low temperature	-	-40 to +100 °C (-40 to +212 °F)	-	H
HNBR	FDA 21 CFR 177.2600, 3A Class I, KTW, AFNOR, BAM	-25 to +100 °C (-13 to +212 °F)	-20 to +100 °C (-4 to +212 °F)	G
EPDM 70	FDA 21 CFR 177.2600	-40 to +100 °C (-40 to +212 °F)	-	J
EPDM 331	FDA 21 CFR 177.2600, 3A Class II, USP Class VI, DVGW (UBA "KTW", W270), NSF61	-20 to +100 °C (-4 to +212 °F)	-20 to +150 °C (-4 to +302 °F)	K
FFKM Kalrez 6375	-	+5 to +100 °C (+41 to +212 °F)	-	L
FFKM Kalrez 7075	-	+5 to +100 °C (+41 to +212 °F)	-	M
FFKM Kalrez 6221	FDA 21 CFR 177.2600, USP Class VI	-5 to +100 °C (+23 to +212 °F)	-5 to +150 °C (+23 to +302 °F)	N

Seal	Notes	Process temperature range		Option <sup>1)</sup>
		Thread/flange	Hygienic process connections	
Fluoroprene XP40	FDA 21 CFR 177.2600, USP Class VI, 3A Class I	+5 to +100 °C (+41 to +212 °F)	+5 to +150 °C (+41 to +302 °F)	P
VMQ silicone	FDA 21 CFR 177.2600	-35 to +85 °C (-31 to +185 °F)	-20 to +85 °C (-4 to +185 °F)	S

- 1) Product Configurator, "Seal" ordering feature  
 2) With option "HB", see Product Configurator, "Service" ordering feature

*Applications with jumps in temperature*

Extreme jumps in temperature can result in temporary measured errors. Temperature compensation takes effect after a few 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.

**PMP51 (with metallic process membrane)**

Designation	Limits
Process connections with internal process membrane	-40 to +125 °C (-40 to +257 °F)
Process connections with flush process membrane <sup>1)</sup>	-40 to +100 °C (-40 to +212 °F)
Hygienic process connections	-40 to +130 °C (-40 to +266 °F) For a maximum of 60 minutes: 150 °C (302 °F)

- 1) Process connection GRC, GRJ, GZJ, GOJ, G7J, G8J: supplied seal for process temperature to -20 °C (-4 °F)

**PMP55 (with diaphragm seal)**

Depends on the diaphragm seal and fill fluid: -70 °C (-94 °F) to +400 °C (+752 °F). Observe the temperature application limits → 123.

*Devices with PTFE-coated process membrane*

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

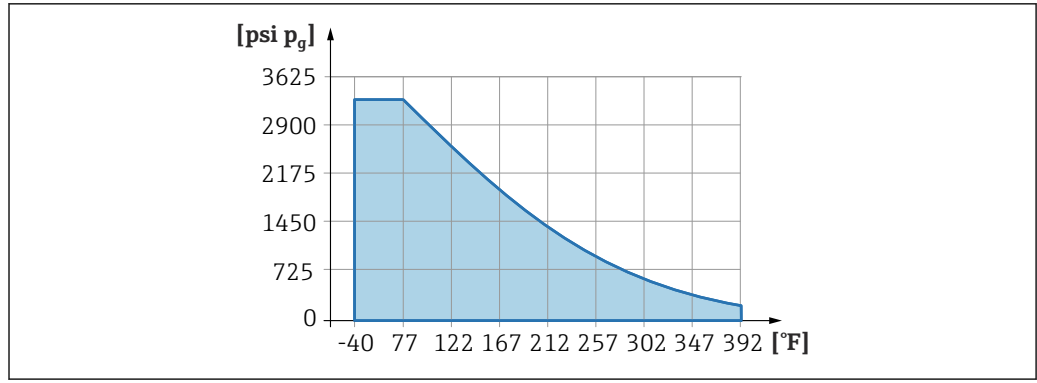
**NOTICE**

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

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

*Range of application of the PTFE foil*

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

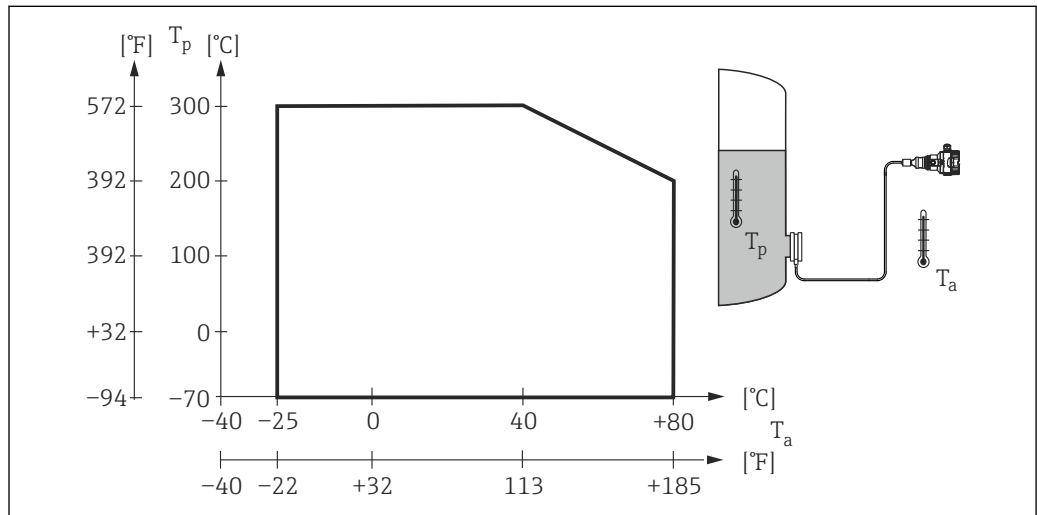


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**i** For vacuum applications:  $p_{abs} \leq 1 \text{ bar (14.5 psi)}$  to  $0.05 \text{ bar (0.725 psi)}$  up to max.  $+150 \text{ }^\circ\text{C (302 }^\circ\text{F)}$ .

**Process temperature limits of flexible capillary armoring:**  
PMP55

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



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Pressure specifications



The maximum pressure for the measuring device depends on the lowest-rated element with regard to pressure (components are: process connection, optional mounted parts or accessories).

- ▶ Only operate the measuring device within the prescribed limits of the components!
- ▶ MWP (maximum working pressure): The MWP 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. Note temperature dependence of MWP. For flanges, refer to the following standards for the permitted pressure values at higher temperatures: 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). MWP data that deviate from this are provided in the relevant sections of the Technical Information.
- ▶ The test pressure corresponds to the overpressure limit (OPL) of the overall system. This value refers to a reference temperature of +20 °C (+68 °F).
- ▶ 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.
- ▶ Oxygen applications: In oxygen applications, the values for  $p_{max}$  and  $T_{max}$  for oxygen applications may not be exceeded.
- ▶ Devices with ceramic process membrane: Avoid steam hammering! Steam hammering can cause zero point drift. Recommendation: Residue (such as condensation or drops of water) can remain at the process membrane after CIP cleaning and lead to local steam hammering if steam is introduced again immediately. In practice, drying the process membrane (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
PMP51 <sup>1)</sup>	400 mbar (6 psi) to 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) PMP55 with mounted diaphragm seal system, PMC51 with ceramic membrane and the universal adapter process connection are exceptions.

## 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	Height	Example
Housing height	→ 50 ff.	(A)	
Optional mounted parts	→ 81	(B)	
Process connections	→ 52 → 66	(H)	
Installation space	-	(I)	
Installation space			

### F31 housing, aluminum

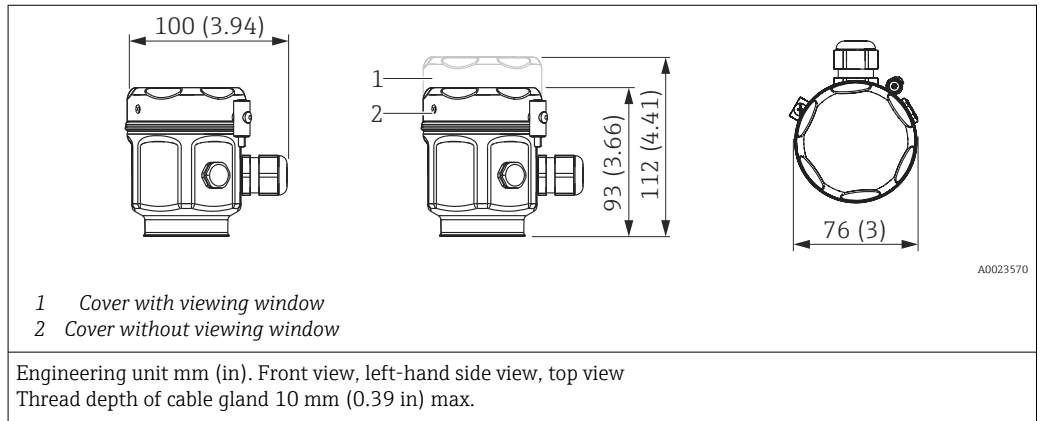
1 Cover with viewing window  
2 Cover without viewing window

Engineering unit mm (in). Front view, left-hand side view, top view

Material	Weight kg (lbs)		Option <sup>1)</sup>
	With display	Without display	
Aluminium <sup>2)</sup>	1.1 (2.43)	1.0 (2.21)	I
Aluminum with glass viewing window <sup>2)</sup>			J

- 1) Product Configurator, "Housing" ordering feature  
2) Degree of protection dependent on cable entry used → 44

**F15 housing, stainless steel (hygienic)**



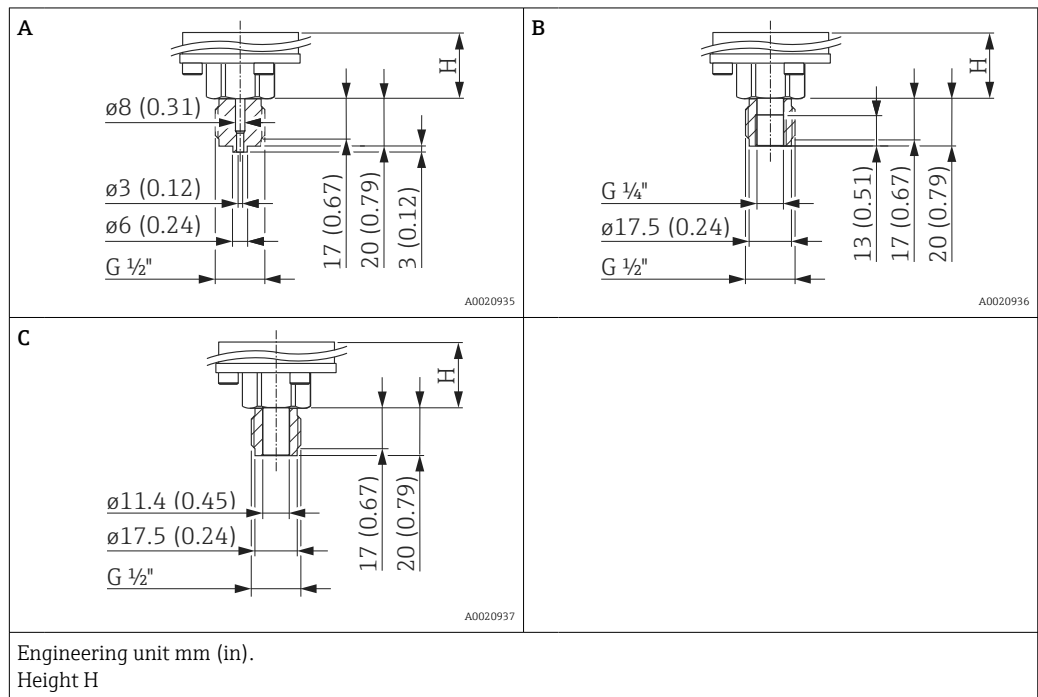
Material	Weight kg (lbs)		Option <sup>1)</sup>
	With display	Without display	
Stainless steel <sup>2)</sup>	1.1 (2.43)	1.0 (2.21)	Q
Stainless steel with glass viewing window <sup>2)</sup>			R
Stainless steel with plastic viewing window <sup>2)</sup>			S

- 1) Product Configurator, "Housing" ordering feature
- 2) Degree of protection depends on the cable entry used → 44

**PMC51: height H**

Process connection	F31 housing	F15 housing
FNPT1/2 MNPT1/2 MNPT1/2 FNPT1/4 G1/2 G1/2 M20x1.5 B0202 B0203	28 mm (1.1 in)	34 mm (1.34 in)
MNPT1-1/2 MNPT2 G1-1/2 G2 M44x1.25	59 mm (2.32 in)	66 mm (2.6 in)
Flanges	83 mm (3.27 in)	90 mm (3.54 in)
Hygienic process connections	90 mm (3.54 in)	97 mm (3.82 in)

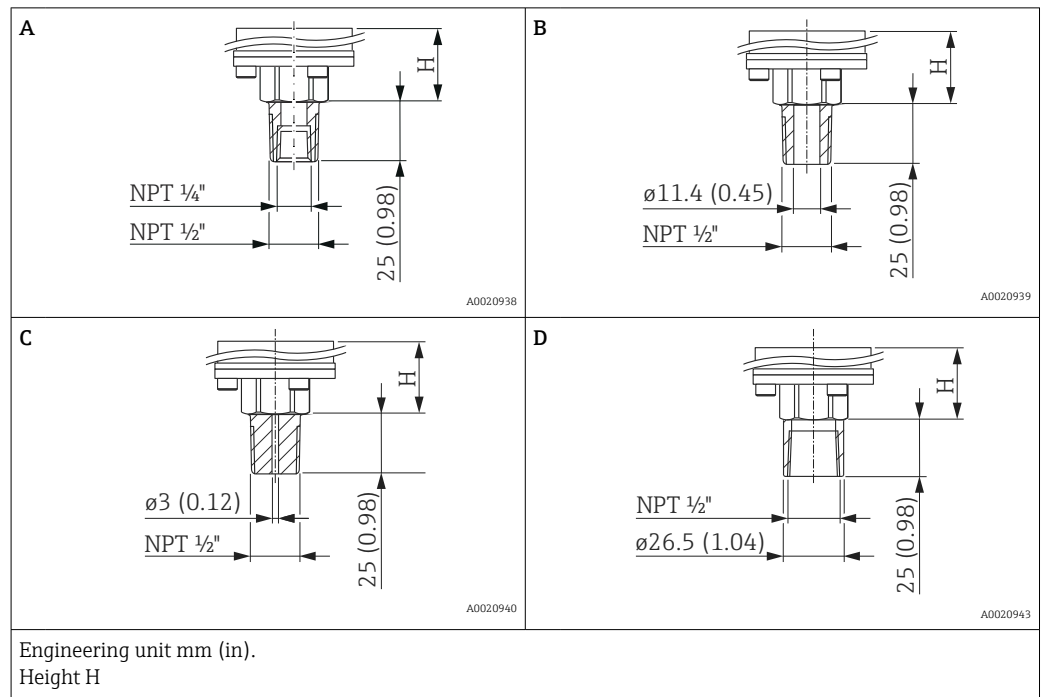
PMC51: process connections with internal process membrane ISO 228 G thread



Item	Designation	Material	Weight <sup>1)</sup>	Approval <sup>2)</sup>	Option <sup>3)</sup>
			kg (lb)		
A	Thread ISO 228 G 1/2" A EN 837	AISI 316L	0.60 (1.32)	CRN	GCJ
		Alloy C276 (2.4819)		CRN	GCC
		<b>PVDF</b> <ul style="list-style-type: none"> <li>■ Mount only with enclosed mounting bracket</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>		-	GCF
B	Thread ISO 228 G 1/2" A, G 1/4" (female)	AISI 316L		CRN	GLJ
		Alloy C276 (2.4819)		CRN	GLC
C	Thread ISO 228 G 1/2" A, Bore 11.4 mm (0.45 in)	AISI 316L		CRN	GMJ
		Alloy C276 (2.4819)	CRN	GMC	

- 1) Total weight consisting of sensor assembly and process connection.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature

ANSI thread

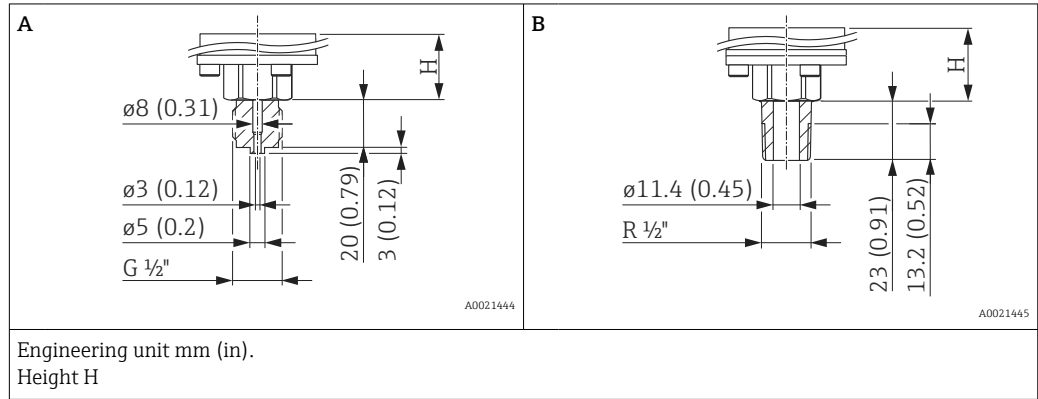


Item	Designation	Material	Weight <sup>1)</sup>	Approval <sup>2)</sup>	Option <sup>3)</sup>
			kg (lb)		
A	ANSI 1/2" MNPT, 1/4" FNPT	AISI 316L	0.60 (1.32)	CRN	RLJ
		Alloy C276 (2.4819)		CRN	RLC
B	ANSI 1/2" MNPT, Bore 11.4 mm (0.45 in)	AISI 316L		CRN	RKJ
		Alloy C276 (2.4819)		CRN	RKC
C	ANSI 1/2" MNPT, Bore 3 mm (0.12 in)	<b>PVDF</b> <ul style="list-style-type: none"> <li>■ Mount only with enclosed mounting bracket</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>		-	RJF
D	ANSI 1/2" FNPT Bore 11.4 mm (0.45 in)	AISI 316L		CRN	R1J
		Alloy C276 (2.4819)	CRN	R1C	

- 1) Total weight consisting of sensor assembly and process connection.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature

PMC51: process connections  
with internal process  
membrane

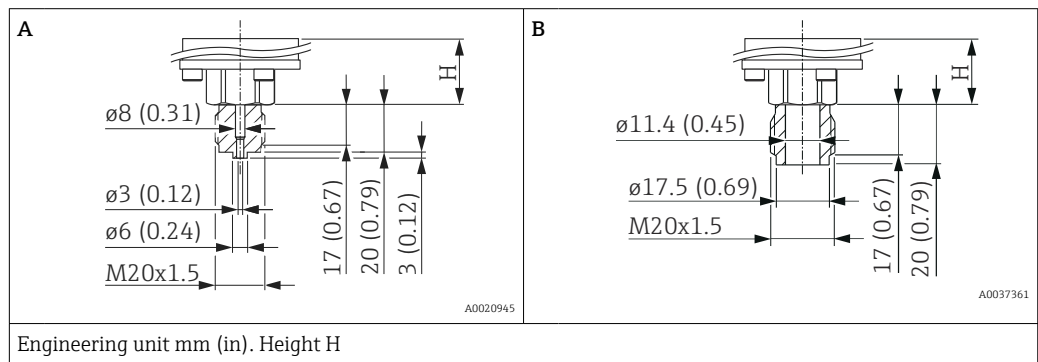
JIS thread



Item	Designation	Material	Weight <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)	
A	JIS B0202 G 1/2" (male)	AISI 316L	0.60 (1.32)	GNJ
B	JIS B0203 R 1/2" (male)			GOJ

- 1) Total weight consisting of sensor assembly and process connection.
- 2) Product Configurator, "Process connection" ordering feature

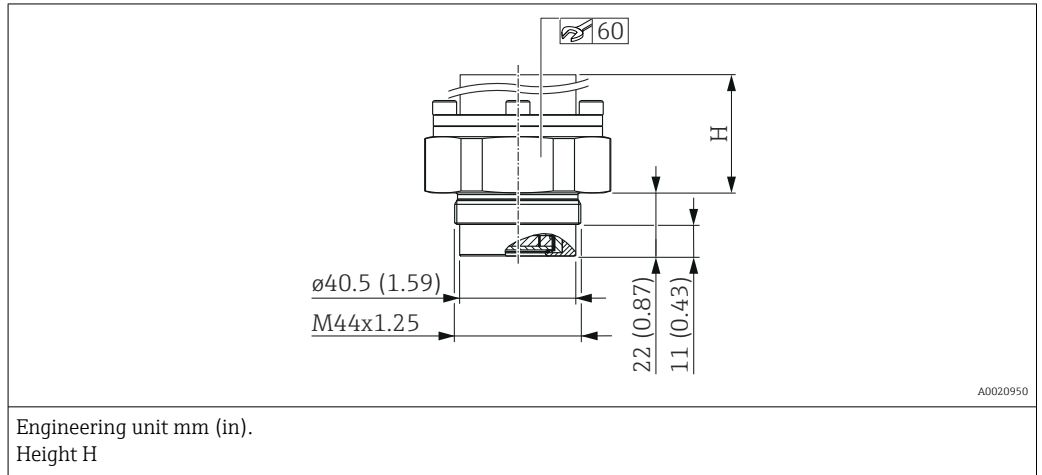
DIN 13 thread



Item	Designation	Material	Weight <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)	
A	DIN 13 M20 x 1.5, EN 837 bore 3 mm (0.12 in)	AISI 316L	0.60 (1.32)	G5J
		Alloy C276 (2.4819)		G6J
B	DIN 13 M20 x 1.5 11.4 mm (0.45 in)	AISI 316L		G1J

- 1) Total weight consisting of sensor assembly and process connection.
- 2) Product Configurator, "Process connection" ordering feature

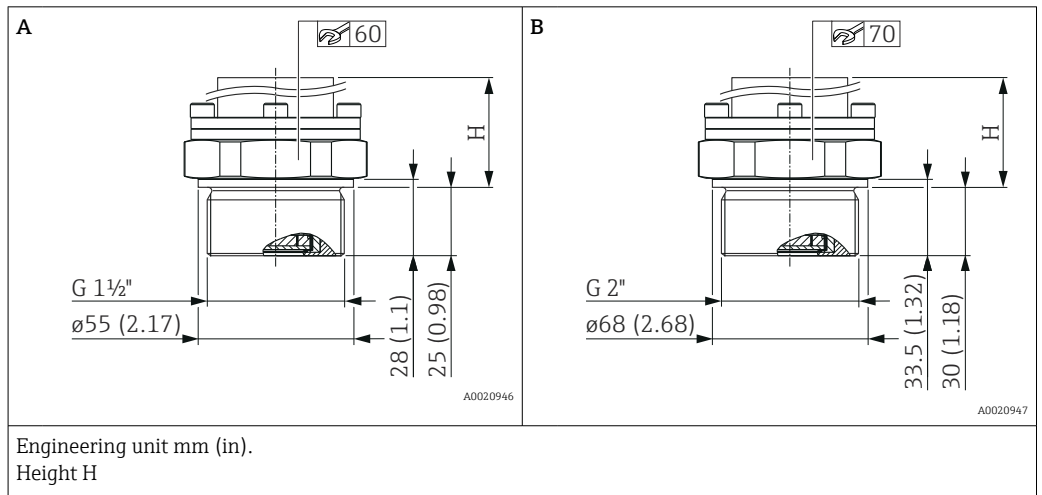
**PMC51: process connections with flush membrane**     **DIN 13 thread**



Designation	Material	Weight <sup>1)</sup>	Option <sup>2)</sup>
		kg (lb)	
DIN 13 M44 x 1.25	AISI 316L	0.90 (1.98)	G4J

- 1) Total weight consisting of sensor assembly and process connection.
- 2) Product Configurator, "Process connection" ordering feature

**ISO 228 G thread**

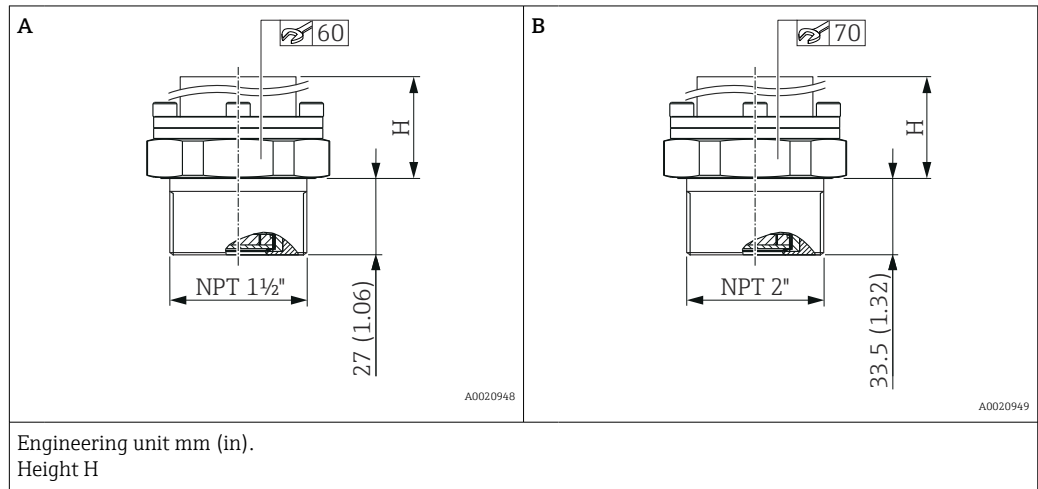


Item	Designation	Material	Weight <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)	
A	Thread ISO 228 G 1 1/2" A	AISI 316L	0.8 (1.76)	GVJ
B	Thread ISO 228 G 2" A	AISI 316L	1.2 (2.65)	GWJ

- 1) Total weight consisting of sensor assembly and process connection.
- 2) Product Configurator, "Process connection" ordering feature

PMC51: process connections  
with flush membrane

ANSI thread

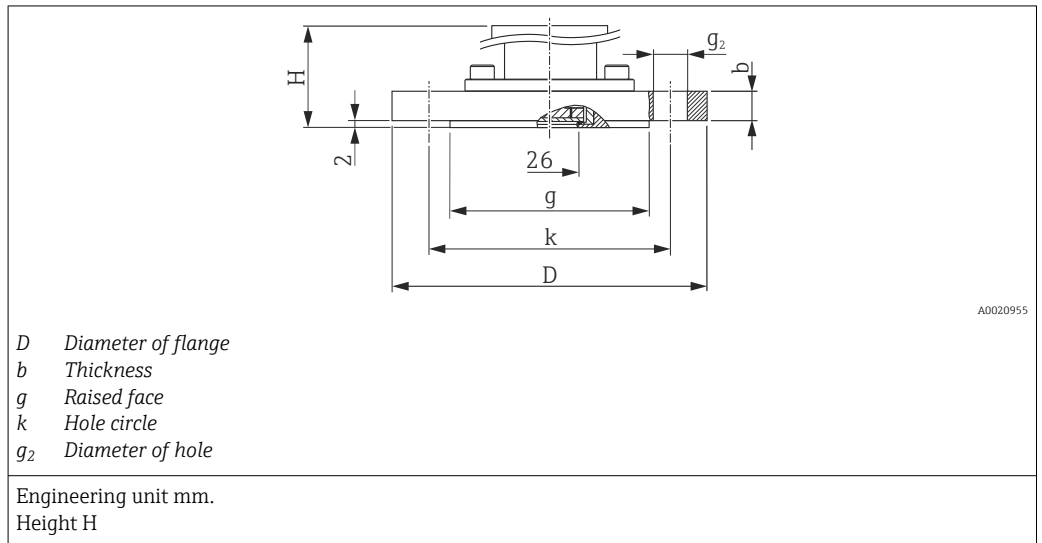


Item	Designation	Material	Weight <sup>1)</sup>	Approval <sup>2)</sup>	Option <sup>3)</sup>
			kg (lb)		
A	Thread ANSI 1 1/2" MNPT	AISI 316L	0.80 (1.76)	CRN	U7J
B	Thread ANSI 2" MNPT	AISI 316L	1.20 (2.65)	CRN	U8J

- 1) Total weight consisting of sensor assembly and process connection.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature



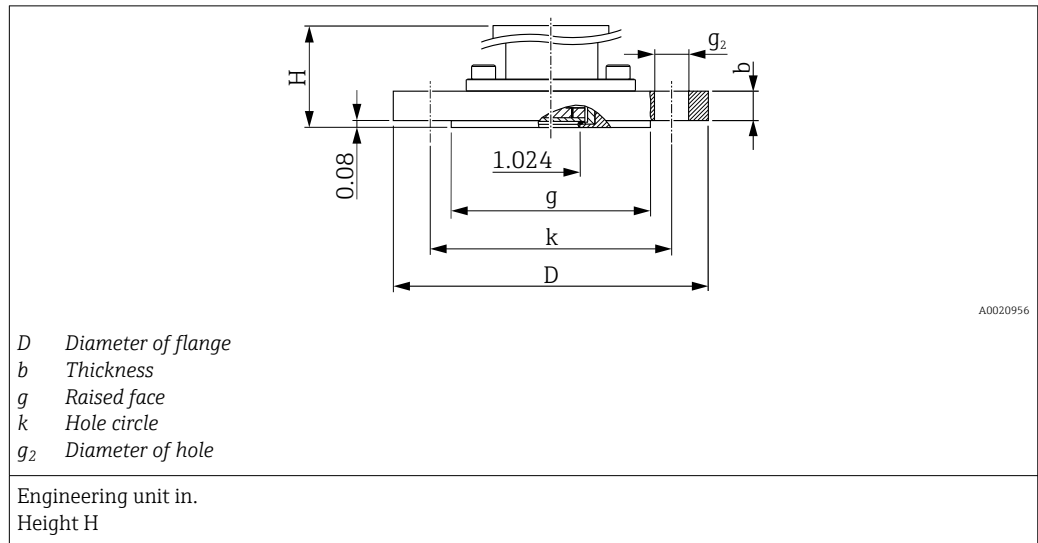
**PMC51: process connections with flush membrane**      **EN flanges, connection dimensions as per EN 1092-1**



Flange				Boltholes						Weight <sup>1)</sup> kg (lb)	Option <sup>2)</sup>
Material	Nominal diameter	Nominal pressure	Shape	D	b	g	Quantity	g <sub>2</sub>	k		
				mm	mm	mm					
AISI 316L	DN 25	PN 10-40	B1	115	18	68	4	14	85	1.9 (4.19)	CNJ
AISI 316L	DN 32	PN 10-40	B1	140	18	78	4	18	100	2.5 (5.51)	CPJ
AISI 316L	DN 40	PN 10-40	B1	150	18	88	4	18	110	3.0 (6.62)	CQJ
ECTFE <sup>3)</sup>	DN 40	PN 10-40	B2	150	21	88	4	18	110	3.0 (6.62)	CQP
AISI 316L	DN 50	PN 10-40	B1	165	20	102	4	18	125	3.5 (7.72)	CXJ
PVDF <sup>4)</sup>	DN 50	PN 10-16	B2	165	21.4	102	4	18	125	1.4 (3.09)	CFF
ECTFE <sup>3)</sup>	DN 50	PN 25-40	B2	165	20	102	4	18	125	3.7 (8.16)	CRP
AISI 316L	DN 80	PN 10-40	B1	200	24	138	8	18	160	5.8 (12.79)	CZJ
ECTFE <sup>3)</sup>	DN 80	PN 25-40	B2	200	24	138	8	18	160	5.2 (11.47)	CSP

- 1) Total weight consisting of sensor assembly and process connection.
- 2) Product Configurator, "Process connection" ordering feature
- 3) ECTFE coating on AISI 316L (1.4404). When operating in hazardous areas, avoid electrostatic charging of the plastic surfaces.
- 4) MWP 10 bar (150 psi), OPL max. 15 bar (225 psi); process temperature range: -10 to +60 °C (+14 to +140 °F)

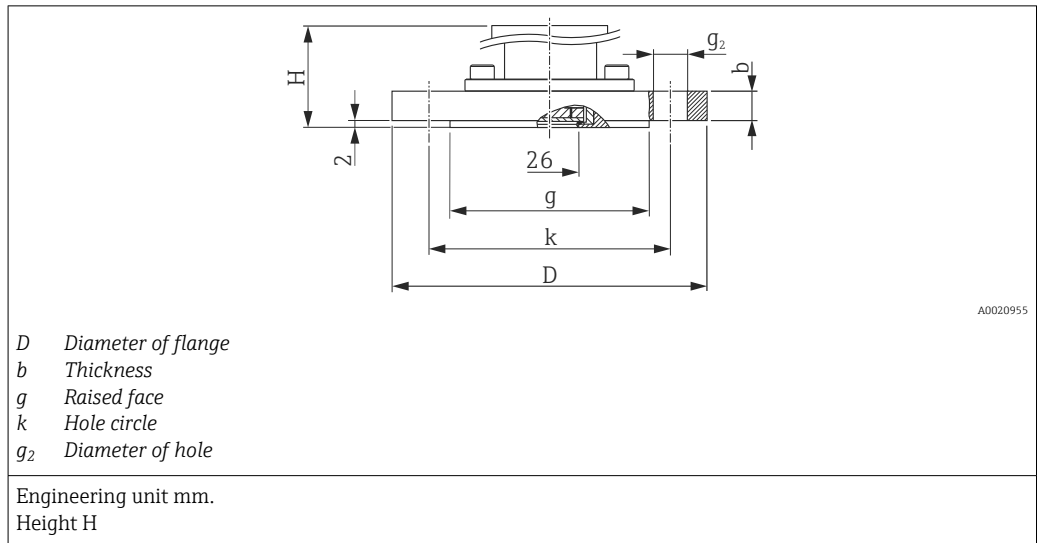
ASME flanges, connection dimensions as per ASME B 16.5, raised face RF



Flange						Boltholes			Weight <sup>1)</sup>	Approval <sup>2)</sup>	Option <sup>3)</sup>
Material	Nominal diameter	Class	D	b	g	Quantity	g <sub>2</sub>	k			
	[in]	[lb./sq.in]	[in]	[in]	[in]		[in]	[in]	[kg (lb)]		
AISI 316/316L <sup>4)</sup>	1	150	4.25	1.18	2	4	0.62	3.12	2.3 (5.07)	-	ACJ <sup>5)</sup>
AISI 316/316L <sup>4)</sup>	1	300	4.88	1.18	2	4	0.75	3.5	8.5 (18.74)	-	ANJ <sup>5)</sup>
AISI 316/316L <sup>4)</sup>	1 ½	150	5	0.69	2.88	4	0.62	3.88	2.1 (4.63)	CRN	AEJ
AISI 316/316L <sup>4)</sup>	1 ½	300	6.12	0.81	2.88	4	0.88	4.5	3.3 (7.28)	CRN	AQJ
AISI 316/316L <sup>4)</sup>	2	150	6	0.75	3.62	4	0.75	4.75	3.1 (6.84)	CRN	AFJ
ECTFE <sup>6)</sup>	2	150	6	0.75	3.62	4	0.75	4.75	3.1 (6.84)	-	AFN
PVDF <sup>7)</sup>	2	150	6	0.75	3.62	4	0.75	4.75	0.5 (1.1)	-	AFF
AISI 316/316L <sup>4)</sup>	2	300	6.5	0.88	3.62	8	0.75	5	4.0 (8.82)	CRN	ARJ
AISI 316/316L <sup>4)</sup>	3	150	7.5	0.94	5	4	0.75	6	5.7 (12.57)	CRN	AGJ
ECTFE <sup>6)</sup>	3	150	7.5	0.94	5	4	0.75	6	5.7 (12.57)	-	AGN
PVDF <sup>7)</sup>	3	150	7.5	0.94	5	4	0.75	6	1.6 (3.53)	-	AGF
AISI 316/316L <sup>4)</sup>	3	300	8.25	1.12	5	8	0.88	6.62	7.5 (16.54)	CRN	ASJ
AISI 316/316L <sup>4)</sup>	4	150	9	0.94	6.19	8	0.75	7.5	7.6 (16.76)	CRN	AHJ
ECTFE <sup>6)</sup>	4	150	9	0.94	6.19	8	0.75	7.5	7.8 (17.20)	-	AHN
AISI 316/316L <sup>4)</sup>	4	300	10	1.25	6.19	8	0.88	7.88	12.4 (27.34)	CRN	ATJ

- 1) Total weight consisting of sensor assembly and process connection.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 5) Screws must be 15 mm (0.59 in) longer than the standard flange screws.
- 6) ECTFE coating on AISI 316/316L. When operating in hazardous areas, avoid electrostatic charging of the plastic surfaces.
- 7) 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 as per JIS B 2220 BL, raised face RF

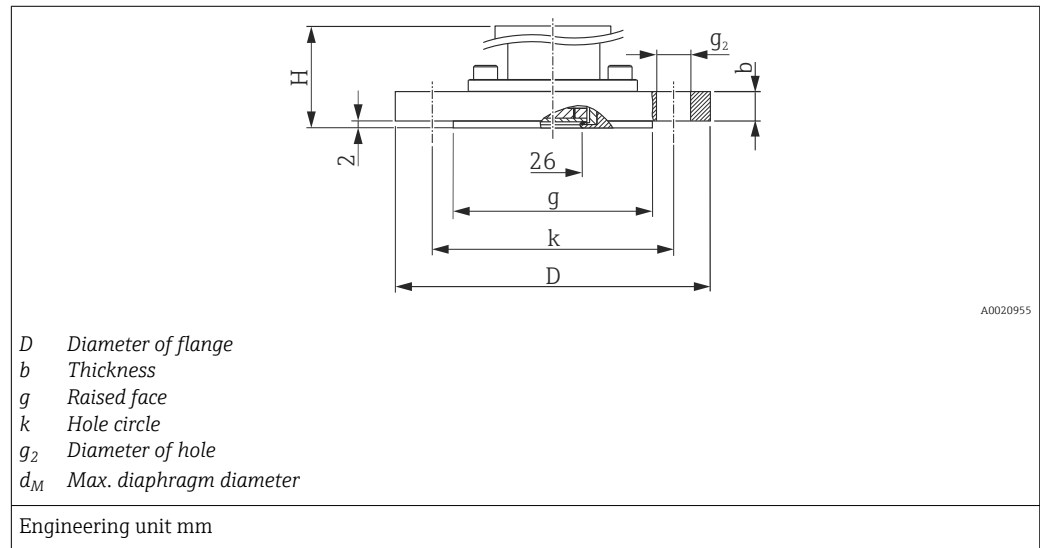


Flange						Boltholes			Weight <sup>1)</sup> kg (lb)	Option <sup>2)</sup>
Material	Nominal diameter	Nominal pressure	D	b	g	Quantity	g <sub>2</sub>	k		
			mm	mm	mm		mm	mm		
AISI 316L (1.4435)	50 A	10 K	155	16	96	4	19	120	2.9 (6.39)	KFJ
	80 A	10 K	185	18	127	8	19	150	3.9 (8.60)	KGJ
	100 A	10 K	210	18	151	8	19	175	5.3 (11.69)	KHJ

- 1) Total weight consisting of sensor assembly and process connection.
- 2) Product Configurator, "Process connection" ordering feature

PMC51: 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]	[mm]	[kg (lb)]
DN										
DN50	40 bar	165	20	102	27.5	4	18	125	3 (6.6)	7HJ
DN80	40 bar	200	24	138	45.5	8	18	160	5.5 (12.13)	7KJ
[in]										
2"	150lb./sq.in	150	17.5	92.1	22.55	4	18	120.7	2.2 (4.85)	7PJ
2"	300 lb./sq.in	165	20.7	92.1	22.55	8	18	127	3 (6.62)	7RJ
3"	150 lb./sq.in	190	22.3	127	40	4	18	152.4	4.7 (10.36)	7VJ
3"	300 lb./sq.in	210	27	127	40	8	22	168.3	6.6 (14.55)	7XJ

1) Material: AISI 316L

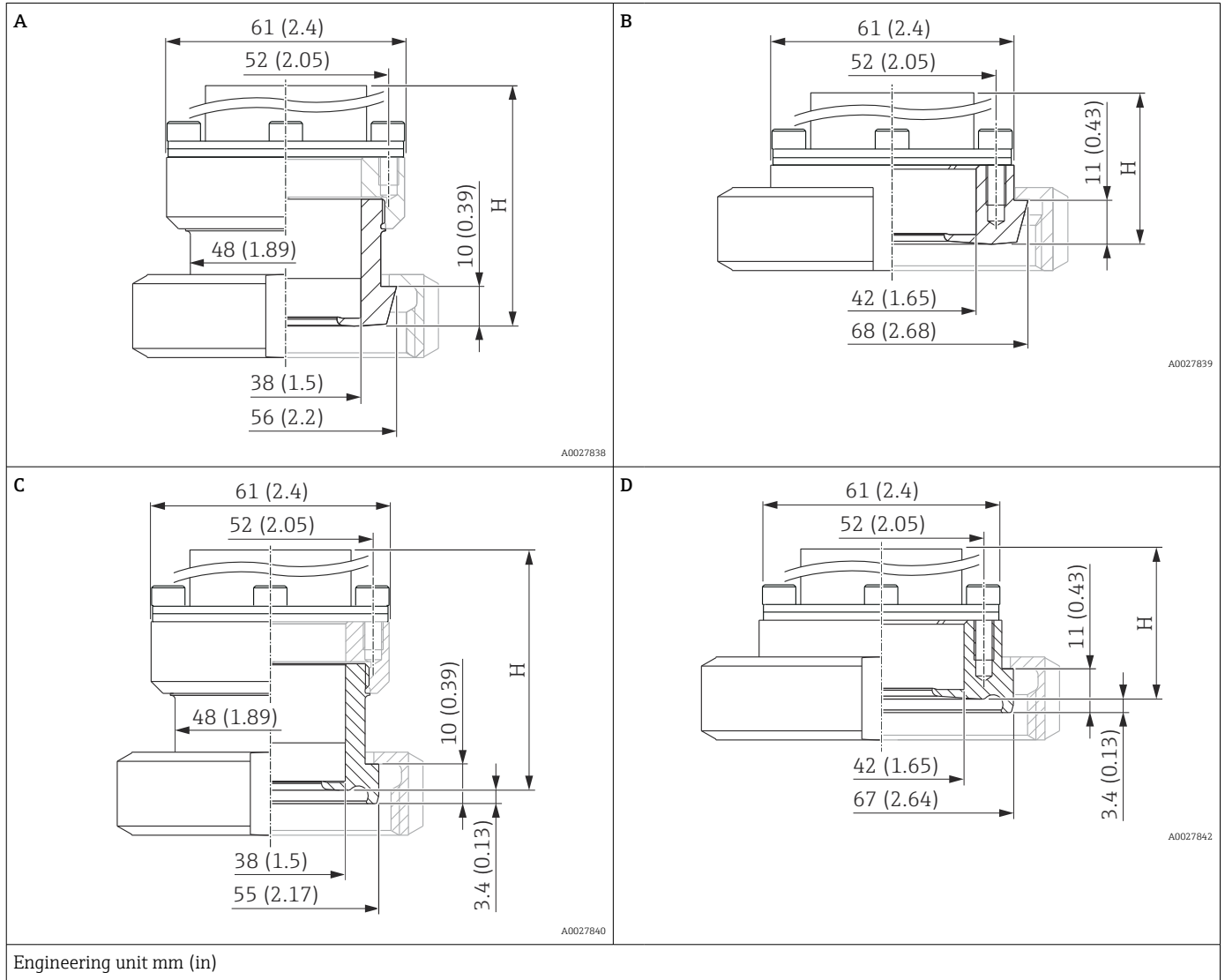
2) Product Configurator, order code for "Process connection"

PMC51 hygienic

Hygienic process connections with flush membrane

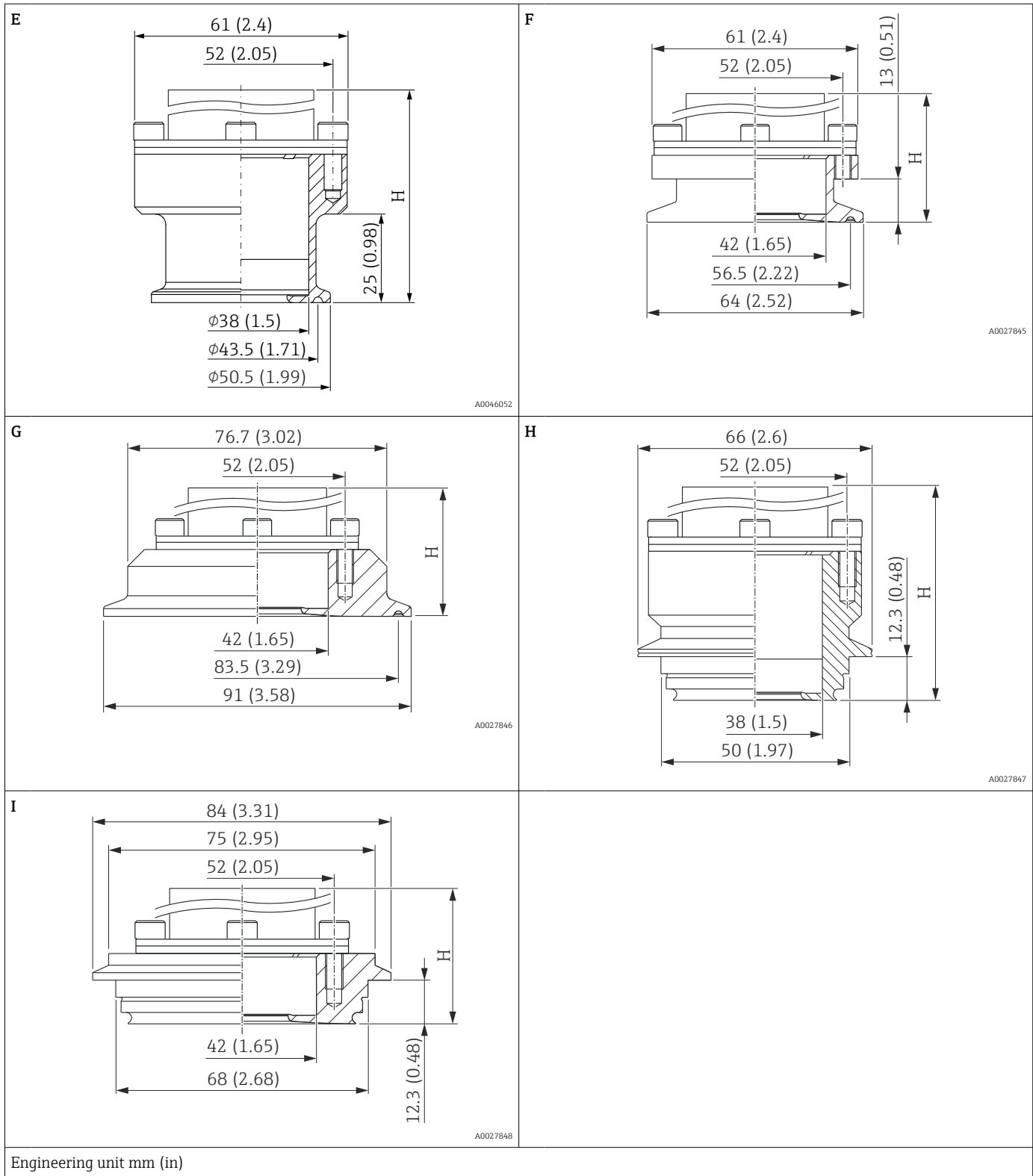
In order to guarantee a hygiene approval, a seal with appropriate approval must be selected for the hygienic process connection:

- For 3A approval, you require a seal made of EPDM or HNBR → 46
- For EHEDG approval, you require a seal made of VMQ silicone, FFKM Kalrez → 46



Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb) <sup>4)</sup>		
A	DIN 11851 DN 40	PN 25	AISI 316L (1.4435)	1.3 (2.87)	EHEDG, 3A with seal FDA, ASME-BPE, CRN	MZJ <sup>5)</sup>
B	DIN 11851 DN 50	PN 25		1.27 (2.80)	EHEDG, 3A with seal FDA, ASME-BPE, CRN	MRJ <sup>5)</sup>
C	DIN 11864 DN 40, pipe DIN 11866-A	PN 16		1.30 (2.87)	EHEDG, 3A with seal FDA, ASME-BPE	NCJ <sup>5)</sup>
D	DIN 11864 DN 50, pipe DIN 11866-A	PN 16		1.28 (2.82)	EHEDG, 3A with seal FDA, ASME-BPE	NDJ <sup>5)</sup>

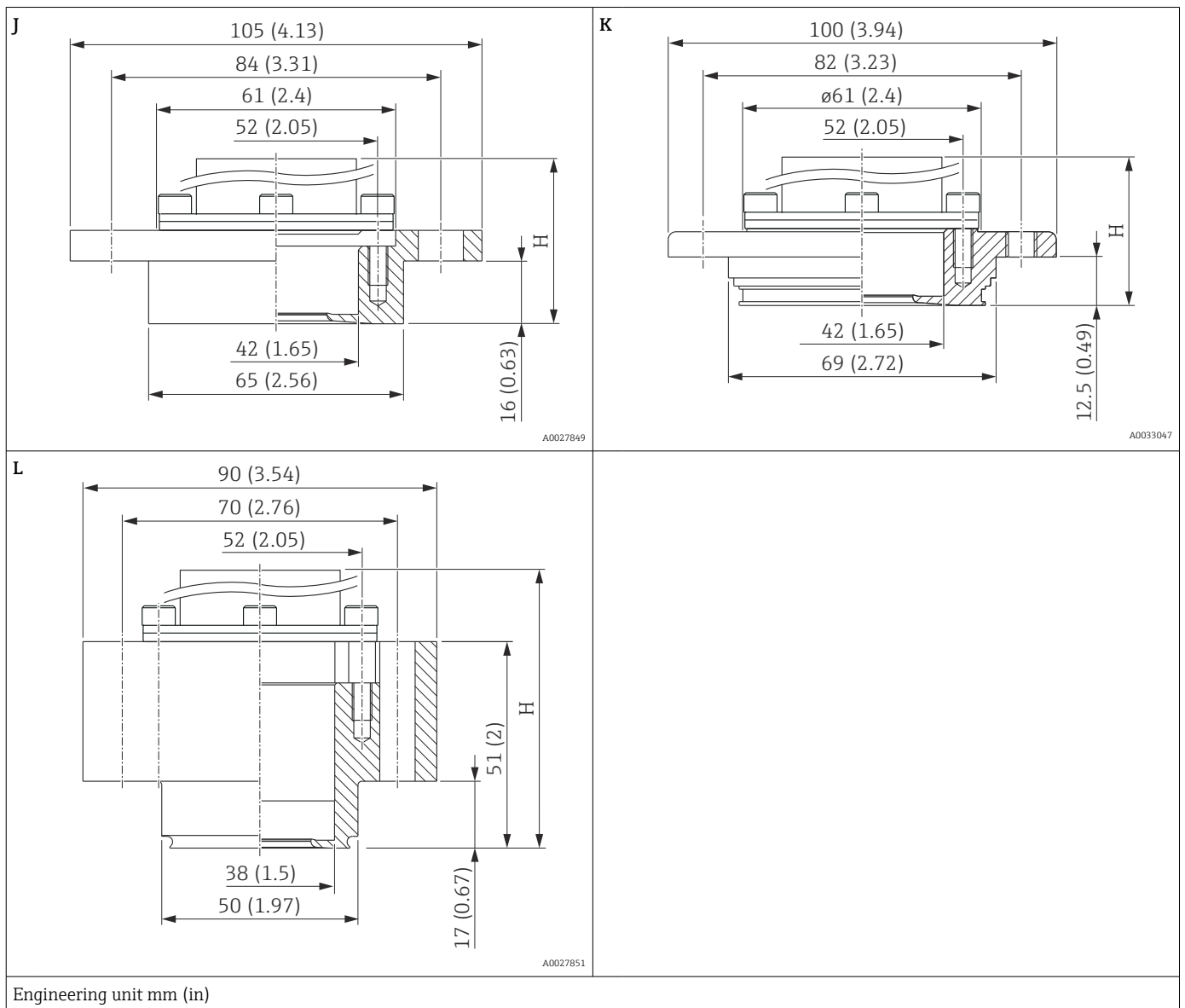
- 1) Delta ferrite content < 1 %. The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ).
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) Total weight consisting of sensor assembly and process connection.
- 5) 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).



Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb) <sup>4)</sup>		
E	Tri-Clamp ISO 2852, DN 40-DN 38 (1 1/2")	PN 40	AISI 316L (1.4435)	0.95 (2.09)	EHEDG, 3A with seal FDA, CRN, ASME-BPE	TJJ
F	Tri-Clamp ISO 2852, DN 40-DN 51 (2")	PN 40	AISI 316L (1.4435)	0.83 (1.83)	EHEDG, 3A with seal FDA, CRN, ASME-BPE	TDJ

Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb) <sup>4)</sup>		
G	Tri-Clamp ISO 2852, DN 76.1 (3")	PN 40		1.2 (2.65)	EHEDG, 3A with seal FDA, CRN, ASME-BPE	TFJ
H	Varivent F pipe, DN 25-32	PN 40		1.12 (2.47)	EHEDG, 3A with seal FDA, ASME-BPE	TQJ
I	Varivent N pipe, DN 40-162	PN 40		1.09 (2.40)	EHEDG, 3A with seal FDA, ASME-BPE	TRJ

- 1) Delta ferrite content < 1 %. The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ).
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) Total weight consisting of sensor assembly and process connection.



Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb) <sup>4)</sup>		
J	DRD, DN 50 (65 mm) slip-on flange	PN 25	AISI 316L (1.4435)	1.28 (2.82)	FDA	TIJ
K	APV Inline, DN 50	PN 25		1.18 (2.60)	3A with seal FDA, CRN, ASME-BPE	TMJ
L	NEUMO BioControl, DN 50	PN 16		1.99 (4.39)	3A with seal FDA, ASME-BPE	S4J <sup>5)</sup>

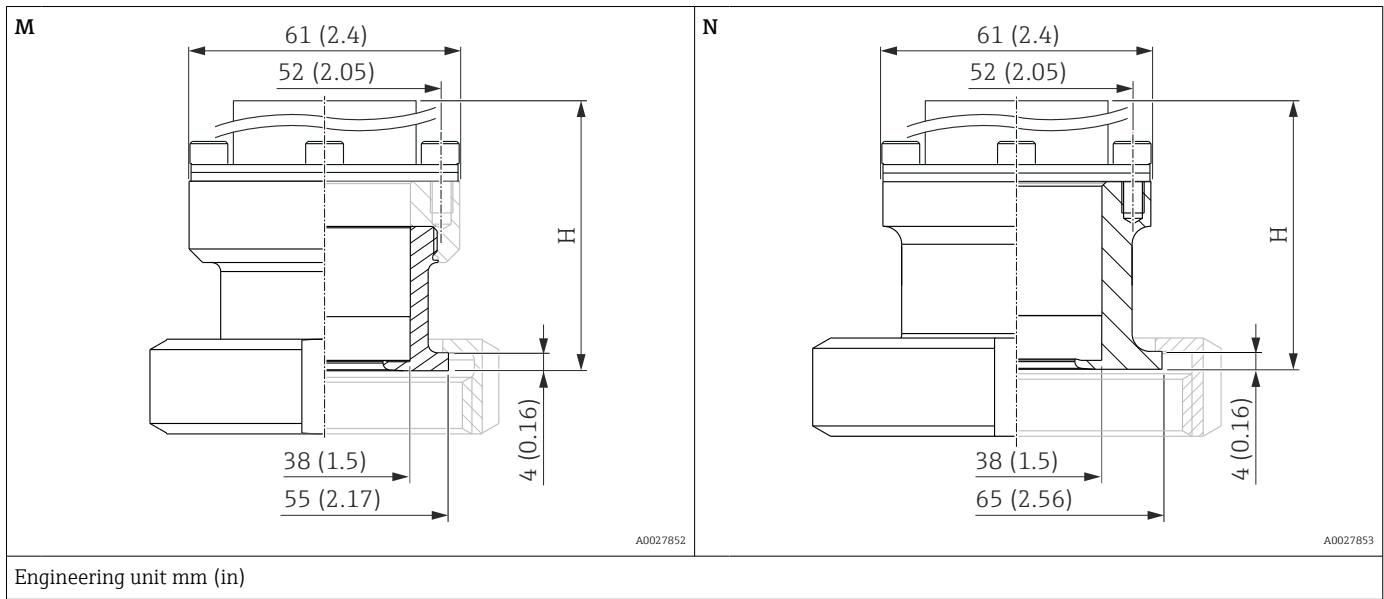
1) Delta ferrite content < 1 %. The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ).

2) CSA approval: Product Configurator, "Approval" ordering feature

3) Product Configurator, "Process connection" ordering feature

4) Total weight consisting of sensor assembly and process connection.

5) 4 screws DIN 912 M8 x 45 are enclosed (material A4-80)



Item	Designation	Nominal pressure	Material <sup>1)</sup>	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
				kg (lb) <sup>4)</sup>		
M	SMS 1 1/2"	PN 25	AISI 316L (1.4435)	1.27 (2.80)	3A, ASME-BPE	TXJ <sup>5)</sup>
N	SMS 2"	PN 25		1.39 (3.06)	3A, ASME-BPE	T7J <sup>5)</sup>

1) Delta ferrite content < 1 %. The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ).

2) CSA approval: Product Configurator, "Approval" ordering feature

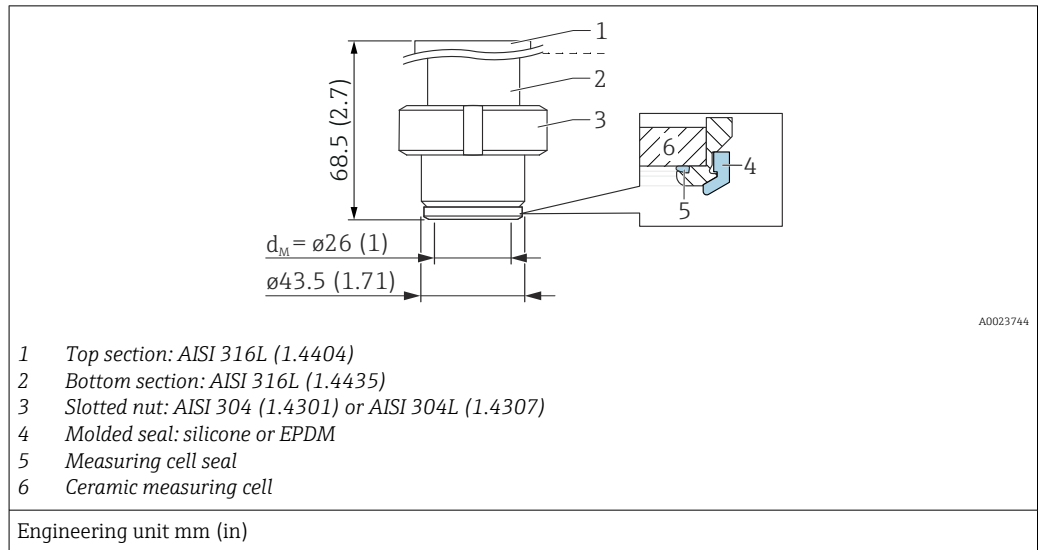
3) Product Configurator, "Process connection" ordering feature

4) Total weight consisting of sensor assembly and process connection.

5) 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).



Universal process adapter



- The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ).
- Silicone molded seal: FDA 21CFR177.2600/USP Class VI, order number: 52023572
- EPDM molded seal: FDA, USP Class VI; 5 pcs, order number: 71100719

Designation	Nominal pressure bar (psi)	Weight	Process connection approval <sup>1)</sup>	Option <sup>2)</sup>
		[kg (lb)] <sup>3)</sup>		
Universal process adapter Molded seal made of silicone	10 (145)	0.74 (1.63)	ASME-BPE	UPJ
Universal process adapter Molded seal made of EPDM			ASME-BPE	UNJ

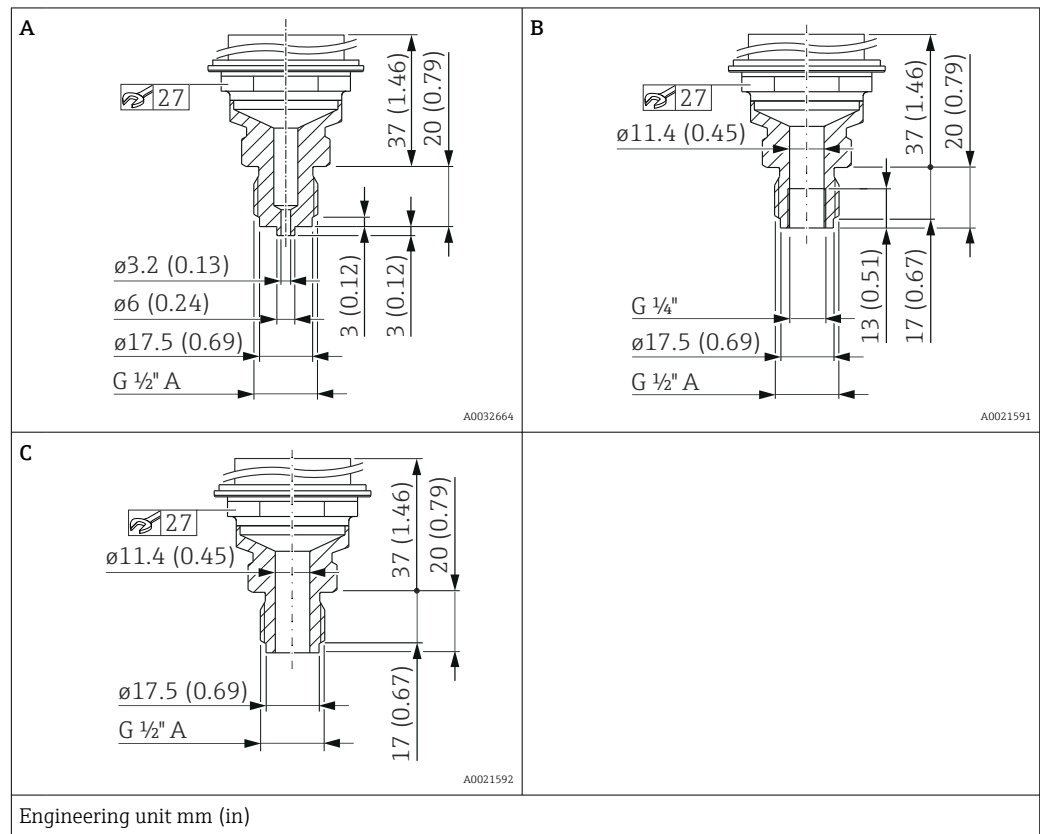
- 1) See Product Configurator for additional approvals.
- 2) Product Configurator, "Process connection" ordering feature
- 3) Total weight consisting of sensor assembly and process connection.

Material of the molded seal (exchangeable seal)	Material of the measuring cell seal on ceramic sensor (seal not exchangeable)	Approval of measuring cell seal	Option <sup>1)</sup>
Silicone	EPDM	FDA <sup>2)</sup> 3A Class II, USP Class VI. DVGW, KTW, W270, WRAS, ACS, NSF61	K
EPDM	EPDM	FDA <sup>2)</sup>	J
		FDA <sup>2)</sup> 3A Class II, USP Class VI. DVGW, KTW, W270, WRAS, ACS, NSF61	K

- 1) Product Configurator, "Seal" ordering feature
- 2) Food-safe FDA 21 CFR 177.2600

PMP51: process connections  
with internal process  
membrane

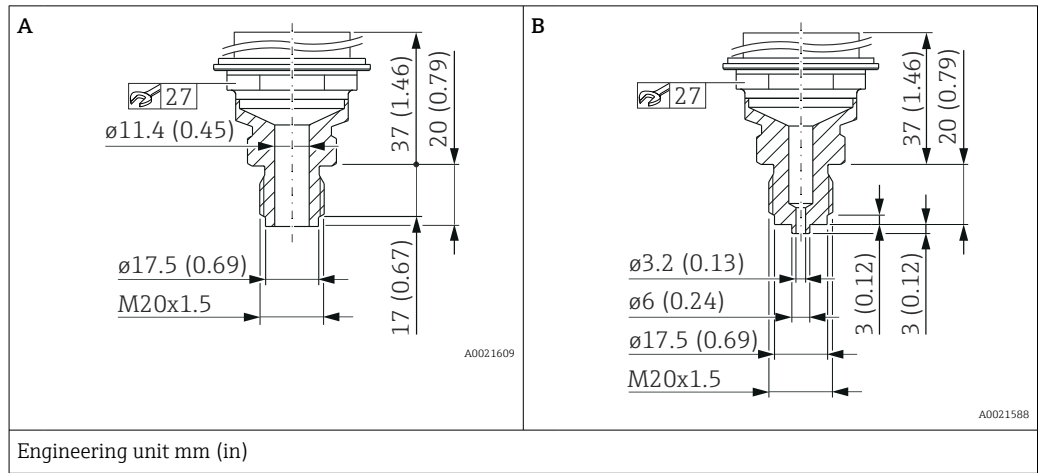
ISO 228 G thread



Item	Designation	Material	Weight kg (lb)	Option <sup>1)</sup>
A	Thread ISO 228 G 1/2" A EN 837	AISI 316L	0.63 (1.39)	GCJ
		Alloy C276 (2.4819)		GCC
B	Thread ISO 228 G 1/2" A, G 1/4" (female)	AISI 316L		GLJ
		Alloy C276 (2.4819)		GLC
C	Thread ISO 228 G 1/2" A, Bore 11.4 mm (0.45 in)	AISI 316L		GMJ
		Alloy C276 (2.4819)		GMC

1) Product Configurator, "Process connection" ordering feature

DIN 13 thread

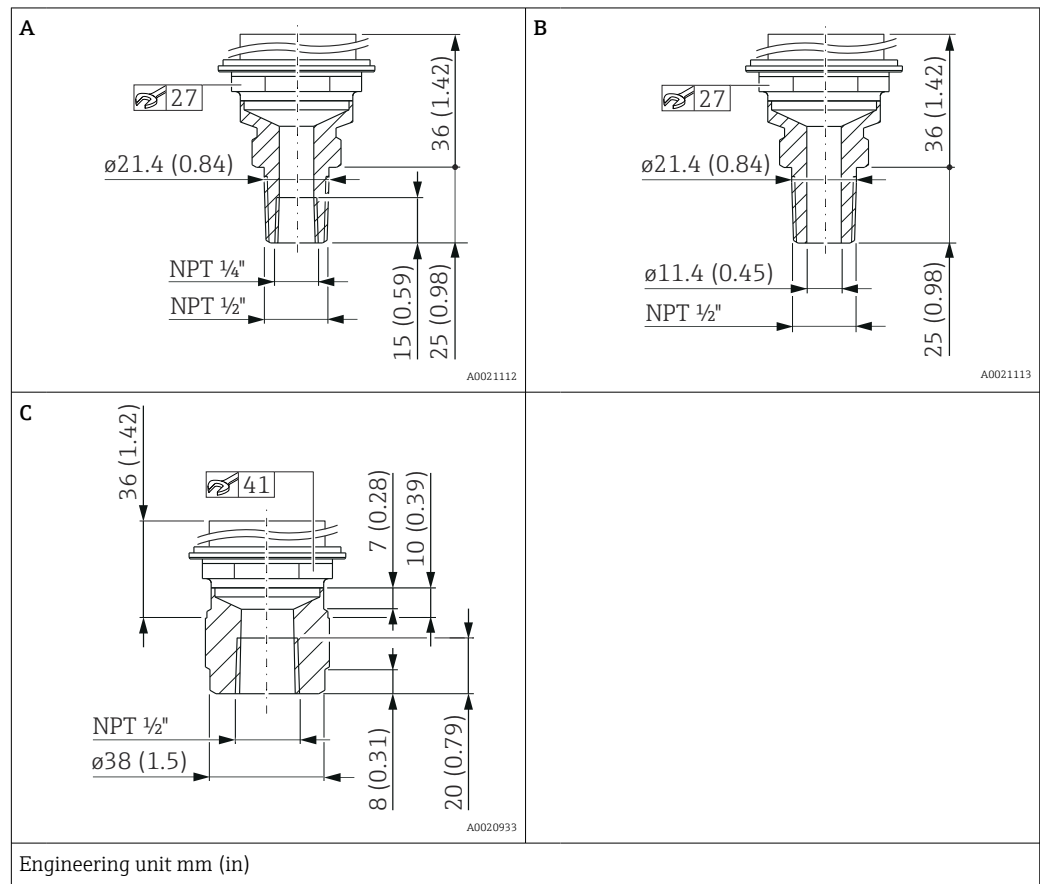


Item	Designation	Material	Weight kg (lb)	Option <sup>1)</sup>
A	DIN 13 M20 x 1.5 Bore 11.4 mm (0.45 in)	AISI 316L	0.6 (1.32)	G1J
		Alloy C276 (2.4819)		G2J
B	DIN 13 M20 x 1.5, EN 837, bore 3 mm (0.12 in)	AISI 316L		G5J
		Alloy C276 (2.4819)		G6J

1) Product Configurator, "Process connection" ordering feature

**PMP51: process connections with internal process membrane**

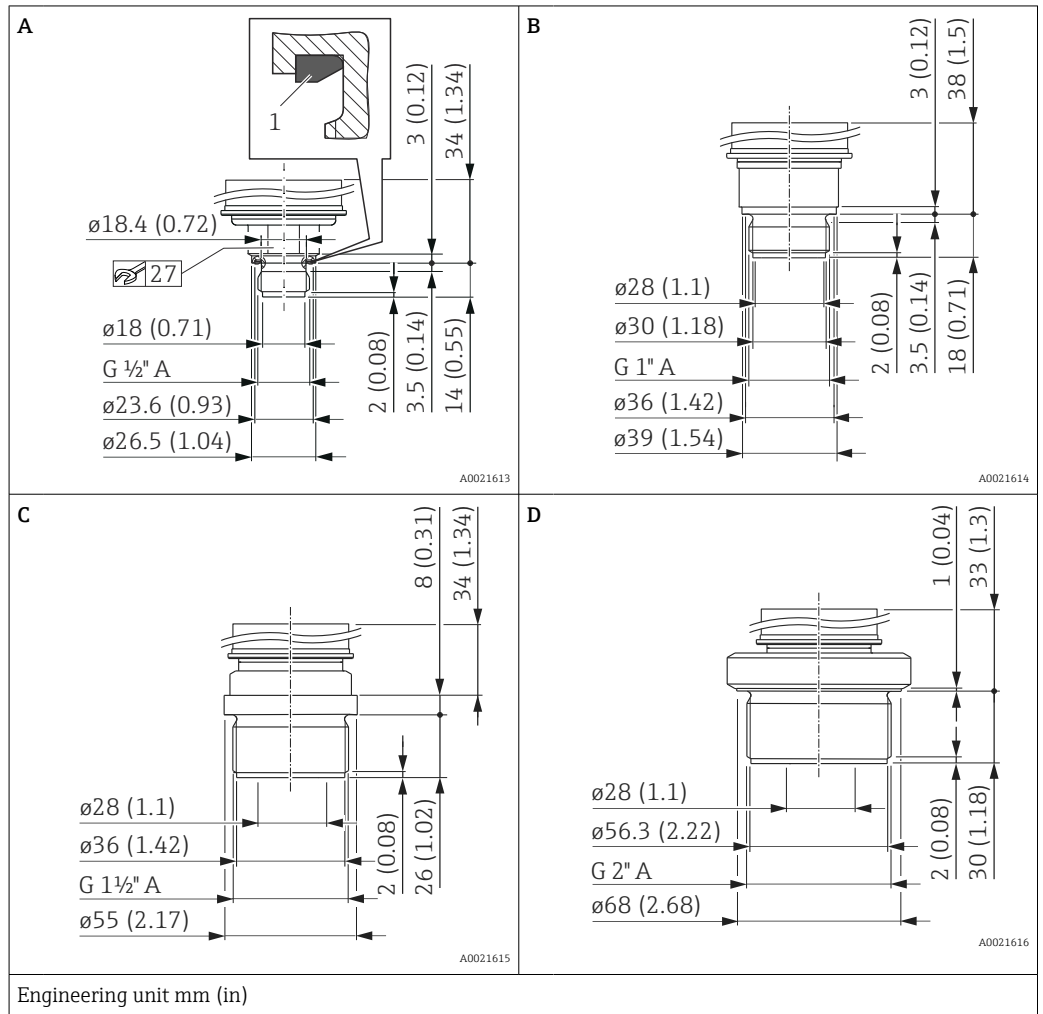
**ANSI thread**



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	RLJ
		Alloy C276 (2.4819)			RLC
B	ANSI 1/2" MNPT, bore 11.4 mm (0.45 in) = 400 bar (6 000 psi)	AISI 316L	0.63 (1.39)	CRN	RKJ
		Alloy C276 (2.4819)			RKC
C	ANSI 1/2" FNPT	AISI 316L	0.7 (1.54)	CRN	R1J
		Alloy C276 (2.4819)			R1C

1) CSA approval: Product Configurator, "Approval" ordering feature  
 2) Product Configurator, "Process connection" ordering feature

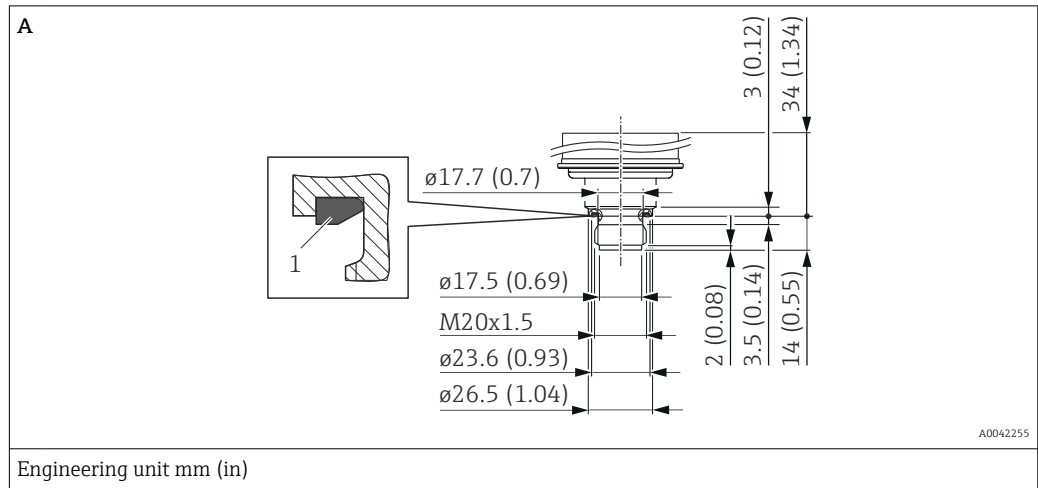
**PMP51: process connections with flush membrane**    **ISO 228 G thread**



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

1) Product Configurator, "Process connection" ordering feature

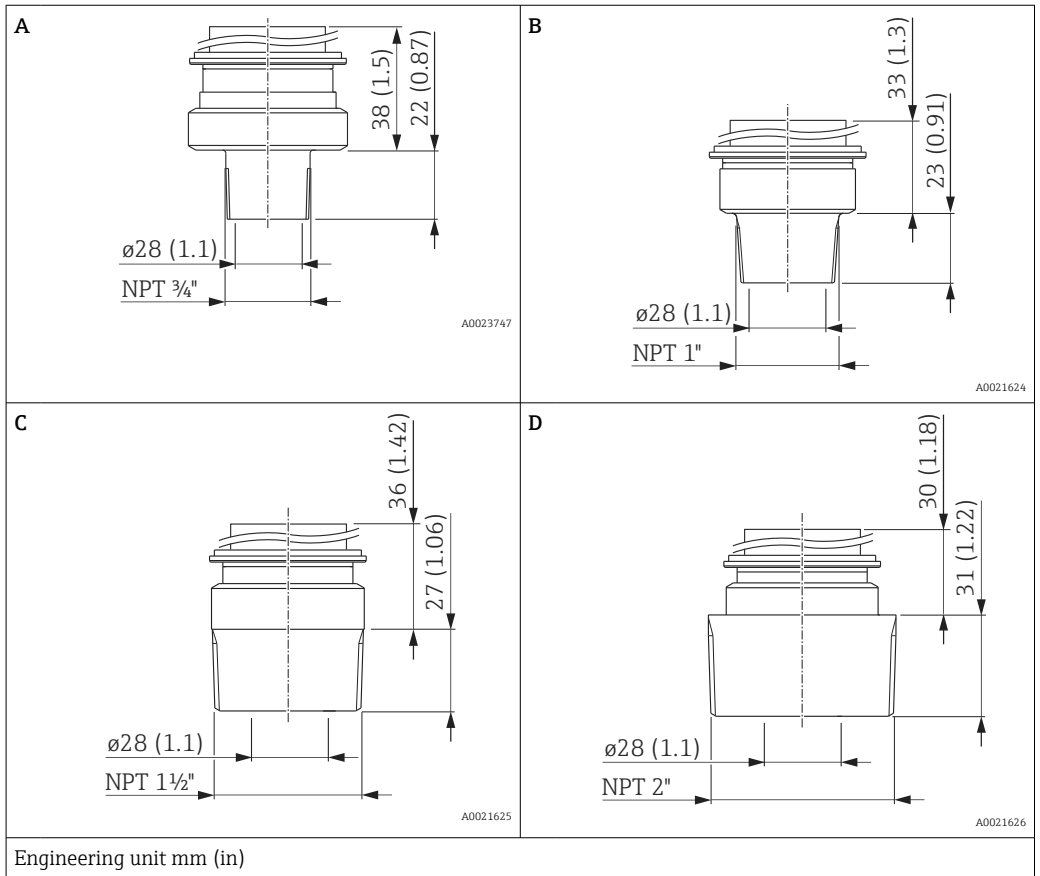
DIN 13 thread



Designation	Material	Weight	Option <sup>1)</sup>
		kg (lb)	
Thread DIN 13 M20 x 1.5 FKM 80 flat seal (item 1) pre-installed	AISI 316L	0.6 (1.32)	G7J
	Alloy C276 (2.4819)		G8J

1) Product Configurator, "Process connection" ordering feature

ANSI thread

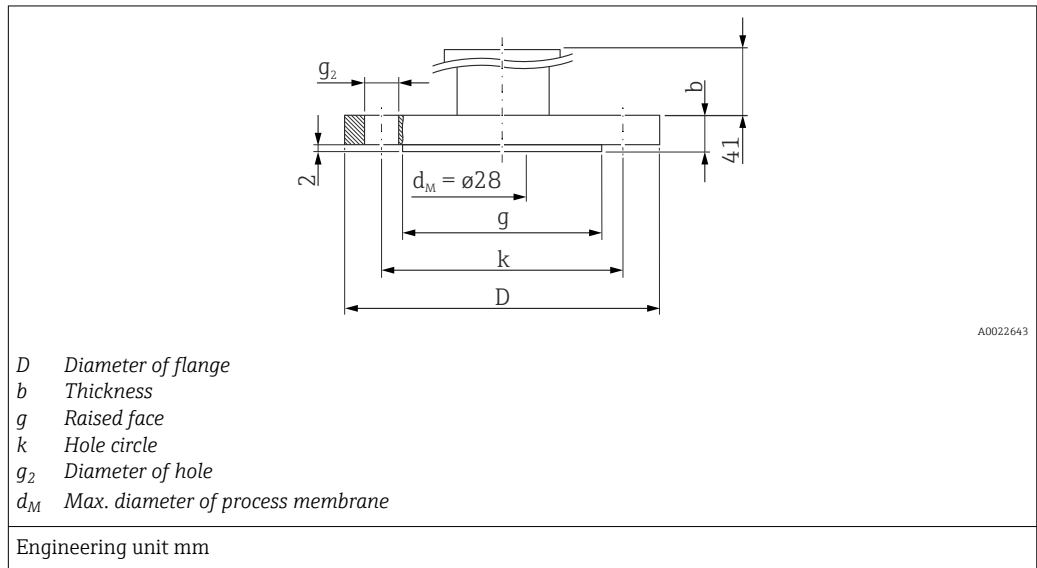


Item	Designation	Material	Weight	Approval <sup>1)</sup>	Option <sup>2)</sup>
			kg (lb)		
A	ANSI 3/4" MNPT	AISI 316L	0.6 (1.32)	-	U4J
B	ANSI 1" MNPT		0.7 (1.54)	CRN	U5J
C	ANSI 1 1/2" MNPT		1 (2.21)	CRN	U7J
D	ANSI 2" MNPT		1.3 (2.87)	CRN	U8J

- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature

**PMP51: process connections with flush membrane**

**EN flanges, connection dimensions as per EN 1092-1**



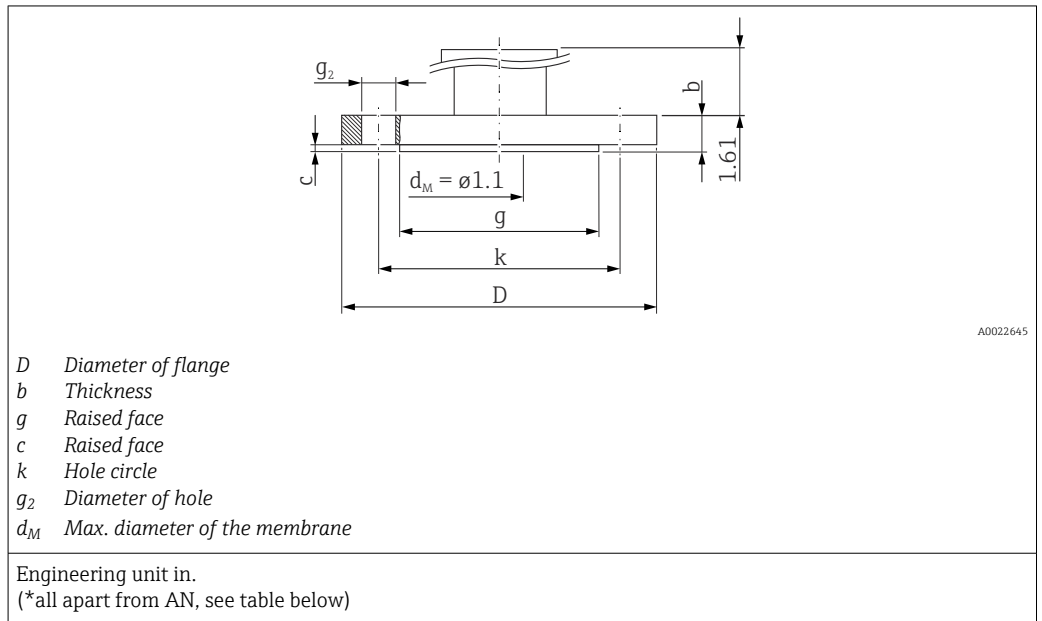
Flange <sup>1)</sup>			Boltholes						Weight Flange	Option <sup>2)</sup>
Nominal diameter	Nominal pressure	Shape	D	b	g	Quantity	g <sub>2</sub>	k		
			[mm]	[mm]	[mm]		[mm]	[mm]		
DN 25	PN 10-40	B1	115	18	68	4	14	85	1.2 (2.65)	CNJ
DN 32	PN 10-40	B1	140	18	78	4	18	100	1.9 (4.19)	CPJ
DN 40	PN 10-40	B1	150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

1) Material: AISI 316L  
 2) Product Configurator, "Process connection" ordering feature



**PMP51: process connections with flush membrane**

**ASME flanges, connection dimensions as per ASME B 16.5, raised face RF\***

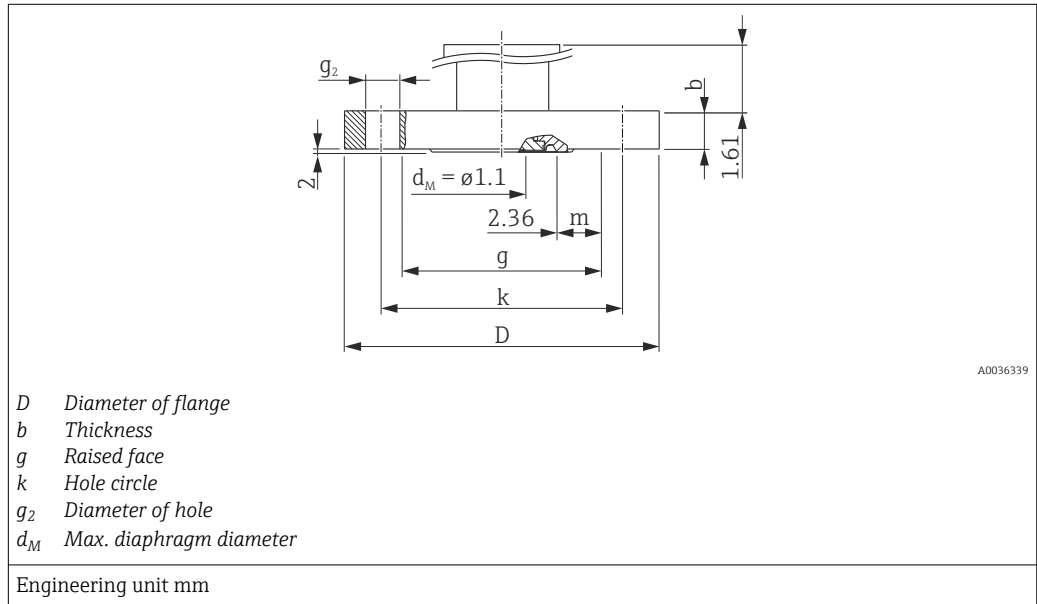


Flange <sup>1)</sup>							Boltholes			Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
Nominal diameter	Class/nominal pressure	D	b	g	c	m	Quantity	g <sub>2</sub>	k			
[in]	lb./sq.in	[in]	[in]	[in]	[in]	[in]		[in]	[in]	[kg (lb)]		
1	150	4.25	0.61	2.44	0.08	-	4	0.62	3.13	1.1 (2.43)	CRN	ACJ
1	300	4.88	0.69	2 <sup>4)</sup>	0.06	0.2	4	0.75	3.5	1.3 (2.87)	CRN	ANJ
1 ½	150	5	0.69	2.88 <sup>4)</sup>	0.08	0.52	4	0.62	3.88	1.5 (3.31)	CRN	AEJ
1 ½	300	6.12	0.81	2.88 <sup>4)</sup>	0.08	0.52	4	0.88	4.5	2.6 (5.73)	CRN	AQJ
2	150	6	0.75	3.62	0.08	-	4	0.75	4.75	2.4 (5.29)	CRN	AFJ
2	300	6.5	0.88	3.62	0.08	-	8	0.75	5	3.2 (7.06)	CRN	ARJ
3	150	7.5	0.94	5	0.08	-	4	0.75	6	4.9 (10.8)	CRN	AGJ
3	300	8.25	1.12	5	0.08	-	8	0.88	6.62	6.7 (14.77)	CRN	ASJ
4	150	9	0.94	6.19	0.08	-	8	0.75	7.5	7.1 (15.66)	CRN	AHJ
4	300	10	1.25	6.19	0.08	-	8	0.88	7.88	11.6 (25.88)	CRN	ATJ

- 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, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) With these process connections the raised face is smaller than described in the standard. Due to the smaller raised face a special seal must be used.

PMP51: 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



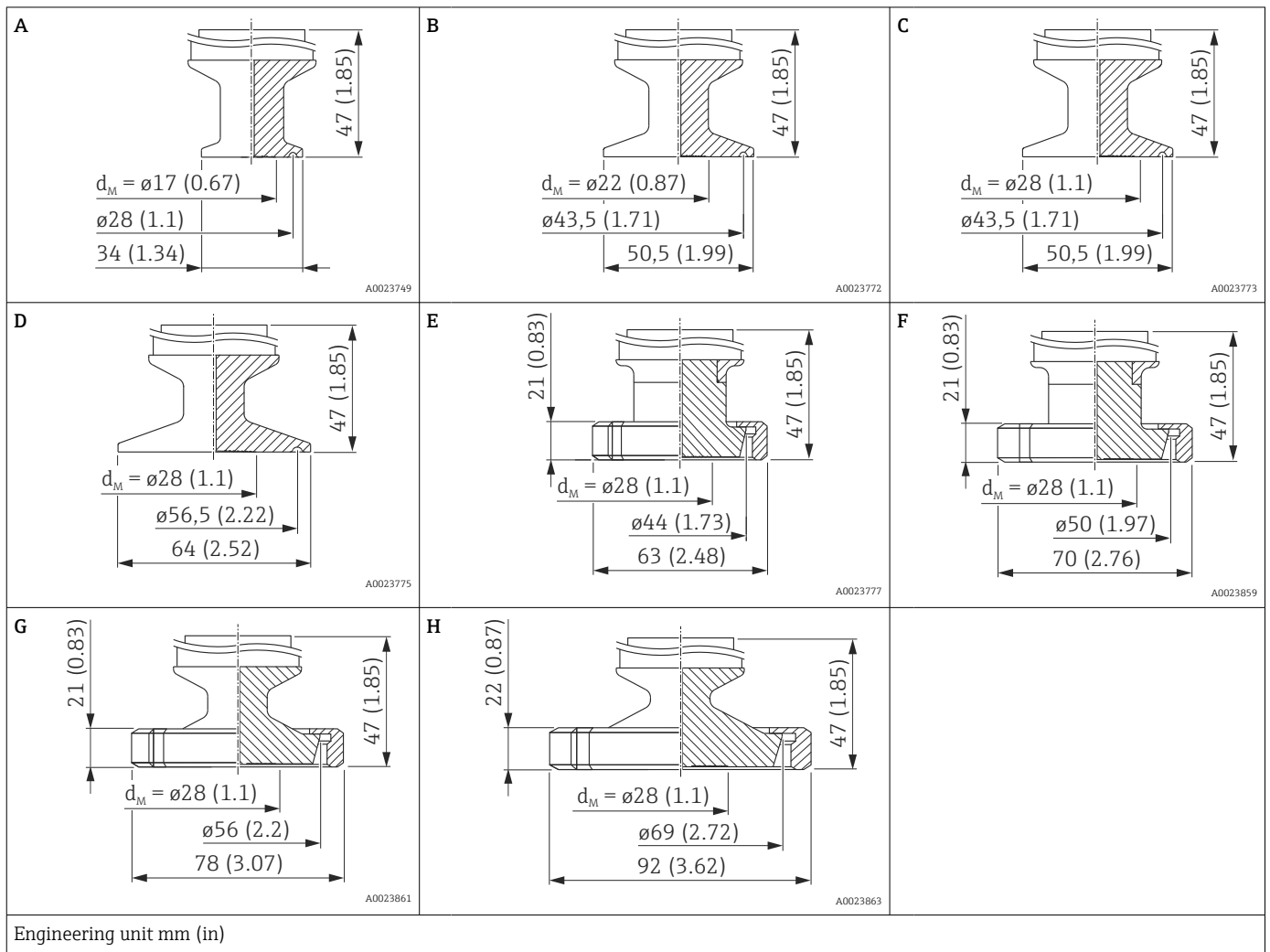
Flange <sup>1)</sup>						Boltholes			Weight	Option <sup>2)</sup>
Nominal diameter	Class/nominal pressure	D	b	g	m	Number	g <sub>2</sub>	k		
		[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[kg (lb)]	
DN										
DN50	40 bar	165	20	102	27.5	4	18	125	3 (6.6)	7HJ
DN80	40 bar	200	24	138	45.5	8	18	160	5.5 (12.13)	7KJ
[in]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

1) Material: AISI 316L

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

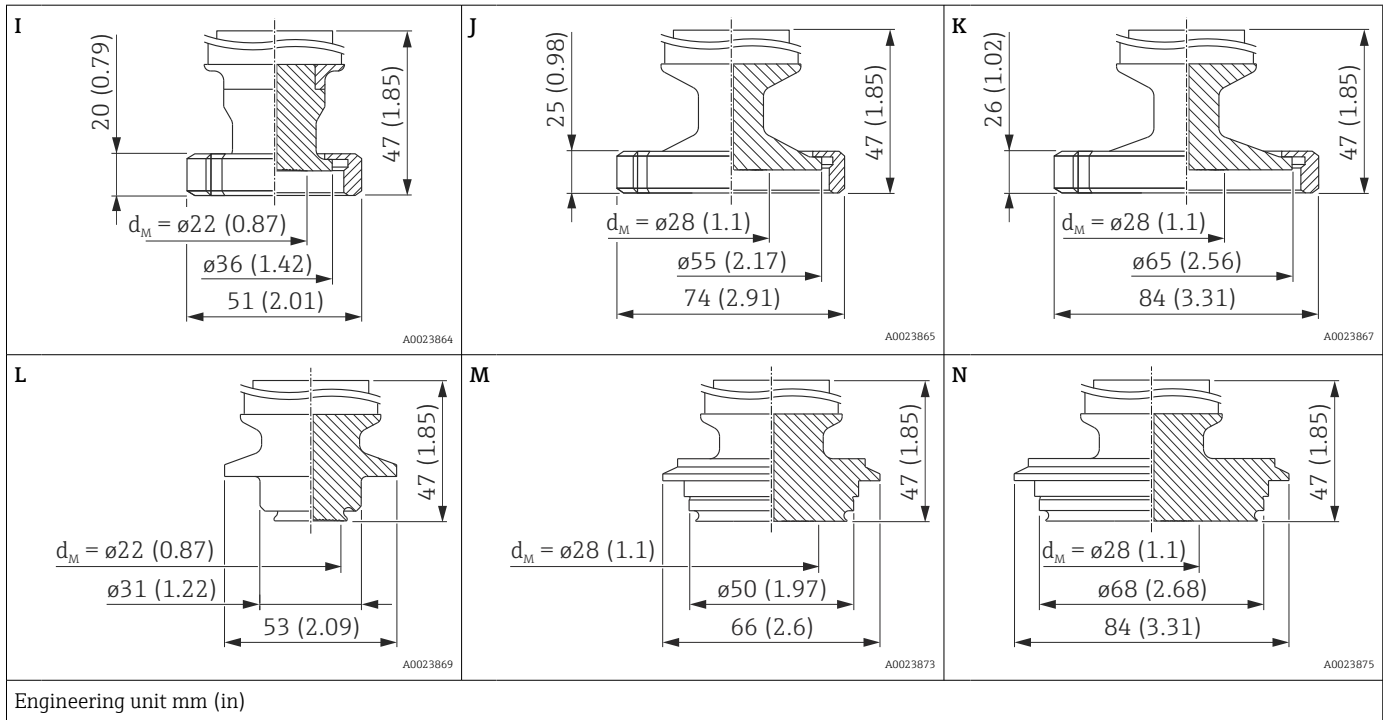
PMP51 hygienic

Hygienic process connections with flush membrane



Item <sup>1) 2)</sup>	Designation	Nominal pressure	Weight	Approval	Option <sup>3)</sup>
			kg (lb) <sup>4)</sup>		
A	Clamp ISO2852, DN 18-22, DIN 32676 DN 15-20	PN 40	0.5 (1.10)	EHEDG, 3A	TBJ
B	Tri-Clamp ISO2852 DN 25 (1"), DIN 32676 DN 25	PN 40	0.6 (1.32)	EHEDG, 3A, ASME-BPE	TCJ
C	Tri-Clamp ISO2852 DN 38 (1½"), DIN 32676 DN 40	PN 40	0.95 (2.09)	EHEDG, 3A, ASME-BPE	TJJ
D	Tri-Clamp ISO2852 DN 40-51 (2"), DIN 32676 DN 50	PN 40	0.83 (1.83)	EHEDG, 3A, ASME-BPE	TDJ
E	DIN 11851 DN 25	PN 40	0.7 (1.54)	EHEDG, 3A, ASME-BPE	MXJ
F	DIN 11851 DN 32	PN 40	0.8 (1.76)	EHEDG, 3A, ASME-BPE	MIJ
G	DIN 11851 DN 40	PN 40	1.3 (2.87)	EHEDG, 3A, ASME-BPE	MZJ
H	DIN 11851 DN 50	PN 25	1.27 (2.80)	EHEDG, 3A, ASME-BPE	MRJ

- 1) Material: AISI 316L (1.4435)
- 2) The roughness of the surface in contact with the medium is  $R_a 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ). ASME-BPE-compliant version optionally available for use in biochemical processes, surfaces in contact with the medium  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using ordering feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, "Process connection" ordering feature
- 4) Total weight consisting of sensor assembly and process connection.



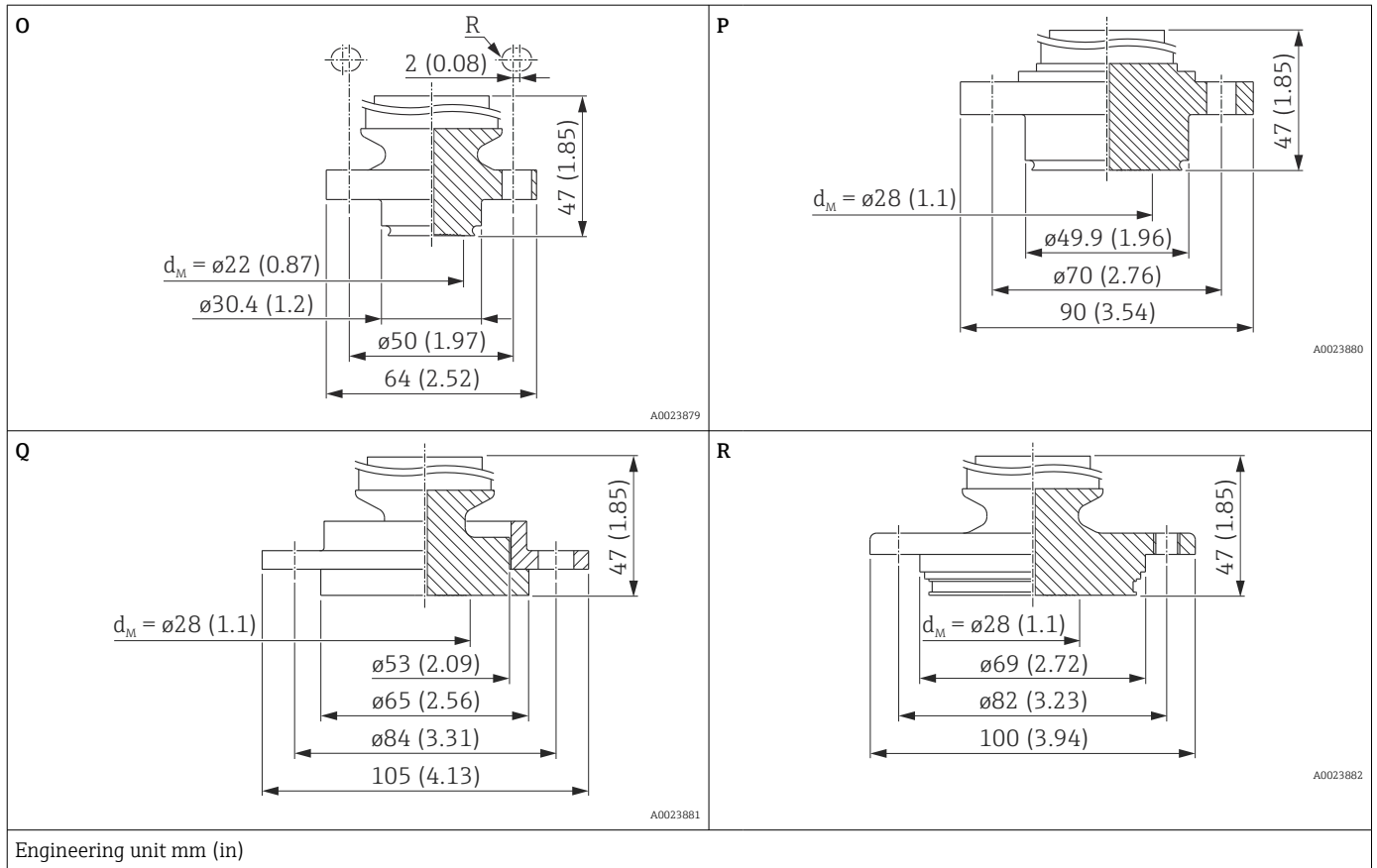
Item <sup>1) 2)</sup>	Designation	Nominal pressure	Weight	Approval	Option <sup>3)</sup>
			kg (lb) <sup>4)</sup>		
I	SMS 1"	PN 25	0.7 (1.54)	3A, ASME-BPE	T6J
J	SMS 1½"	PN 25	1.27 (2.80)	3A, ASME-BPE	T7J
K	SMS 2"	PN 25	1.39 (3.06)	3A, ASME-BPE	TXJ
L	Varivent B pipe DN 10-15	PN 40	0.7 (1.54)	EHEDG, 3A, ASME-BPE	TPJ
M	Varivent F pipe DN 25-32	PN 40	0.12 (2.47)	EHEDG, 3A, ASME-BPE	TQJ
N	Varivent N pipe DN 40-162	PN 40	1.09 (2.40)	EHEDG, 3A, ASME-BPE	TRJ

1) Material: AISI 316L (1.4435)

2) The roughness of the surface in contact with the medium is  $R_a 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ). ASME-BPE-compliant version optionally available for use in biochemical processes, surfaces in contact with the medium  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using ordering feature 570 "Service", option "HK" in the order code.

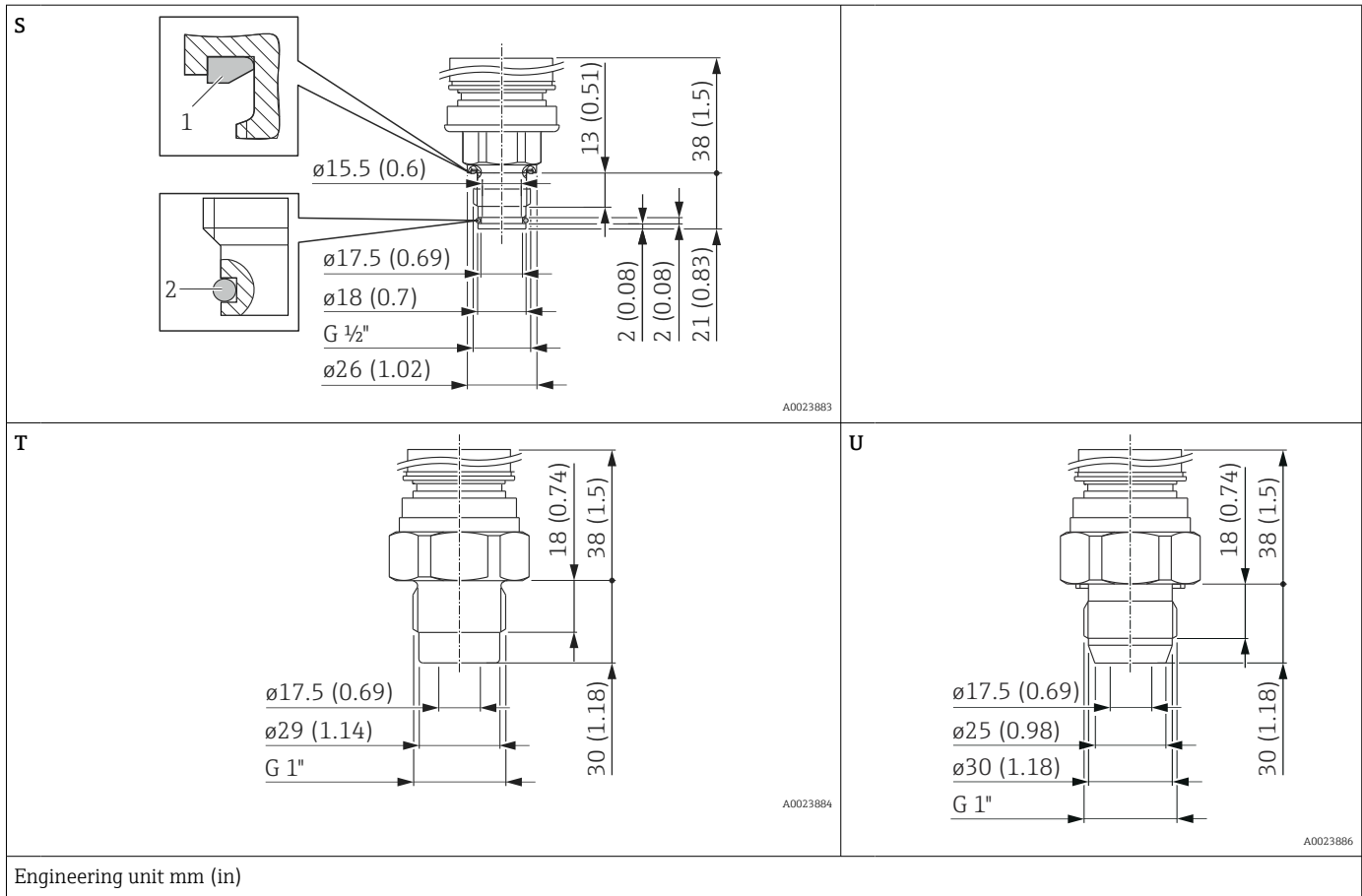
3) Product Configurator, "Process connection" ordering feature

4) Total weight consisting of sensor assembly and process connection.



Item <sup>1) 2)</sup>	Designation	Nominal pressure	Boltholes		Weight kg (lb) <sup>4)</sup>	Approval	Option <sup>3)</sup>
			Quantity	Diameter			
				mm (in)			
O	NEUMO BioControl D 25	PN 16	4	R: 3.5 (0.14)	0.8 (1.76)	EHEDG, 3A, ASME-BPE	S1J
P	NEUMO BioControl D 50	PN 16	4	9 (0.35)	1.99 (4.39)	EHEDG, 3A, ASME-BPE	S4J
Q	DRD DN 50 slip-on flange	PN 25	4	11.5 (0.45)	1.28 (2.82)	ASME-BPE	TIJ
R	APV Inline DN 50	PN 25	6	8.6 (0.34)	1.18 (2.60)	EHEDG, 3A, ASME-BPE	TPJ
			2	M8			

- 1) Material: AISI 316L (1.4435)
- 2) The roughness of the surface in contact with the medium is  $R_a 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ). ASME-BPE-compliant version optionally available for use in biochemical processes, surfaces in contact with the medium  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using ordering feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, "Process connection" ordering feature
- 4) Total weight consisting of sensor assembly and process connection.

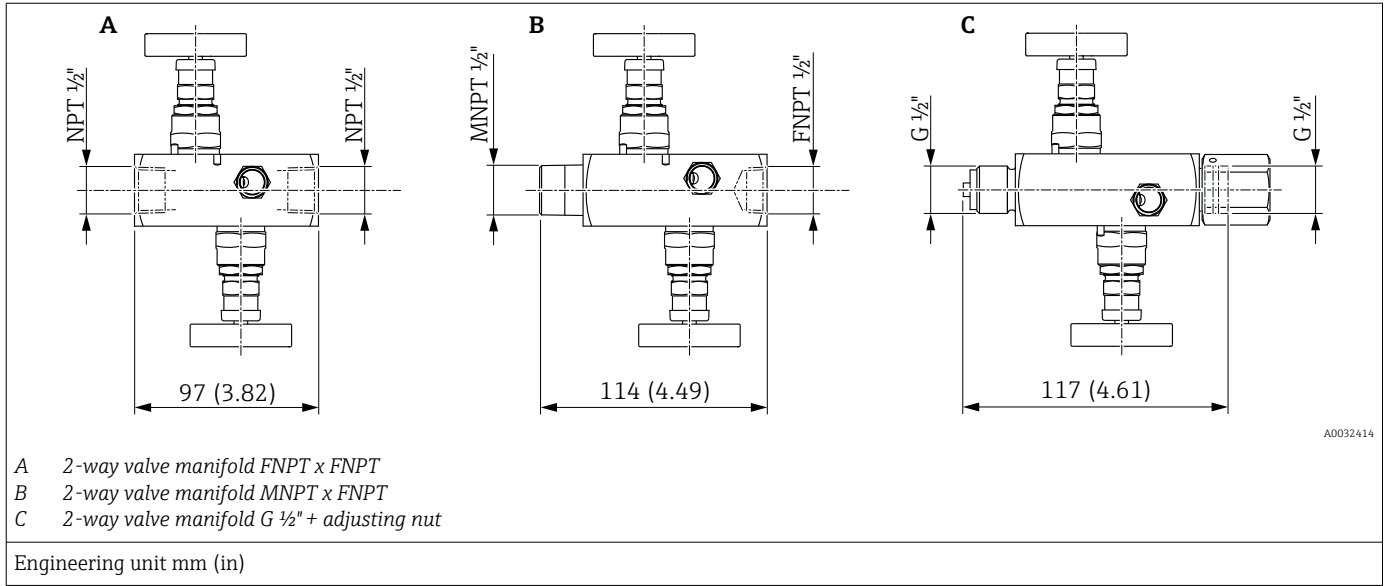


Item <sup>1) 2)</sup>	Designation	Seal		Nominal pressure	Weight kg (lb) <sup>4)</sup>	Approval	Option <sup>3)</sup>
		Item	Designation				
S	Thread ISO 228 G 1/2"	1	FKM molded seal pre-installed	PN 40	0.5 (1.1)	ASME-BPE	G0J
		2	FKM O-ring pre-installed				
T	Thread ISO 228 G1"	-	Sealing via O-ring.	PN 40	0.8 (1.76)	3A, ASME-BPE	GZJ <sup>5)</sup>
U	Thread ISO 228 G1"	1	Conical metal joint VMQ O-ring enclosed with accessories QE and QF.	PN 100	0.8 (1.76)	ASME-BPE	GXJ

- 1) Material: AISI 316L (1.4435)
- 2) The roughness of the surface in contact with the medium is  $R_a 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ). ASME-BPE-compliant version optionally available for use in biochemical processes, surfaces in contact with the medium  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using ordering feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, "Process connection" ordering feature
- 4) Total weight consisting of sensor assembly and process connection.
- 5) EHEDG in conjunction with EHEDG-certified process adapter or weld-in adapter; for details, see TI00426F.

**DA63M- valve manifold (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

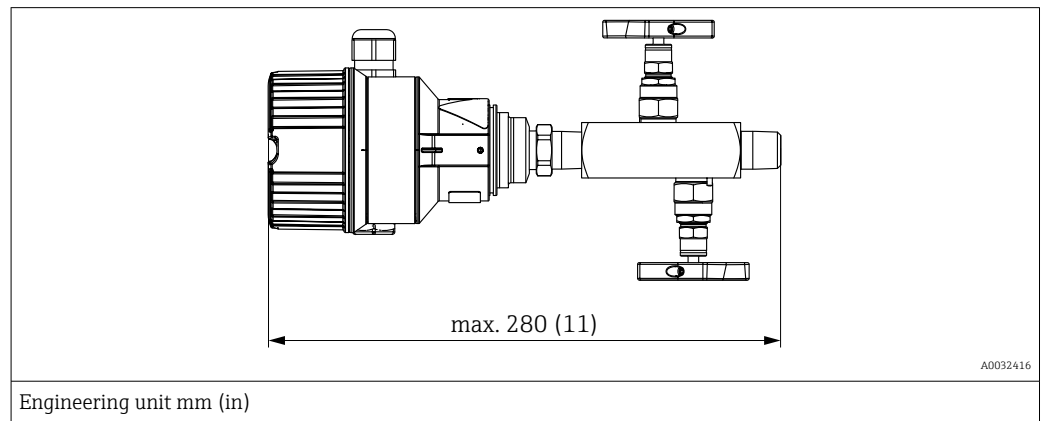
- as **enclosed** accessories (seal for mounting included)
- as a **mounted** accessory (mounted valve manifolds are supplied with a documented leakage test).

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.

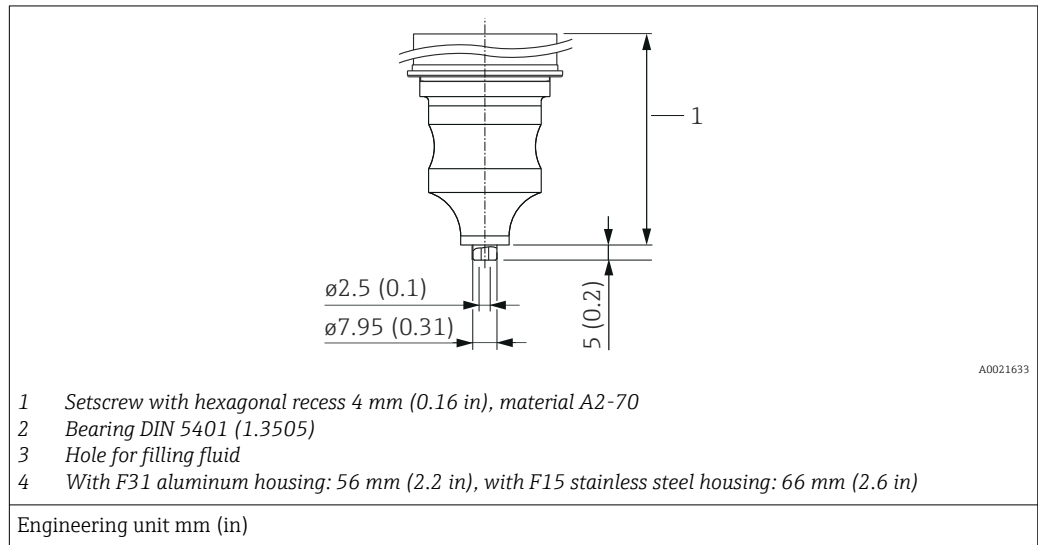
**Mounting on valve manifold**



Ordering information:

Product Configurator, "Mounted accessories" ordering feature

**PMP51: process connections**    **Prepared for diaphragm seal mounting**

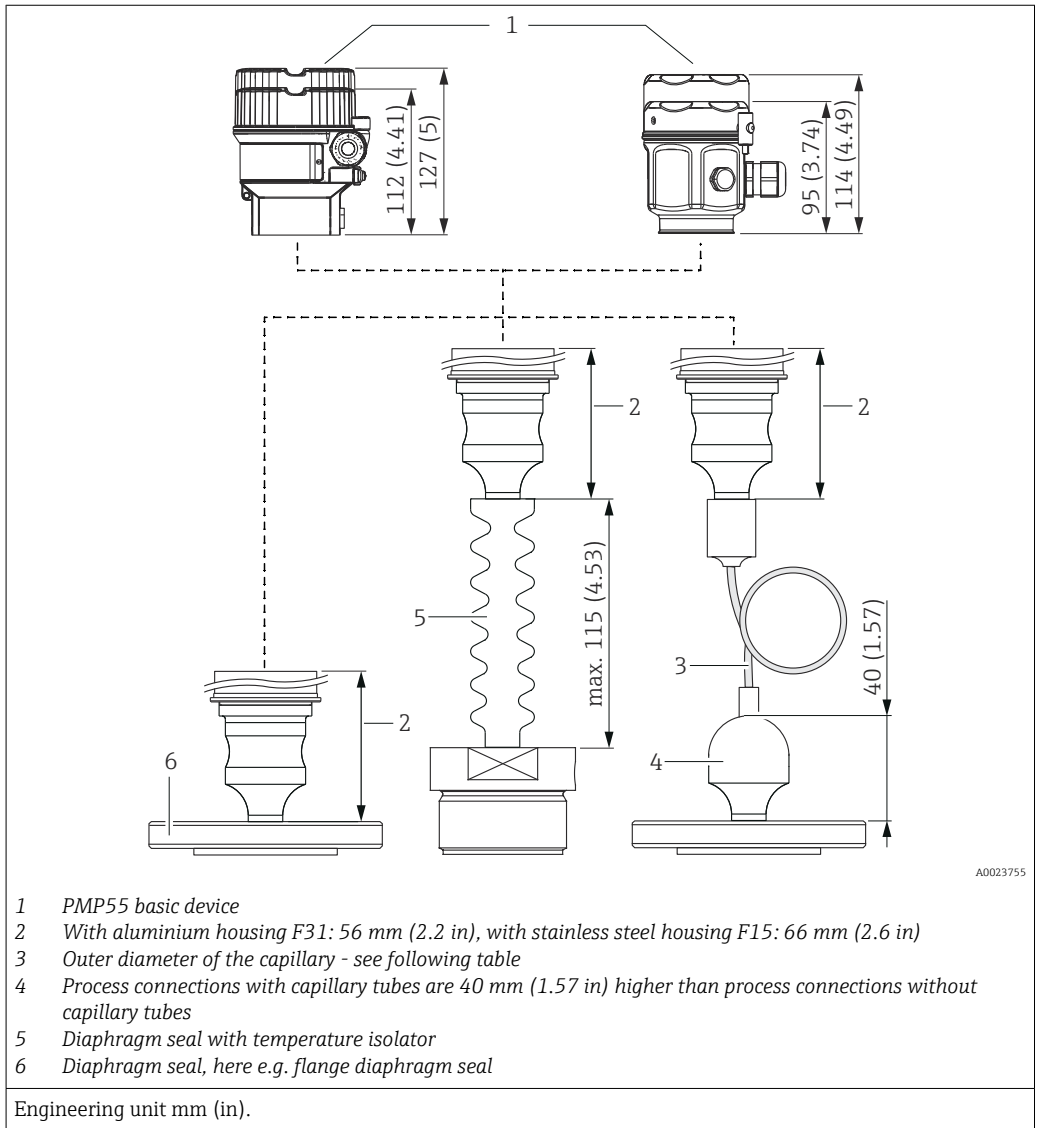


Material	Designation	Weight kg (lb)	Approval <sup>1)</sup>	Option <sup>2)</sup>
AISI 316L (1.4404)	Prepared for diaphragm seal mounting	1.9 (4.19)	CRN	XSJ

- 1)    CSA approval: Product Configurator, "Approval" ordering feature
- 2)    Product Configurator, "Process connection" ordering feature



**PMP55 basic device - examples**



**Outer diameter of capillary**

Designation	Outer diameter
Flexible armor made from 316L	8 mm (0.31 in)
Flexible armor with PVC-coating	10 mm (0.39 in)
Flexible armor with PTFE-coating	12.5 mm (0.49 in)

**Diaphragm seal connection**

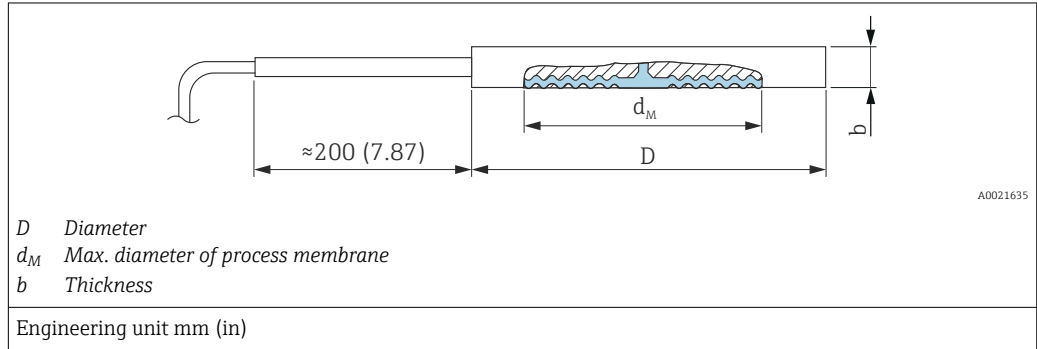
Designation	OptionProduct Configurator, "Diaphragm seal connection" ordering feature
Direct	A
Temperature isolator	B
..... m capillary	D
..... ft capillary	E

**Process connections for PMP55 with flush membrane**



- The weights of the diaphragm seals are specified in the tables. See → 50 for the weight of the housing.
- The following drawings are schematic diagrams. 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 → 121
- For further information please contact your local Endress+Hauser Sales Center.

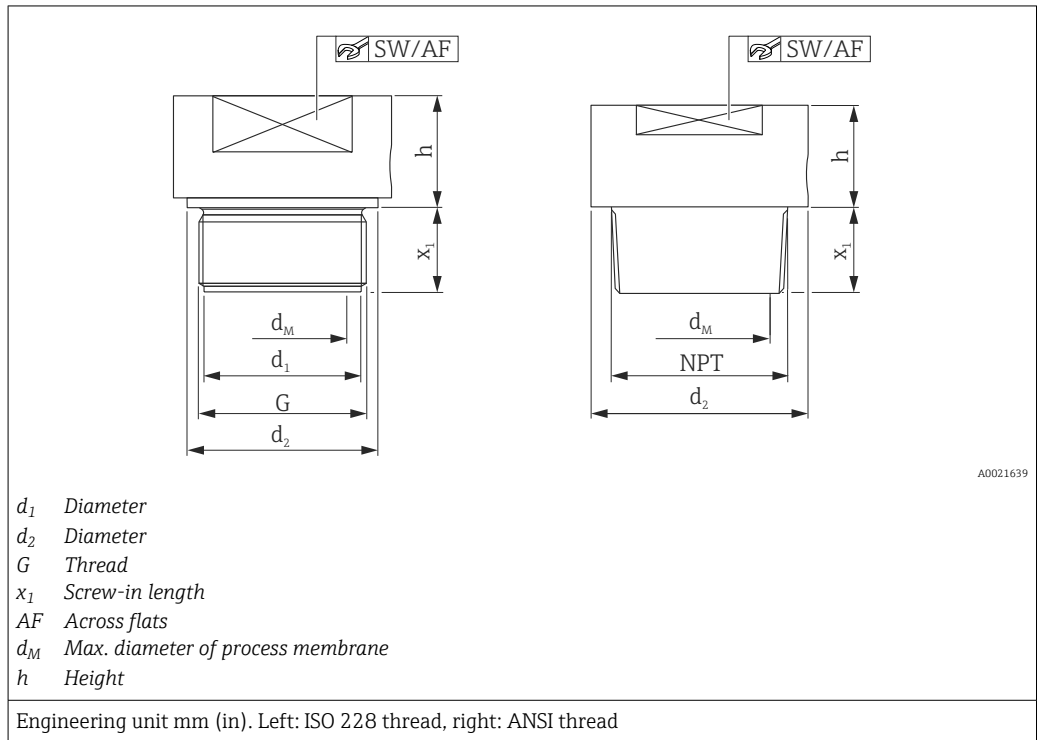
**Pancake seal**



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 <sup>4)</sup>	102	20 - 22	59	1.3 (2.87)	-	UJJ <sup>5)</sup>
	DN 80	PN 16-400 <sup>4)</sup>	138	20 - 22	89	2.3 (5.07)	-	UJJ <sup>5)</sup>
	DN 100	PN 16-400 <sup>4)</sup>	162	20 - 22	89	3.1 (6.84)	-	UKJ
	[in]	[lb/sq.in]	[in]	[in]	[in]	[kg (lb)]		
	2	150-2500	3.89	0.79 - 0.87	2.32	1.3 (2.87)	CRN	ULJ <sup>5)</sup>
	3	150-2500	5.00	0.79 - 0.87	3.50	2.3 (5.07)	CRN	UMJ <sup>5)</sup>
	4	150-2500	6.22	0.79 - 0.87	3.50	3.1 (6.84)	CRN	URJ

- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature
- 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 → 49.
- 4) MWP = 250 bar (3 625 psi) in the case of PTFE coating, see "Range of application of the PTFE foil" for details → 47
- 5) With TempC membrane.

**PMP55: process connections with flush membrane** ISO 228 and ANSI thread

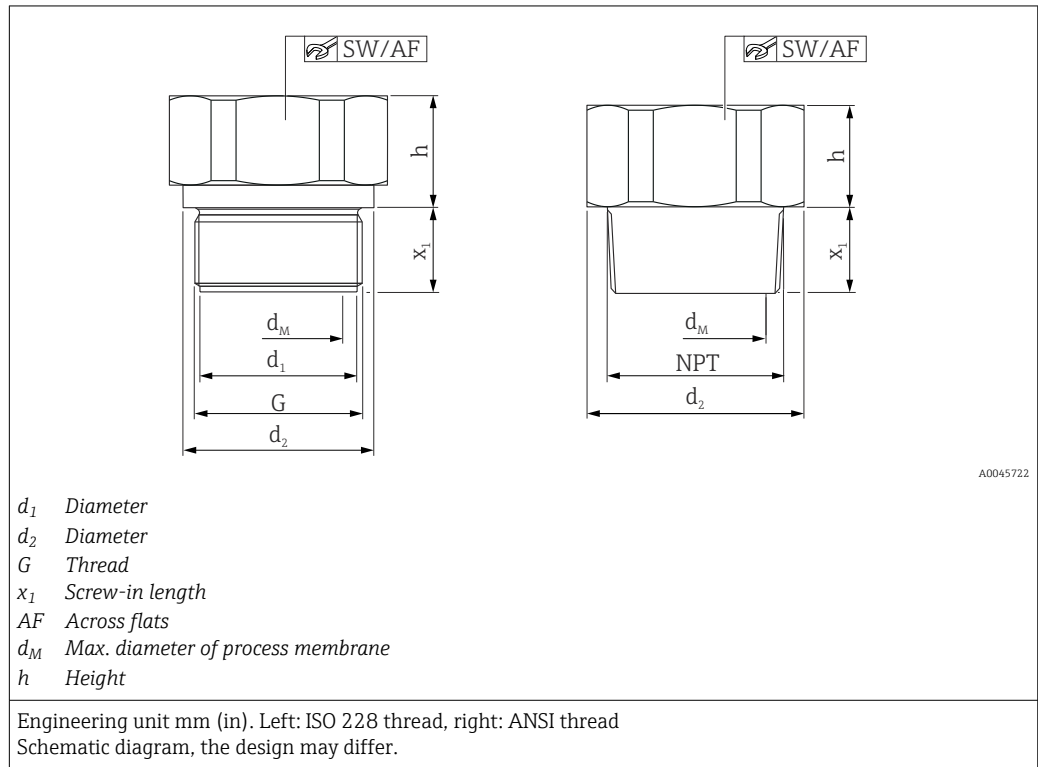


Thread							Diaphragm seal			Approval <sup>1)</sup>	Option <sup>2)</sup>
Material	G	Nominal pressure	$d_1$	$d_2$	$x_1$	AF	$d_M$	h	Weight		
		PN	[mm]	[mm]	[mm]		[mm]	[mm]	[kg (lb)]		
AISI 316L	G 1" A	400	30	39	21	41	30	19	0.4 (0.88)	-	GTJ
Alloy C276									0.5 (1.1)	-	GTC
AISI 316L	G 1 ½" A	400	44	55	30	50	42	20	0.9 (1.98)	-	GVJ
Alloy C276									1.0 (2.21)	-	GVC
AISI 316L	G 2"	400	56	68	30	65	50	20	1.9 (4.19)	-	GWJ
Alloy C276									2.1 (4.63)	-	GWC
AISI 316L	1" MNPT	400	-	45	28	41	24	17	0.6 (1.32)	CRN	U5J
Alloy C276									0.7 (1.54)	CRN	U5C
AISI 316L	1 ½" MNPT	400	-	60	30	41	36	20	0.9 (1.98)	CRN	U7J
Alloy C276				52	30	46	32	20	1.0 (2.21)	CRN	U7C
AISI 316L	2" MNPT	400	-	78	30	65	38	35	1.8 (3.97)	CRN	U8J
Alloy C276									2.0 (4.41)	CRN	U8C

1) CSA approval: Product Configurator, "Approval" ordering feature  
 2) Product Configurator, "Process connection" ordering feature

**PMP55: process connections with flush TempC process membrane**

**ISO 228 and ANSI thread**

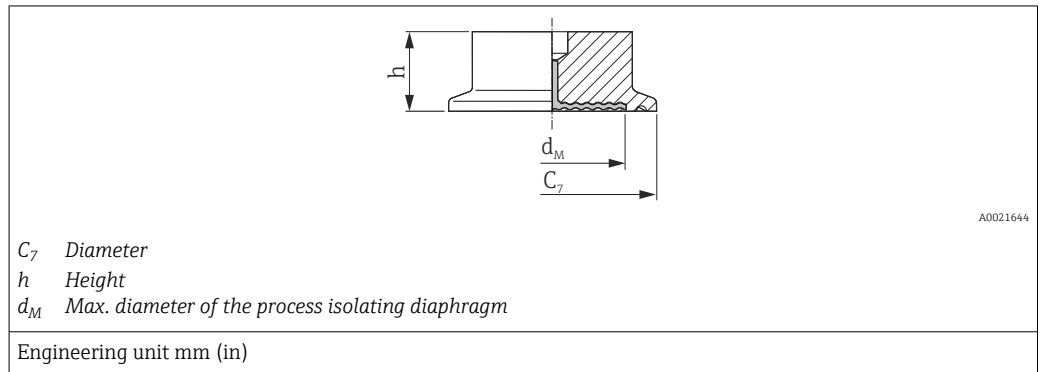


Thread							Diaphragm seal			Approval <sup>1)</sup>	Option <sup>2)</sup>
Material	G	Nominal pressure	d <sub>1</sub>	d <sub>2</sub>	x <sub>1</sub>	AF	d <sub>M</sub>	h	Weight		
		PN	[mm]	[mm]	[mm]		[mm]	[mm]	[kg (lb)]		
AISI 316L	G 1" A	400	30	39	21	41	28	19	0.35 (0.77)	-	GTJ
Alloy C276									0.38 (0.84)	-	GTC
AISI 316L	G 1 ½" A	400	-	55	30	46	41	20	0.73 (1.61)	-	GVJ
Alloy C276									0.79 (1.74)	-	GVC
AISI 316L	G 2"	400	-	68	30	60	48	20	1.20 (2.65)	-	GWJ
Alloy C276									1.30 (2.87)	-	GWC
AISI 316L	1" MNPT	400	-	45	23	41	28	16	0.38 (0.84)	CRN	U5J
Alloy C276									0.41 (0.90)	CRN	U5C
AISI 316L	1 ½" MNPT	400	-	60	30	46	41	20	0.70 (1.54)	CRN	U7J
Alloy C276									0.76 (1.68)	CRN	U7C
AISI 316L	2" MNPT	400	-	60	34	46	48	21	1.10 (2.43)	CRN	U8J
Alloy C276									1.19 (2.62)	CRN	U8C

1) CSA approval: Product Configurator, "Approval" ordering feature  
 2) Product Configurator, "Process connection" ordering feature

**PMP55: process connections with flush-mounted process isolating diaphragm**

**Tri-Clamp ISO 2852**



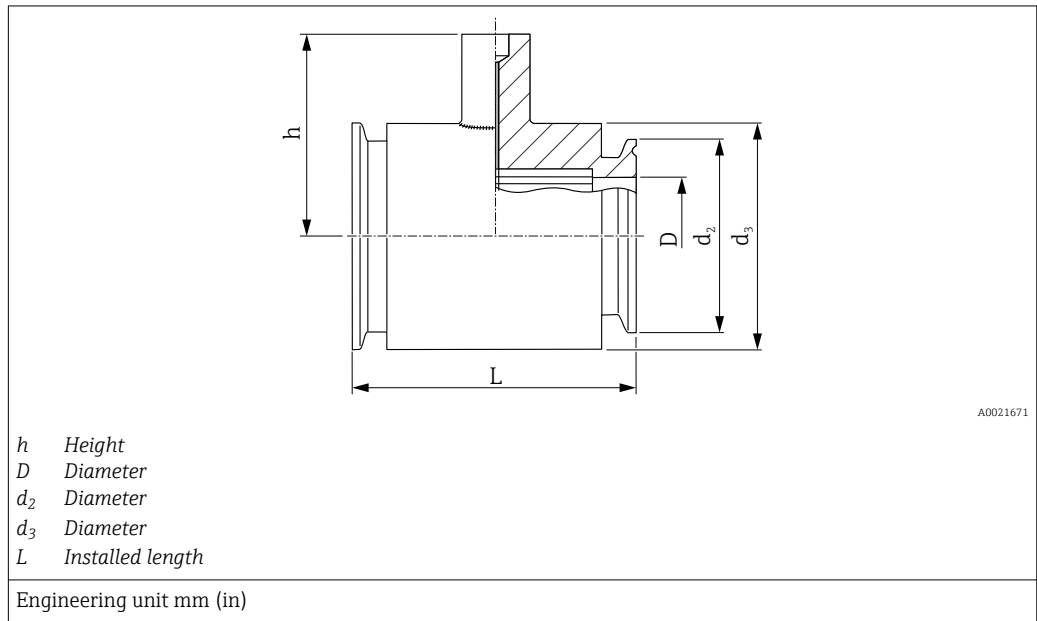
Material <sup>1)</sup>	Nominal diameter ISO 2852	Nominal diameter DIN 32676	Nominal diameter	$C_7$	$d_M$		$h$	Weight	Approval <sup>2)</sup>	Option <sup>3)</sup>
					Standard	With TempC Membrane				
			[in]	[mm]	[mm]	[mm]	[mm]	[kg (lb)]		
AISI 316L	ND 25 / 33.7	DN 25	1	50.5	24	-	37	0.32 (0.71)	EHEDG, 3A, CRN, ASME-BPE	TCJ
	ND 38	DN 40	1 ½	50.5	36	36	30	1 (2.21)	EHEDG, 3A, CRN, ASME-BPE	TJJ <sup>4) 5)</sup>
	ND 51 / 40	DN 50	2	64	48	41	30	1.1 (2.43)	EHEDG, 3A, CRN, ASME-BPE	TDJ <sup>4) 5)</sup>
	ND 63.5	-	2 ½	77.5	61	61	30	0.7 (1.54)	EHEDG, 3A, ASME-BPE	TEJ <sup>6)</sup>
	ND 76.1	-	3	91	73	61	30	1.2 (2.65)	EHEDG, 3A, CRN, ASME-BPE	TFJ <sup>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. Lower surface roughness available on request
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Process connections without TempC Membrane: optionally available as ASME-BPE-compliant diaphragm seal version for use in biochemical processes, wetted surfaces  $R_a < 0.38 \mu\text{m}$  ( $15 \mu\text{in}$ ), electropolished (the electropolished version with nominal diameter DN 40 / 1 ½ inch has a standard diameter  $d_M$  of 35 mm); ordering information: Product Configurator, order code for "Service", option HK
- 5) Alternatively available with TempC Membrane.
- 6) With TempC Membrane

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

**PMP55: process connections with flush-mounted process isolating diaphragm**

**Pipe diaphragm seal Tri-Clamp ISO 2852**

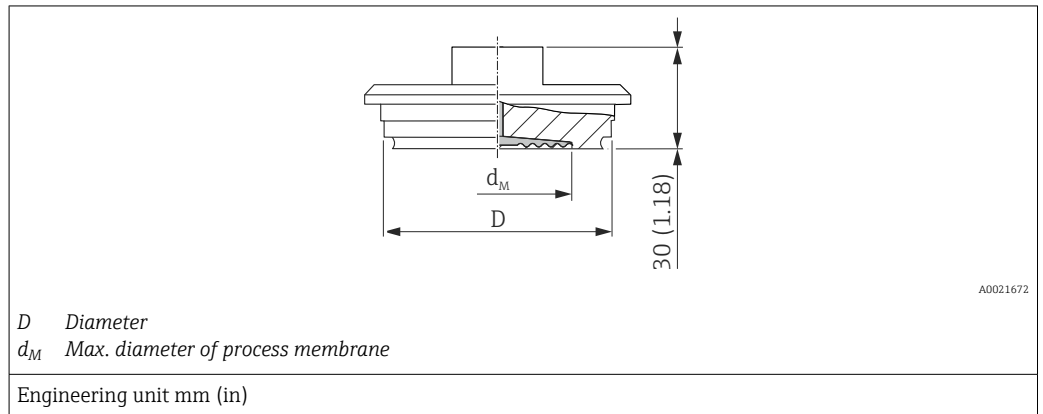


Material <sup>1)</sup>	Nominal diameter ISO 2852	Nominal diameter	Nominal pressure	D	d <sub>2</sub>	d <sub>3</sub>	h	L	Weight [kg (lb)]	Approval <sup>2)</sup>	Option <sup>3)</sup>
		[in]		[mm]	[mm]	[mm]	[mm]	[mm]			
AISI 316L	DN 10	¾	PN 40	10.5	25	34	41.5	140	0.6 (1.32)	3A, CRN	SIJ
	DN 25	1	PN 40	22.5	50.5	54	67	126	1.7 (3.75)	3A, CRN	SBJ
	DN 38	1 ½	PN 40	35.5	50.5	69	67	126	1.0 (2.21)	3A, CRN	SCJ <sup>4)</sup>
	DN 51	2	PN 40	48.6	64	78	79	100	1.7 (3.75)	3A, CRN	SDJ <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) 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

**PMP55: hygienic process connections with flush membrane**

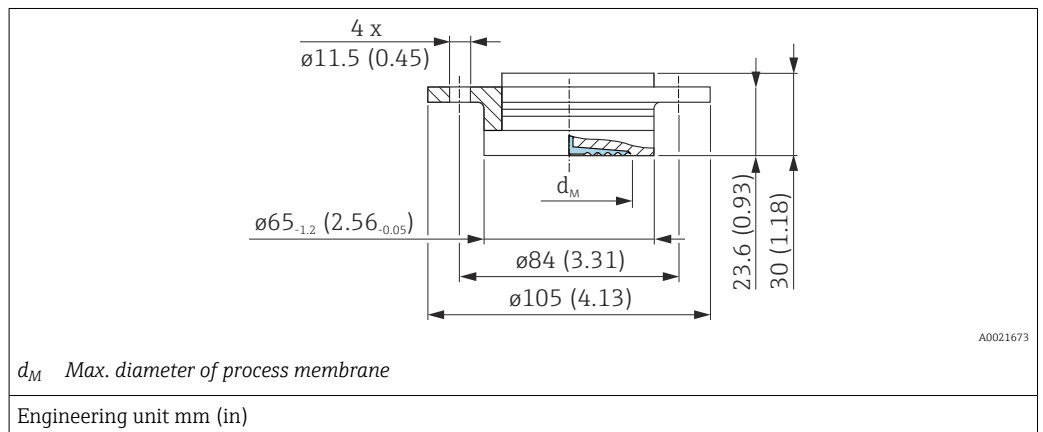
**Varivent for pipes**



Material <sup>1)</sup>	Designation	Nominal pressure	D	d <sub>M</sub>		Weight	Approval	Option <sup>2)</sup>
				Standard	With TempC membrane			
				[mm]	[mm]			
AISI 316L	Type F for DN 25 - DN 32 pipes	PN 40	50	34	36	0.4 (0.88)	EHEDG, 3A, ASME-BPE	TQJ <sup>3)</sup>
AISI 316L	Type N for DN 40 - DN 162 pipes	PN 40	68	58	61	0.8 (1.76)	EHEDG, 3A, ASME-BPE	TRJ <sup>4) 3)</sup>

- 1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, "Process connection" ordering feature
- 3) Alternatively available with TempC membrane.
- 4) ASME-BPE-compliant diaphragm seal version optionally available for use in biochemical processes, surfaces in contact with the medium  $R_a < 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; ordering information: Product Configurator, "Service" ordering feature, option HK. In combination with the "Electropolished" option, the wetted parts of Varivent connection type N are made of 316L (1.4435).

**DRD DN 50 (65 mm)**

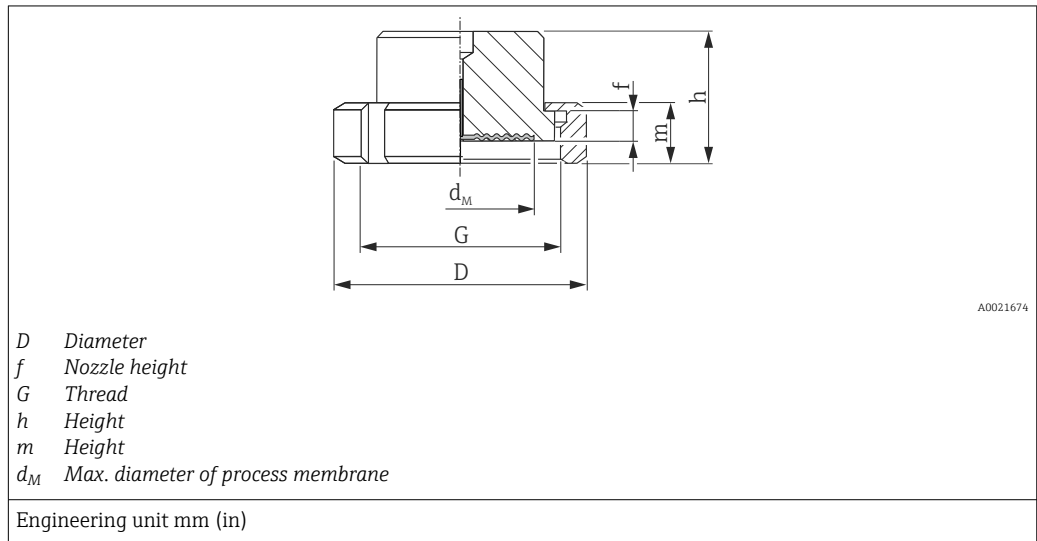


Material <sup>1)</sup>	Nominal pressure	d <sub>M</sub>		Weight	Option <sup>2)</sup>
		Standard	With TempC membrane		
		[mm]	[mm]		
AISI 316L	PN 25	50	48	0.75 (1.65)	TIJ <sup>3)</sup>

- 1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, "Process connection" ordering feature
- 3) Alternatively available with TempC membrane.

**PMP55: hygienic process connections with flush membrane**

**SMS nozzle with coupling nut**



Material <sup>1)</sup>	Nominal diameter	Nominal pressure	D	f	G	m	h	d <sub>M</sub>	Weight	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, ASME-BPE	T6J
	1 ½	PN 25	74	4	Rd 60 - 1/6	25	57	36	0.65 (1.43)		T7J <sup>3)</sup>
	2	PN 25	84	4	Rd 70 - 1/6	26	62	48	1.05 (2.32)		TXJ <sup>3)</sup>

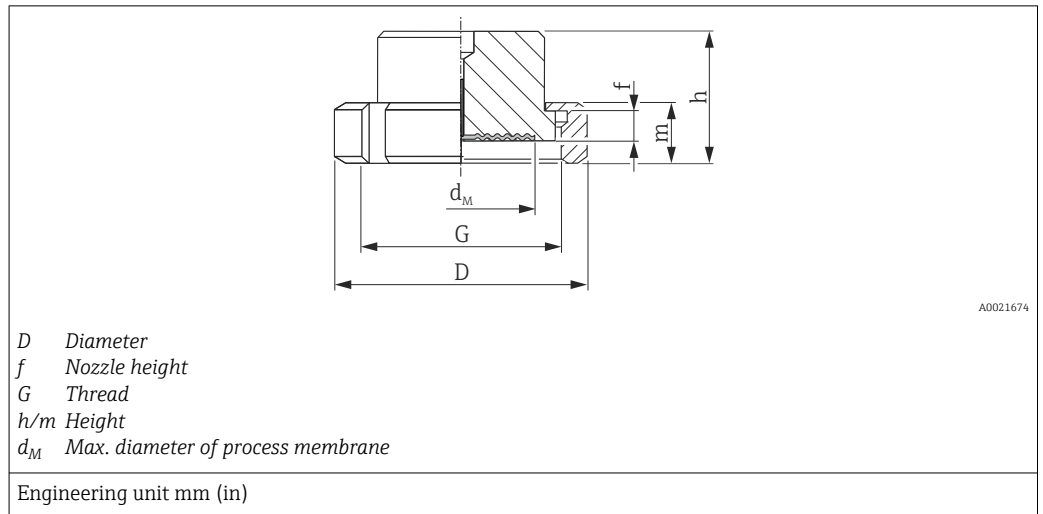
1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.

2) Product Configurator, "Process connection" ordering feature

3) Alternatively available with TempC membrane.



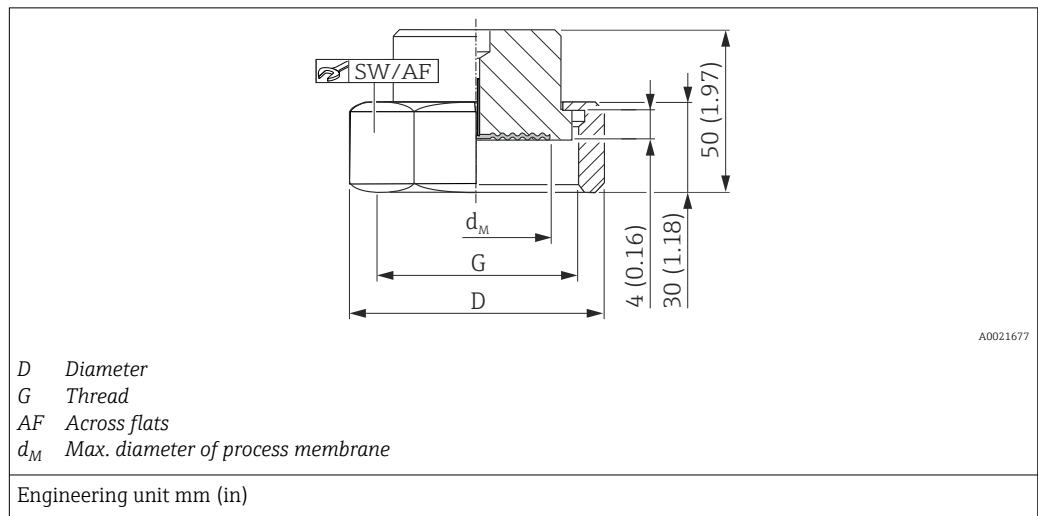
APV-RJT nozzle with coupling nut



Material <sup>1)</sup>	Nominal diameter	Nominal pressure	D	f	G	m	h	d <sub>M</sub>	Weight	Option <sup>2)</sup>
	[in]	[bar]	[mm]	[mm]		[mm]	[mm]	[mm]	[kg (lb)]	
AISI 316L	1	PN 40	77	6.5	1 13/16 - 1/8"	22	42.6	21	0.45 (0.99)	T0J
	1 ½	PN 40	72	6.4	2 5/16 - 1/8"	22	42.6	28	0.75 (1.65)	T1J
	2	PN 40	86	6.4	2 7/8 - 1/8"	22	42.6	38	1.2 (2.65)	T2J

- 1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, "Process connection" ordering feature

APV-ISS nozzle with coupling nut

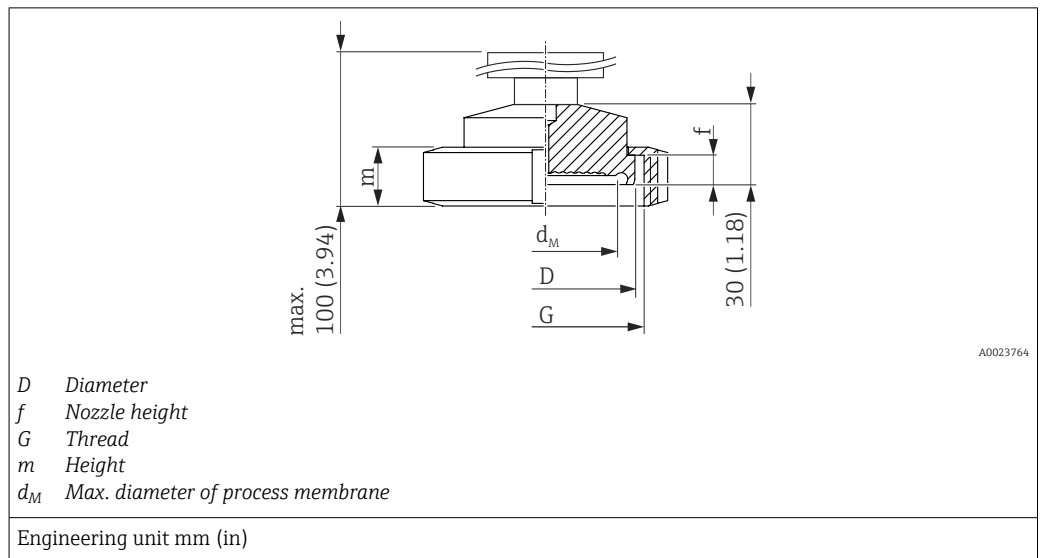


Material <sup>1)</sup>	Nominal diameter	Nominal pressure	D	G	AF	d <sub>M</sub>	Weight	Option <sup>2)</sup>
	[in]	[bar]	[mm]					
AISI 316L	1	PN 40	54.1	1 ½" - 1/8"	46.8	24	0.4 (0.88)	T3J
	1 ½	PN 40	72	2" - 1/8"	62	34	0.6 (1.32)	T4J
	2	PN 40	89	2 ½" - 1/8"	77	45	1.1 (2.43)	T5J

1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.

2) Product Configurator, "Process connection" ordering feature

Aseptic pipe union, union nut, DIN 11864-1 Form A; DIN 11866-A pipe

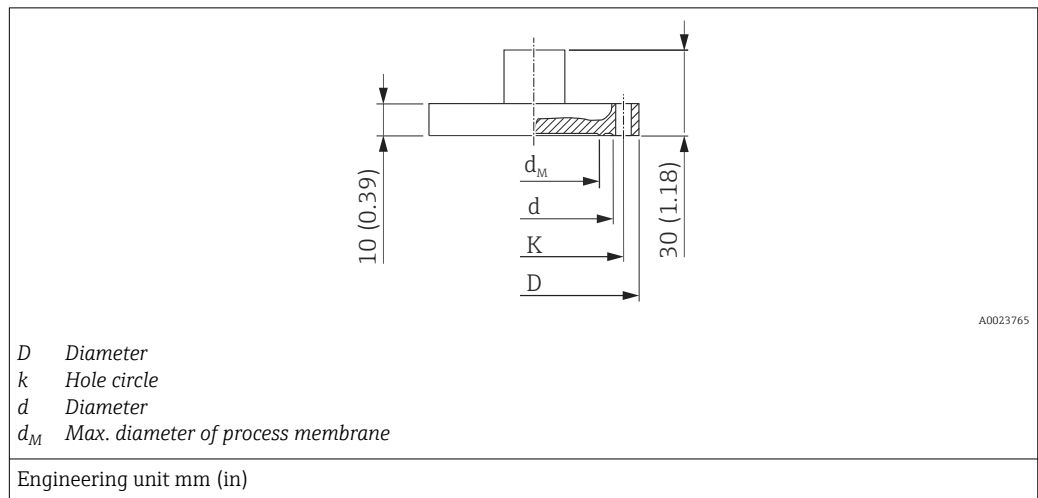


Material <sup>1)</sup>	Union nut				Slotted nut		Diaphragm seal		Approval	Option <sup>2)</sup>
	Nominal diameter	Nominal pressure	D	f	G	m	d <sub>M</sub>	Weight		
	[in]	[bar]	[mm]	[mm]			[mm]	[kg (lb)]		
AISI 316L	DN 40	PN 40	55	10	Rd 65 x 1/6"	21	36	0.63 (1.39)	EHEDG, 3A, ASME-BPE	NCJ
	DN 50	PN 25	67	11	Rd 78 x 1/6"	22	48	0.92 (2.03)		NDJ

1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.

2) Product Configurator, "Process connection" ordering feature

Aseptic flange connection, DIN 11864-2 Form A; DIN 11866-1 pipe

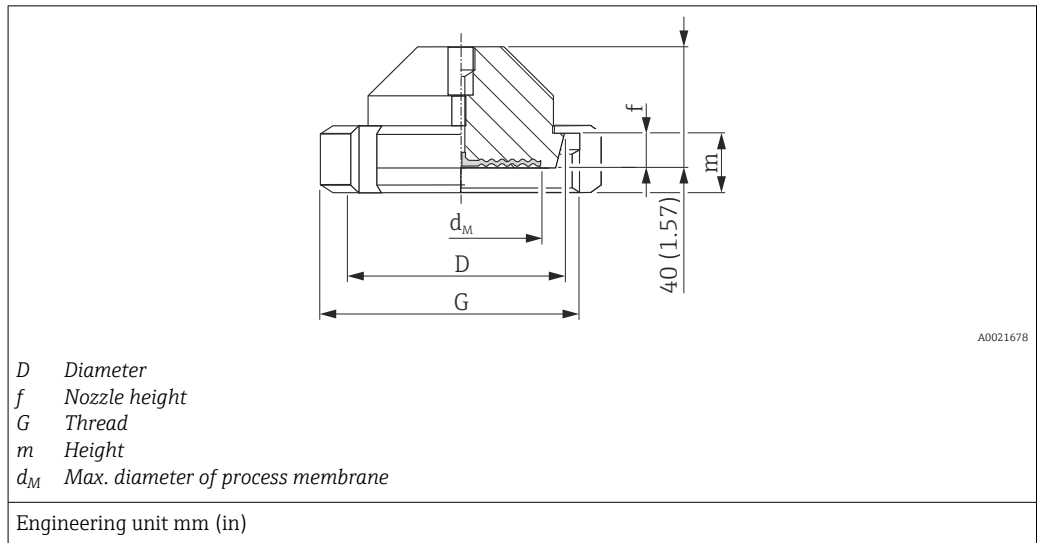


Material <sup>1)</sup>	Collar flange					Diaphragm seal		Approval	Option <sup>2)</sup>
	Nominal diameter	Nominal pressure	K	d	D	d <sub>M</sub>	Weight		
	[in]	[bar]	[mm]	[mm]	[mm]	[mm]	[kg (lb)]		
AISI 316L	DN 32	PN 16	59	47.7	76	25	1.5 (3.31)	EHEDG, 3A, ASME-BPE	NFJ
	DN 40		65	53.7	82	35	1.7 (3.75)		
	DN 50		77	65.7	94	45	2.2 (4.85)		

1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.

2) Product Configurator, "Process connection" ordering feature

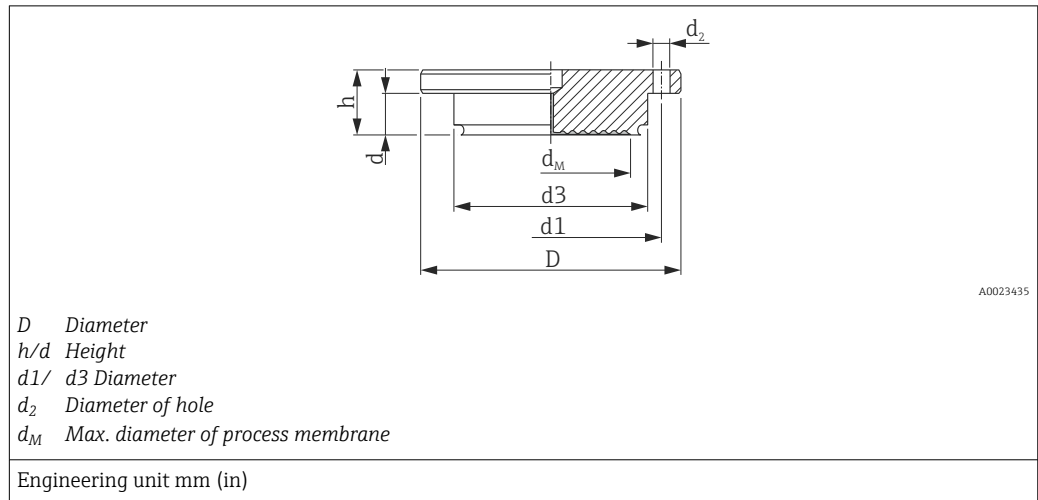
Conical coupling with union nut, DIN 11851



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

- 1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, "Process connection" ordering feature
- 3) Alternatively available with TempC membrane.

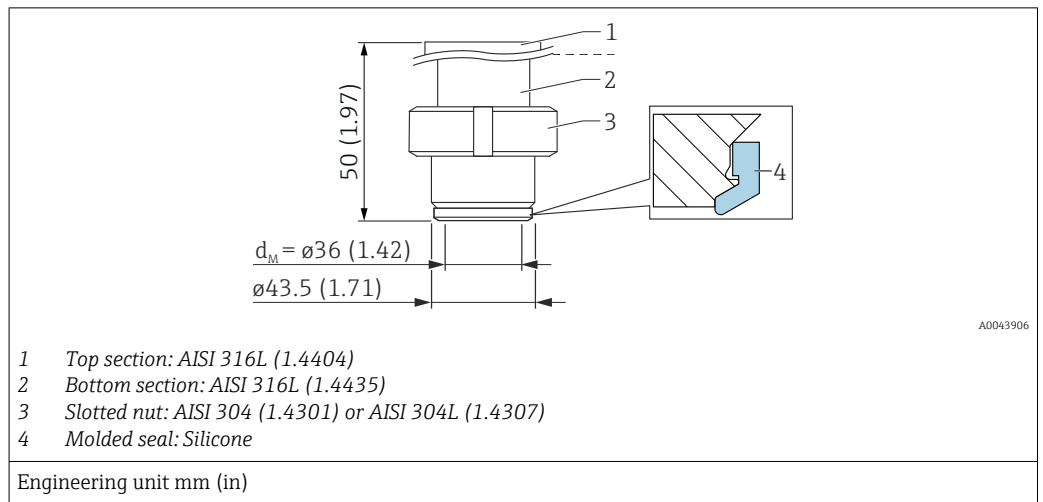
NEUMO BioControl



Material <sup>1)</sup>	NEUMO BioControl Process temperature range: -10 to +200 °C (+14 to +392 °F)								Diaphragm seal			Approval	Option <sup>2)</sup>
	Nominal diameter	Nominal pressure	D	d	d <sub>2</sub>	d <sub>3</sub>	d <sub>1</sub>	h	d <sub>M</sub>		Weight		
									Stand-ard	With TempC mem-brane			
[bar]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg (lb)]			
AISI 316L	DN 50	PN 16	90	17	4 x Ø 9	50	70	27	40	36	1.1 (2.43)	3A, ASME-BPE	S4J <sup>3)</sup>
	DN 80	PN 16	140	25	4 x Ø 11	87.4	115	37	61	61	2.6 (5.73)	EHEDG, 3A, ASME-BPE	S6J <sup>4)</sup>

- 1) Roughness of surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, "Process connection" ordering feature
- 3) Alternatively available with TempC membrane.
- 4) With TempC membrane

**Universal process adapter**



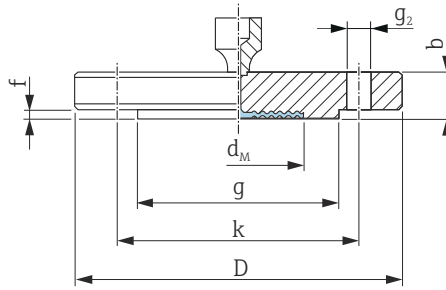
- The roughness of the surface in contact with the medium  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ )
- Temperature operating range:  $-60$  to  $+150 \text{ }^\circ\text{C}$  ( $-76$  to  $+302 \text{ }^\circ\text{F}$ )
- Silicone molded seal: FDA 21CFR177.2600/USP Class VI, order number: 52023572

Designation	Nominal pressure	Weight	Approval	Option <sup>1)</sup>
	bar (psi)	[kg (lb)]		
Universal process adapter Molded seal made of silicone (4)	10	0.8 (1.76)	3A	UPJ <sup>2)</sup>

- 1) Product Configurator, "Process connection" ordering feature  
 2) Alternatively available with TempC membrane.

PMP55: process connections  
with flush membrane

## EN flanges, connection dimensions as per 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 process membrane

Engineering unit mm

Flange <sup>1) 2) 3)</sup>							Boltholes			Diaphragm seal		Option <sup>4)</sup>
Nominal diameter	Nominal pressure	Shape	$D$	$b$	$g$	$f$	Quantity	$g_2$	$k$	$d_M$	Weight	
			[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	
DN 25	10-40	B1	115	18	68	3	4	14	85	32	2.1 (4.63)	CNJ <sup>5)</sup>
DN 25	63-160	B2	140	24	68	2	4	18	100	28	2.5 (5.51)	QIJ
DN 25	250	B2	150	28	68	2	4	22	105	28	3.7 (8.16)	QJJ
DN 25	400	B2	180	38	68	2	4	26	130	28	7.0 (15.44)	QSJ
DN 32	10-40	B1	140	18	77	2.6	4	18	100	34	1.9 (4.19)	CPJ
DN 40	10-40	B1	150	18	87	2.6	4	18	110	48	2.2 (4.85)	CQJ
DN 50	10-40	B1	165	20	102	3	4	18	125	59	3.0 (6.62)	CXJ <sup>5)</sup>
DN 50	63	B2	180	26	102	3	4	22	135	59	4.6 (10.14)	PDJ
DN 50	100-160	B2	195	30	102	3	4	26	145	59	6.2 (13.67)	QOJ
DN 50	250	B2	200	38	102	3	8	26	150	59	7.7 (16.98)	QMJ
DN 50	400	B2	235	52	102	3	8	30	180	59	14.7 (32.41)	QVJ
DN 80	10-40	B1	200	24	138	3.5	8	18	160	89	5.3 (11.69)	CZJ <sup>5)</sup>
DN 80	100	B2	230	32	138	4	8	24	180	89	8.9 (19.62)	PPJ
DN 100	100	B2	265	36	175	5	8	30	210	89	13.7 (30.21)	PQJ

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 or PTFE is  $R_a < 0.8 \mu\text{m}$  ( $31.5 \mu\text{in}$ ). Lower surface roughness available on request.

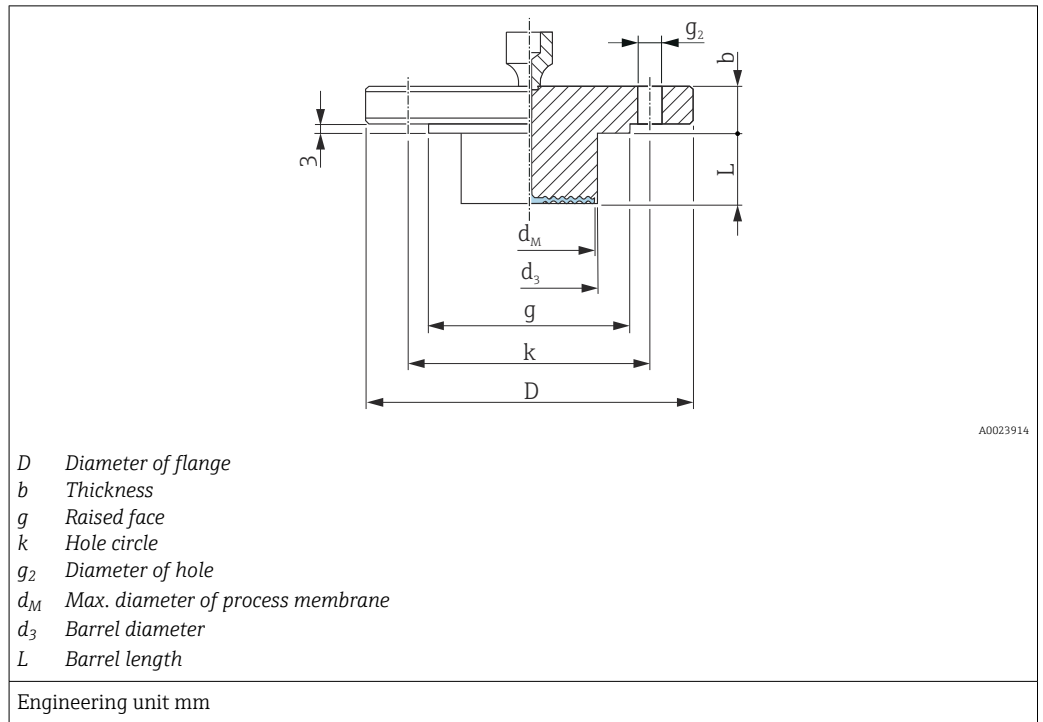
3) The flange raised face is made of the same material as the process membrane.

4) Product Configurator, "Process connection" ordering feature

5) Alternatively available with TempC membrane. Diameter of process membrane modified in TempC version: DN 25: 28 mm; DN 50: 61 mm.



EN flanges with barrel, connection dimensions as per EN 1092-1



A0023914

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

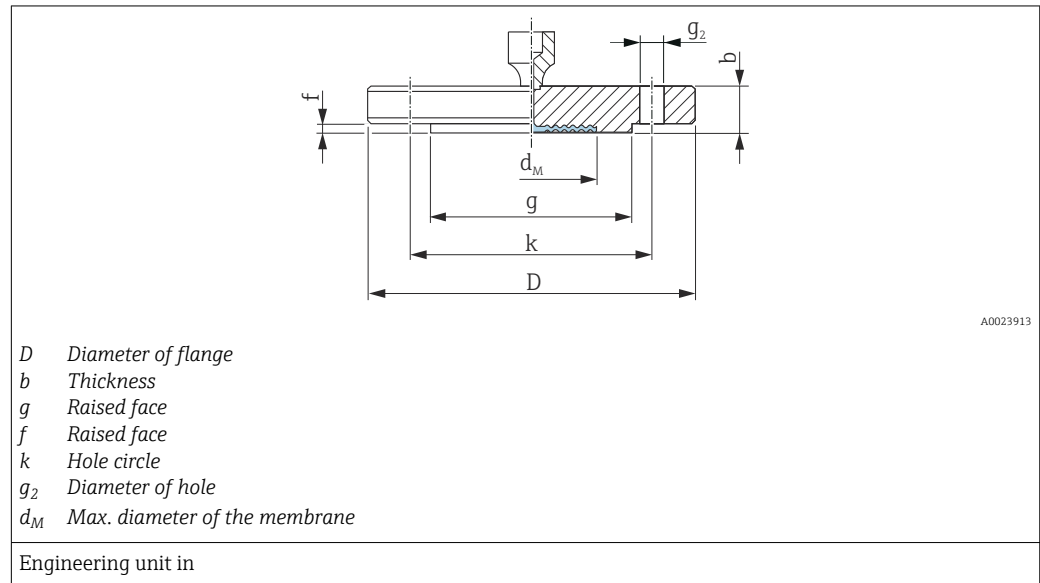
- 1) Material: AISI 316L
- 2) In the case of process membranes made of Alloy C276, Monel or tantalum, the raised face of the flange and the barrel are made of 316L
- 3) Product Configurator, "Process connection" ordering feature
- 4) Available with 50 mm (1.97 in), 100 mm (3.94 in) and 200 mm (7.87 in)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

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

- 1) Product Configurator, "Process connection" ordering feature

**PMP55: process connections with flush membrane**

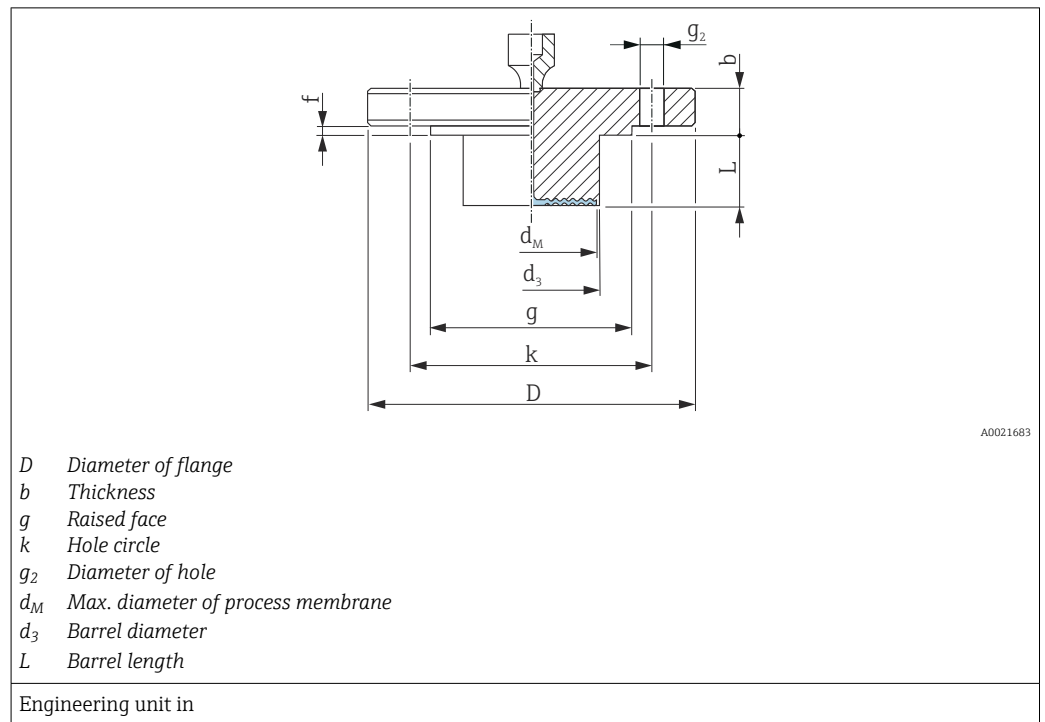
**ASME flanges, as per connection dimensions ASME B 16.5, raised face RF**



Flange <sup>1) 2) 3)</sup>						Boltholes			Diaphragm seal		Approval <sup>4)</sup>	Option <sup>5)</sup>
Nominal diameter	Class	D	b	g	f	Quantity	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>	ACJ <sup>7)</sup>
1	300	4.88	0.69	2	0.08	4	0.75	3.5	1.26	1.3 (2.87)	CRN	ANJ <sup>7)</sup>
1	400/600	4.88	0.69	2	0.25	4	0.75	3.5	1.26	1.4 (3.09)	CRN	A0J
1	900/1500	5.88	1.12	2	0.25	4	1	4	1.26	3.2 (7.06)	CRN	A2J
1	2500	6.25	1.38	2	0.25	4	1	4.25	1.26	4.6 (10.14)	CRN	A4J
1 ½	150	5	0.69	2.88	0.06	4	0.62	3.88	1.89	1.5 (3.31)	CRN	AEJ
1 ½	300	6.12	0.81	2.88	0.06	4	0.88	4.5	1.89	2.6 (5.73)	CRN	AQJ
2	150	6	0.75	3.62	0.06	4	0.75	4.75	2.32	2.2 (4.85)	CRN	AFJ <sup>7)</sup>
2	300	6.5	0.88	3.62	0.06	8	0.75	5	2.32	3.4 (7.5)	CRN	ARJ <sup>7)</sup>
2	400/600	6.5	1	3.62	0.25	8	0.75	5	2.32	4.3 (9.48)	CRN	A1J
2	900/1500	8.5	1.5	3.62	0.25	8	1	6.5	2.32	10.3 (22.71)	CRN	A3J
2	2500	9.25	2	3.62	0.25	8	1.12	6.75	2.32	15.8 (34.84)	CRN	A5J
3	150	7.5	0.94	5	0.06	4	0.75	6	3.5	5.1 (11.25)	CRN	AGJ <sup>7)</sup>
3	300	8.25	1.12	5	0.06	8	0.75	6	3.5	7.0 (15.44)	CRN	ASJ <sup>7)</sup>
4	150	9	0.94	6.19	0.06	8	0.75	7.5	3.5	7.2 (15.88)	CRN	AHJ
4	300	10	1.25	6.19	0.06	8	0.88	7.88	3.5	11.7 (25.8)	CRN	ATJ

- 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 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 membrane.
- 4) CSA approval: Product Configurator, "Approval" ordering feature
- 5) Product Configurator, "Process connection" ordering feature
- 6) CRN approval not for TempC membrane.
- 7) Alternatively available with TempC membrane. Diameter of process membrane is modified in TempC version: nominal diameter 1": 1.1 in; 2": 2.40 in.

ASME flanges with barrel, connection dimensions as per ASME B 16.5, raised face RF



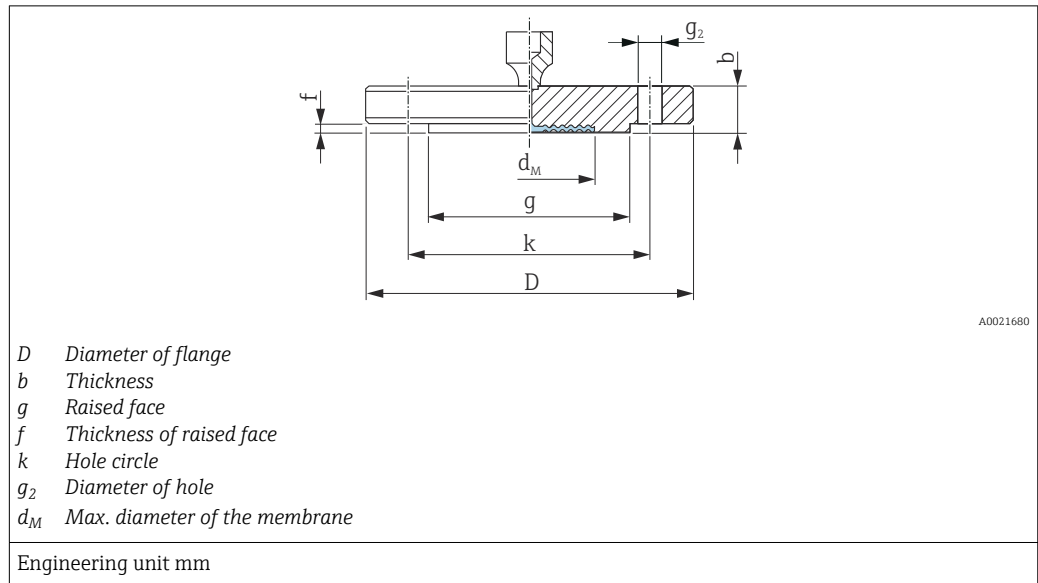
Flange <sup>1) 2)</sup>						Boltholes			Diaphragm seal		Approval <sup>3)</sup>	Option <sup>4)</sup>
Nominal diameter	Class	D	b	g	f	Quantity	g <sub>2</sub>	k	d <sub>M</sub>	Weight		
[in]	[lb./sq.in]	[in]	[in]	[in]	[in]		[in]	[in]	[in]	[in]		
2	150	6	0.75	3.62	0.06	4	0.75	4.75	1.85	<sup>5)</sup>	CRN	FMJ <sup>5)</sup>
3	150	7.5	0.94	5	0.06	4	0.75	6	2.83	<sup>5)</sup>	CRN	FNJ <sup>5)</sup>
3	300	8.25	1.12	5	0.06	8	0.88	6.62	2.83	<sup>5)</sup>	CRN	FWJ <sup>5)</sup>
4	150	9	0.94	6.19	0.06	8	0.75	7.5	3.5	<sup>5)</sup>	CRN	FOJ <sup>5)</sup>
4	300	10	1.25	6.19	0.06	8	0.88	7.88	3.5	<sup>5)</sup>	CRN	FXJ <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 membranes made of Alloy C276, Monel or tantalum, the raised face of the flange and the barrel are made of 316L.
- 3) CSA approval: Product Configurator, "Approval" ordering feature
- 4) Product Configurator, "Process connection" ordering feature
- 5) Available with 2", 4", 6" and 8" barrel, see the following table for barrel diameter and weight

Option <sup>1)</sup>	Nominal diameter	Class	(L)	d <sub>3</sub>	Weight
	[in]	[lb./sq.in]	in (mm)	in (mm)	[kg (lb)]
FMJ	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)
FNJ	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)
FWJ	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)
FOJ	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)
FXJ	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, "Process connection" ordering feature

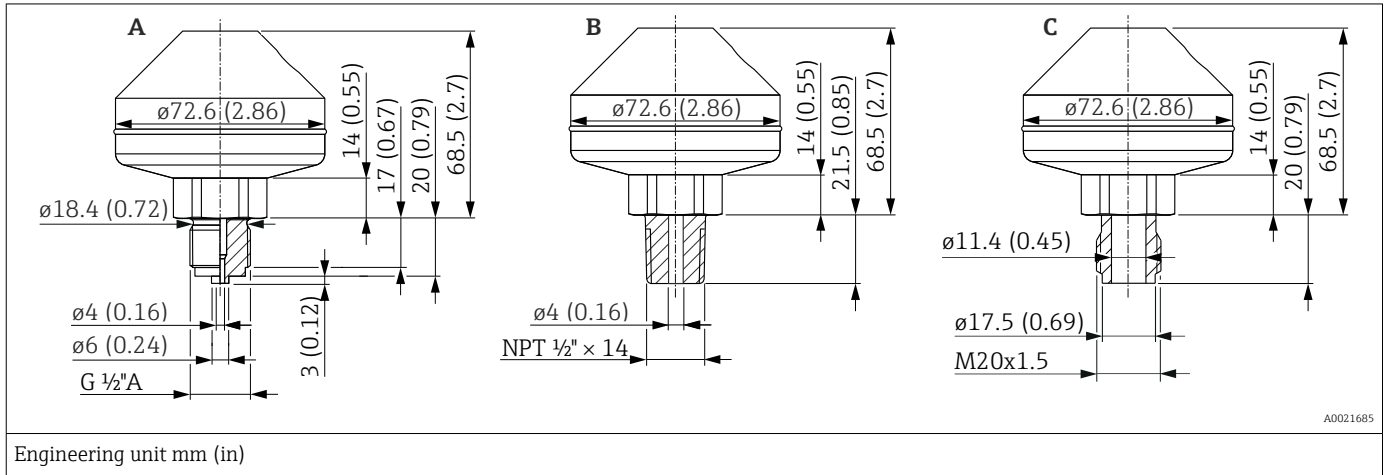
JIS flanges, connection dimensions as per JIS B 2220 BL, raised face RF



Flange <sup>1) 2) 3)</sup>						Boltholes			Diaphragm seal		Option <sup>4)</sup>
Nominal diameter	Nominal pressure	D	b	g	f	Quantity	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)	KCJ
40 A	10 K	140	16	81	2	4	19	105	48	2.0 (4.41)	KEJ
50 A	10 K	155	16	96	2	4	19	120	59	2.3 (5.07)	KFJ
80 A	10 K	185	18	127	2	8	19	150	89	3.3 (7.28)	KGJ
100 A	10 K	210	18	151	2	8	19	175	89	4.4 (9.7)	KHJ

- 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 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 membrane.
- 4) Product Configurator, "Process connection" ordering feature

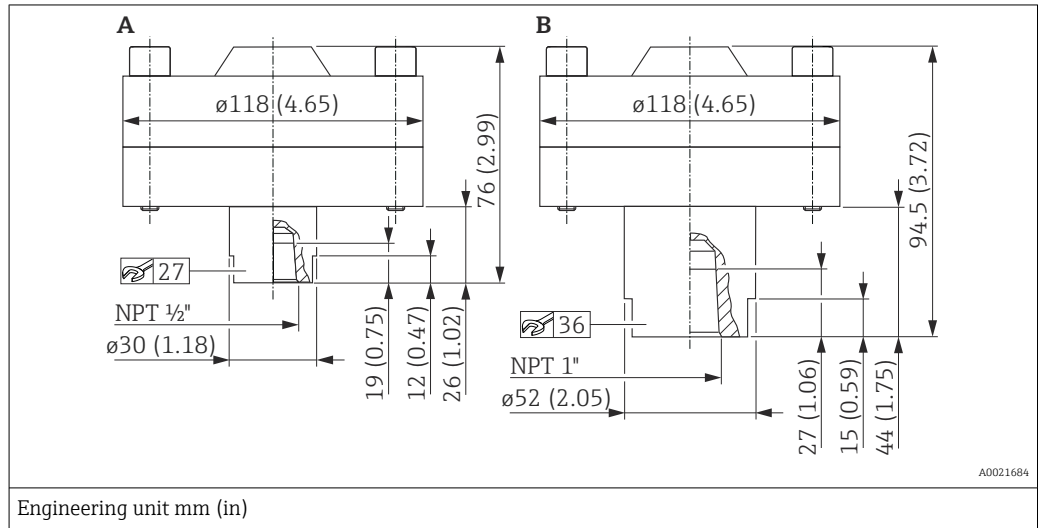
**PMP55 process connections    Welded separators**



Item	Designation	Material	Measuring range [bar (psi)]	Nominal pressure	Approval	Weight	Option <sup>1)</sup>
						[kg (lb)]	
A	Welded, ISO 228 G 1/2 A EN 837	AISI 316L	≤ 160 (2320)	PN 160	-	1.43 (3.15)	UBJ <sup>2)</sup>
B	Welded, ANSI 1/2 MNPT				CRN <sup>3)</sup>		UCJ <sup>2)</sup>
C	Welded, thread DIN 13 M20x1.5				-		UFJ <sup>2)</sup>

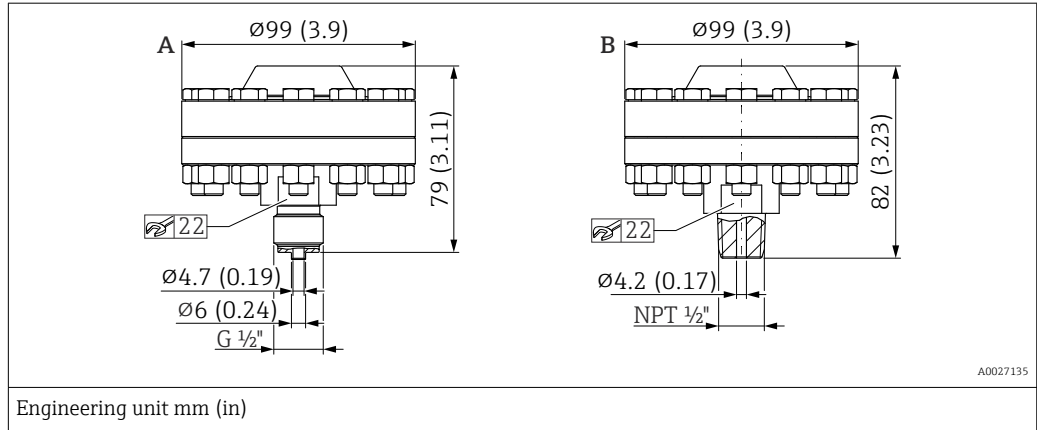
- 1) Product Configurator, "Process connection" ordering feature
- 2) Alternatively available with TempC process membrane.
- 3) CSA approval: Product Configurator, "Approval" ordering feature

**Threaded separators**



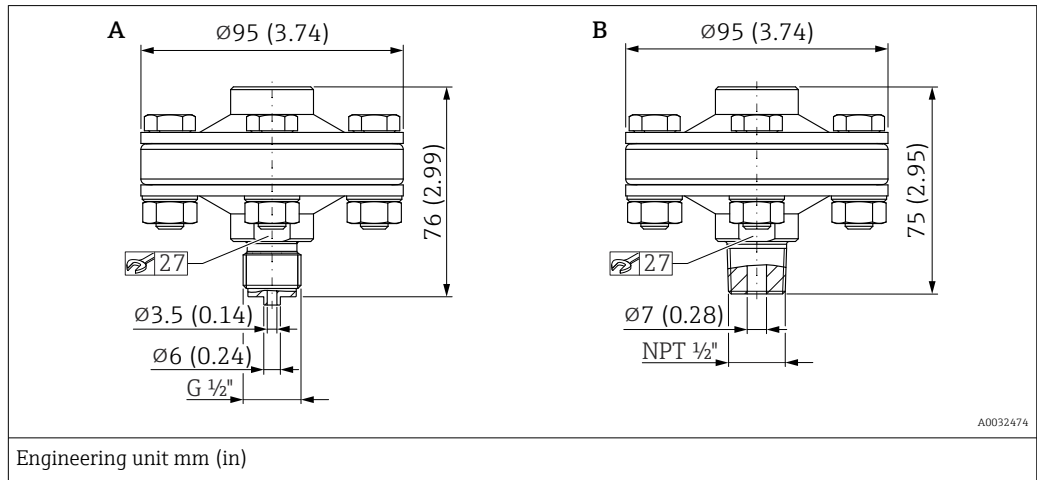
Item	Designation	Material	Measuring range [bar (psi)]	Nominal pressure	Weight	Option <sup>1)</sup>
					[kg (lb)]	
A	Threaded, 1/2" NPT with FKM seal -20 to +200 °C (-4 to +392 °F)	AISI 316L Screws made of A4	≤ 250 (3625)	PN 250	4.75 (10.47)	UGJ
B	Threaded, 1" NPT with FKM seal -20 to +200 °C (-4 to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

- 1) Product Configurator, "Process connection" ordering feature



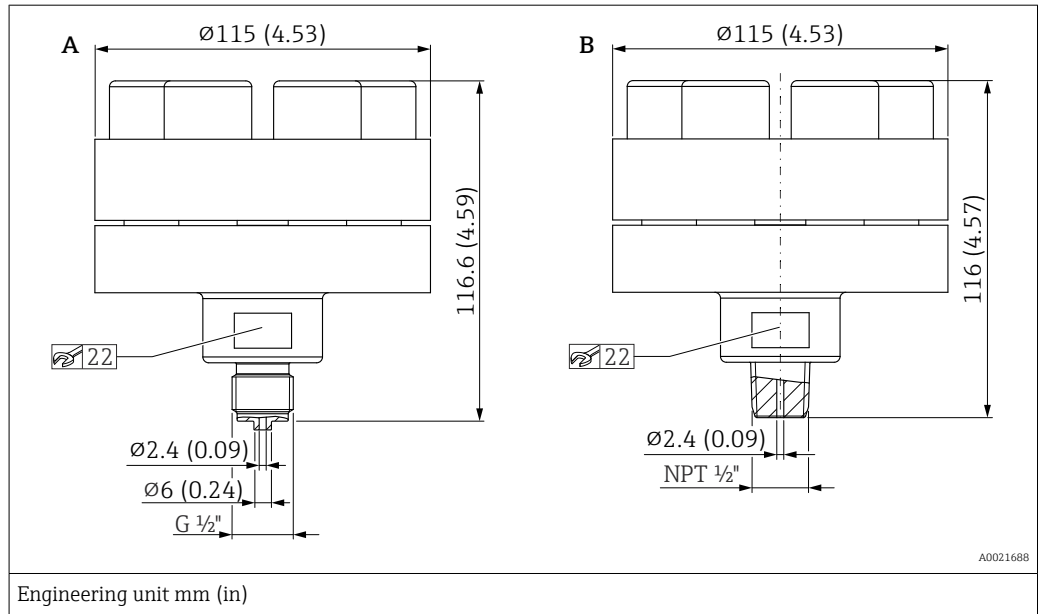
Item	Designation	Material	Measuring range	Nominal pressure	Weight	Option <sup>1)</sup>
			[bar (psi)]		[kg (lb)]	
A	Threaded, ISO 228 G ½ A EN 837 with PTFE seal -40 to +260 °C (-40 to +500 °F)	AISI 316L Screws made of A4	≤ 40 (580)	PN 40	1.43 (3.15)	UDJ <sup>2)</sup>
B	Threaded, ANSI ½ MNPT with PTFE seal -40 to +260 °C (-40 to +500 °F)					UEJ <sup>2)</sup>

- 1) Product Configurator, "Process connection" ordering feature
- 2) In combination with silicone oil, inert oil and vegetable oil.



Item	Designation	Material	Measuring range	Nominal pressure	Weight	Option <sup>1)</sup>
			[bar (psi)]		[kg (lb)]	
A	Threaded, ISO 228 G ½ A EN 837 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 ½ MNPT with metal seal (silver-plated) -60 to +400 °C (-76 to +752 °F)					UEJ <sup>2)</sup>

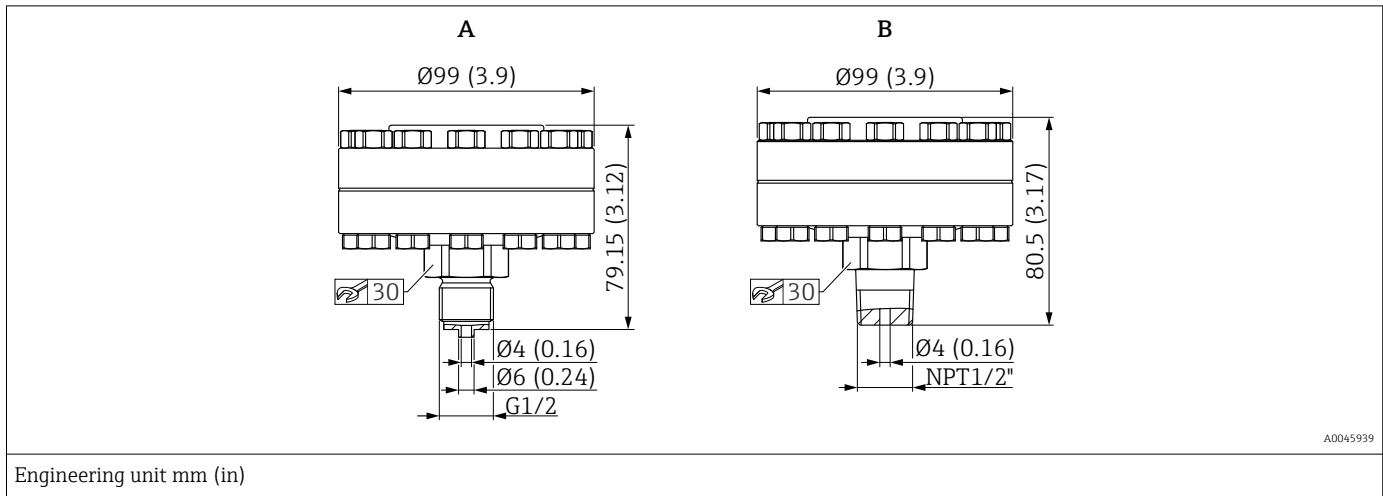
- 1) Product Configurator, "Process connection" ordering feature
- 2) In combination with high-temperature oil.



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 EN 837, with integrated seal lip -60 to +400 °C (-76 to +752 °F)	AISI 316L Screws made of A4	> 40 (580)	PN 400	4.75 (10.47)	UDJ
B	Threaded, ANSI 1/2 MNPT, with integrated seal lip -60 to +400 °C (-76 to +752 °F)					UEJ

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

With TempC process membrane

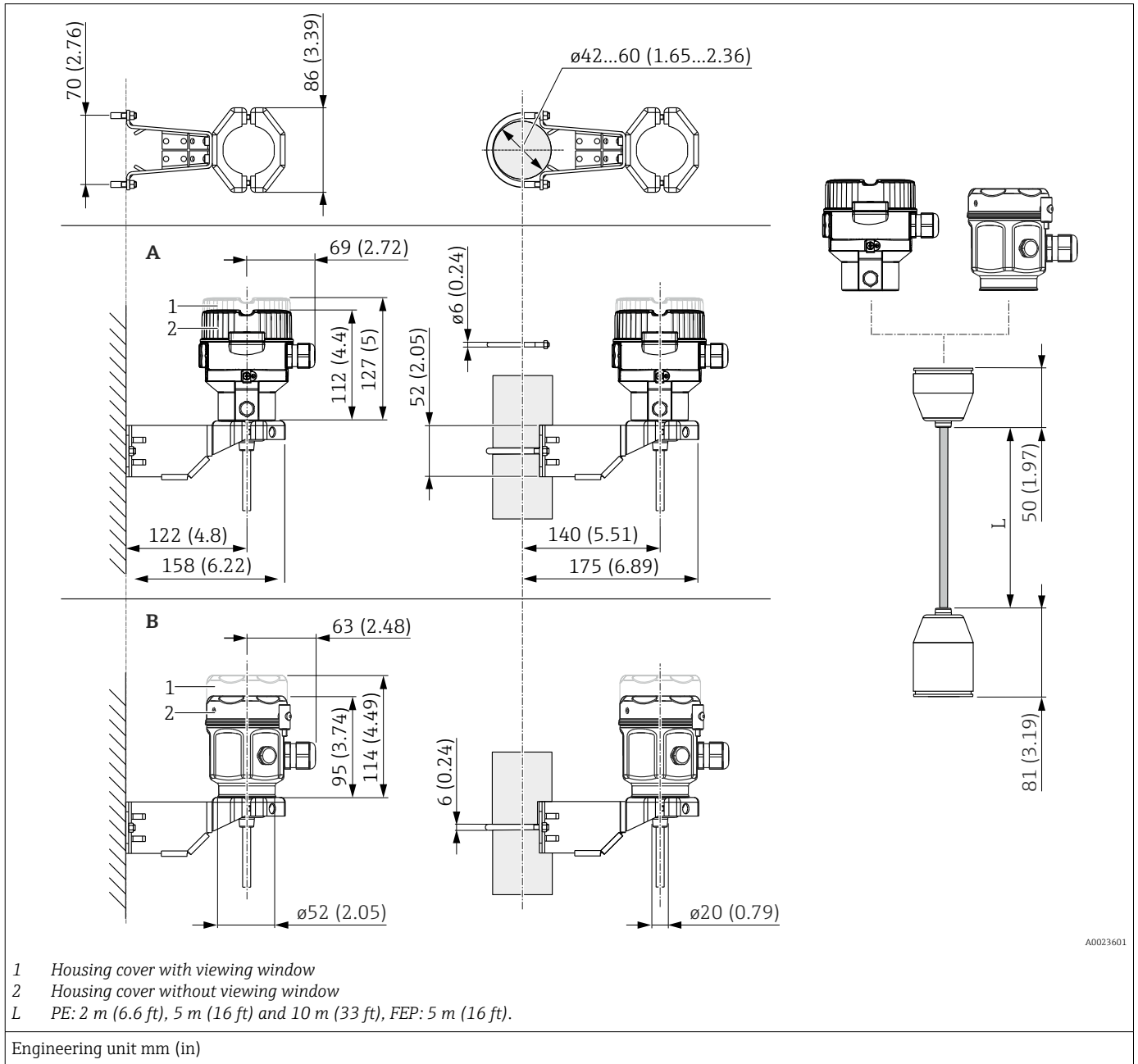


Item	Designation	Material	Measuring range	PN	Weight	Option <sup>1)</sup>
			bar (psi)		kg (lb)	
A	Threaded, ISO 228 G½ EN 837 with metal seal (silver-plated) -60 to +400 °C (-76 to +752 °F)	AISI 316L Screws made of A4	≤ 40 (580)	PN 40	2.35 kg (5.18 lb)	UDJ
B	Threaded, ASME MNPT ½ with metal seal (silver-plated) -60 to +400 °C (-76 to +752 °F)				2.35 kg (5.18 lb)	UEJ

1) Product Configurator, "Process connection" ordering feature



Wall and pipe mounting with mounting bracket



A0023601

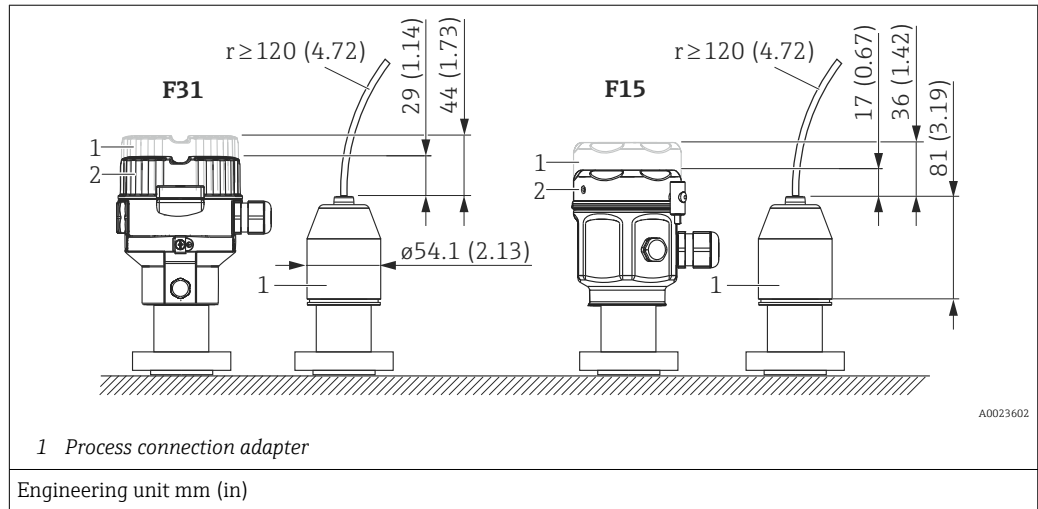
Item	Designation	Weight (kg (lb))		Option <sup>1)</sup>
		Housing (F31 or F15)	Mounting bracket	
A	Dimensions with F31 housing	→ 50	0.5 (1.10)	U
B	Dimensions with F15 housing			

1) Product Configurator, "Separate housing" ordering feature

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

**Reduction in installation height**

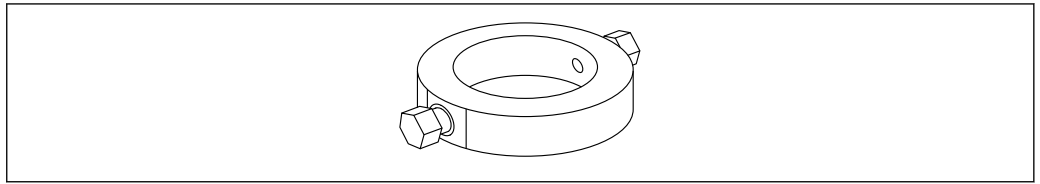
If the separate housing is used, the mounting height of the process connection is reduced compared to the dimensions of the standard version.



**Weight**

Component	Weight
Housing	See "Housing" section
Process connection	See "Process connections" section
Temperature isolator	0.355 kg (0.78 lb)
Capillary with armoring made of AISI 316L (1.4404)	0.16 kg/m (0.35 lb/m) + 0.35 kg (0.77 lb) (weight per capillary tube)
Capillary with armoring made of AISI 316L (PVC)	0.21 kg/m (0.46 lb/m) + 0.35 kg (0.77 lb) (weight per capillary tube)
Capillary with armoring made of AISI 316L (PTFE)	0.29 kg/m (0.64 lb/m) + 0.35 kg (0.77 lb) (weight per capillary tube)

**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 "Mechanical accessories for pressure measuring devices".

**Ordering information**

*Cerabar*

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



Use for:

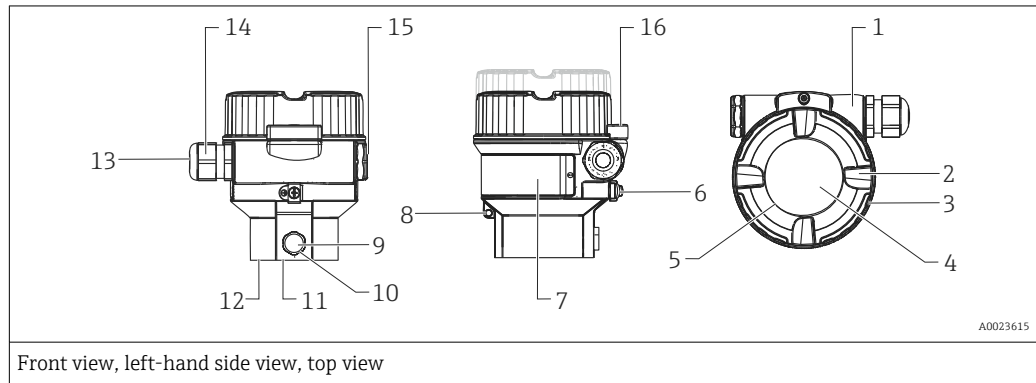
- PMP55, PMP75
- PMC51B, PMC71B, PMP51B, PMP71B



Select the corresponding option in the order codes in the Product Configurator.

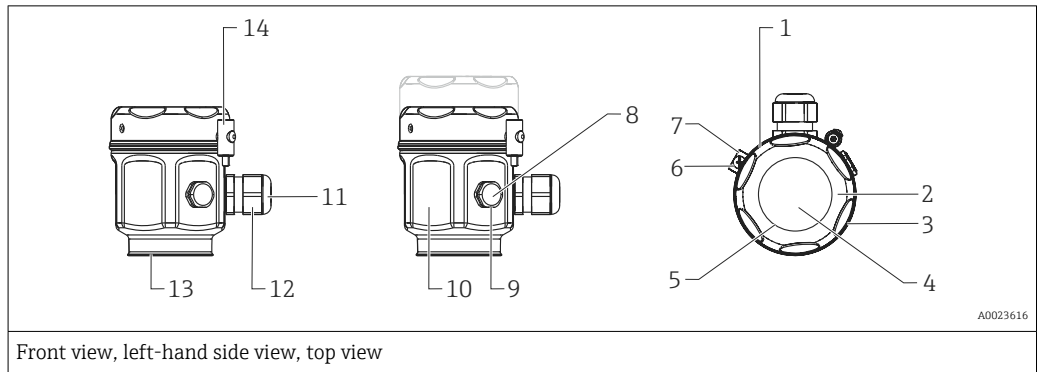
Material	Nominal diameter	Approval	Accessory <sup>1)</sup> Part number
AISI 316L	EN1092-1		
	DN25 <sup>2)</sup>	-	71377379
	DN50 <sup>3)</sup>	-	71377380
	DN80 <sup>4)</sup>	-	71377383
	ASME B16.5		
	NPS 1" <sup>5)</sup>	CRN	71377369
	NPS 2" <sup>6)</sup>	CRN	71377370
	NPS 3" <sup>7)</sup>	CRN	71377371

- 1) Inspection certification according to EN10204-3.1 material
- 2) Product Configurator: PMP55, PMP75 order code "620", option "PO"; PMC51B, PMC71B, PMP51B, PMP71B order code "620", option "RD"
- 3) Product Configurator: PMP55, PMP75 order code "620", option "PP"; PMC51B, PMC71B, PMP51B, PMP71B order code "620", option "RE"
- 4) Product Configurator: PMP55, PMP75 order code "620", option "PQ"; PMC51B, PMC71B, PMP51B, PMP71B order code "620", option "RF"
- 5) Product Configurator: PMP55, PMP75 order code "620", option "PK"; PMC51B, PMC71B, PMP51B, PMP71B order code "620", option "RA"
- 6) Product Configurator: PMP55, PMP75 order code "620", option "PL"; PMC51B, PMC71B, PMP51B, PMP71B order code "620", option "RB"
- 7) Product Configurator: PMP55, PMP75 order code "620", option "PM"; PMC51B, PMC71B, PMP51B, PMP71B order code "620", option "RC"

**Materials not in contact with process**    **F31 housing**


Item number	Component part	Material
1	F31 housing, RAL 5012 (blue)	Die-cast aluminum with protective powder-coating on polyester base
2	Cover, RAL 7035 (gray)	Die-cast aluminum with protective powder-coating on polyester base
3	Cover seal	EPDM
4	Sight glass	Mineral glass
5	Sight glass seal	Silicone (VMQ)
6	External ground terminal	AISI 304 (1.4301)
7	Nameplates	Plastic film
8	Fastening for wired-on tag plate	AISI 304 (1.4301)/AISI 316 (1.4401)
9	Pressure compensation filter	AISI 316L (1.4404) and PBT-FR
10	Pressure compensation filter, O-ring	VMQ or EPDM
11	Sealing ring	EPDM
12	Snap ring	PC Plastic
13	Seal of cable gland and blind plug	EPDM/NBR
14	Cable gland	Polyamide (PA), for dust ignition-proof: CuZn nickel-plated
15	Blind plug	PBT-GF30 FR for dust ignition-proof, Ex d, FM XP and CSA XP: AISI 316L (1.4435)
16	Cover clamp	Clamp AISI 316L (1.4435), screw A4

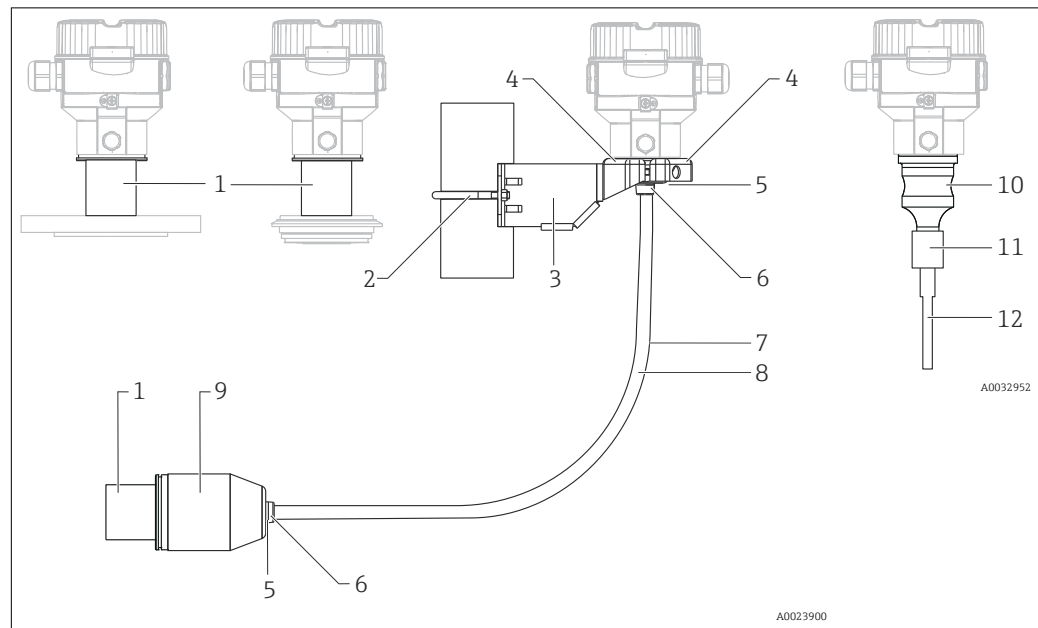
**F15 housing**



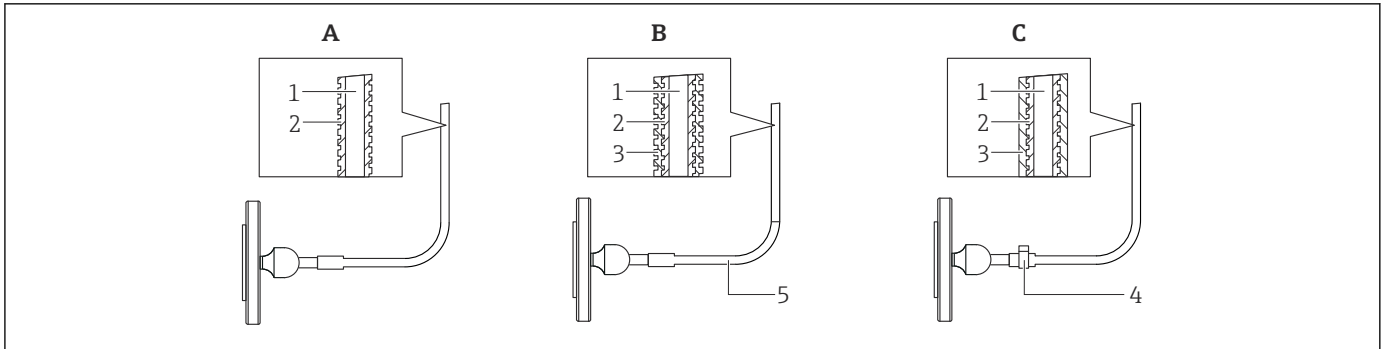
Front view, left-hand side view, top view

Item number	Component part	Material
1	F15 housing	AISI 316L (1.4404)
2	Cover	
3	Cover seal	Silicone with PTFE coating
4	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)
4	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
5	Sight glass seal	Silicone (VMQ)
6	External ground terminal	AISI 304 (1.4301)
7	Fastening for wired-on tag plate	AISI 304 (1.4301)/AISI 316 (1.4401)
8	Pressure compensation filter	AISI 316L (1.4404) and PBT-FR
9	Pressure compensation filter, O-ring	VMQ or EPDM
10	Nameplates	Lasered on
11	Cable gland	Polyamide (PA), for dust ignition-proof: CuZn nickel-plated
12	Seal of cable gland and blind plug	NBR/Silicone/EPDM
13	Sealing ring	EPDM
14	Screw	A4-50

## Connecting parts



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	FKM, EPDM
6	<ul style="list-style-type: none"> <li>■ Gland for cable from separate housing:</li> <li>■ Screws:</li> </ul>	<ul style="list-style-type: none"> <li>■ AISI 316L (1.4404)</li> <li>■ A2</li> </ul>
7	PE cable for separate housing	Abrasion-proof cable with strain-relief Dynema members; shielded using aluminum-coated film; 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 wires, 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 tubing (available only if flexible armor for capillary has PVC coating or PTFE hose)	Polyolefin



A0028087

Item	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	Flexible armor 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

- ▶ Device components in contact with the process are listed in the "Mechanical construction" → 50 and "Ordering information" → 131 sections.

#### Delta-ferrite content

The delta- ferrite content of the wetted parts material can be guaranteed and certified to ≤ 3% if the option "KF" is chosen in the Product Configurator "Material of the process isolating diaphragm" ordering feature. When PMC51 with hygienic process connections is chosen, the deltaferrite content can be guaranteed and certified to ≤ 1% if the option "KF" is chosen in the Product Configurator "Material of the process isolating diaphragm" ordering feature.

#### 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" (see also "Ordering information" section): AISI 316L (DIN/EN material number 1.4435)
- Endress+Hauser supplies process connections with threaded connections and 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 13E0 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 membrane**

Device	Designation	Option <sup>1)</sup>
PMC51	Al <sub>2</sub> O <sub>3</sub> Aluminum oxide ceramic (FDA <sup>2)</sup> , USP Class VI+121°C), ultrapure 99.9 % (see also <a href="http://www.endress.com/ceraphire">www.endress.com/ceraphire</a> )	Standard
PMP51	AISI 316L (DIN/EN material number 1.4435)	A
	AISI 316L with gold-rhodium coating	M
	Alloy C276 (DIN/EN material number 2.4819)	B
PMP55	AISI 316L (DIN/EN material number 1.4435)	A
	AISI 316L, TempC	E
	AISI 316L with gold-rhodium coating	M
	AISI 316L with 0.25 mm (0.01 in) PTFE coating	S
	Alloy C276 (DIN/EN material number 2.4819)	B <sup>3)</sup>
	Monel (2.4360)	C <sup>3)</sup>
	Tantalum (UNS R05200)	D <sup>3)</sup>

- 1) Product Configurator, "Material of the process membrane" ordering feature
- 2) The US Food & Drug Administration (FDA) has no objection to the use of ceramics made of aluminum oxide as a surface material in contact with foods. This declaration is based on the FDA certificates of our ceramic suppliers.
- 3) The material of the flange raised face is the same material as is used for the process membrane.

**Seals**

Device	Designation	Option <sup>1)</sup>
PMC51	FKM	A
	FKM, FDA, 3A Class I, USP Class VI	B
	FFKM Perlast G75LT	C
	NBR	F
	HNBR, FDA, 3A Class II, KTW, AFNOR, BAM	G
	NBR, low temperature	H
	EPDM, FDA	J
	EPDM, FDA, 3A Class II, USP Class VI+121°C, DVGW, KTW, W270, WRAS, ACS, NSF61	K
	FFKM Kalrez 6375	L
	FFKM Kalrez 7075	M
	FFKM Kalrez 6221, FDA, USP Class VI	N
	Fluoroprene XP40, FDA, USP Class VI+121°C, 3A Class I	P
	VMQ silicone, FDA	S

- 1) Product Configurator, "Seal" ordering feature

**Fill fluid**

Designation	Option PMP51 <sup>1)</sup>
Silicone oil	1
Inert oil	2
Synthetic oil as per FDA 21 CFR 178.3620 (b)(1) and NSF H-1	3

- 1) Product Configurator, "Fill fluid" ordering feature



Designation	Option PMP55 <sup>1)</sup>
Silicone oil, suitable for foods FDA 21 CFR 175.105	1
Inert oil	2
Vegetable oil, suitable for foods FDA 21 CFR 172.856	4
High-temperature oil	5
Low-temperature oil	6

1) Only select fill fluids with FDA approval for diaphragm seal devices with 3-A and EHEDG certificates!

## Operability

### Operating concept

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

- Commissioning
- Operation
- Diagnostics
- Expert level

#### Quick and safe commissioning

Guided menus for applications

#### Reliable operation

- Onsite operation possible in several languages
- Standardized operation at the device and in the operating tools
- Parameters can be locked/unlocked using the device's write protection switch (not IO-Link), using the device software or via remote control

#### Efficient diagnostics increase measurement reliability

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

### Onsite operation

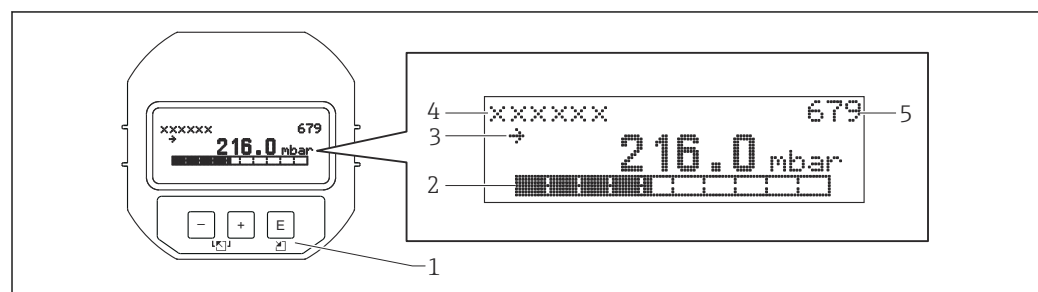
#### Onsite display (optional)

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 liquid crystal display of the device can be turned in 90° stages. Depending on the orientation of the device, this makes it easy to operate the device and read the measured values.

Functions:

- 8-digit measured value display incl. sign and decimal point in relation to the set pressure range.
  - Bar graph for 4 to 20 mA HART as current display
  - Bar graph for IO-Link as current display
  - Bar graph for PROFIBUS PA as graphic display of the standardized value of the AI block
  - Bar graph for FOUNDATION Fieldbus as graphic display of the transducer output
- Simple and complete menu guidance as parameters are split into several levels and groups
- 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.)

Overview



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

A0016498

Ordering information: Product Configurator, "Output, Operation" ordering feature

Function	Operation via display				
	Analog	HART	IO-Link	PROFIBUS PA	FOUNDATION Fieldbus
Position adjustment (zero point correction)	–	✓	✓	✓	✓
Setting lower range value and upper range value - reference pressure present at the device	–	✓	✓	✓	✓
Device reset	–	✓	✓	✓	✓
Locking and unlocking parameters relevant to the measured value	–	✓	✓	✓	✓
Switching damping on and off	–	✓	✓	✓	✓

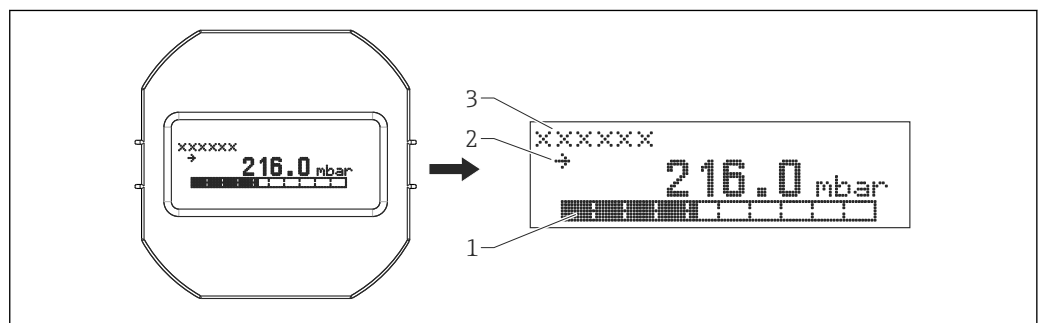
**Local display (optional) for devices with analog electronics**

A 4-line liquid crystal display (LCD) is used. The local display shows measured values, fault messages and notice messages. The liquid crystal display of the device can be turned in 90° stages. Depending on the orientation of the device, this makes it easy to operate the device and read the measured values.

Functions:

- 8-digit measured value display including sign and decimal point, bar graph for 4 to 20 mA as current display.
- Diagnostic functions (fault and warning message etc.)

Overview



- 1 Bar graph
- 2 Symbol
- 3 Parameter name

Ordering information: Product Configurator, "Display, operation" ordering feature

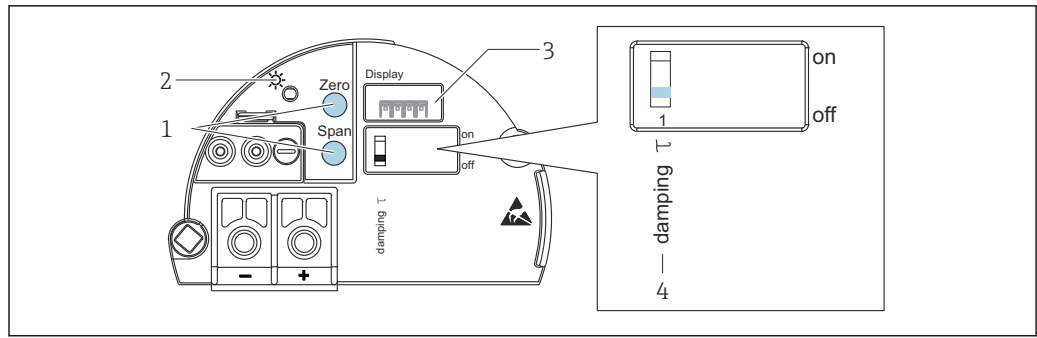
**Operating keys and elements located internally on the electronic insert**

Function	Operation with operating keys and elements on the electronic insert				
	Analog	HART	IO-Link	PROFIBUS PA	FOUNDATION Fieldbus
Position adjustment (zero point correction)	✓	✓	✓	✓	✓
Setting lower range value and upper range value - reference pressure present at the device	✓	✓	✓	–	–
Device reset	✓	✓	✓	✓	✓
Locking and unlocking parameters relevant to the measured value	–	✓	–	✓	✓
Value acceptance indicated by the green LED	✓	✓	✓	✓	✓
Switching damping on and off	✓	✓	–	✓	✓

Ordering information:

Product Configurator, "Output, Operation" ordering feature

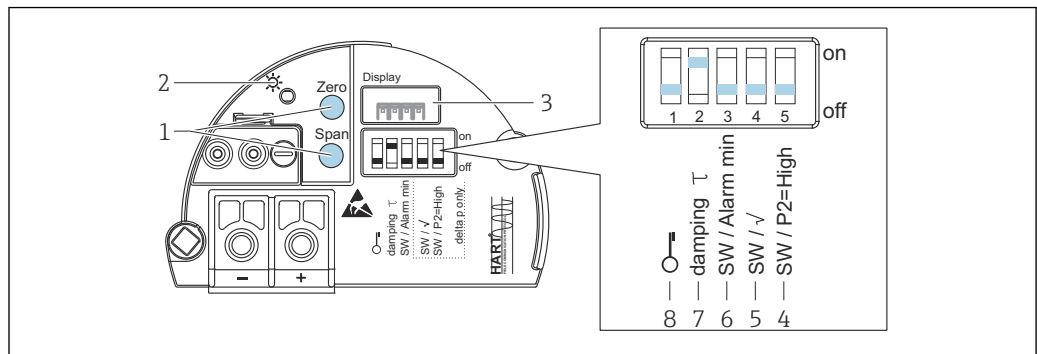
Analog



A0032657

- 1 Operating keys for lower range value (zero), upper range value (span), position zero adjustment or reset
- 2 Green LED to indicate successful operation
- 3 Slot for optional local display
- 4 DIP switch for switching damping on/off

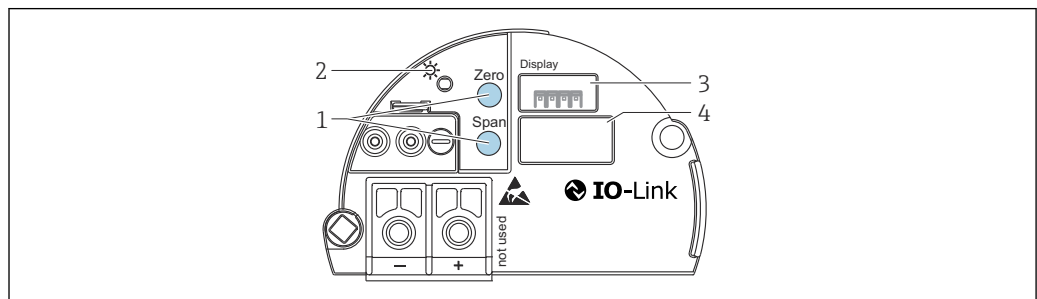
HART



A0032658

- 1 Operating keys for lower range value (zero) and upper range value (span)
- 2 Green LED to indicate successful operation
- 3 Slot for optional local display
- 4 DIP switch only for Deltabar M
- 5 DIP switch only for Deltabar M
- 6 DIP switch for alarm current SW / Alarm Min (3.6 mA)
- 7 DIP switch for switching damping on/off
- 8 DIP switch for locking/unlocking parameters relevant to the measured value

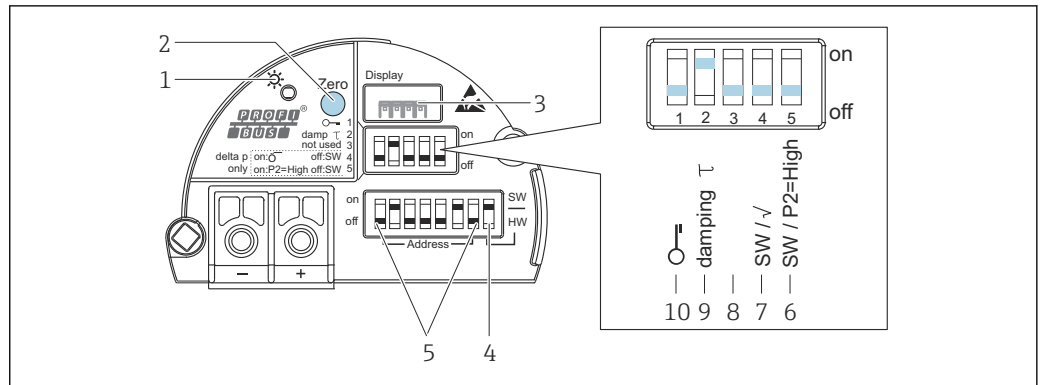
IO-Link



A0045576

- 1 Operating keys for lower range value (zero) and upper range value (span)
- 2 Green LED to indicate successful operation
- 3 Slot for optional onsite display
- 4 Slot for M12 plug

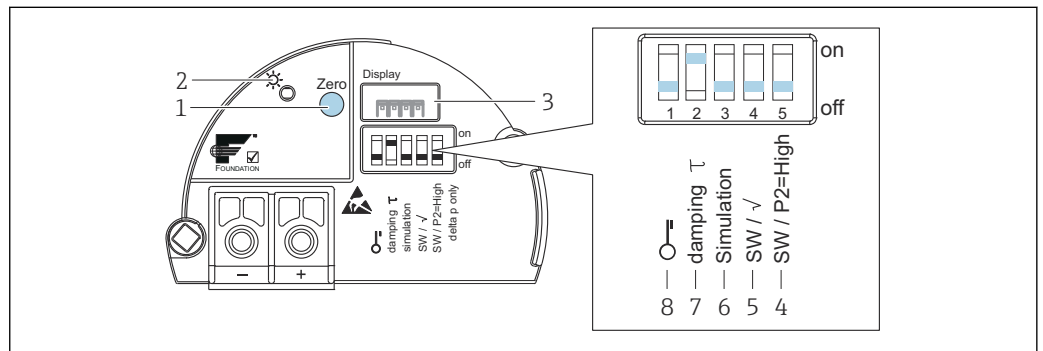
PROFIBUS PA



A0032659

- 1 Green LED to indicate successful operation
- 2 Operating key for position zero adjustment (Zero) or reset
- 3 Slot for optional local display
- 4 DIP-switch for bus address SW / HW
- 5 DIP-switch for hardware address
- 6 DIP switch only for Deltabar M
- 7 DIP switch only for Deltabar M
- 8 Not used
- 9 DIP switch for switching damping on/off
- 10 DIP switch for locking/unlocking parameters relevant to the measured value

FOUNDATION Fieldbus



A0032660

- 1 Operating key for position zero adjustment (Zero) or reset
- 2 Green LED to indicate successful operation
- 3 Slot for optional local display
- 4 DIP switch only for Deltabar M
- 5 DIP switch only for Deltabar M
- 6 DIP-switch for simulation mode
- 7 DIP switch for switching damping on/off
- 8 DIP switch for locking/unlocking parameters relevant to the measured value

Operating languages

You can also choose another language in addition to the standard language "English":





Designation	Option <sup>1)</sup>
English	AA
German	AB
French	AC
Spanish	AD
Italian	AE
Dutch	AF

Designation	Option <sup>1)</sup>
Chinese	AK
Japanese	AL

1) Product Configurator "Additional Operation Language" ordering feature

## Remote operation

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

Hardware and software for remote operation	HART	IO-Link	PROFIBUS PA	FOUNDATION Fieldbus
FieldCare →  118	✓ <sup>1)</sup>	✓ <sup>2)</sup>	✓ <sup>3)</sup>	✓
FieldXpert SFX100 →  118	✓	–	–	✓
NI-FBUS Configurator →  119	–	–	–	✓
Field Xpert SMT70, SMT77 →  118	✓ <sup>1)</sup>	✓ <sup>2)</sup>	–	✓

- 1) Commubox FXA195 required  
 2) SFP20 required  
 3) Profiboard or Proficard required

### 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
- Loading and saving device data (upload/download)
- Documentation of the measuring point

Connection options:

- HART via Commubox FXA195 and the USB port on a computer
- IO-Link with FieldPort SFP20 and the USB interface of a computer and IO-Link IODD Interpreter DTM
- PROFIBUS PA via segment coupler and PROFIBUS interface card



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/DE.

### Field Xpert SMT70, SMT77

The Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in hazardous (Ex Zone 2) and non-hazardous areas. It is suitable for commissioning and maintenance staff. It manages Endress+Hauser and third-party field instruments with a digital communication interface and documents the progress of the work. The SMT70 is designed as a complete solution. It comes with a pre-installed driver library and is an easy-to-use, touch-enabled tool for managing field devices throughout their entire life cycle.

The Field Xpert SMT77 for device configuration enables mobile plant asset management in areas categorized as Ex Zone 1. It is suitable for commissioning and maintenance staff for easy management of field instruments with a digital communication interface. The touch-enabled tablet PC is designed as a complete solution. It comes with comprehensive pre-installed driver libraries and offers users a modern software user interface to manage field instruments throughout the entire life cycle.

Required tool: "IO-Link IODD Interpreter DTM"

**FieldPort SFP20**

The FieldPort SFP20 is a USB interface for the configuration of Endress+Hauser IO-Link devices, and also of devices from other vendors. Combined with the IO-Link CommDTM and the IODD Interpreter, the FieldPort SFP20 complies with the FDT/DTM standards.

**Commubox FXA195**

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

**Profiboard**

For connecting a PC to PROFIBUS.

**Proficard**

For connecting a laptop to PROFIBUS.

**FF configuration program**

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

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

*Remote operation via NI-FBUS Configurator:*

The NI-FBUS Configurator is an easy-to-use graphical environment for creating linkages, field-based control loops and a schedule based on the FOUNDATION Fieldbus concept.

You can use the NI-FBUS Configurator to configure a fieldbus network as follows:

- Set function block and device tags
- Set device addresses
- Create and edit field-based control systems and control loops
- Configure sensor-specific parameters
- Create and edit schedules
- Read and write to control systems and control loops
- Execute methods that are listed in the manufacturer-specific device description (DD) (e.g., device basic settings)
- Display DD menus (e.g., tab for calibration data)
- Save the device and network configuration
- Verify a configuration and compare it to a saved configuration
- Monitor a saved configuration
- Replace a virtual device by a real device
- Save and print a configuration

**System integration (except analog electronics)**

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

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

1) Product Configurator, "Identification" ordering feature

**IO-Link Smart Sensor Profile 2nd Edition**

Supports

- Identification
- Diagnosis
- Digital Measuring Sensor (as per SSP 4.3.3)

**IO-Link (optional)**

*Operating concept for devices with IO-Link*

- Operator-oriented menu structure for user-specific tasks
- Quick and safe commissioning

*Efficient diagnostics increase measurement reliability*

- Remedial measures
- Simulation options

*IO-Link information*

IO-Link is a point-to-point connection for communication between the measuring device and an IO-Link master. The measuring device features an IO-Link communication interface type 2 (pin 4) with a second IO function on pin 2. This requires an IO-Link-compatible assembly (IO-Link master) for operation. The IO-Link communication interface enables direct access to the process and diagnostic data. It also provides the option of configuring the measuring device while in operation.

Characteristics of the IO-Link interface:

- IO-Link specification: Version 1.1
- IO-Link Smart Sensor Profile 2nd Edition
- Speed: COM2; 38.4 kBaud
- Minimum cycle time: 10 ms
- Process data width: 14 Byte
- IO-Link data storage: Yes
- Block configuration: Yes
- Device operational: The measuring device is operational 5 seconds after the supply voltage is applied

*IO-Link download*

<http://www.endress.com/download>

- Select "Software" as the media type
- Select "Device Driver" as the software type
- Select IO-Link (IODD)  
IODD for Cerabar M PMC51, PMP51, PMP55
- In the "Text Search" field enter the device name.

<https://ioddfinder.io-link.com/>

Search by

- Manufacturer
- Article number
- Product type

**Device Search (IO-Link)**

The Device Search parameter is used to uniquely identify the device during installation.



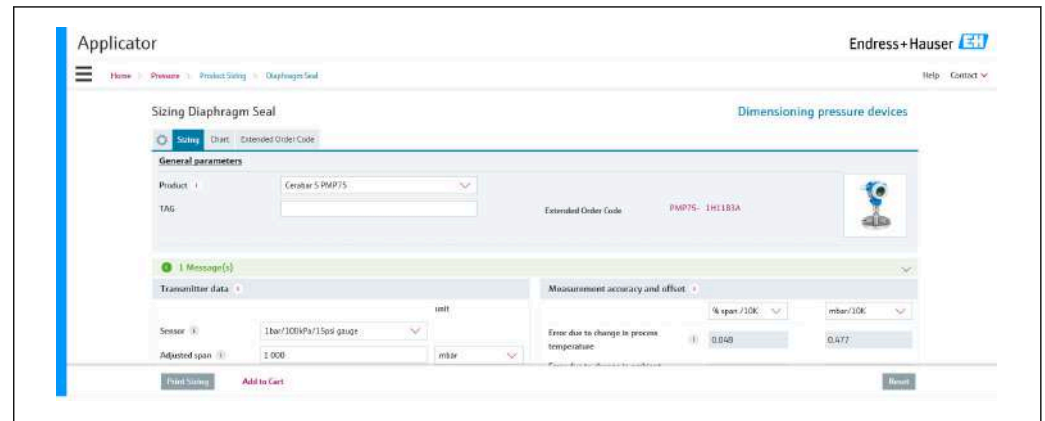
## Planning instructions, diaphragm seal systems

### 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.



A0034616

-  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
- 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

**Design and operation mode**

Diaphragm seals are separating equipment between the measuring system and 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 membrane of the diaphragm seal on the liquid-filled system, which transfers the process pressure onto the sensor of the pressure transmitter.

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

The diaphragm seal determines the application range of the system by:

- The process membrane diameter
- The process membrane stiffness and material
- The design (oil volume)

**Diameter of the process membrane**

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

**The process membrane stiffness**

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

*The Endress+Hauser TempC membrane: maximum accuracy and process safety during pressure and differential pressure measurement with 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 membrane guarantees the utmost level of accuracy and process safety in diaphragm seal applications.

- The very low temperature effect minimizes the effect of process temperature 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 in the event of very long sterilization and cleaning cycles (SIP/CIP) in tanks and pipes at high temperatures.
- Smaller instrumentation is 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. The effect of the overshoot on the output signal can be reduced by setting a damping in the case of TempC membranes.
- In addition, the TempC diaphragm excels in terms of improved hygienic cleanability and its insensitivity to large changes in the pressure load.

Ordering information:

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

Selection in the Applicator:

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

**Capillary**

Capillaries with an internal diameter of 1 mm (0.04 in) are used as standard.

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.

**Fill fluid**

When selecting the fill fluid, the medium temperature and ambient temperature, as well as the process pressure, are of crucial importance. Observe the temperatures and pressures during commissioning and cleaning. A further selection criterion is the compatibility of the fill fluid with the requirements of the medium. For this reason, only fill fluids that are harmless to health are used in the food industry, such as vegetable oil or silicone oil.

The fill fluid used influences the thermal change, the temperature operating range of a diaphragm seal system and the response time. A temperature change results in a volume change of the fill fluid. The volume change is dependent on the coefficient of thermal expansion of the fill fluid and on the volume of the fill fluid at calibration temperature (constant in the range of: +21 to +33 °C (+70 to +91 °F)).

For example, the fill fluid expands in the event of a temperature increase. The additional volume presses against the process membrane of a diaphragm seal. The stiffer a process membrane is, the greater its return force, which counteracts a volume change and acts on the measuring cell together with the process pressure, thus shifting the zero point.

**Pressure transmitter**

The pressure transmitter influences the temperature application range, the thermal change and the response time as a result of its volume change. The volume change is the volume that has to be shifted to pass through the complete measuring range.

Pressure transmitters from Endress+Hauser are 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](#)".



A0038925

**Operating temperature range** The operating temperature range of a diaphragm seal system depends on the fill fluid, capillary length and internal diameter, process temperature and oil volume of the diaphragm seal.

The range of application can be extended by using a fill fluid with a smaller expansion coefficient and a shorter capillary.

**Cleaning instructions** Endress+Hauser offer 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. A frequent use of sterilization in place (SIP) will increase the stress on the process isolating diaphragm. Under unfavorable circumstances in the long term view we cannot exclude that a frequent temperature change could lead to a 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.
- 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.
- 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 tube to prevent the capillary from bending (capillary bending radius  $\geq 100$  mm (3.94 in))

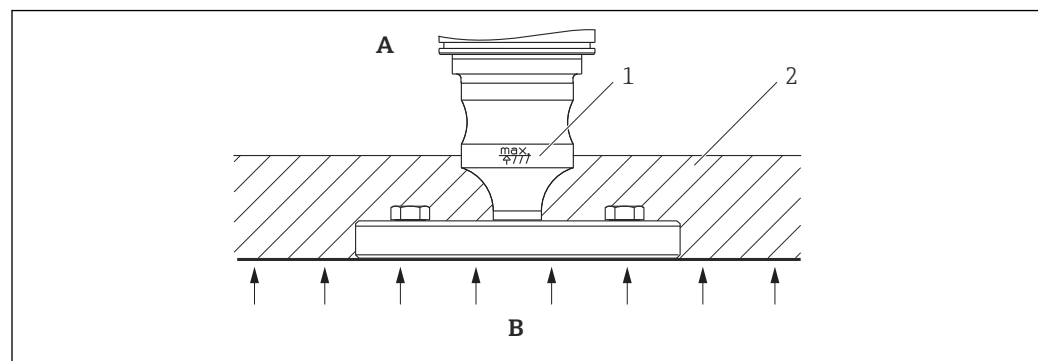
### Capillary

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)

### Heat insulation

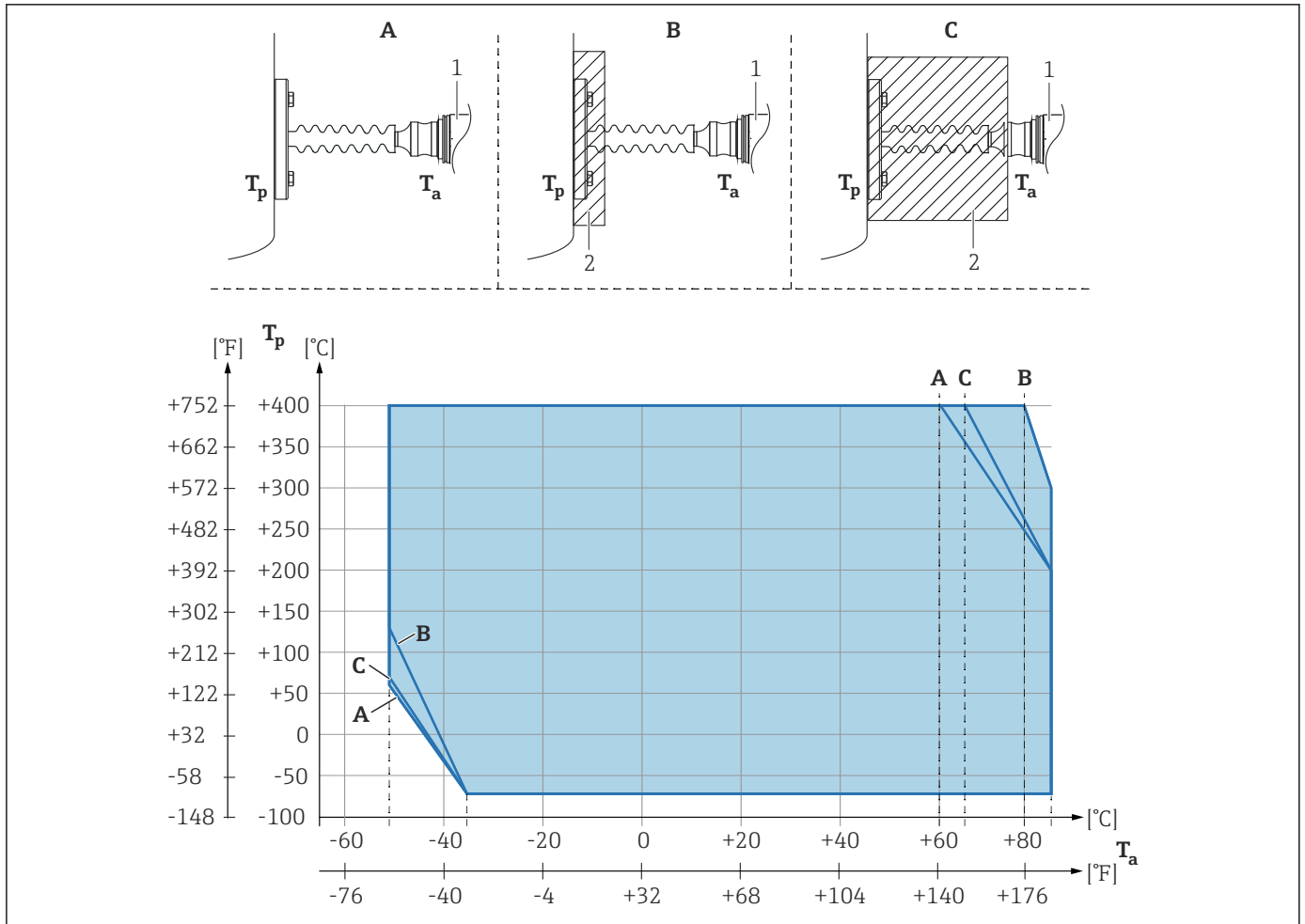
The PMP55 may only be insulated up to a certain height. The maximum permitted insulation height is indicated on the devices and applies to an insulation material with a heat conductivity  $\leq 0.04$  W/(m x K) and to the maximum permitted ambient and process temperature. The data were determined under the most critical application "quiescent air". Maximum permitted insulation height, here indicated on a PMP55 with a flange:



- A Ambient temperature  $\leq 70$  °C (158 °F)  
 B Process temperature  
 1 Maximum permitted insulation height  
 2 Insulation material

**Mounting with temperature isolator**

Endress+Hauser recommends the 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. Depending on the fill fluid used, diaphragm seal systems with temperature isolators can be used for maximum temperatures of up to +400 °C (+752 °F) → 123, , section "Diaphragm seal fill fluids". To minimize the influence of rising heat, Endress+Hauser recommends the device be mounted horizontally or with the housing pointing downwards. The additional installation height also brings about a zero point shift of maximum 2.1 mbar (0.315 psi) due to the hydrostatic column in the temperature isolator. You can correct this zero point shift at the device.



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

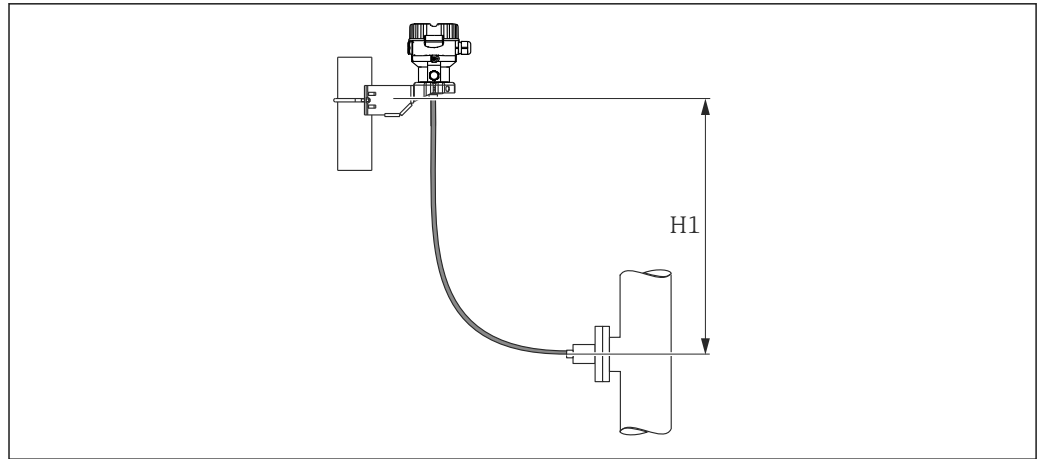
**Vacuum applications**

**Installation instructions**

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

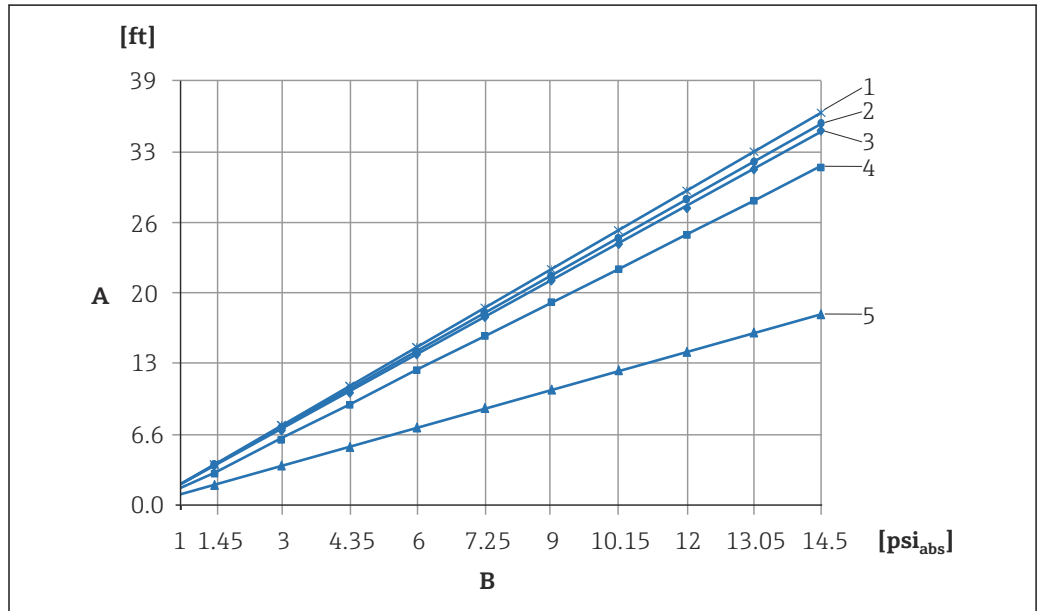
For applications under vacuum, Endress+Hauser recommends mounting the pressure transmitter below the diaphragm seal. This prevents a vacuum load on the diaphragm seal caused by the presence of fill fluid in the capillary.

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



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The maximum height difference depends on the density of the fill fluid and the lowest pressure that is permitted to occur at the diaphragm seal (empty tank). See illustration below. The following diagram shows the maximum installation height above the lower diaphragm seal for vacuum applications.



A0023986-EN

- 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 the substance restrictions of the Restriction on Hazardous Substances Directive 2011/65/EU (RoHS 2).
<b>RCM 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 marking on the nameplate.</p> <div style="text-align: center;">  </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>▪ IECEx</li> <li>▪ FM</li> <li>▪ CSA</li> <li>▪ NEPSI</li> <li>▪ Combinations of different approvals also</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 devices .</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 together with the standards applied.</p> <p>The manufacturer 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>Certificate of Compliance ASME BPE 2012</b>	<p>Ordering information:</p> <p>Product Configurator, "Additional approval" ordering feature, option "LW"</p>
<b>Functional safety SIL</b>	<p>The Cerabar M with 4 to 20 mA output signal has been developed to assessed and certified by TÜV NORD CERT as per IEC 61508 Edition 2.0 and IEC 61511. These devices can be used to monitor the process level and pressure up to SIL 2. For a detailed description of the safety functions with Cerabar M, settings and functional safety data, see the "Functional safety manual - Cerabar M" SD00347P.</p> <p>Ordering information:</p> <p>Product Configurator, "Additional approval" ordering feature, option "LA"</p>
<b>CRN approvals</b>	<p>Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. PMP55 devices with a capillary are not CRN-approved. These devices are fitted with a separate plate bearing the registration number OF10525.5C</p> <p>Ordering information:</p>

Product Configurator, "Process connection" section and  
Product Configurator, "Approval" ordering feature

#### 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 and IEC 62828-2:**

Transmitters for use in industrial-process control systems. Part 1: Methods for performance evaluation

##### **DIN 16086:**

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

##### **EN 61326 series:**

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

##### **EN 60529:**

Degrees of protection provided by enclosures (IP code)

#### AD2000

The pressure retaining material 316L (1.4435/1.4404) corresponds to AD2000 - W2/W10.

#### 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 maximum allowable pressure  $PS >$  200 bar (2 900 psi) shall 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. The conformity assessment of the pressure equipment shall be determined by the category I under consideration of the above-mentioned low pressurized volume. These devices shall be provided with CE marking.

##### *Reasons:*

- Classification of pressure equipment acc. to Article 13 and Annex II of Pressure Equipment Directive 2014/68/EU
- 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:*

- PMP51 /PMP55 with thread and internal process membrane PN > 200:  
Suitable for stable gases in group 1, category I, module A
- PMP55 with pipe diaphragm seals  $\geq 1.5$ "/PN 40:  
Suitable for stable gases in group 1, category II, module A2
- PMP55 with separators PN 400:  
Suitable for stable gases in group 1, category I, module A

**Manufacturer declaration**

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

- 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

**Marine approval**

Designation	Option <sup>1)</sup>
GL (Germanischer Lloyd)	LE
ABS (American Bureau of Shipping)	LF
LR (Lloyd's Register )	LG
BV (Bureau Veritas)	LH
DNV (Det Norske Veritas)	LI

1) Product Configurator, "Additional approval" ordering feature

**Drinking water approval**

NSF 61 - approval for PMC51 and PMP51

UBA / W270 - approval for PMC51 and PMP51

Ordering information:

Product Configurator, "Additional approval" ordering feature, option "LR"

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

Endress+Hauser instruments are designed according to ANSI/ISA 12.27.01 either as single seal or dual seal devices with annunciation, allowing the user to waive the use 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.

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

**Inspection certificate**

Designation	PMC51	PMP51	PMP55	Option <sup>1)</sup>
3.1 Material certificate, wetted metallic parts, EN10204-3.1 inspection certificate	✓	✓	✓	JA <sup>2)</sup>
Conformity to NACE MR0175, wetted metallic parts	✓	✓	✓	JB <sup>2)</sup>
Conformity to NACE MR0103, wetted metallic parts	✓	✓	✓	JE <sup>2)</sup>
Conformity to AD2000, wetted metallic parts, excepting process membrane	—	✓	✓	JF
Surface finish measurement ISO4287/Ra, wetted metallic parts, Inspection certificate	✓	✓	✓	KB
Helium leak test, internal procedure, inspection certificate	✓	✓	✓	KD

Designation	PMC51	PMP51	PMP55	Option <sup>1)</sup>
Pressure test, internal procedure, inspection certificate	✓	✓	✓	KE
3.1 Material certificate+Delta-Ferrit measurement, internal procedure, wetted metallic parts, EN10204-3.1 inspection certificate	✓	✓	✓	KF
3.1 Material certificate+PMI test (XRF), internal procedure, wetted metallic parts, EN10204-3.1 inspection certificate	–	✓	✓	KG
Welding documentation, wetted/pressurized seams	–	✓	–	KS

- 1) Product Configurator, "Test, certificate" ordering feature  
 2) The selection of this feature for coated process isolating diaphragm / process connections refers to the metallic base material.

**Calibration; unit**

Designation	Option <sup>1)</sup>
Sensor range; %	A
Sensor range; mbar/bar	B
Sensor range; kPa/MPa	C
Sensor range; mm/mH <sub>2</sub> O	D
Sensor range; inH <sub>2</sub> O/ftH <sub>2</sub> O	E
Sensor range; psi	F
Customized pressure; see additional specification	J
Customized level; see additional specification	K

- 1) Product Configurator, "Calibration; unit" ordering feature

**Calibration**

Designation	Option <sup>1)</sup>
Factory calib. certificate 5-point	F1
DKD/DAkkS calib. certificate 10-point <sup>2)</sup>	F2

- 1) Product Configurator "Calibration" ordering feature  
 2)

**Service**

Designation	Option <sup>1)</sup>
Cleaned from oil+grease <sup>2)</sup>	HA
Cleaned for oxygen service <sup>2)</sup>	HB
Cleaned from PWIS (PWIS = paint wetting impairment substances) <sup>2)</sup>	HC
Adjusted min alarm current	IA
Adjusted HART Burst Mode PV	IB

- 1) Product Configurator "Service" ordering feature  
 2) Only device, not accessory or enclosed accessory

## Ordering information

Detailed ordering information is available as follows:

- 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 information specific to the measuring point, such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic generation of the order code with 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

- Device
- Optional accessories
- Brief Operating Instruction
- Calibration certificates
- Optional certificates

### Measuring point (TAG)

<b>Order code for</b>	895: Marking
<b>Option</b>	Z1: Tagging (TAG), see additional spec.
<b>Location of measuring point identification</b>	To be selected in the additional specification: <ul style="list-style-type: none"> <li>■ Tie-on label, stainless steel</li> <li>■ Adhesive paper label</li> <li>■ Label provided</li> <li>■ RFID TAG</li> <li>■ RFID TAG + tie-on label, stainless steel</li> <li>■ RFID TAG + adhesive paper label</li> <li>■ RFID TAG + label provided</li> </ul>
<b>Definition of measuring point identification</b>	To be specified in additional specification: 3 lines each with a maximum of 18 characters  The measuring point designation appears on the selected label and/or the RFID TAG.
<b>Identification on electronic nameplate (ENP)</b>	32 characters
<b>Identification on display module</b>	10 characters

### Configuration data sheet (HART, IO-Link, PROFIBUS PA, FOUNDATION Fieldbus electronics)



IO-Link: The following data can only be selected for cyclic data and not for acyclic data.

**Pressure**

If the option "J" was selected for the order code for "Calibration; Unit" in the Product Configurator, the following configuration data sheet must be completed and included with the order.


Pressure unit			
<input type="checkbox"/> mbar	<input type="checkbox"/> mmH <sub>2</sub> O	<input type="checkbox"/> mmHg	<input type="checkbox"/> Pa
<input type="checkbox"/> bar	<input type="checkbox"/> mH <sub>2</sub> O	<input type="checkbox"/> kgf/cm <sup>2</sup>	<input type="checkbox"/> kPa
<input type="checkbox"/> psi	<input type="checkbox"/> ftH <sub>2</sub> O		<input type="checkbox"/> MPa
	<input type="checkbox"/> inH <sub>2</sub> O		

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

Display	
1st Value Display <sup>1)</sup>	2nd Value Display <sup>1)</sup>
<input type="checkbox"/> Main Value	<input type="checkbox"/> None (Default)
	<input type="checkbox"/> Main Value [%]
	<input type="checkbox"/> Pressure
	<input type="checkbox"/> Current [mA] (HART only)
	<input type="checkbox"/> Temperature

1) Depending on sensor and communication version

Damping	
Damping:	_____ sec (Default 2 sec)

Lowest calibratable span (preset at factory) →  12



**Configuration data sheet  
(Analog electronics)**
**Pressure**

If the option "J" was selected in the "Kalibration; Einheit" ordering feature of the Product Configurator, the following configuration data sheet must be completed and included with the order.


Pressure Engineering Unit			
<input type="checkbox"/> mbar	<input type="checkbox"/> mmH <sub>2</sub> O	<input type="checkbox"/> mmHg	<input type="checkbox"/> Pa
<input type="checkbox"/> bar	<input type="checkbox"/> mH <sub>2</sub> O	<input type="checkbox"/> kgf/cm <sup>2</sup>	<input type="checkbox"/> kPa
<input type="checkbox"/> psi	<input type="checkbox"/> ftH <sub>2</sub> O		<input type="checkbox"/> MPa
	<input type="checkbox"/> inH <sub>2</sub> O		

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

Display Information	
1st Value Display <sup>1)</sup>	2st Value Display
<input type="checkbox"/> Main Value	<input type="checkbox"/> none (Default)

1) Depending on sensor and communication variant

Damping	
Damping:	_____ sec (Default 2 sec)

Smallest span (factory calibration) →  12

## Supplementary documentation



For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter the serial number from the nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

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### Standard documentation

- **Technical Information: planning guide**  
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
- **Brief Operating Instructions: takes you quickly to the 1st measured value**  
The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning
- **Operating Instructions: reference manual**  
The Operating Instructions contain all the information that is required in the various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal

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### Supplementary device-dependent documentation

Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

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### Field of Activities

Pressure measurement, powerful instruments for process pressure, differential pressure, level and flow:

FA00004P/00/EN

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### Safety instructions

See Download area of the website.

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### Special Documentation



Document SD01553P

Mechanical accessories for pressure measuring devices

The documentation provides an overview of available manifolds, oval flange adapters, pressure gauge valves, shutoff valves, siphons, condensate pots, cable shortening kits, test adapters, flushing rings, block-and-bleed valves and protective roofs.

## Accessories

### Manifolds

→  79

For 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, adapter test, flushing rings, block&amp;bleed valves, protective roofs.

For details see SD01553P/00/EN "Mechanical accessories for pressure measuring devices".

### Welding necks and weld-in adapters

For dimensions and technical data see Technical Information TI00426F/00.


Designation	PMC51	PMP51	PMP55	Option <sup>1)</sup>
Weld-in adapter G1/2, 316L,	–	✓	✓	QA
Weld-in adapter G1/2, 316L, 3.1 EN10204-3.1 material, inspection certificate	–	✓	✓	QB
Weld-in tool adapter G1/2, brass	–	✓	✓	QC
Weld-in adapter G1, 316L, conical metal joint	–	✓	–	QE
Weld-in adapter G1, 316L, 3.1 EN10204-3.1 material, inspection certificate, conical metal joint	–	✓	–	QF
Weld-in tool adapter G1, brass conical metal joint	–	✓	–	QG
Weld-in adapter G1/2, 316L, for G1/2 A DIN 3852	–	✓	–	QM
Weld-in adapter G1/2, 316L, 3.1, for G1/2 A DIN 3852, EN10204-3.1 material, inspection certificate	–	✓	–	QN
Weld-in adapter G1-1/2, 316L	✓	✓	✓	QJ
Weld-in adapter G1-1/2, 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	✓	✓	QK
Weld-in tool adapter G1-1/2, brass	✓	✓	✓	QL
Weld-in flange DRD DN50 65mm, 316L	✓	✓	✓	QP
Weld-in fl. DRD DN50 65mm, 316L 3.1 EN10204-3.1 material, inspection certificate	✓	✓	✓	QR
Weld-in tool flange DRD DN50 65mm, brass	✓	✓	✓	QS
Weld-in adapter Uni D65, 316L	✓	–	–	QT
Weld-in adapter Uni D65, 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	–	QU
Weld-in tool adapter Uni D65/D85, brass	✓	–	–	Q1
Weld-in adapter Uni D85, 316L	✓	–	–	Q2
Weld-in adapter Uni D85, 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	–	Q3
Adapter Uni > DIN11851 DN40, 316L, slotted-nut	✓	–	–	RA
Adapter Uni > DIN11851 DN50, 316L, slotted-nut	✓	–	–	RB
Adapter Uni > DRD DN50 65mm, 316L	✓	–	–	RC
Adapter Uni > Clamp 2", 316L	✓	–	–	RD
Adapter Uni > Clamp 3", 316L	✓	–	✓	RE
Adapter Uni > Varivent N, 316L	✓	–	–	RF
Adapter Uni > Cherry Burell 2", 316L	✓	–	–	RH
Adapter Uni > DIN11851 DN40, 316L, 3.1, slotted-nut, EN10204-3.1 material, inspection certificate	✓	–	–	R1
Adapter Uni > DIN11851 DN50, 316L, 3.1, slotted-nut, EN10204-3.1 material, inspection certificate	✓	–	–	R2
Adapter Uni > DRD DN50 65mm, 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	–	R3
Adapter Uni > Clamp 2", 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	–	R4
Adapter Uni > Clamp 3", 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	✓	R5



Designation	PMC51	PMP51	PMP55	Option <sup>1)</sup>
Adapter Uni > Varivent, 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	–	R6
Adapter Uni > Cherry Burrell, 316L, 3.1 EN10204-3.1 material, inspection certificate	✓	–	–	R7




1) Product Configurator, order code for "Accessories"

For dimensions and technical data see Technical Information TI00426F/00.


**Mounting bracket for wall and pipe mounting** →  41

**M12 connector** →  22

**Service-specific accessories**

Accessories	Description
DeviceCare SFE100	<p>Configuration tool for HART, PROFIBUS and FOUNDATION Fieldbus field devices</p> <p> Technical Information TI01134S</p> <p> DeviceCare is available to 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.</p>
FieldCare SFE500	<p>FDT-based plant asset management tool</p> <p>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.</p> <p> Technical Information TI00028S</p>
FieldPort SFP20	<p><b>Mobile configuration tool for all IO-Link devices:</b></p> <ul style="list-style-type: none"> <li>▪ Pre-installed device and communication DTMs in FieldCare</li> <li>▪ Pre-installed device and communication DTMs in FieldXpert</li> <li>▪ M12 connection for IO-Link field devices</li> </ul>
Field Xpert SMT70, SMT77	<p>The Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in hazardous (Ex Zone 2) and non-hazardous areas. It is suitable for commissioning and maintenance staff. It manages Endress+Hauser and third-party field instruments with a digital communication interface and documents the progress of the work. The SMT70 is designed as a complete solution. It comes with a pre-installed driver library and is an easy-to-use, touch-enabled tool for managing field devices throughout their entire life cycle.</p> <p>The Field Xpert SMT77 for device configuration enables mobile plant asset management in areas categorized as Ex Zone 1. It is suitable for commissioning and maintenance staff for easy management of field instruments with a digital communication interface. The touch-enabled tablet PC is designed as a complete solution. It comes with comprehensive pre-installed driver libraries and offers users a modern software user interface to manage field instruments throughout the entire life cycle.</p>

## Registered trademarks

- **KALREZ®**  
Registered label of E.I. Du Pont de Nemours & Co., Wilmington, USA
- **TRI-CLAMP®**  
Registered label of Ladish & Co., Inc., Kenosha, USA
- **HART®**  
Registered trademark of the FieldComm Group, Austin, USA
-  **IO-Link**  
Registered trademark of the IO-Link Community.

- PROFIBUS PA®  
Trademark of the PROFIBUS User Organization, Karlsruhe, Germany
- FOUNDATION™ Fieldbus  
Registered trademark of the FieldComm Group, Austin, USA
- GORE-TEX® trademark of W.L. Gore & Associates, Inc., USA



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