

# 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. |
|--------------------------|---|

### Symbols used









#### Safety symbols

| Symbol  | Meaning  |
|---|--|
|  | <b>DANGER!</b><br>This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury. |
|  | <b>WARNING!</b><br>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury. |
|  | <b>CAUTION!</b><br>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.  |
|  | <b>NOTICE!</b><br>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><br>A terminal which must be connected to ground prior to establishing any other connections. |  | <b>Ground connection</b><br>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><br>Procedures, processes or actions that are permitted. |
|  | <b>Preferred</b><br>Procedures, processes or actions that are preferred. |
|  | <b>Forbidden</b><br>Procedures, processes or actions that are forbidden. |
|  | <b>Tip</b><br>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 |

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**Documentation**

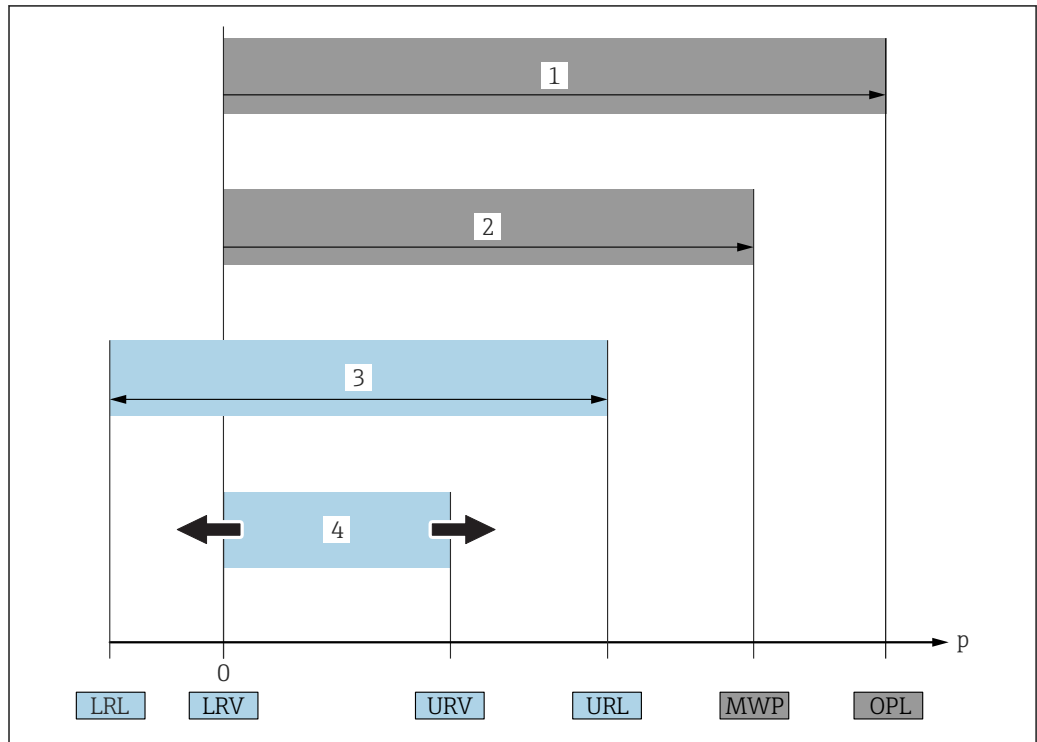
See chapter "Additional documentation" →  128



The document types listed are available:

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

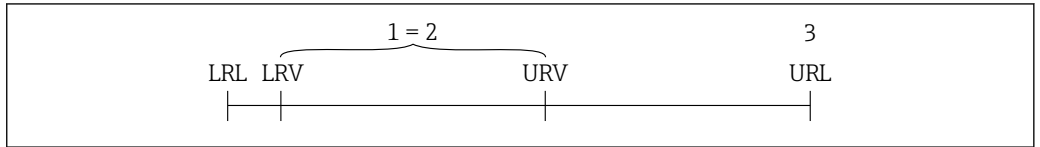
Terms and abbreviations



A0029505

| Item | Term/abbreviation              | Explanation  |
|------|--------------------------------|--|
| 1    | OPL                            | The OPL (over pressure limit = sensor overload limit) for the measuring device depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional notes see the → 47 section.<br>The OPL may only be applied for a limited period of time.                        |
| 2    | MWP                            | The MWP (maximum working pressure) for the sensors depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional notes see the → 47 section.<br>The MWP may be applied at the device for an unlimited period.<br>The MWP can also be found on the nameplate. |
| 3    | Maximum sensor measuring range | Span between LRL and URL<br>This sensor measuring range is equivalent to the maximum calibratable/adjustable span.   |
| 4    | Calibrated/adjusted span       | Span between LRV and URV<br>Factory setting: 0 to URL<br>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<br>Example - see the following section.  |

**Turn down calculation**



A0029545

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

**Example**

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

Turn down (TD):

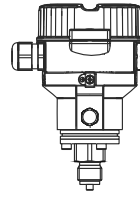
$$TD = \frac{URL}{|URV - LRV|}$$

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

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

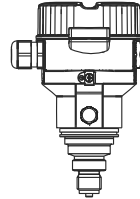
## Function and system design

### Device selection



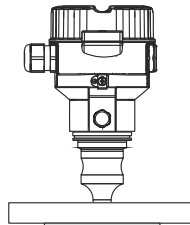
A0023673

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



A0023675

PMP51 with piezoresistive measuring cell and metal welded process isolating diaphragm



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 mount hygienic connections

PMP51:

- Thread
- EN flanges DN 25 – DN 80
- ANSI flanges 1" – 4"
- Prepared for diaphragm seal mount
- Flush mount 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 filling oil)

#### Ambient temperature range

- Without LCD: -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 limitations 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 DC (versions with plug-in connection 35 V DC)
- For intrinsically safe device versions: 11.5 to 30 V DC

#### Output

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

#### Options

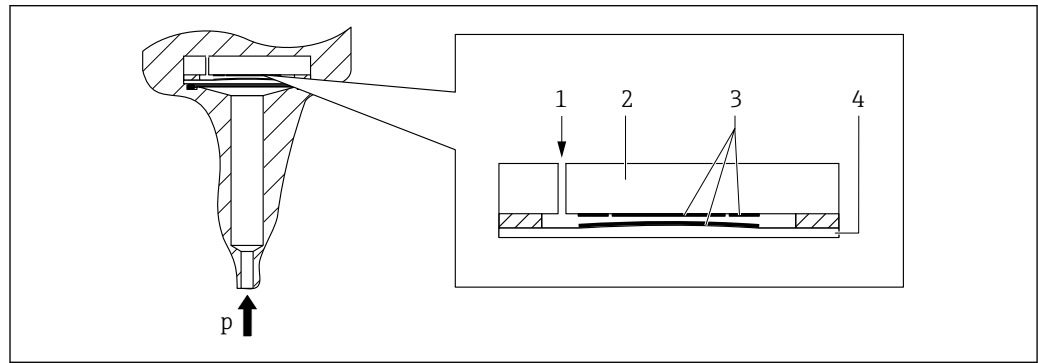
- Inspection certificate 2.2 or 3.1 or other certificates
- 3A approval and EHEDG approval
- Specific firmware versions
- Initial device settings
- Separate housing
- Broad range of accessories
- NACE-compliant materials

#### 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
  - Fully welded versions

## Measuring principle

## Ceramic process isolating diaphragm used in PMC51 (Ceraphire®)



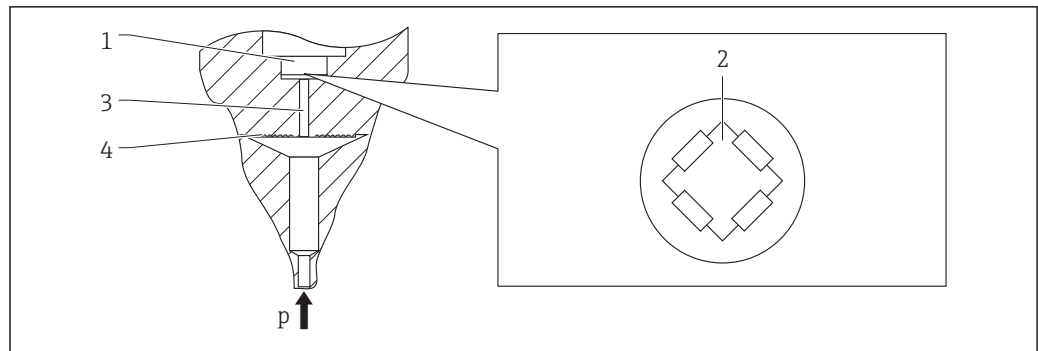
A0020465

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

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

**Advantages:**

- Guaranteed overload resistance up to 40 times the nominal pressure
- 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

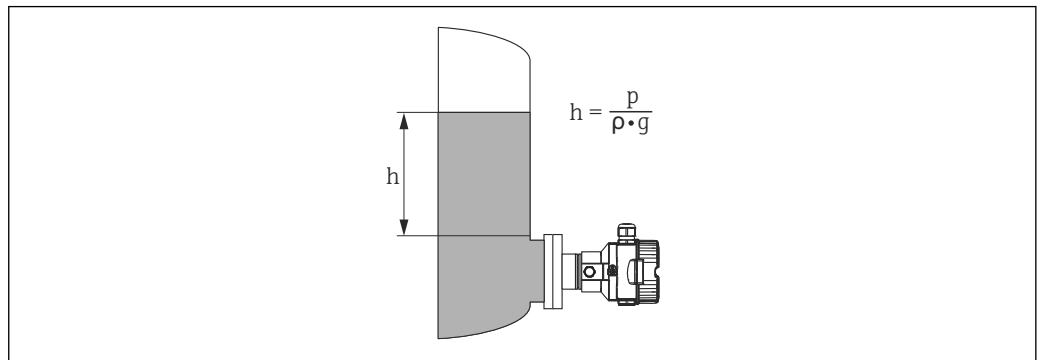
*PMP55*

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)**



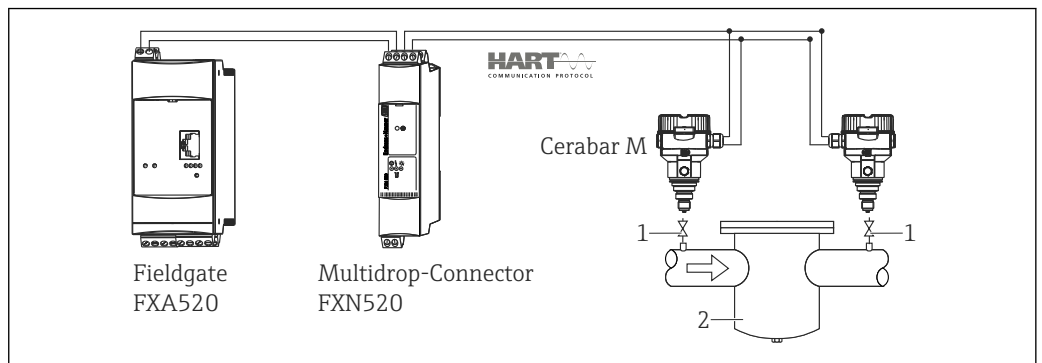
A0023678

- 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.

---

**Communication protocol**

- 4 to 20 mA without communication protocol (analog electronics)
- 4 to 20 mA with HART 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 pressure and gauge pressure, from which level (level, volume or mass) is derived

### 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/<br>Inert oil/<br>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<br>(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 (1500 psi) | -1 (-15)                       | +100 (+1500) | 5 (75)   | 100 (1500)   | 400 (6000) |  | 1U                   |
| 400 bar (6000 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 → 115.
- 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/<br>Inert oil/<br>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<br>(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 (1500 psi) | 0  | +100 (+1500)                               | 5 (75)   | 100 (1500)   | 400 (6000) |  | 2U                   |
| 400 bar (6000 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 → 115.
- 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 PROFIBUS PA (Profile 3.02)
- Digital communication signal FOUNDATION Fieldbus

| Output              | Option <sup>1)</sup> |
|---------------------|----------------------|
| 4 to 20mA           | 1                    |
| 4 to 20mA HART      | 2                    |
| PROFIBUS PA         | 3                    |
| FOUNDATION Fieldbus | 4                    |

1) Product Configurator, "Output" ordering feature

### Signal range 4 to 20 mA

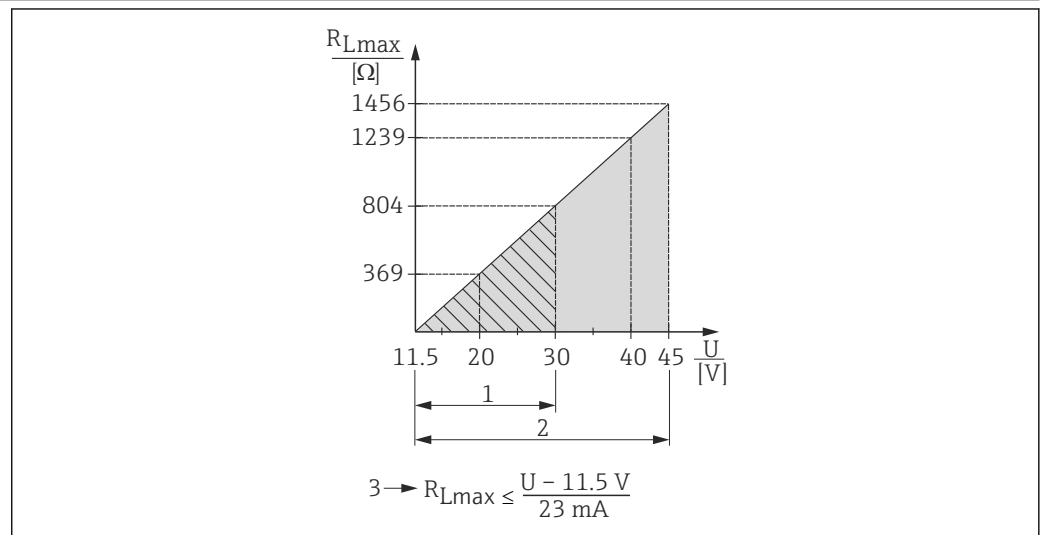
4 to 20 mA Analog, 4 to 20 mA HART: 3.8 to 20.5 mA

### Signal on alarm

As per NAMUR NE 43

- 4 to 20 mA Analog:
  - Signal overshoot: > 20.5 mA
  - Signal undershoot: < 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
- 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



A0023090

- 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

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

**Damping**

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

- Via on-site display, handheld terminal or PC with operating program, continuous from 0...999 s
- Via DIP-switch on the electronic insert, switch position "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

**Protocol-specific data HART**

|                                    |   |
|------------------------------------|---|
| Manufacturer ID                    | 17 (11 hex)   |
| Device Type Code                   | 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 can be found: <ul style="list-style-type: none"> <li>■ <a href="http://www.endress.com">www.endress.com</a></li> <li>■ <a href="http://www.fieldcommgroup.org">www.fieldcommgroup.org</a></li> </ul>  |
| HART load                          | Min. 250 Ω  |
| HART device variables              | The measured values can be freely 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 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 operating modes</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))

**Protocol-specific data PROFIBUS PA**

|                 |                             |
|-----------------|-----------------------------|
| Manufacturer ID | 17 (11 hex)                 |
| Ident number    | 1554 hex                    |
| Profile Version | 3.02<br>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<br/>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> |

**Protocol-specific data  
FOUNDATION Fieldbus**

|                                       |  |
|---------------------------------------|--|
| Device Type                           | 0x1019   |
| Device Revision                       | 01 (hex)   |
| DD Revision                           | 0x01021  |
| Device description files (DTM, DD)    | Information and files can be found: <ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com">www.endress.com</a></li> <li>▪ <a href="http://www.fieldcommgroup.org">www.fieldcommgroup.org</a></li> </ul> |
| CFF Revision                          | 0x000102   |
| ITK Version                           | 5.2.0  |
| ITK-Certification Driver-No.          | IT067700   |
| Link-Master (LAS) capable             | 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<br>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.<br>Enhancement: digital outputs for process alarms, fail safe mode.  | 2                | 25 ms          | enhanced      |
| Digital Input Block                          | This block contains the discrete data of the Diagnose 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 im 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 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 Block                        | YES |
| Number of additional instantiable function blocks | 20  |

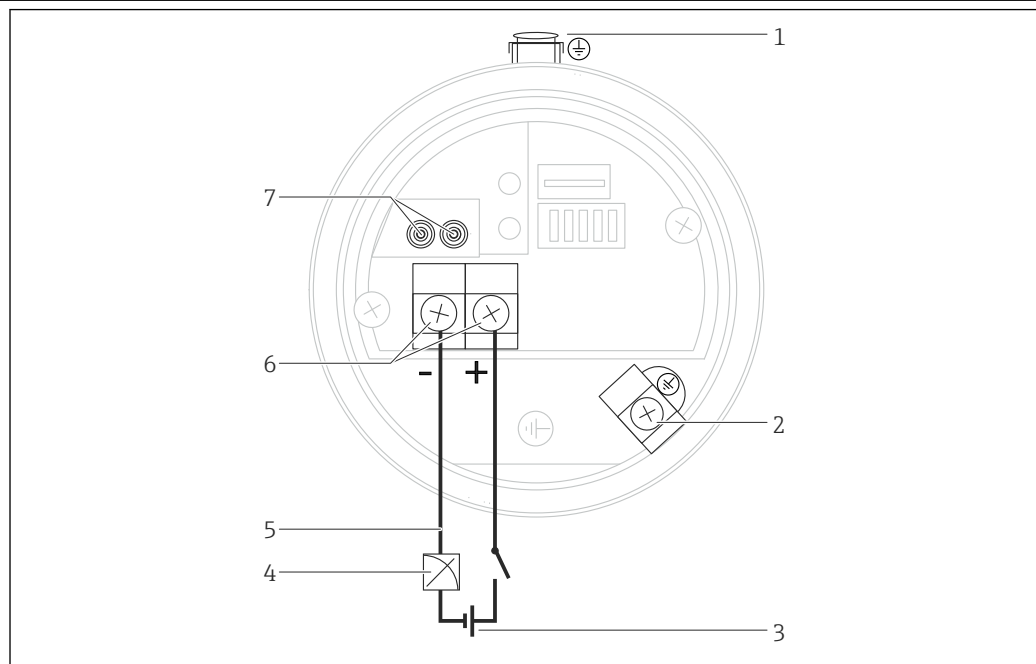
## Power supply

### **⚠ WARNING**

#### An incorrect connection compromises electrical safety!

- ▶ When using the measuring device in hazardous areas, the relevant national standards and regulations as well as the Safety Instructions or Installation or Control Drawings must be observed → [128](#).
- ▶ All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all Ex-systems → [128](#).
- ▶ 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 the "Ordering information" section).
- ▶ Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.

### Terminal assignment



A0023505

- 1 External grounding terminal (only for devices with certainly approvals or if "Measuring point" (TAG) is ordered)
- 2 Internal grounding terminal
- 3 Supply voltage → [20](#)
- 4 4...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" → [20](#)

### 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<br>(versions with plug-in connection 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.

#### 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**

- 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           | IP66/67 NEMA 4X/6P                                  | A                    |
| G ½" thread         | IP66/67 NEMA 4X/6P                                  | C                    |
| NPT ½" thread       | IP66/67 NEMA 4X/6P                                  | D                    |
| M12 plug            | IP66/67 NEMA 4X/6P                                  | I                    |
| 7/8" plug           | IP66/67 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, order code for "Electrical connection"

**PROFIBUS PA**

The digital communication signal is transmitted over the bus via a 2-wire connection. The bus also provides the power supply. For further information on the network structure and grounding, and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA00034S "PROFIBUS DP/PA: Guidelines for planning and commissioning" and the PNO Guideline.

**FOUNDATION Fieldbus**


The digital communication signal is transmitted over the bus via a 2-wire connection. The bus also provides the power supply. For further information on the network structure and grounding and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA00013S "FOUNDATION Fieldbus Overview" and the FOUNDATION Fieldbus Guideline.

**Terminals**

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

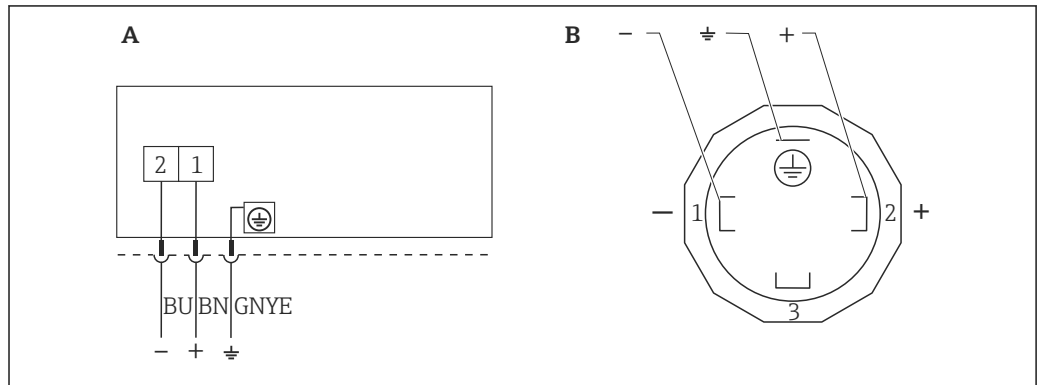
**Cable entry**

| Approval   | Type                 | Clamping area                  |
|--|----------------------|--------------------------------|
| Standard, CSA GP<br>ATEX II1/2G or II2G Ex ia,<br>IEC Ex ia Ga/Gb or Ex ia Gb,<br>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,<br>II3G Ex nA,<br>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 →  48

Device plugs

Devices with valve connector (HART)



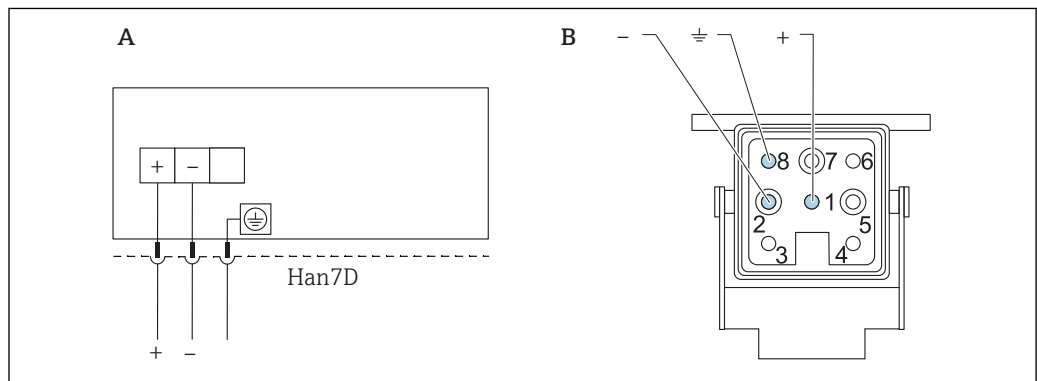
A0023097

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

Devices with Harting plug Han7D (HART)

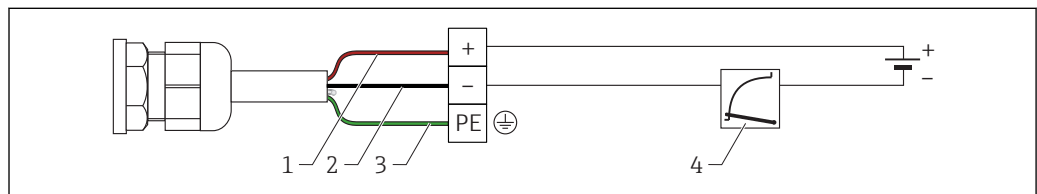


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A Electrical connection for devices with Harting plug Han7D  
 B View of the plug-in connector at the device

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

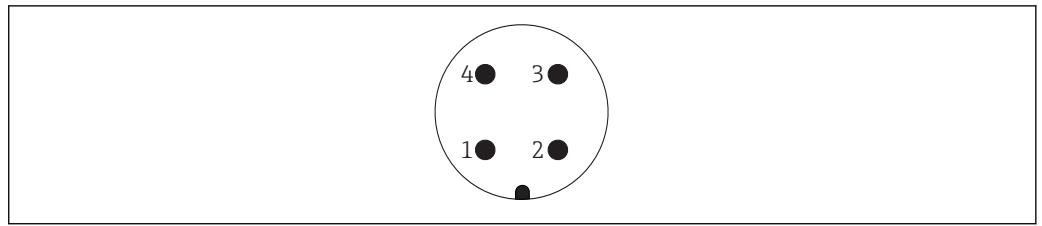
Connecting the cable version (all device versions)



A0019991

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

**Devices with M12 plug(Analog, HART, PROFIBUS PA)**



A0011175

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

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

Plug-in jack M 12x1, straight

- Material: body PA; coupling nut CuZn, nickel-plated
- Degree of protection (fully locked): IP66/67
- Order number: 52006263

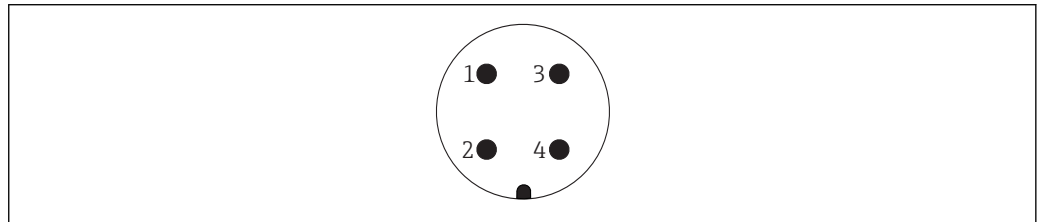
Plug-in jack M 12x1, elbowed

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

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

- Material: body PUR; coupling nut CuSn/Ni; cable PVC
- Degree of protection (fully locked): IP66/67
- Order number: 52010285

**Devices with 7/8" plug (Analog, HART, FOUNDATION Fieldbus)**



A0011176

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

External thread: 7/8 - 16 UNC

- Material: 316L (1.4401)
- Protection: IP66/68

**Cable specification**

**Analog**

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

**HART**

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

**PROFIBUS PA**

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

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

**FOUNDATION Fieldbus**

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

**i** 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)

**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

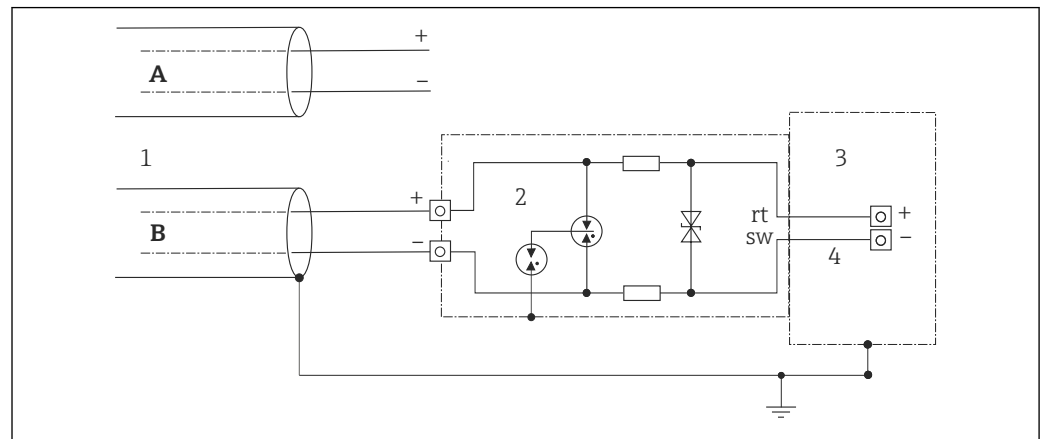
**Overvoltage protection (optional)**

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**

A0029111

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



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

### Response time

#### HART

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

#### PROFIBUS PA

- Acyclic: approx. 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: 5 to 80 % RH  $\pm$  5 %
- Ambient pressure  $p_A$  = constant, in the range: 860 to 1060 mbar (12.47 to 15.37 psi)
- Position of the measuring cell: horizontal  $\pm$ 1°
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Zero based span
- Material of the process isolating diaphragm: 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  $\Omega$
- Turn down (TD) =  $URL / |URV - LRV|$

### Maximum measured error (total performance)

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

- Total performance of measuring device
- Installation factors

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

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

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

E1 = Reference accuracy

E2 = Temperature effect per  $\pm 28$  °C (50 °F)

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

Calculation of E2:

$$E2 = E2_M + E2_E$$

E2<sub>M</sub> = Main temperature error

E2<sub>E</sub> = 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]

Reference accuracy comprises the non-linearity [IEC 62828-1 / DIN EN 61298-2] including the hysteresis [IEC 62828-1 / DIN EN 61298-2] and the non-repeatability [IEC 62828-1 / DIN EN 61298-2] in accordance with the limit point method as per [IEC 62828-1 / DIN EN 60770-2].

#### 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/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:  $\pm 0.20$  %
- 5 years:  $\pm 0.40$  %
- 10 years:  $\pm 0.50$  %

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

- 1 year:  $\pm 0.10$  %
- 5 years:  $\pm 0.25$  %
- 10 years:  $\pm 0.40$  %

With hygienic process connections

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

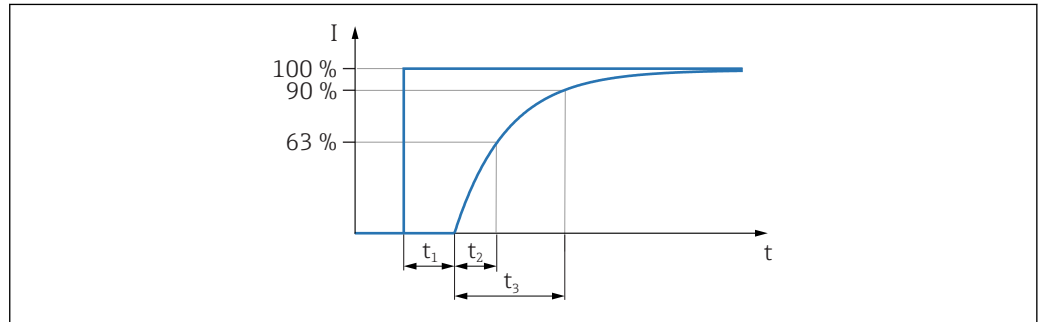
- 1 year:  $\pm 0.35$  %
- 5 years:  $\pm 0.50$  %
- 10 years:  $\pm 0.60$  %

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

- 1 year:  $\pm 0.20$  %
- 5 years:  $\pm 0.35$  %
- 10 years:  $\pm 0.50$  %

**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)**

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

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

*Cycle time (update time)*

Cyclic (burst): min. 300 ms

**Dynamic behavior, PROFIBUS PA**

|      | Dead time ( $t_1$ ) | Dead time ( $t_1$ ) +<br>Time constant T63 (= $t_2$ ) | Dead time ( $t_1$ ) +<br>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 (dependent on the number and type of function blocks used in a 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 ( $t_1$ ) +<br>Time constant T63 (= $t_2$ ) | Dead time ( $t_1$ ) +<br>Time constant T90 (= $t_3$ ) |
|------|---------------------|---|---|
| min. | 95 ms               | 180 ms  | 245 ms  |
| Max. | 1095 ms             | 1180 ms   | 1245 ms   |

*Reading cycle*

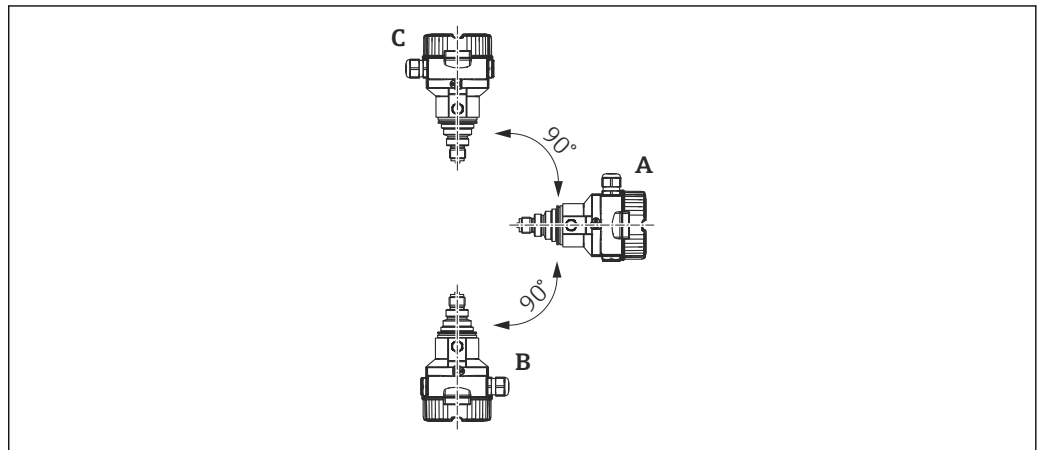
- Acyclic: typically 5/s
- Cyclic: max. 10/s (dependent on the number and type of function blocks used in a closed-control loop)

*Cycle time (update time)*

Cyclic: min. 100 ms

Installation factors

Influence of installation position



A0023697

Measuring error in mbar (psi)

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

**i** A position-dependent zero point shift can be corrected on the device.

Warm-up period

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

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

### Response time

#### HART

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

#### PROFIBUS PA

- Acyclic: approx. 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: 5 to 80 % RH
- Ambient pressure  $p_A$  = constant, in the range: 860 to 1060 mbar (12.47 to 15.37 psi)
- Position of the measuring cell: constant, in range:  $\pm 1^\circ$  horizontally
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Zero based span
- Material of the process isolating diaphragm: AISI 316L
- Filling oil 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 with HART: 250  $\Omega$

### Maximum measured error (total performance)

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

- Total performance of measuring device
- Installation factors

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

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

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

$E1$  = Reference accuracy

$E2$  = Temperature effect per  $\pm 28$  °C (50 °F)

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

Calculation of  $E2$ :

$$E2 = E2_M + E2_E$$

$E2_M$  = Main temperature error

$E2_E$  = Electronics error

$E2_{LT}$  = Low temperature error

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



### Reference accuracy [E1]

Reference accuracy comprises the non-linearity [IEC 62828-1 / DIN EN 61298-2] including the hysteresis [IEC 62828-1 / DIN EN 61298-2] and the non-repeatability [IEC 62828-1 / DIN EN 61298-2] in accordance with the limit point method as per [IEC 62828-1 / DIN EN 60770-2].

#### *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 (1 500 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 (6 000 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 (1500 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 (6000 psi) sensor

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



Platinum only for direct diaphragm seal mounting.

### Temperature effect [E2]

$E2_M$  - 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

$\pm(0.08\% \cdot TD + 0.16\%)$

1 bar (15 psi) sensor

$\pm(0.08\% \cdot TD + 0.16\%)$

2 bar (30 psi) sensor

$\pm(0.08\% \cdot TD + 0.16\%)$

4 bar (60 psi) sensor

$\pm(0.08\% \cdot TD + 0.16\%)$

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

$\pm(0.06\% \cdot TD + 0.06\%)$

100 bar (1500 psi) sensor

$\pm(0.03\% \cdot TD + 0.12\%)$

400 bar (6000 psi) sensor

$\pm(0.03\% \cdot TD + 0.12\%)$

*PMP51 with hygienic process connections*

400 mbar (6 psi) sensor with Clamp 1/2"

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

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

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

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

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

$E2_E$  - Electronics error

- Analog output (4 to 20 mA): 0.2 %
- Digital output (HART/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  $\mu$ A
- Display: can be set (factory setting: presentation of the maximum accuracy of the transmitter)

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#### 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).

- 1 year:  $\pm 0.10\%$
- 5 years:  $\pm 0.20\%$
- 10 years:  $\pm 0.25\%$

**PMP51 with hygienic process connections**

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

- 1 year:  $\pm 0.25\%$
- 5 years:  $\pm 0.48\%$
- 10 years:  $\pm 0.58\%$

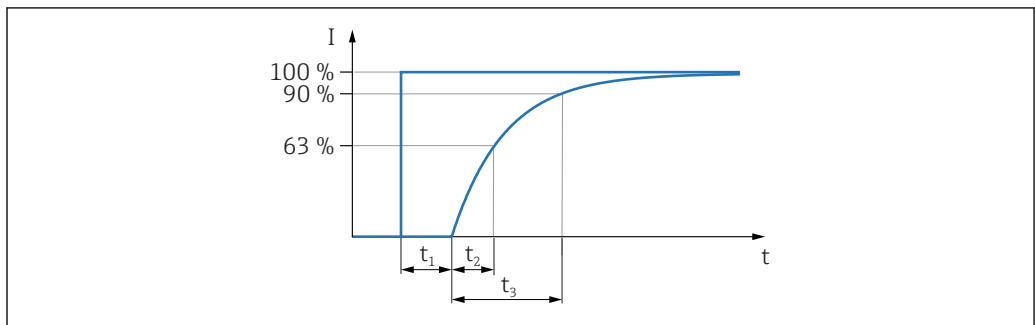
2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi) and 40 bar (600 psi) sensor

- 1 year:  $\pm 0.10\%$
- 5 years:  $\pm 0.33\%$
- 10 years:  $\pm 0.43\%$

**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)**

|      | 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 <sub>1</sub> )             | Dead time (t <sub>1</sub> ) + Time constant T63 (= t <sub>2</sub> ) | Dead time (t <sub>1</sub> ) + Time constant T90 (= t <sub>3</sub> ) |
|------|--------|---|---|---|
| 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, typical 1/s (depends on command # and number of preambles)
- Cyclic (burst): max. 3/s, typical 2/s

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

*Cycle time (update time)*

Cyclic (burst): min. 300 ms

**Dynamic behavior, PROFIBUS PA**

|      | Device | Dead time (t <sub>1</sub> )             | Dead time (t <sub>1</sub> ) + Time constant T63 (= t <sub>2</sub> ) | Dead time (t <sub>1</sub> ) + Time constant T90 (= t <sub>3</sub> ) |
|------|--------|---|---|---|
| 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 (dependent on the number and type of function blocks used in a 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 <sub>1</sub> )             | Dead time (t <sub>1</sub> ) + Time constant T63 (= t <sub>2</sub> ) | Dead time (t <sub>1</sub> ) + Time constant T90 (= t <sub>3</sub> ) |
|------|--------|---|---|---|
| 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*

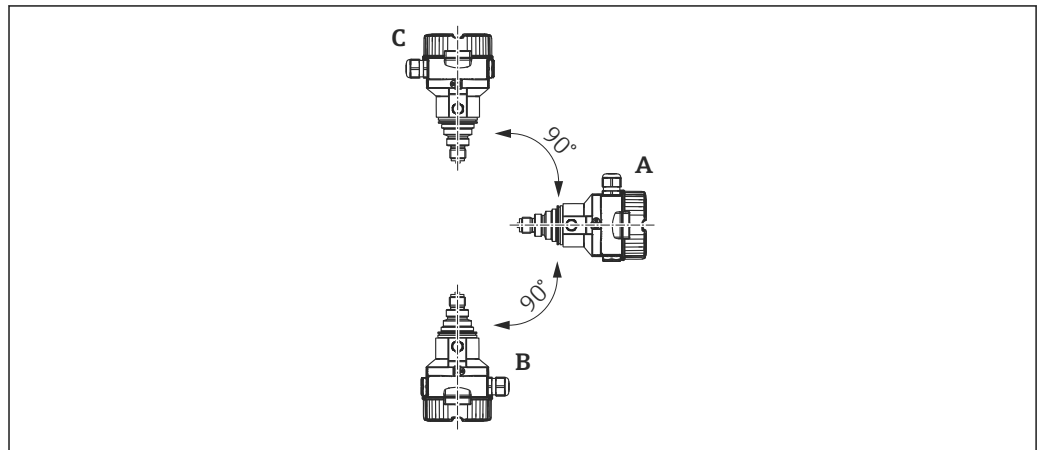
- Acyclic: typically 5/s
- Cyclic: max. 10/s (dependent on the number and type of function blocks used in a closed-control loop)

*Cycle time (update time)*

Cyclic: min. 100 ms

Installation factors

Influence of installation position



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Measuring error in mbar (psi)

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

**i** A position-dependent zero point shift can be corrected on the device.

Warm-up period

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

## Installation

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### 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

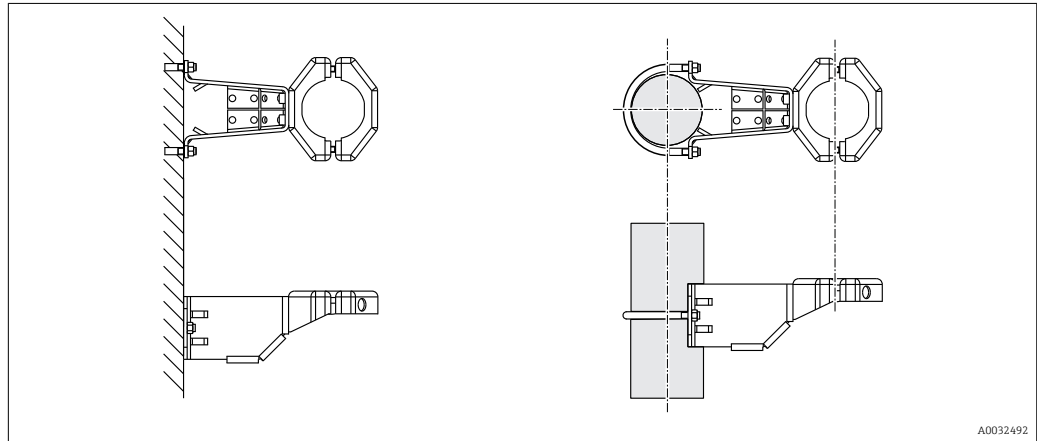
- Mount Cerabar M below the lowest measuring point (zero point of the measurement).
- Do not mount the device at the following positions: In the filling curtain, in the tank outlet or at a point in the vessel which could be affected by pressure pulses from an agitator or a pump.
- The calibration and 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

→  113

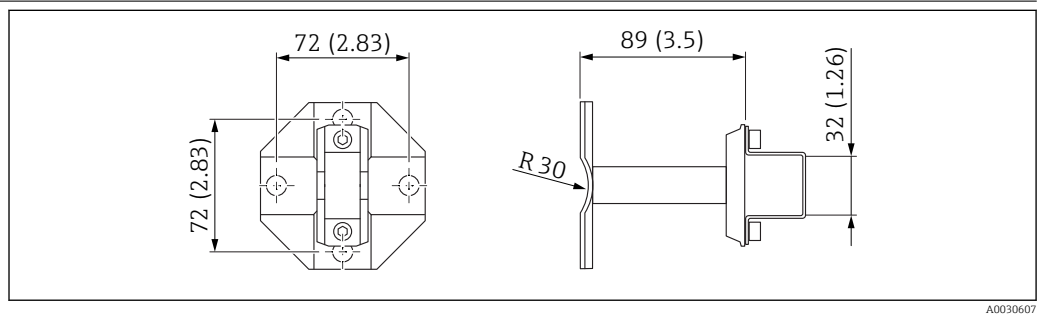
**Wall and pipe mounting, transmitter (optional)**

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 → 98.

**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:

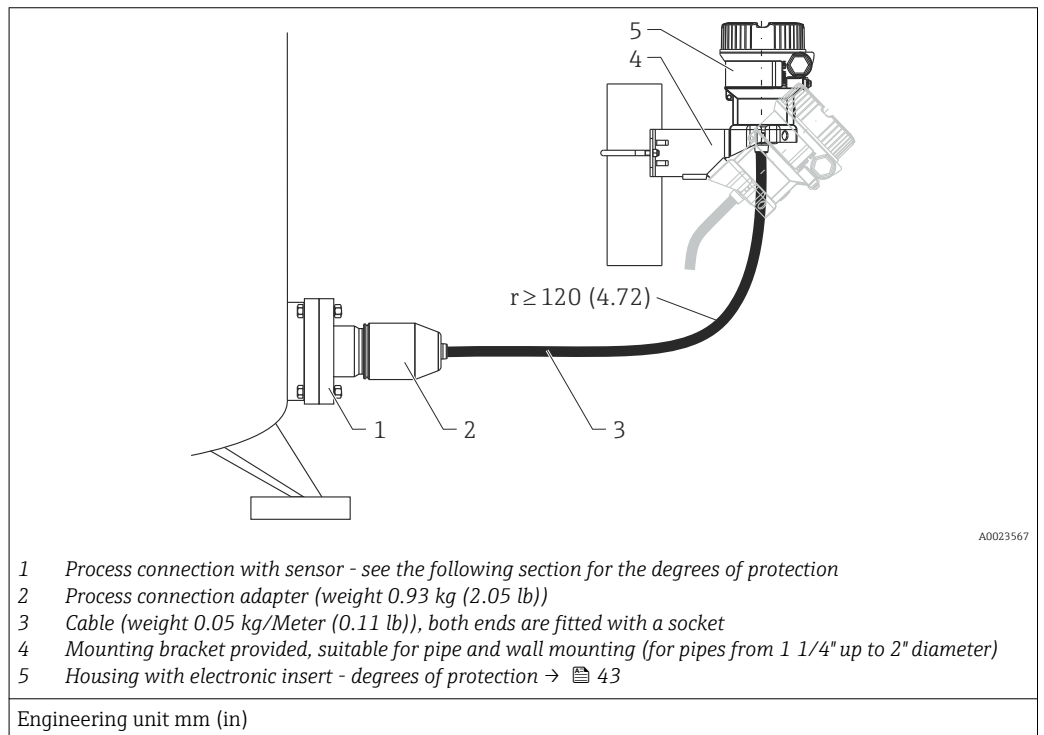
- PE: 2 m (6.6 ft), 5 m (16 ft) and 10 m (33 ft)
- FEP: 5 m (16 ft).

Ordering information:

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

For the dimensions →  98

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



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

- FEP-cabel:
  - IP 69 <sup>1)</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

1) 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.
- Dependent on the materials used, a certain maximum temperature and a maximum pressure for oxygen applications must not be exceeded.

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

| Order code for devices <sup>1)</sup> ,<br>cleaned for oxygen applications       | $p_{\max}$ for oxygen applications  | $T_{\max}$ for oxygen<br>applications |
|---|---|---------------------------------------|
| PMC51 <sup>2)</sup> – devices with sensors,<br>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,<br>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, order code for "Service" option "HB"
- 3) Product Configurator, order code for "Sensor range"
- 4) PMC51 with PVDF thread or PVDF flange  $p_{\max} = 15 \text{ bar (225 psi)}$  15 bar (225 psi)
- 5) Product Configurator, order code for "Service" 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

| Ambient temperature range | Version                              | PMC51  | PMP51 | PMP55  |
|---------------------------|--------------------------------------|--|-------|--------|
|                           | Without LCD display                  | -40 to +85 °C (-40 to +185 °F)                                     |       |        |
|                           | With LCD display <sup>1)</sup>       | -20 to +70 °C (-4 to +158 °F)                                      |       |        |
|                           | With M12 plug , elbowed              | -25 to +85 °C (-13 to +185 °F)                                     |       |        |
|                           | With separate housing                | -20 to +60 °C (-4 to +140 °F)<br>(installation without insulation) |       | –      |
|                           | Diaphragm seal systems <sup>2)</sup> | –  | –     | →  113 |

- 1) Extended temperature application range (-40 to +85 °C (-40 to +185 °F)) with restrictions in optical properties such as display speed and contrast
- 2) Ambient temperature range and process temperature range are mutually dependent - see chapter "Thermal insulation" → 116

### NOTICE

#### High temperatures or vibrations can destroy the device!

- ▶ For high-temperature applications, either a PMP55 with a temperature isolator or with a capillary can be used. If vibrations also occur in the application, Endress+Hauser recommends you use a PMP55 with a capillary. If a PMP55 with a temperature isolator or capillary is used, we recommend a suitable bracket for mounting (see "Wall and pipe mounting, transmitter (optional)" → 40).

| 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 +85 °C (-13 to +185 °F) |       |        |
|                           | With separate housing                | -40 to +60 °C (-40 to +140 °F) |       | –      |
|                           | Diaphragm seal systems <sup>1)</sup> | –                              | –     | →  113 |


- 1) Devices with PVC-sheathed capillary: -25 to +90 °C (-13 to +194 °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 → 41

| Vibration resistance | Device/accessory                 | Test standard   | Vibration resistance  |
|----------------------|----------------------------------|---|---|
|                      | Devices without mounting bracket | GL VI-7-2<br><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<br>5 to 25 Hz: ±1.6 mm (0.06 in);<br>25 to 100 Hz: 4 g<br>in all 3 axes    |
|                      |                                  | IEC 62828-1 / IEC 61298-3<br>IEC 60068-2-6  | Guaranteed for<br>10 to 60 Hz: ±0.35 mm (0.01 in);<br>60 to 2000 Hz: 5 g<br>in all 3 axes |
|                      | Devices with mounting bracket    | IEC 62828-1 / IEC 61298-3<br>IEC 60068-2-6  | Guaranteed for<br>10 to 60 Hz: ±0.15 mm (0.01 in);<br>60 to 500 Hz: 2 g<br>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 (→  40).

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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.

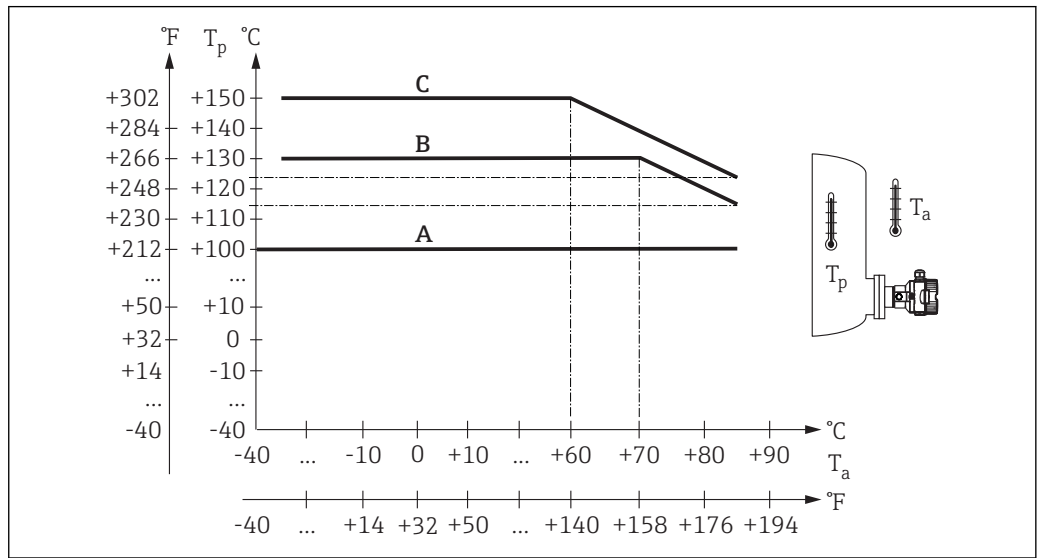
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**Operation in very corrosive environment**

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 and C see next section.  $T_a$  = Ambient temperature.  $T_p$  = Process temperature

### Process temperature limits

For oxygen applications → 42

#### PMC51 (with ceramic process isolating diaphragm)

- 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: For max. 60 minutes: +150 °C (+302 °F) for hygienic process connections
- With applications involving saturated steam, a device with a metal process isolating diaphragm must be used, or a siphon for temperature isolation should be provided during installation.
- Observe the process temperature range of the seal. See also the following table.

| Seal                 | Notes   | Process temperature range       |                                | Option <sup>1)</sup> |
|----------------------|---|---------------------------------|--------------------------------|----------------------|
|                      |   | Thread or flange                | Hygienic process connections   |                      |
| FKM Viton            | -   | -20 to +100 °C (-4 to +212 °F)  | -                              | A                    |
| FKM Viton            | cleaned for O2 application  | -5 to +60 °C (+23 to +140 °F)   | -                              | A <sup>2)</sup>      |
| FKM Viton            | 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                    |
| 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, order code for "Seal"

2) With "HB" option, see Product Configurator, order code for "Service"

*Applications with jumps in temperature*

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



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

**PMP51 (with metal process isolating diaphragm)**

| Designation  | Temperature operating range   |
|--|---|
| Process connections with internal process isolating diaphragm                  | -40 to +125 °C (-40 to +257 °F)   |
| Process connections with flush mount process isolating diaphragm <sup>1)</sup> | -40 to +100 °C (-40 to +212 °F)   |
| Hygienic process connections   | -40 to +130 °C (-40 to +266 °F)<br>For a maximum of 60 minutes: 150 °C (302 °F) |

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

**PMP55 (with diaphragm seal)**

Depends on diaphragm seal and filling oil: -70 °C (-94 °F) up to +400 °C (+752 °F). Observe the temperature application limits → 115.

*Devices with PTFE coated process isolating diaphragm*

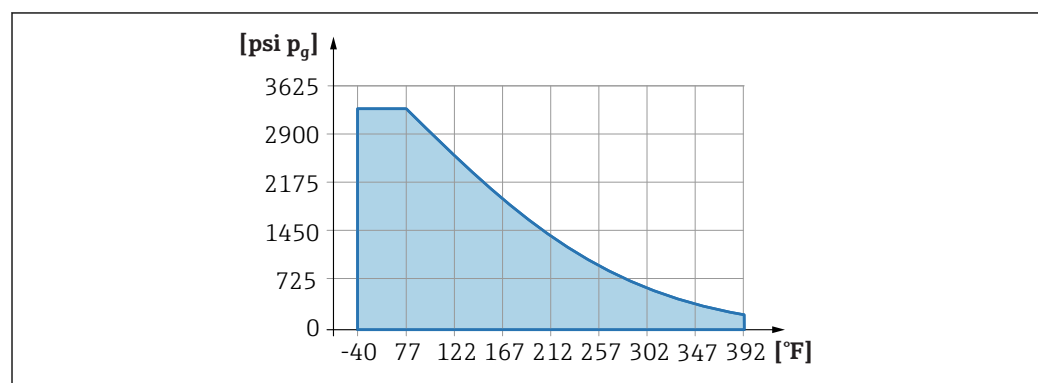
The non-stick coating has excellent gliding properties and is used to protect the process isolating diaphragm against abrasive media.

**NOTICE****Destruction of the device due to incorrect use of PTFE foil!**

- ▶ 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 isolating diaphragm, see the following diagram:



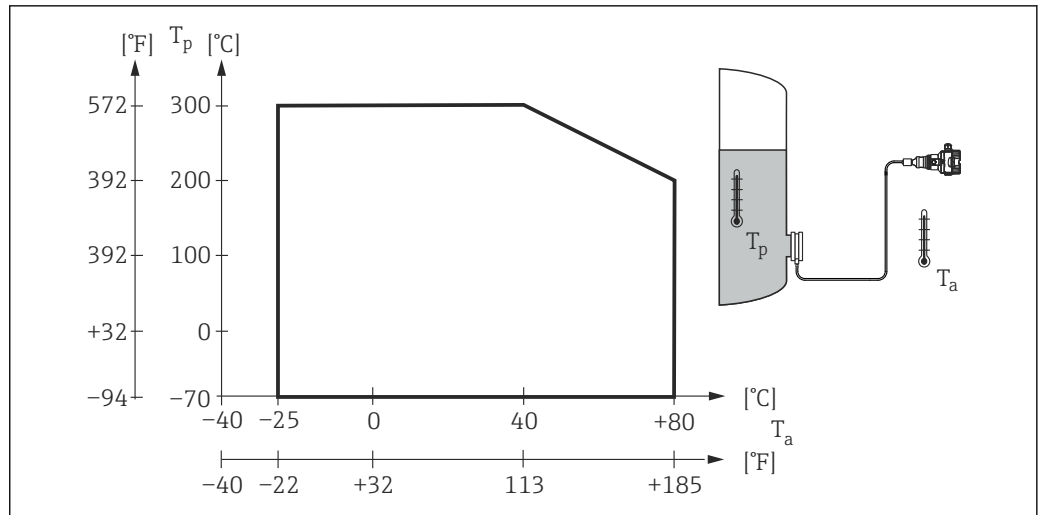
A0026949-EN



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

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

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



A0028227

## Pressure specifications

### ⚠ WARNING

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

- ▶ For pressure specifications, see the "Measuring range" section and the "Mechanical construction" section.
- ▶ Only operate the measuring device within the prescribed limits!
- ▶ 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.
- ▶ MWP (Maximum Working Pressure): The MWP (maximum working pressure) is specified on the nameplate. This value refers to a reference temperature of +20 °C (+68 °F) and may be applied to the device for an unlimited time. Observe the temperature dependency of the MWP. For the pressure values permitted at higher temperatures for flanges, please refer to standards EN 1092-1 (with regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under EN 1092-1; the chemical composition of the two materials can be identical.), ASME B 16.5a, JIS B 2220 (the latest version of the standard applies in each case).
- ▶ OPL (Over Pressure Limit = sensor overload limit): The test pressure corresponds to the over pressure limit of the sensor and may only be applied for a limited time period so that no permanent damage develops. In the case of sensor range and process connection combinations 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 → 42.
- ▶ Devices with ceramic process isolating diaphragm: Avoid steam hammering! Steam hammering can cause zero point drift. Recommendation: Residue (water droplets or condensation) may remain on the process isolating diaphragm following CIP cleaning and can result in local steam hammering the next time steam cleaning takes place. In practice, drying the process isolating diaphragm (e.g. by blowing off excess moisture) has proven to be a successful way of avoiding steam hammering.

## 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         | → 48 ff.     | (A)    |         |
| Optional mounted parts | → 78         | (B)    |         |
| Process connections    | → 50<br>→ 64 | (H)    |         |
| Installation space     | -            | (I)    |         |
| Installation space     |              |        |         |

### F31 housing, aluminum

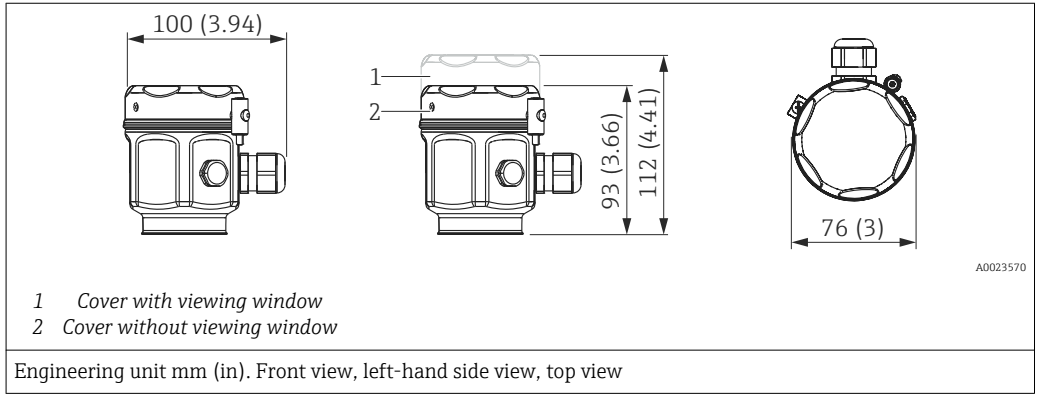
|   |   |
|---|---|
|   | <p>1 Cover with viewing window<br/>2 Cover without viewing window</p> |
| Engineering unit mm (in). Front view, left-hand side view, top view |   |

| 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 → 43



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

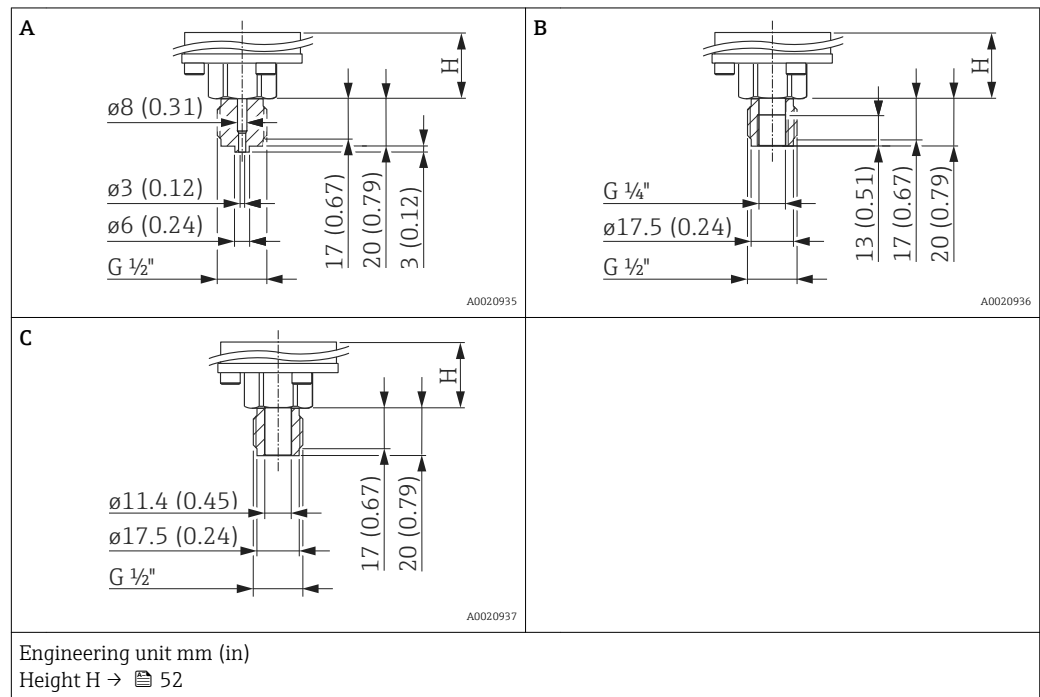


| Material  | Weight kg (lbs) |                 | Option <sup>1)</sup> |
|---|-----------------|-----------------|----------------------|
|   | With display    | Without display |                      |
| Stainless steel <sup>2)</sup>                             | 1.1 (2.43)      | 1.0 (2.21)      | 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) Product Configurator, "Housing" ordering feature → 43

PMC51: process connections  
with internal process  
isolating diaphragm

ISO 228 G threaded connection

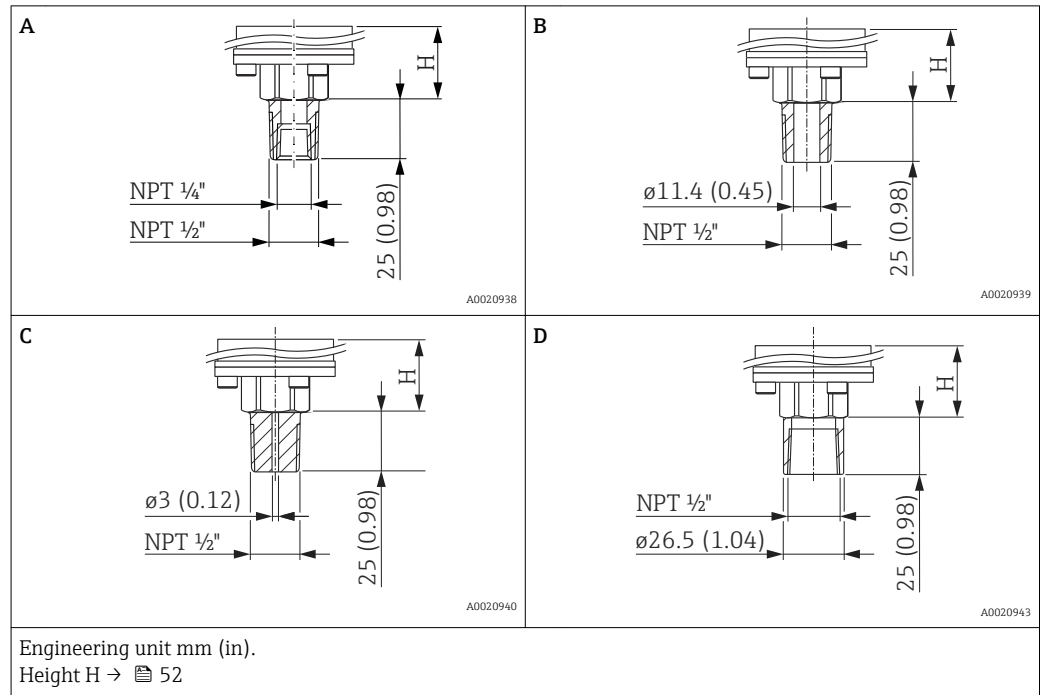


| Item | Designation  | Material   | Weight      | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|------|--|--|-------------|------------------------|----------------------|
|      |  |  | kg (lb)     |                        |                      |
| A    | Thread ISO 228 G 1/2" A EN 837        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

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

2) Product Configurator, "Process connection" ordering feature

ANSI threaded connection

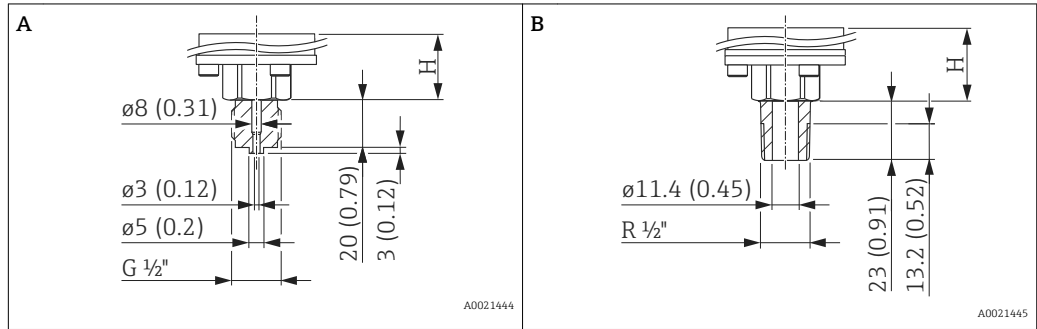


| Item | Designation                               | Material   | Weight      | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|------|---|--|-------------|------------------------|----------------------|
|      |   |  | kg (lb)     |                        |                      |
| A    | ANSI 1/2" MNPT, 1/4" FNPT                 | AISI 316L  | 0.63 (1.39) | CRN                    | RLJ                  |
|      |   | Alloy C276 (2.4819)  |             | CRN                    | RLC                  |
| B    | ANSI 1/2" MNPT,<br>Bore 11.4 mm (0.45 in) | AISI 316L  |             | CRN                    | RKJ                  |
|      |   | Alloy C276 (2.4819)  |             | CRN                    | RKC                  |
| C    | ANSI 1/2" MNPT,<br>Bore 3 mm (0.12 in)    | <b>PVDF</b><br><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<br>Bore 11.4 mm (0.45 in)  | AISI 316L  |             | CRN                    | R1J                  |
|      |   | Alloy C276 (2.4819)  |             | CRN                    | R1C                  |

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

**PMC51: process connections with internal process isolating diaphragm**

**JIS threaded connection**

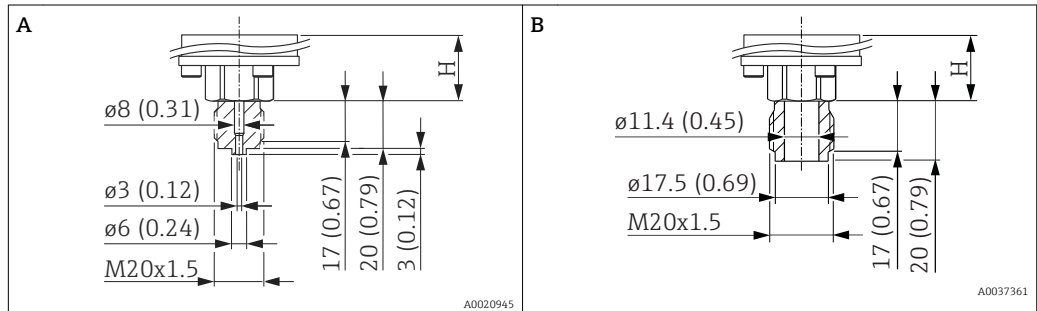


Engineering unit mm (in).  
Height H → 52

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

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

**DIN 13 threaded connection**



Engineering unit mm (in). Height H → 52

| Item | Designation                                  | Material            | Weight      | Option <sup>1)</sup> |
|------|--|---------------------|-------------|----------------------|
|      |  |                     | kg (lb)     |                      |
| A    | DIN 13 M20 x 1.5, EN 837 bore 3 mm (0.12 in) | AISI 316L           | 0.63 (1.39) | G5J                  |
|      |  | Alloy C276 (2.4819) |             | G6J                  |
| B    | DIN 13 M20 x 1.5 11.4 mm (0.45 in)           | AISI 316L           |             | G1J                  |

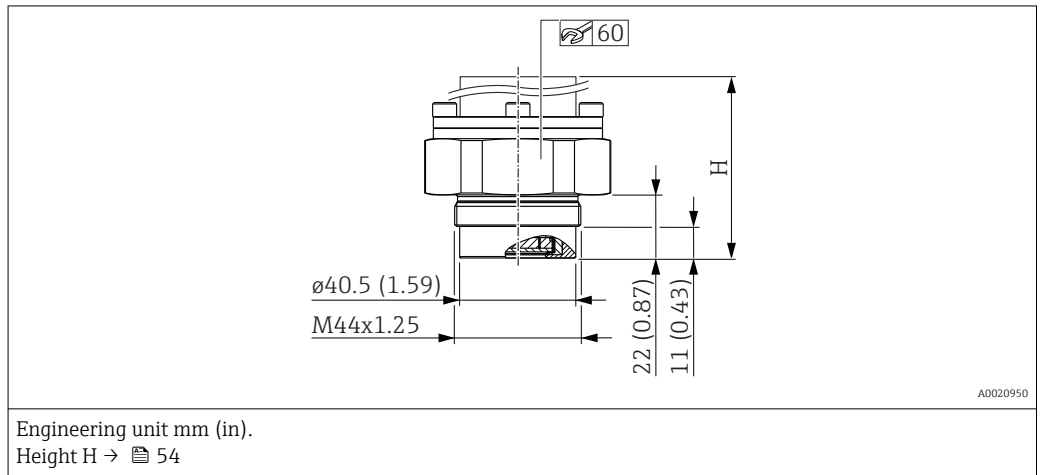
1) Product Configurator, order code for "Process connection"

**PMC51: process connections with internal process isolating diaphragm - height H**

| F31 housing     | F15 housing     |
|-----------------|-----------------|
| 27 mm (1.06 in) | 34 mm (1.34 in) |

**PMC51: process connections with flush-mounted process isolating diaphragm**

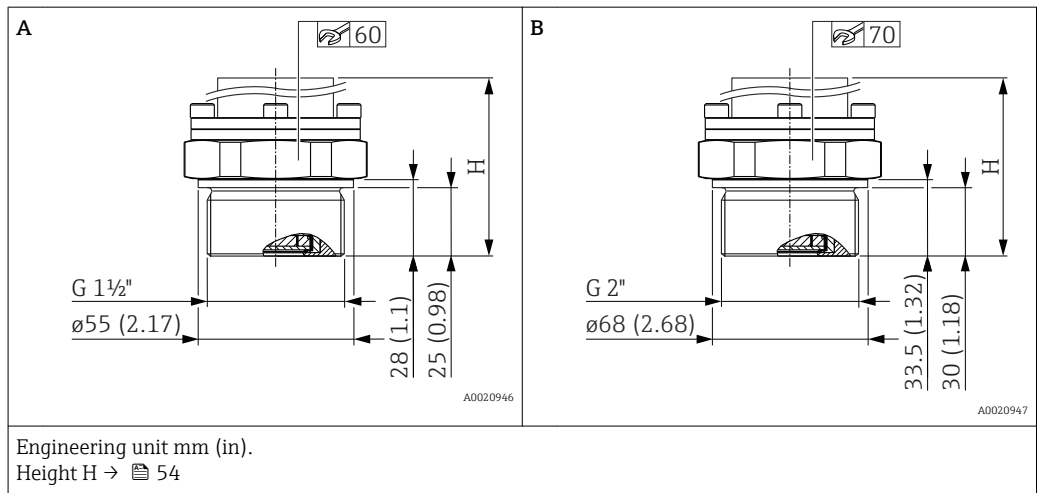
**DIN 13 threaded connection**



| Designation       | Material  | Weight      | Option <sup>1)</sup> |
|-------------------|-----------|-------------|----------------------|
|                   |           | kg (lb)     |                      |
| DIN 13 M44 x 1.25 | AISI 316L | 0.63 (1.39) | G4J                  |

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

**ISO 228 G threaded connection**

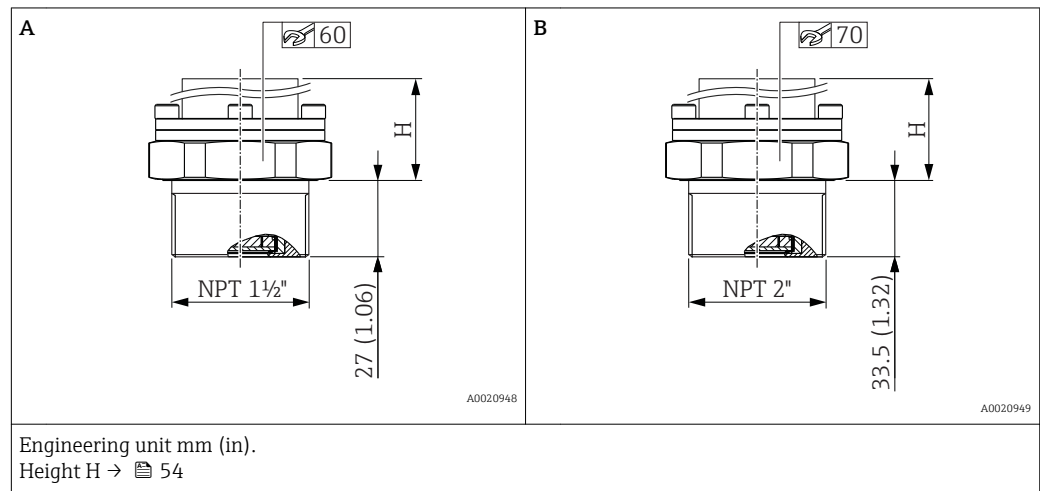


| Item | Designation               | Material  | Weight      | Option <sup>1)</sup> |
|------|---------------------------|-----------|-------------|----------------------|
|      |                           |           | kg (lb)     |                      |
| A    | Thread ISO 228 G 1 1/2" A | AISI 316L | 0.63 (1.39) | GVJ                  |
| B    | Thread ISO 228 G 2" A     | AISI 316L |             | GWJ                  |

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

**PMC51: process connections with flush-mounted process isolating diaphragm**

**ANSI threaded connection**



| Item | Designation             | Material  | Weight      | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|------|-------------------------|-----------|-------------|------------------------|----------------------|
|      |                         |           | kg (lb)     |                        |                      |
| A    | Thread ANSI 1 1/2" MNPT | AISI 316L | 0.63 (1.39) | CRN                    | U7J                  |
| B    | Thread ANSI 2" MNPT     | AISI 316L |             | CRN                    | U8J                  |

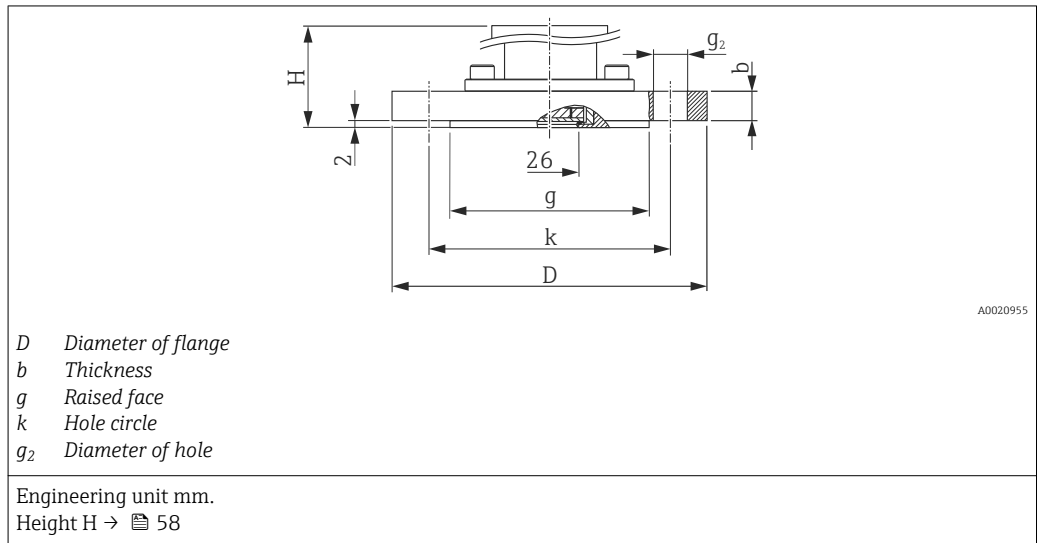
- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"

**PMC51: process connections with flush-mounted process isolating diaphragm - height H**

| Process connection        | F31 housing     | F15 housing     |
|---------------------------|-----------------|-----------------|
| DIN 13 M44 x 1.25         | 53 mm (2.09 in) | 60 mm (2.36 in) |
| Thread ISO 228 G 1 1/2" A | 50 mm (1.97 in) | 57 mm (2.24 in) |
| Thread ISO 228 G 2" A     | 45 mm (1.77 in) | 52 mm (2.05 in) |
| Thread ANSI 1 1/2" MNPT   | 48 mm (1.89 in) | 55 mm (2.17 in) |
| Thread ANSI 2" MNPT       | 45 mm (1.77 in) | 52 mm (2.05 in) |

**PMC51: process connections with flush-mounted process isolating diaphragm**

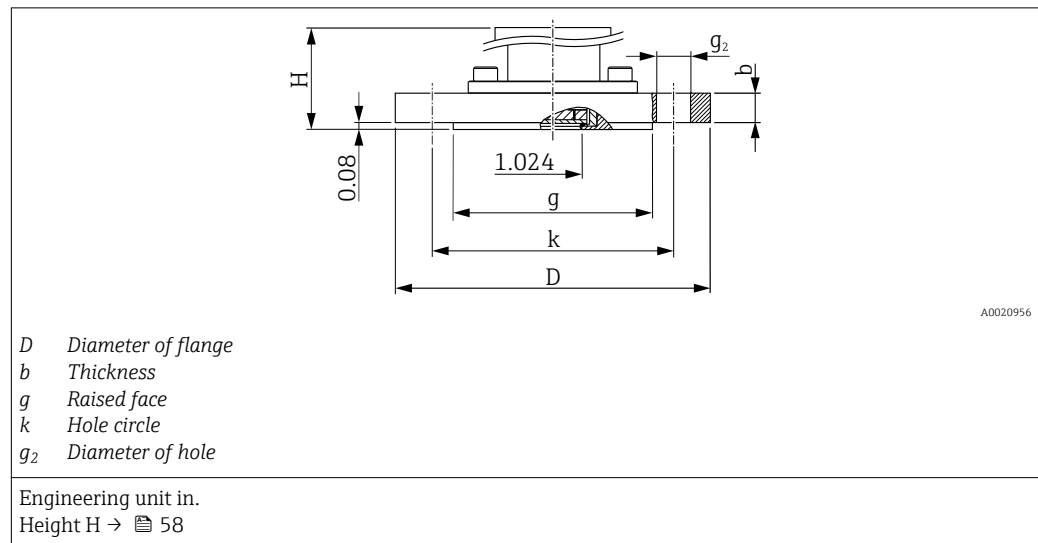
**EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527**



| Flange              |                  |                  |                     | Boltholes |      |     |        |                |     | Weight      | Option <sup>1)</sup> |
|---------------------|------------------|------------------|---------------------|-----------|------|-----|--------|----------------|-----|-------------|----------------------|
| Material            | Nominal diameter | Nominal pressure | Shape <sup>2)</sup> | D         | b    | g   | Number | g <sub>2</sub> | k   | kg (lb)     |                      |
|                     |                  |                  |                     | mm        | mm   | mm  |        | mm             | mm  |             |                      |
| AISI 316L           | DN 25            | PN 10-40         | B1 (D)              | 115       | 18   | 68  | 4      | 14             | 85  | 1.4 (3.09)  | CNJ                  |
| AISI 316L           | DN 32            | PN 10-40         | B1 (D)              | 140       | 18   | 78  | 4      | 18             | 100 | 2.0 (4.41)  | CPJ                  |
| AISI 316L           | DN 40            | PN 10-40         | B1 (D)              | 150       | 18   | 88  | 4      | 18             | 110 | 2.4 (5.29)  | CQJ                  |
| ECTFE <sup>3)</sup> | DN 40            | PN 10-40         | B2 (E)              | 150       | 21   | 88  | 4      | 18             | 110 | 2.6 (5.73)  | CQP                  |
| AISI 316L           | DN 50            | PN 10-40         | B1 (D)              | 165       | 20   | 102 | 4      | 18             | 125 | 3.2 (7.06)  | CXJ                  |
| PVDF <sup>4)</sup>  | DN 50            | PN 10-16         | B2 (E)              | 165       | 21.4 | 102 | 4      | 18             | 125 | 0.6 (1.32)  | CFF                  |
| ECTFE <sup>3)</sup> | DN 50            | PN 25-40         | B2 (E)              | 165       | 20   | 102 | 4      | 18             | 125 | 3.2 (7.06)  | CRP                  |
| AISI 316L           | DN 80            | PN 10-40         | B1 (D)              | 200       | 24   | 138 | 8      | 18             | 160 | 5.4 (11.91) | CZJ                  |
| ECTFE <sup>3)</sup> | DN 80            | PN 25-40         | B2 (E)              | 200       | 24   | 138 | 8      | 18             | 160 | 5.5 (12.13) | CSP                  |

- 1) Product Configurator, order code for "Process connection"
- 2) Description as per DIN 2527 provided in brackets
- 3) ECTFE coating on AISI 316L (1.4404). When using 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 ANSI B 16.5, raised face RF

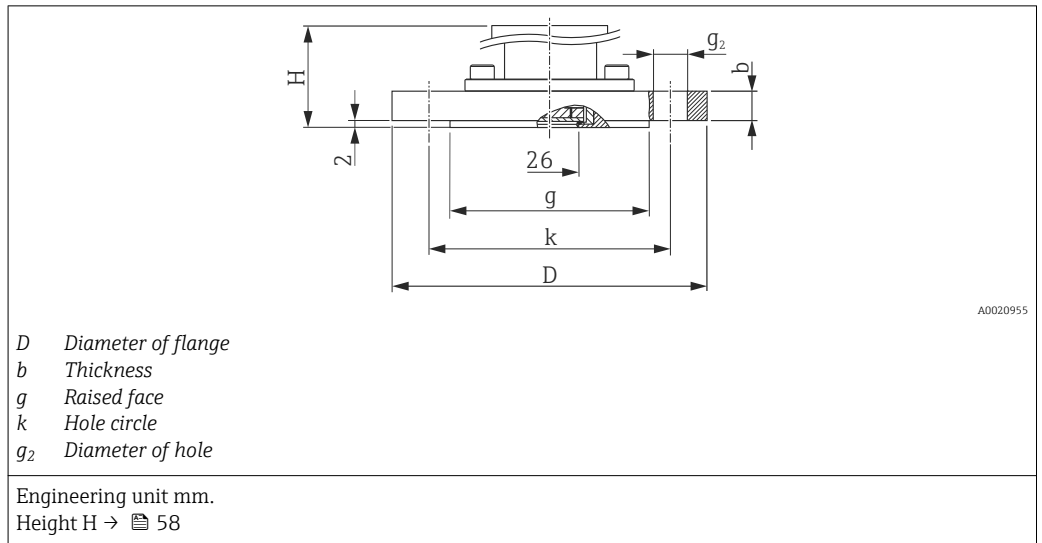


| Flange                      |                  |             |      |      |      | Boltholes |       |      | Weight       | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|-----------------------------|------------------|-------------|------|------|------|-----------|-------|------|--------------|------------------------|----------------------|
| Material                    | Nominal diameter | Class       | D    | b    | g    | Number    | $g_2$ | k    |              |                        |                      |
|                             | [in]             | [lb./sq.in] | [in] | [in] | [in] |           | [in]  | [in] | [kg (lb)]    |                        |                      |
| AISI 316/316L <sup>3)</sup> | 1                | 150         | 4.25 | 1.18 | 2    | 4         | 0.62  | 3.12 | 0.9 (1.98)   | -                      | ACJ <sup>4)</sup>    |
| AISI 316/316L <sup>3)</sup> | 1                | 300         | 4.88 | 1.18 | 2    | 4         | 0.75  | 3.5  | 1.4 (3.09)   | -                      | ANJ <sup>4)</sup>    |
| AISI 316/316L <sup>3)</sup> | 1 ½              | 150         | 5    | 0.69 | 2.88 | 4         | 0.62  | 3.88 | 1.0 (2.21)   | CRN                    | AEJ                  |
| AISI 316/316L <sup>3)</sup> | 1 ½              | 300         | 6.12 | 0.81 | 2.88 | 4         | 0.88  | 4.5  | 2.6 (5.73)   | CRN                    | AQJ                  |
| AISI 316/316L <sup>3)</sup> | 2                | 150         | 6    | 0.75 | 3.62 | 4         | 0.75  | 4.75 | 2.4 (5.29)   | CRN                    | AFJ                  |
| ECTFE <sup>5)</sup>         | 2                | 150         | 6    | 0.75 | 3.62 | 4         | 0.75  | 4.75 | 2.4 (5.29)   | -                      | AFN                  |
| PVDF <sup>6)</sup>          | 2                | 150         | 6    | 0.75 | 3.62 | 4         | 0.75  | 4.75 | 0.5 (1.1)    | -                      | AFF                  |
| AISI 316/316L <sup>3)</sup> | 2                | 300         | 6.5  | 0.88 | 3.62 | 8         | 0.75  | 5    | 3.2 (7.06)   | CRN                    | ARJ                  |
| AISI 316/316L <sup>3)</sup> | 3                | 150         | 7.5  | 0.94 | 5    | 4         | 0.75  | 6    | 4.9 (10.8)   | CRN                    | AGJ                  |
| ECTFE <sup>5)</sup>         | 3                | 150         | 7.5  | 0.94 | 5    | 4         | 0.75  | 6    | 4.9 (10.8)   | -                      | AGN                  |
| PVDF <sup>6)</sup>          | 3                | 150         | 7.5  | 0.94 | 5    | 4         | 0.75  | 6    | 0.9 (1.98)   | -                      | AGF                  |
| AISI 316/316L <sup>3)</sup> | 3                | 300         | 8.25 | 1.12 | 5    | 8         | 0.88  | 6.62 | 6.8 (14.99)  | CRN                    | ASJ                  |
| AISI 316/316L <sup>3)</sup> | 4                | 150         | 9    | 0.94 | 6.19 | 8         | 0.75  | 7.5  | 7.1 (15.66)  | CRN                    | AHJ                  |
| ECTFE <sup>5)</sup>         | 4                | 150         | 9    | 0.94 | 6.19 | 8         | 0.75  | 7.5  | 7.1 (15.66)  | -                      | AHN                  |
| AISI 316/316L <sup>3)</sup> | 4                | 300         | 10   | 1.25 | 6.19 | 8         | 0.88  | 7.88 | 11.6 (25.58) | CRN                    | ATJ                  |

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



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

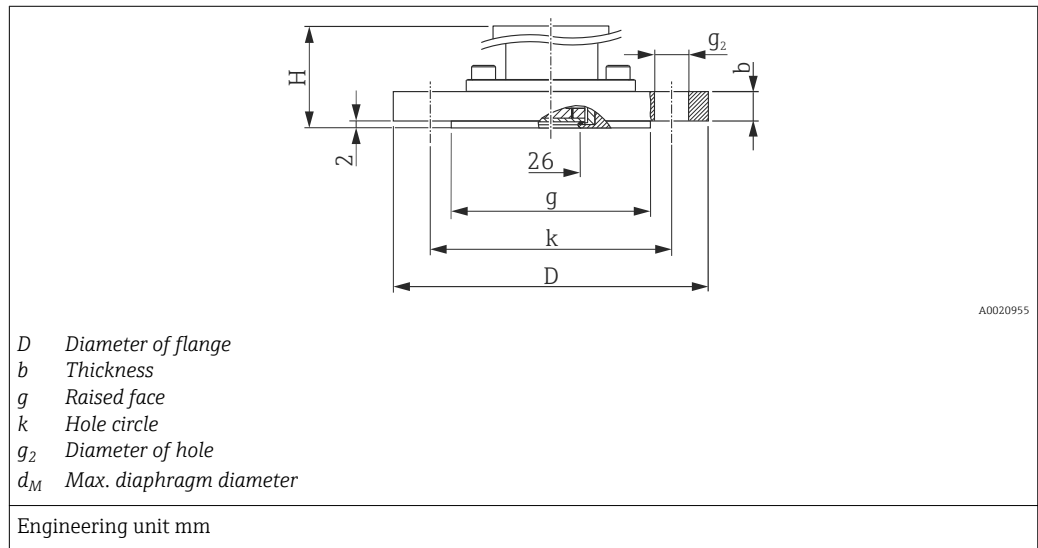


| Flange                |                  |                  |     |    |     | Boltholes |                |     | Weight     | Option <sup>1)</sup> |
|-----------------------|------------------|------------------|-----|----|-----|-----------|----------------|-----|------------|----------------------|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

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

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]  | [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"

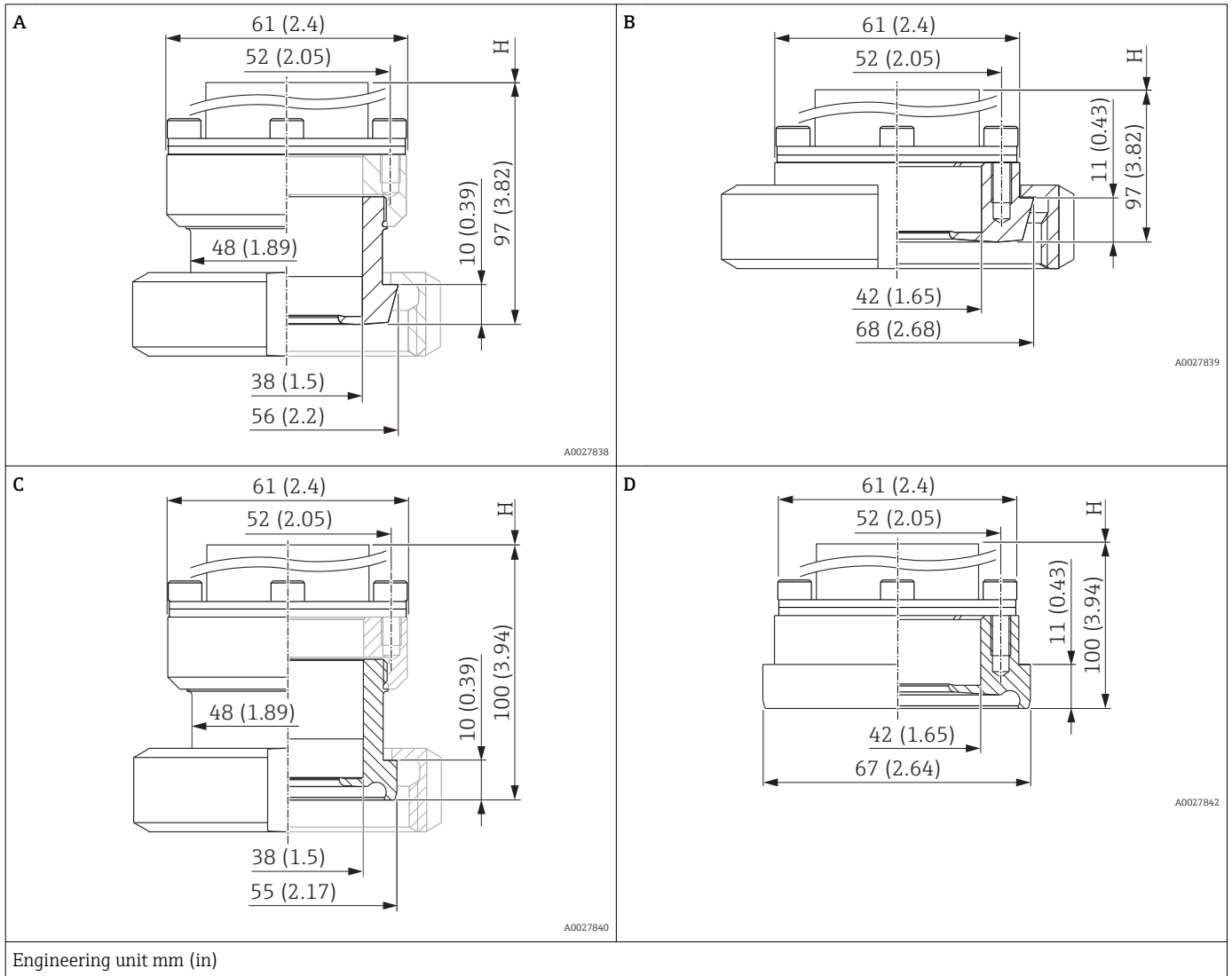
PMC51: process connections with flush-mounted process isolating diaphragm - height H

| F31 housing    | F15 housing     |
|----------------|-----------------|
| 94 mm (3.7 in) | 98 mm (3.86 in) |

**PMC51: hygienic process connections with flush mount process isolating diaphragm**

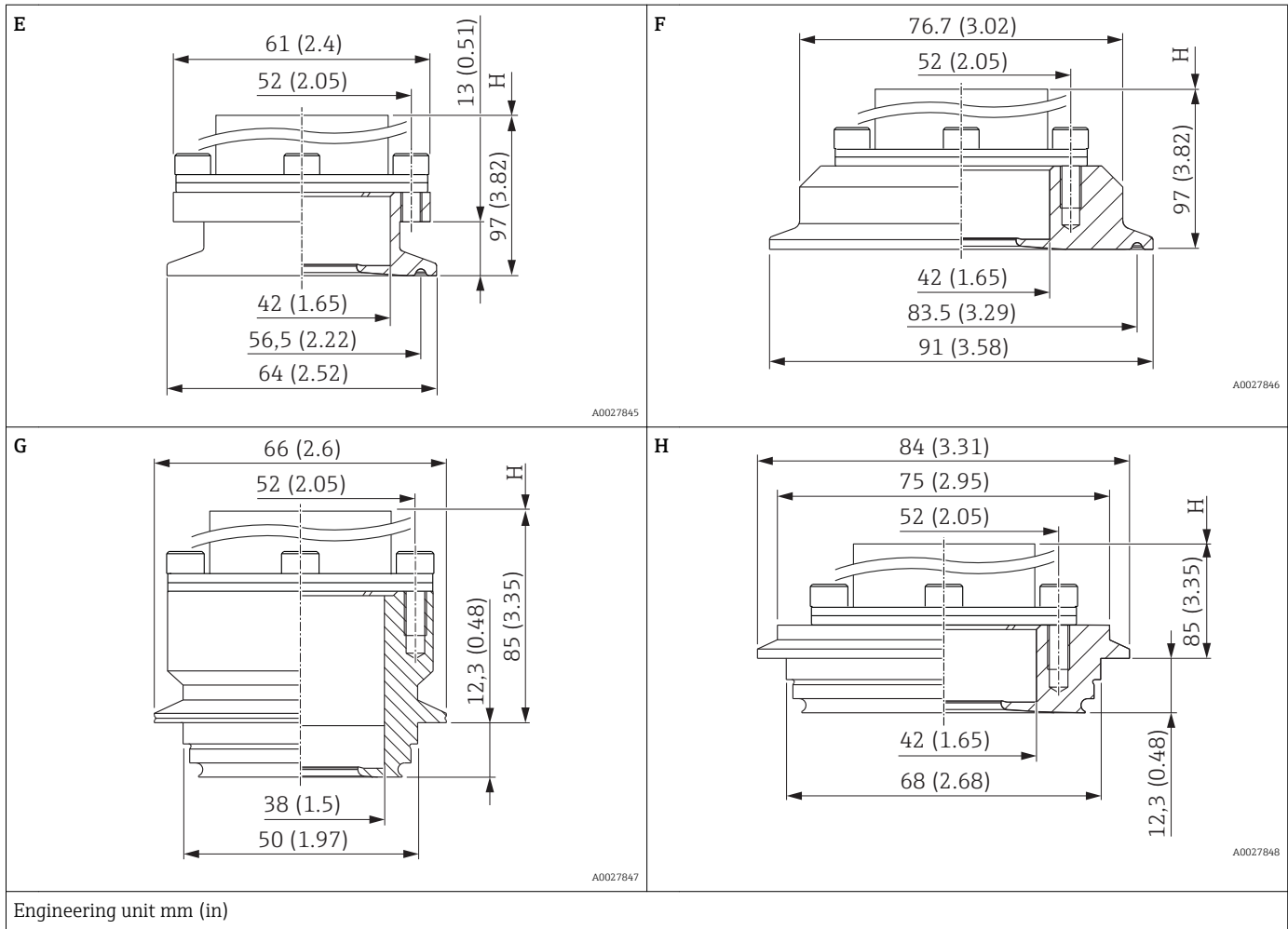
In order to guarantee a hygiene approval, a seal with appropriate approval must be selected for the hygienic process connection:

- For 3A approval, you require a seal made of EPDM or HNBR → 45
- For EHEDG approval, you require a seal made of VMQ silicone, FFKM Kalrez → 45



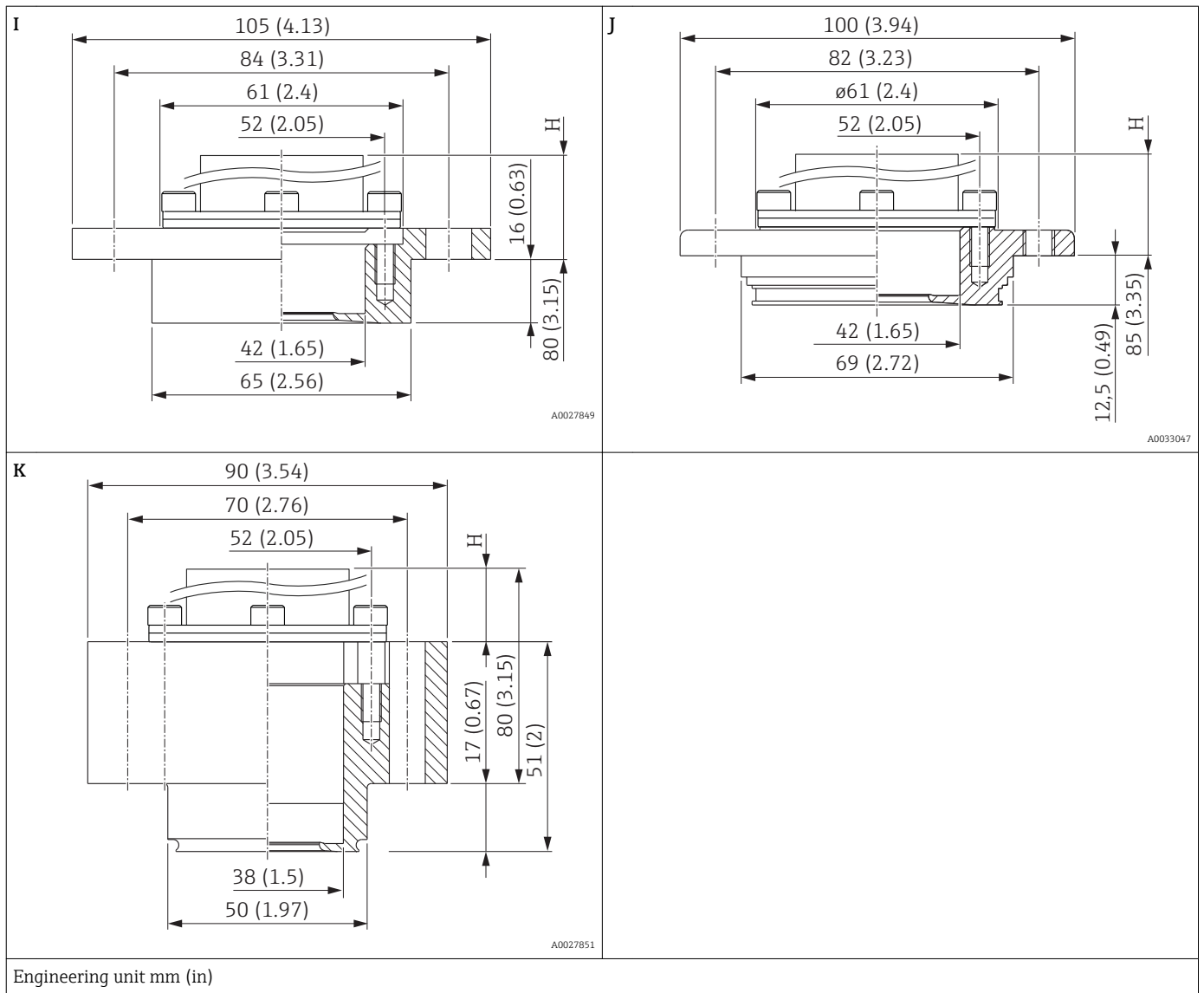
| Item | Designation                         | Nominal pressure | Material <sup>1)</sup> | Weight      | Approval <sup>2)</sup>                 | Option <sup>3)</sup> |
|------|-------------------------------------|------------------|------------------------|-------------|--|----------------------|
|      |                                     |                  |                        | kg (lb)     |  |                      |
| A    | DIN 11851 DN40                      | PN 25            | AISI 316L<br>(1.4435)  | 0.7 (1.54)  | EHEDG, 3A with seal FDA, ASME-BPE, CRN | MZJ <sup>4)</sup>    |
| B    | DIN 11851 DN50                      | PN 25            |                        | 0.9 (1.98)  |  | MRJ <sup>4)</sup>    |
| C    | DIN 11864 DN40,<br>Pipe DIN 11866-A | PN 16            |                        | 0.66 (1.46) | EHEDG, 3A with seal FDA, ASME-BPE      | NCJ <sup>4)</sup>    |
| D    | DIN 11864 DN50,<br>Pipe DIN 11866-A | PN 16            |                        | 0.29 (0.64) |  | NDJ <sup>4)</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, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies these slotted-nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).



| Item | Designation                        | Nominal pressure | Material <sup>1)</sup> | Weight      | Approval <sup>2)</sup>                 | Option <sup>3)</sup> |
|------|------------------------------------|------------------|------------------------|-------------|--|----------------------|
|      |                                    |                  |                        | kg (lb)     |  |                      |
| E    | Tri-Clamp ISO 2852, DN40-DN51 (2") | PN 40            | AISI 316L<br>(1.4435)  | 0.65 (1.44) | EHEDG, 3A with seal FDA, CRN, ASME-BPE | TDJ <sup>4)</sup>    |
| F    | Tri-Clamp ISO 2852, DN76.1 (3")    | PN 40            |                        | 0.9 (1.98)  | EHEDG, 3A with seal FDA, CRN, ASME-BPE | TFJ                  |
| G    | Varivent F pipe, DN25-32           | PN 40            |                        | 0.46 (1)    | EHEDG, 3A with seal FDA, ASME-BPE      | TQJ                  |
| H    | Varivent N pipe, DN40-162          | PN 40            |                        | 1 (2.21)    | EHEDG, 3A with seal FDA, ASME-BPE      | TRJ                  |

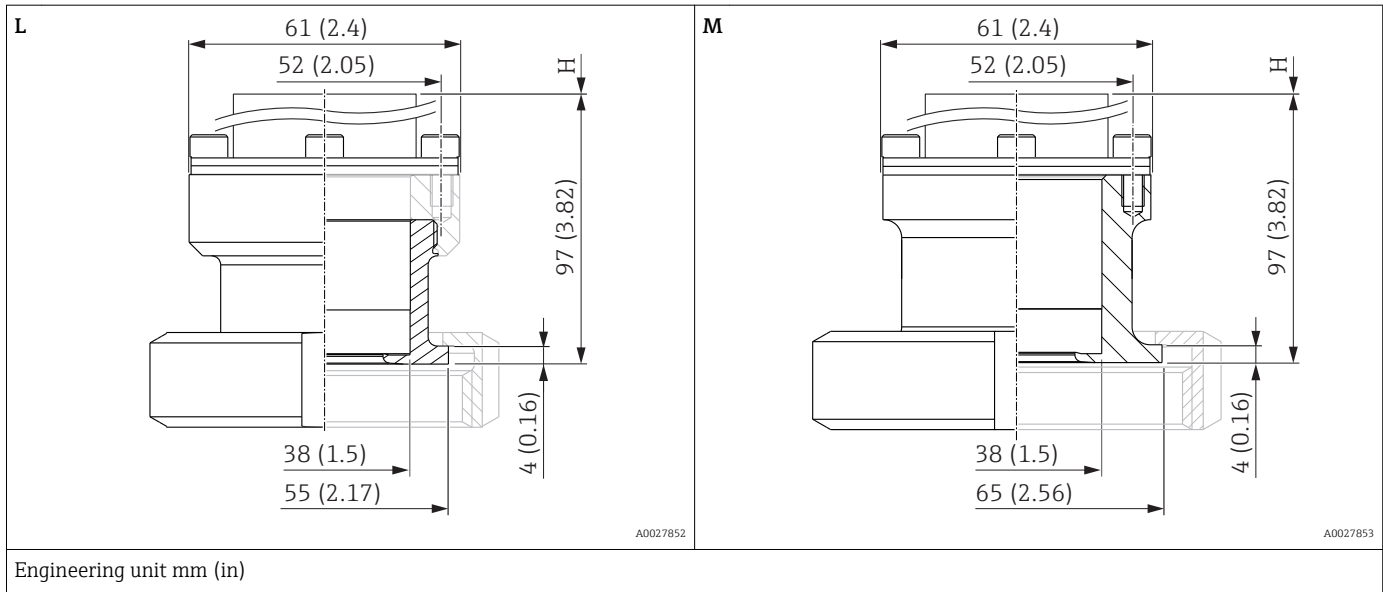
- 1) Delta ferrite content < 1 %. The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (30  $\mu\text{in}$ ).
- 2) CSA approval: Product Configurator, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies these slotted-nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).



Engineering unit mm (in)

| Item | Designation            | Nominal pressure | Material <sup>1)</sup> | Weight      | Approval <sup>2)</sup>          | Option <sup>3)</sup> |
|------|------------------------|------------------|------------------------|-------------|---------------------------------|----------------------|
|      |                        |                  |                        | kg (lb)     |                                 |                      |
| I    | DRD, DN50 (65 mm)      | PN 25            | AISI 316L<br>(1.4435)  | 0.9 (1.98)  | FDA                             | TIJ <sup>4)</sup>    |
| J    | APV Inline, DN50       | PN 40            |                        | 0.52 (1.15) | 3A with seal FDA, CRN, ASME-BPE | TMJ                  |
| K    | NEUMO BioControl, DN50 | PN 16            |                        | 1.34 (2.6)  | 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, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies these slotted-nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).
- 5) 4 screws DIN912 M8 x 45 are enclosed (material A4-80)



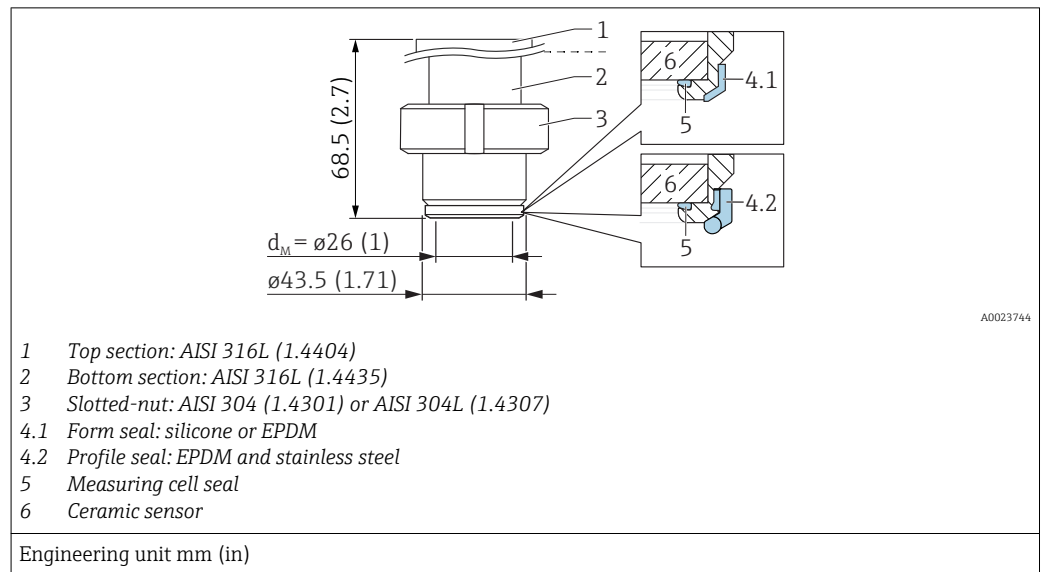
| Item | Designation | Nominal pressure | Material <sup>1)</sup> | Weight      | Approval <sup>2)</sup> | Option <sup>3)</sup> |
|------|-------------|------------------|------------------------|-------------|------------------------|----------------------|
|      |             |                  |                        | kg (lb)     |                        |                      |
| L    | SMS 1 ½"    | PN 25            | AISI 316L<br>(1.4435)  | 0.65 (1.43) | 3A, ASME-BPE           | TXJ <sup>4)</sup>    |
| M    | SMS 2"      | PN 25            |                        | 0.65 (1.43) |                        | T7J <sup>4)</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, order code for "Approval"
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies the slotted-nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).

**Height H**

| Item | Process connection                 | F31 housing     | F15 housing     |
|------|------------------------------------|-----------------|-----------------|
| A    | DIN 11851 DN40                     | 48 mm (1.89 in) | 54 mm (2.13 in) |
| B    | DIN 11851 DN50                     | 70 mm (2.76 in) | 77 mm (3.03 in) |
| C    | DIN 11864 DN40, pipe DIN 11866-A   | 48 mm (1.89 in) | 54 mm (2.13 in) |
| D    | DIN 11864 DN50, pipe DIN 11866-A   | 70 mm (2.76 in) | 77 mm (3.03 in) |
| E    | Tri-Clamp ISO 2852, DN40-DN51 (2") | 70 mm (2.76 in) | 77 mm (3.03 in) |
| F    | Tri-Clamp ISO 2852, DN76.1 (3")    | 70 mm (2.76 in) | 77 mm (3.03 in) |
| G    | Varivent F pipe, DN25-32           | 48 mm (1.89 in) | 54 mm (2.13 in) |
| H    | Varivent N pipe, DN40-162          | 70 mm (2.76 in) | 77 mm (3.03 in) |
| I    | DRD, DN50 (65 mm)                  | 70 mm (2.76 in) | 77 mm (3.03 in) |
| J    | APV Inline, DN50                   | 70 mm (2.76 in) | 77 mm (3.03 in) |
| K    | NEUMO BioControl, DN50             | 48 mm (1.89 in) | 54 mm (2.13 in) |
| L    | SMS 1 ½"                           | 48 mm (1.89 in) | 54 mm (2.13 in) |
| M    | SMS 2"                             | 48 mm (1.89 in) | 54 mm (2.13 in) |

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 form seal: FDA 21CFR177.2600/USP Class VI, order number: 52023572

EPDM form seal: FDA, USP Class VI; 5 pcs, order number: 71100719

EPDM and stainless steel profile seal: FDA, USP Class VI; 1 pc, order number: 71431380

| Designation   | Nominal pressure bar (psi) | Weight      | Process connection approval                    | Option <sup>1)</sup> |
|---|----------------------------|-------------|--|----------------------|
|   |                            | [kg (lb)]   |  |                      |
| Universal process adapter<br>Form seal made of silicone (4.1)   | 10 (145)                   | 0.74 (1.63) | ASME-BPE<br>For more, see Product Configurator | UPJ                  |
| Universal process adapter<br>Form seal made of<br><ul style="list-style-type: none"> <li>■ EPDM (4.1) or</li> <li>■ EPDM and stainless steel (4.2)</li> </ul> |                            |             | ASME-BPE<br>For more, see Product Configurator | UNJ                  |

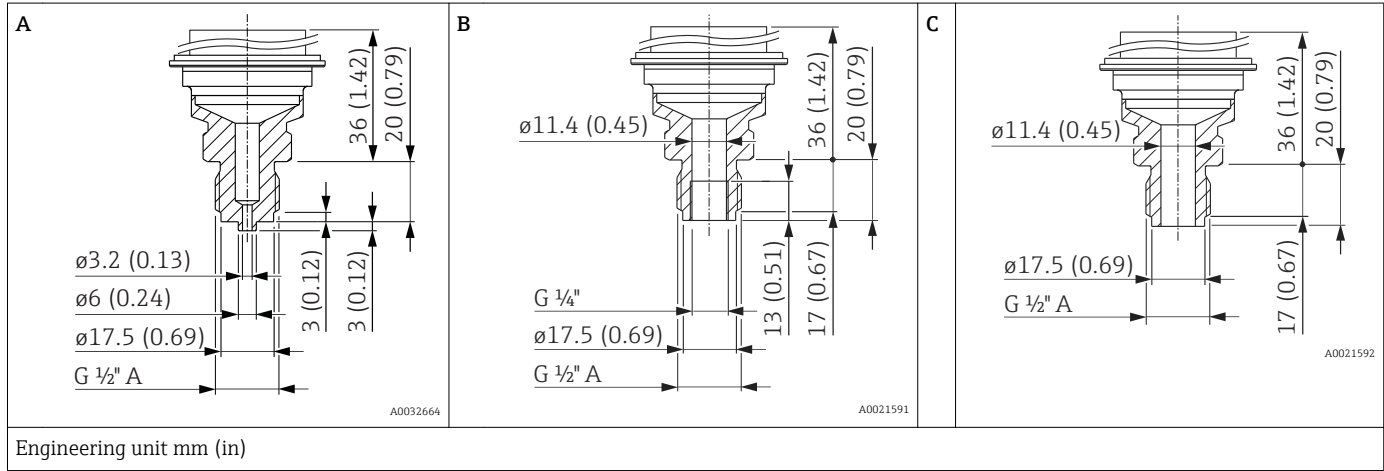
1) Product Configurator, order code for "Process connection"

| Material of the form 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 or EPDM and stainless steel              | EPDM  | FDA <sup>2)</sup>  | J                    |

1) Product Configurator, order code for "Seal"

2) Food-safe FDA 21 CFR 177.2600

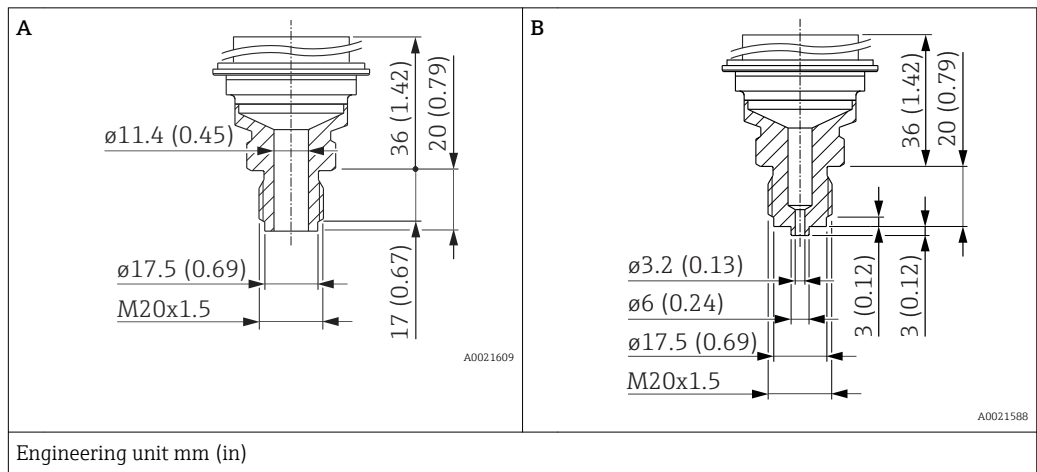
**PMP51: process connections ISO 228 G threaded connection with internal process isolating diaphragm**



| 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)    | G CJ                 |
|      |   | Alloy C276 (2.4819) |                | G CC                 |
| B    | Thread ISO 228 G 1/2" A, G 1/4" (female)        | AISI 316L           |                | GL J                 |
|      |   | Alloy C276 (2.4819) |                | GL C                 |
| C    | Thread ISO 228 G 1/2" A, Bore 11.4 mm (0.45 in) | AISI 316L           | GM J           |                      |
|      |   | Alloy C276 (2.4819) | GM C           |                      |

1) Product Configurator, "Process connection" ordering feature

**DIN 13 threaded connection**



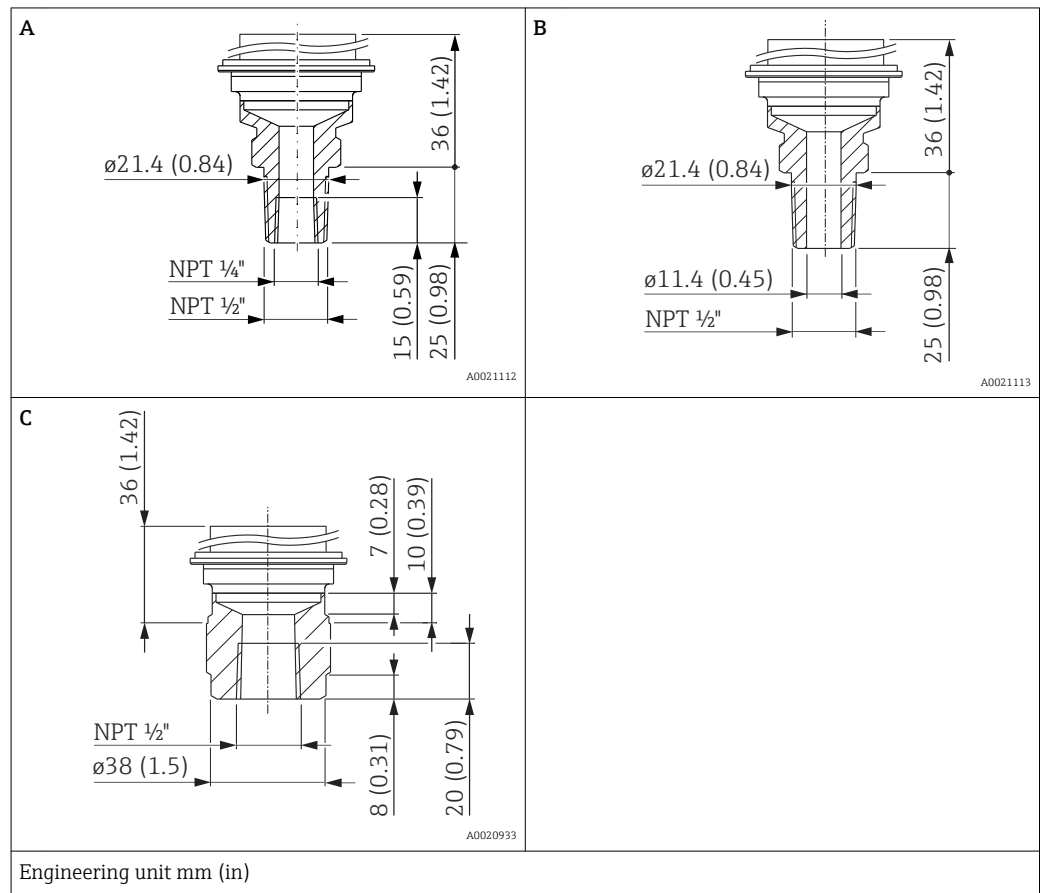
| Item | Designation                                   | Material            | Weight kg (lb) | Option <sup>1)</sup> |
|------|---|---------------------|----------------|----------------------|
| A    | DIN 13 M20 x 1,5 Bore 11.4 mm (0.45 in)       | AISI 316L           | 0.6 (1.32)     | G 1 J                |
|      |   | Alloy C276 (2.4819) |                | G 2 J                |
| B    | DIN 13 M20 x 1,5, EN 837, Bore 3 mm (0.12 in) | AISI 316L           |                | G 5 J                |
|      |   | Alloy C276 (2.4819) |                | G 6 J                |

1) Product Configurator, "Process connection" ordering feature



**PMP51: process connections with internal process isolating diaphragm**

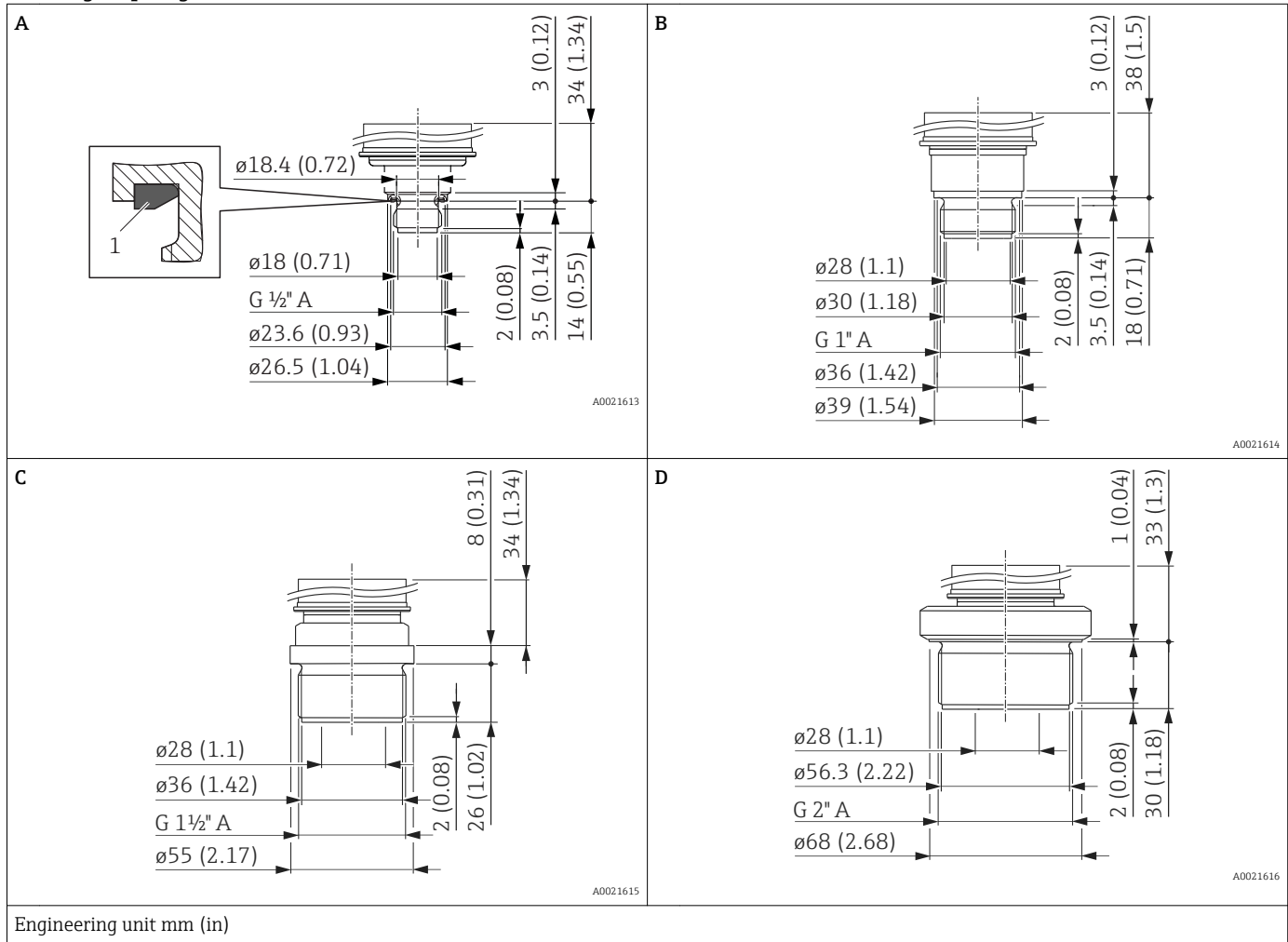
**ANSI threaded connection**



| 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,<br>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

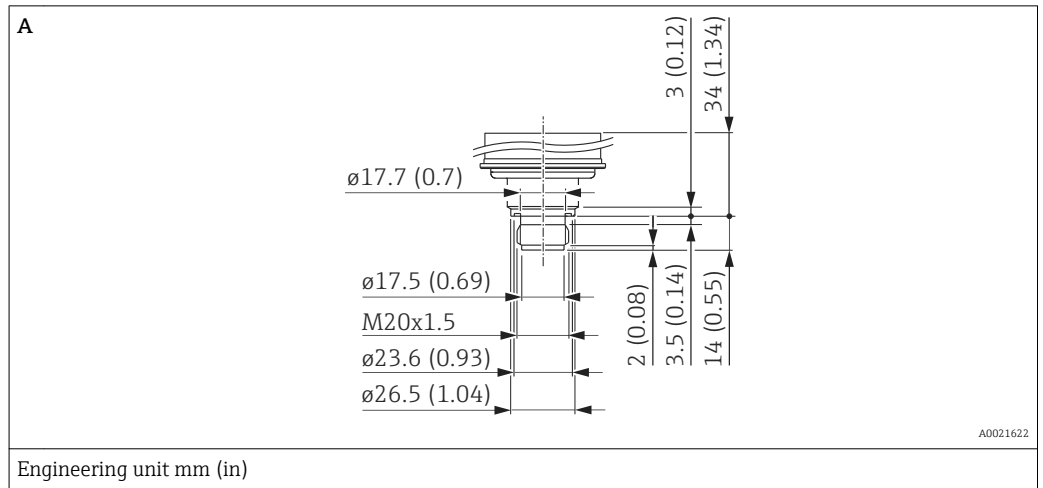
**PMP51: process connections  
with flush-mounted process  
isolating diaphragm**      **ISO 228 G threaded connection**



| Item | Designation  | Material            | Weight     | Option <sup>1)</sup> |
|------|--|---------------------|------------|----------------------|
|      |  |                     | kg (lb)    |                      |
| A    | Thread ISO 228 G 1/2" A DIN 3852<br>FKM form 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, order code for "Process connection"

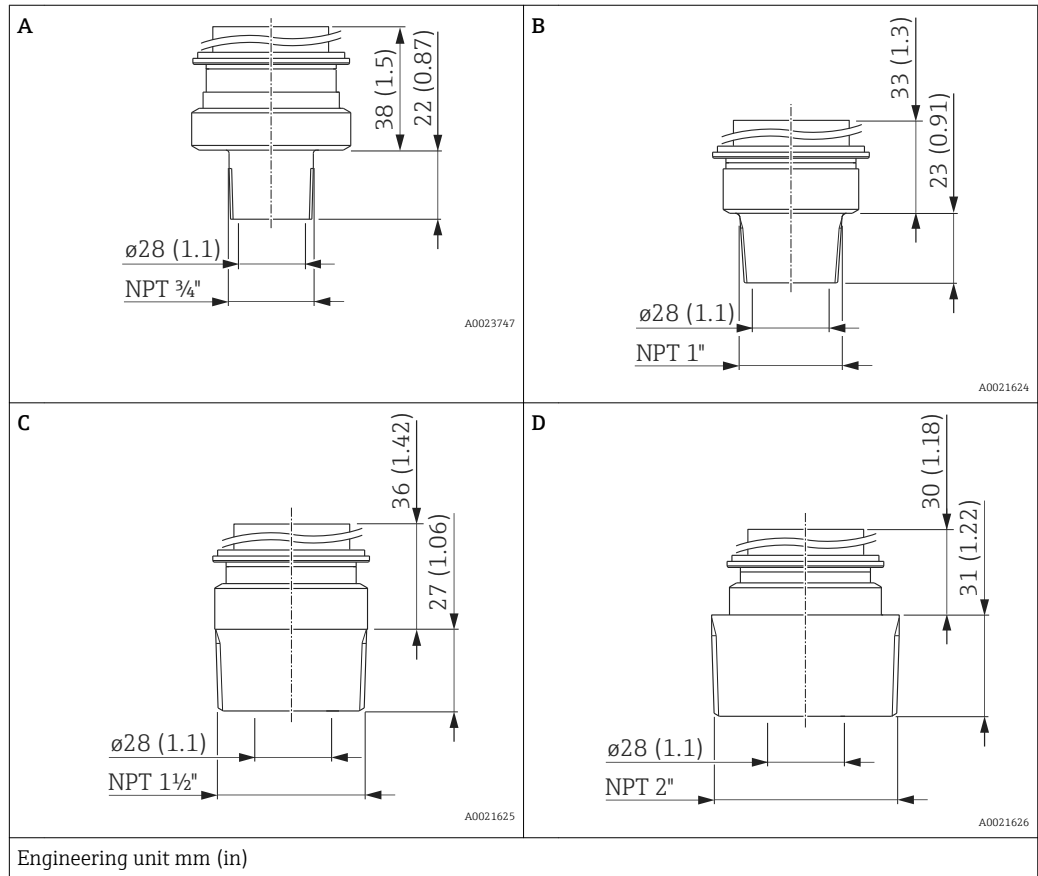
DIN 13 threaded connection



| Designation      | Material            | Weight     | Option <sup>1)</sup> |
|------------------|---------------------|------------|----------------------|
|                  |                     | kg (lb)    |                      |
| DIN 13 M20 x 1.5 | AISI 316L           | 0.6 (1.32) | G7J                  |
|                  | Alloy C276 (2.4819) |            | G8J                  |

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

ANSI threaded connection



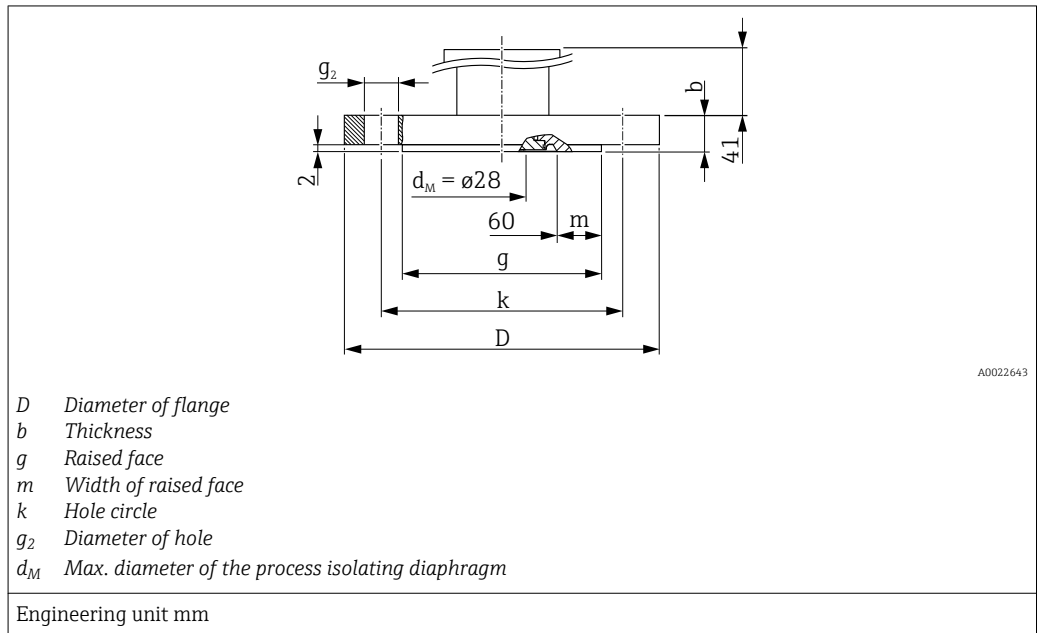
| Position | Designation      | Material  | Weight     | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|----------|------------------|-----------|------------|------------------------|----------------------|
|          |                  |           | kg (lb)    |                        |                      |
| 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, order code for "Approval"

2) Product Configurator, "Process connection" section

**PMP51: process connections with flush-mounted process isolating diaphragm**

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

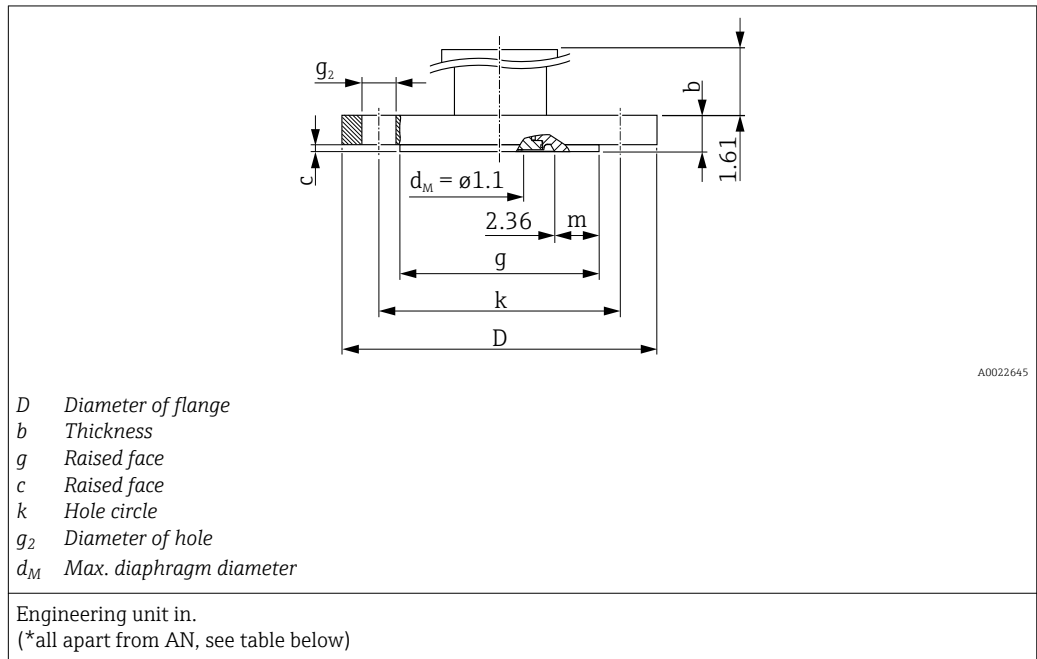


| Flange <sup>1)</sup> |                  |                     |      |      |                  |      | Boltholes |                |      | Weight Flange | Option <sup>2)</sup> |
|----------------------|------------------|---------------------|------|------|------------------|------|-----------|----------------|------|---------------|----------------------|
| Nominal diameter     | Nominal pressure | Shape <sup>3)</sup> | D    | b    | g                | m    | Quantity  | g <sub>2</sub> | k    |               |                      |
|                      |                  |                     | [mm] | [mm] | [mm]             | [mm] |           | [mm]           | [mm] | [mm]          |                      |
| DN 25                | PN 10-40         | B1 (D)              | 115  | 18   | 68 <sup>4)</sup> | 4    | 4         | 14             | 85   | 1.2 (2.65)    | CNJ                  |
| DN 32                | PN 10-40         | B1 (D)              | 140  | 18   | 78 <sup>4)</sup> | 9    | 4         | 18             | 100  | 1.9 (4.19)    | CPJ                  |
| DN 40                | PN 10-40         | B1 (D)              | 150  | 18   | 88 <sup>4)</sup> | 14   | 4         | 18             | 110  | 2.2 (4.85)    | CQJ                  |
| DN 50                | PN 10-40         | B1 (D)              | 165  | 20   | 102              | -    | 4         | 18             | 125  | 3.0 (6.62)    | CXJ                  |
| DN 80                | PN 10-40         | B1 (D)              | 200  | 24   | 138              | -    | 8         | 18             | 160  | 5.3 (11.69)   | CZJ                  |

- 1) Material: AISI 316L
- 2) Product Configurator, "Process connection" section
- 3) Description as per DIN 2527 provided in brackets
- 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**

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

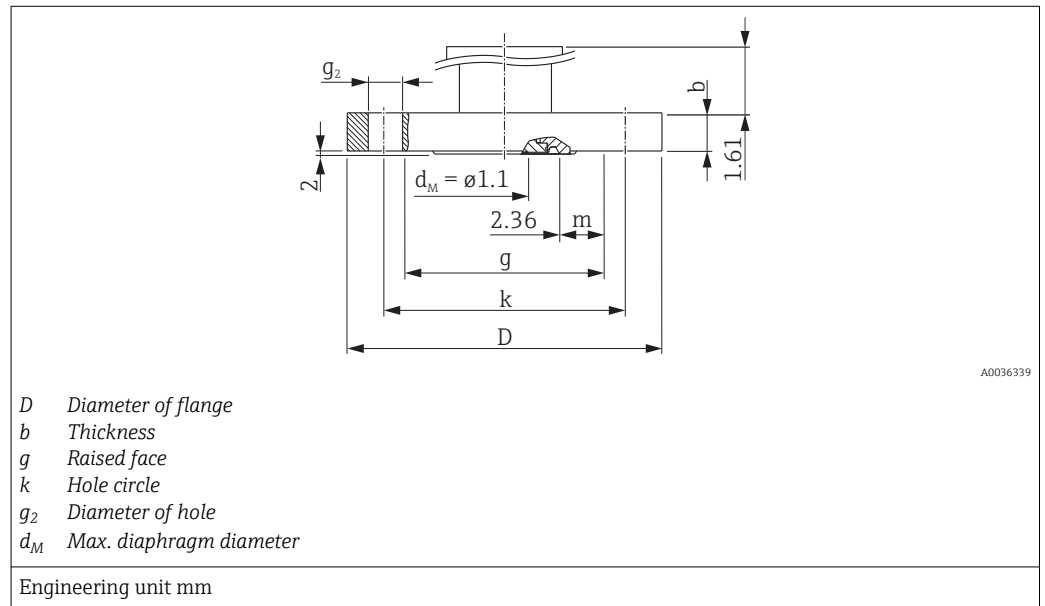


| Flange <sup>1)</sup> |                        |      |      |                    |      |      | Boltholes |                |      | Weight       | Approval <sup>2)</sup> | Option <sup>3)</sup> |
|----------------------|------------------------|------|------|--------------------|------|------|-----------|----------------|------|--------------|------------------------|----------------------|
| 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                    | 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" section
- 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**

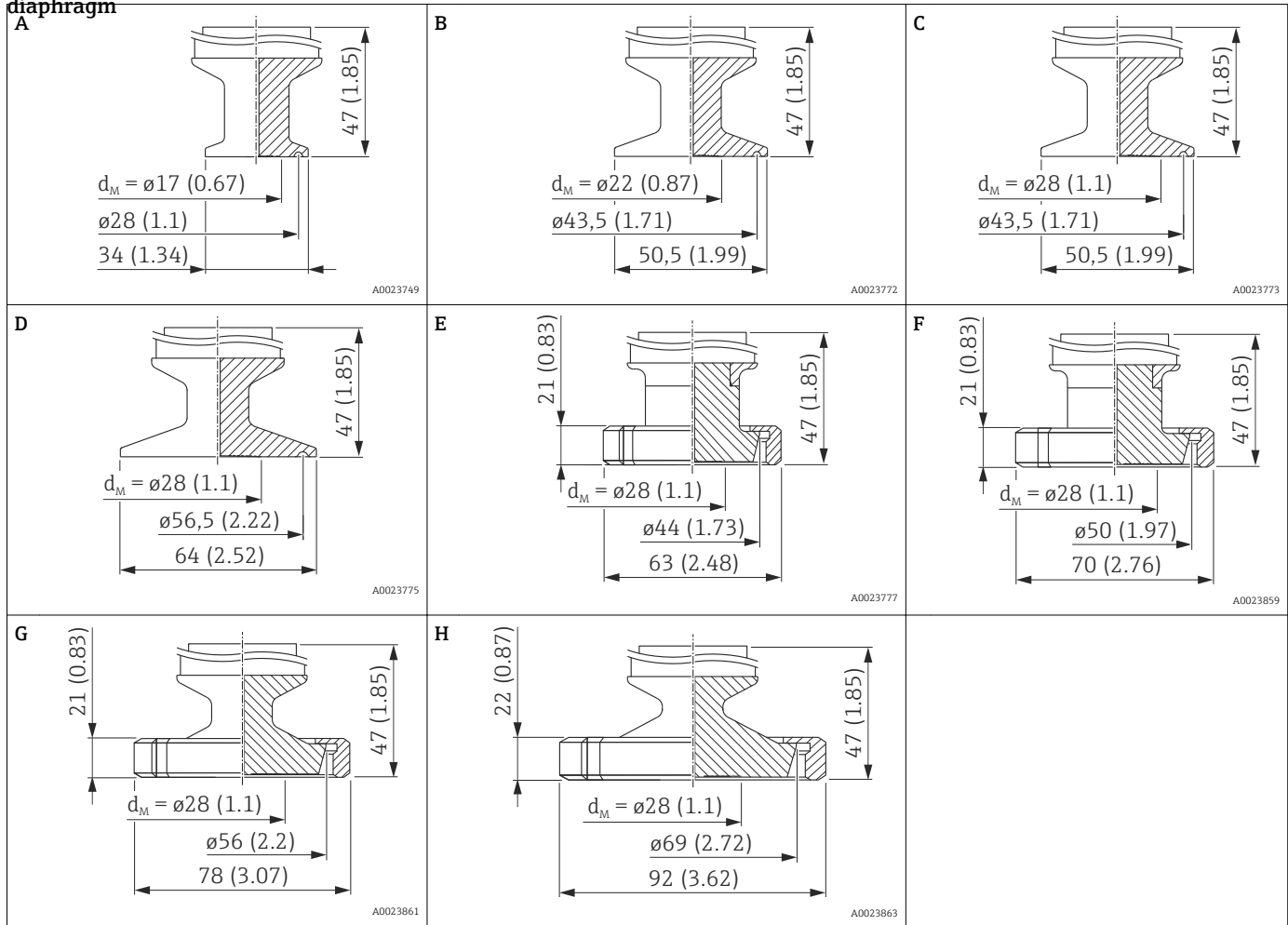


| Flange <sup>1)</sup> |                        |      |      |      |       | Boltholes |                |       | Weight      | Option <sup>2)</sup> |
|----------------------|------------------------|------|------|------|-------|-----------|----------------|-------|-------------|----------------------|
| 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 process connections with flush mount process isolating diaphragm**



Engineering unit mm (in)

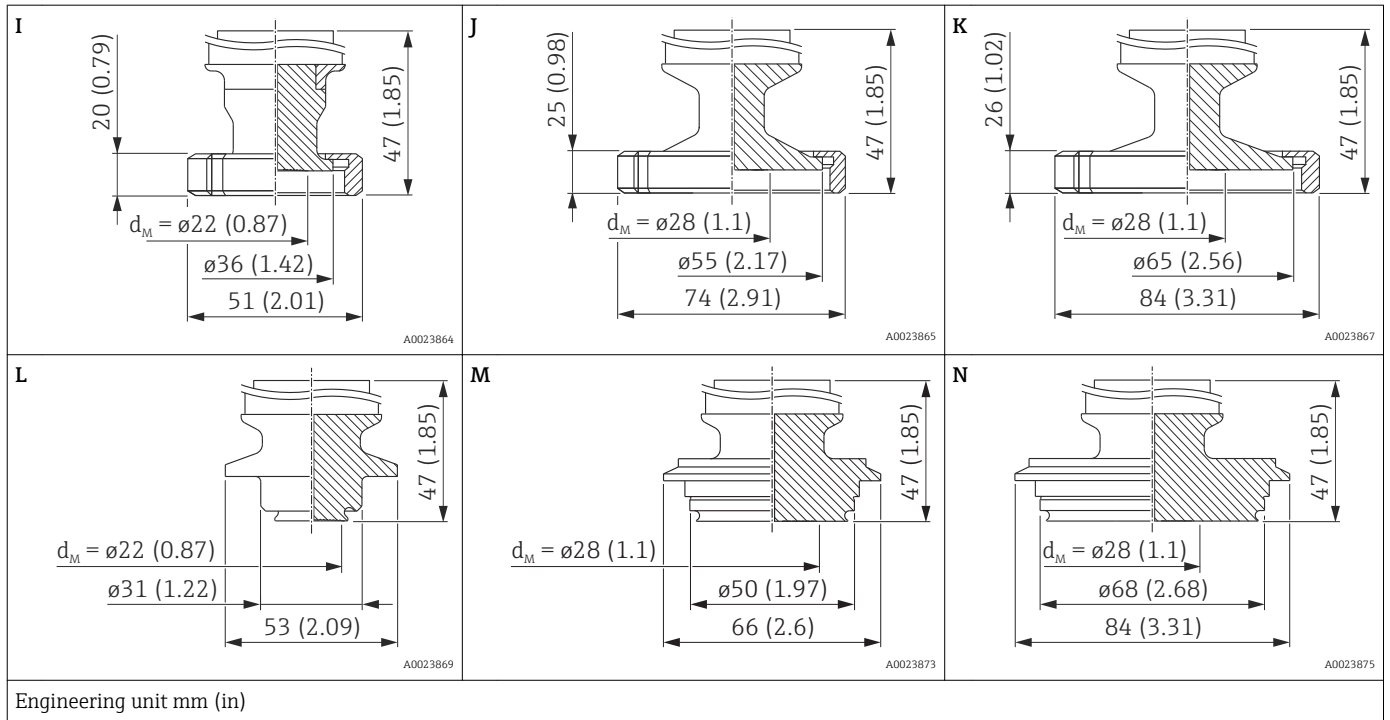
| Item <sup>1) 2)</sup> | Designation                                      | Nominal pressure | Weight     | Approval            | Option <sup>3)</sup> |
|-----------------------|--|------------------|------------|---------------------|----------------------|
|                       |  |                  | kg (lb)    |                     |                      |
| A                     | Clamp ISO2852, DN 18-22, DIN 32676 DN 15-20      | PN 40            | 0.5 (1.10) | EHEDG, 3A, ASME-BPE | 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            | 0.6 (1.32) | EHEDG, 3A, ASME-BPE | TJJ                  |
| D                     | Tri-Clamp ISO2852 DN 40-51 (2"), DIN 32676 DN 50 | PN 40            | 0.7 (1.54) | 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            | 0.9 (1.98) | EHEDG, 3A, ASME-BPE | MZJ                  |
| H                     | DIN 11851 DN 50                                  | PN 25            | 1.1 (2.43) | 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  $\mu\text{in}$ ). Optionally available as an ASME-BPE-compliant version for use in biochemical processes, wetted surfaces  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.

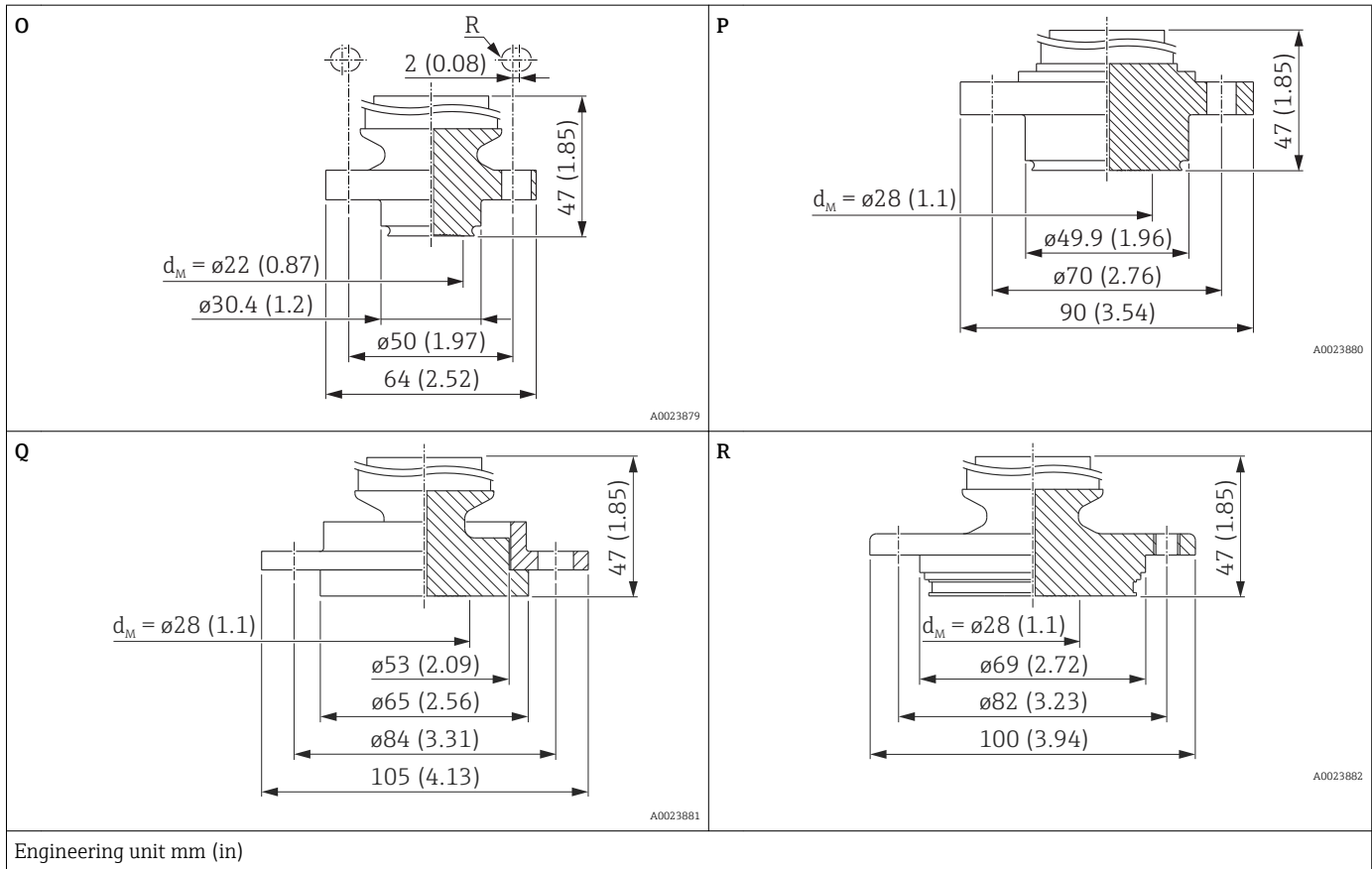
3) Product Configurator, order code for "Process connection"





| Item <sup>1) 2)</sup> | Designation               | Nominal pressure | Weight     | Approval            | Option <sup>3)</sup> |
|-----------------------|---------------------------|------------------|------------|---------------------|----------------------|
|                       |                           |                  | kg (lb)    |                     |                      |
| I                     | SMS 1"                    | PN 25            | 0.7 (1.54) | 3A, ASME-BPE        | T6J                  |
| J                     | SMS 1½"                   | PN 25            | 0.8 (1.76) | 3A, ASME-BPE        | T7J                  |
| K                     | SMS 2"                    | PN 25            | 0.9 (1.98) | 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            | 0.9 (1.98) | EHEDG, 3A, ASME-BPE | TQJ                  |
| N                     | Varivent N pipe DN 40-162 | PN 40            | 1.1 (2.43) | 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  $\mu\text{in}$ ). Optionally available as an ASME-BPE-compliant version for use in biochemical processes, wetted surfaces  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, order code for "Process connection"

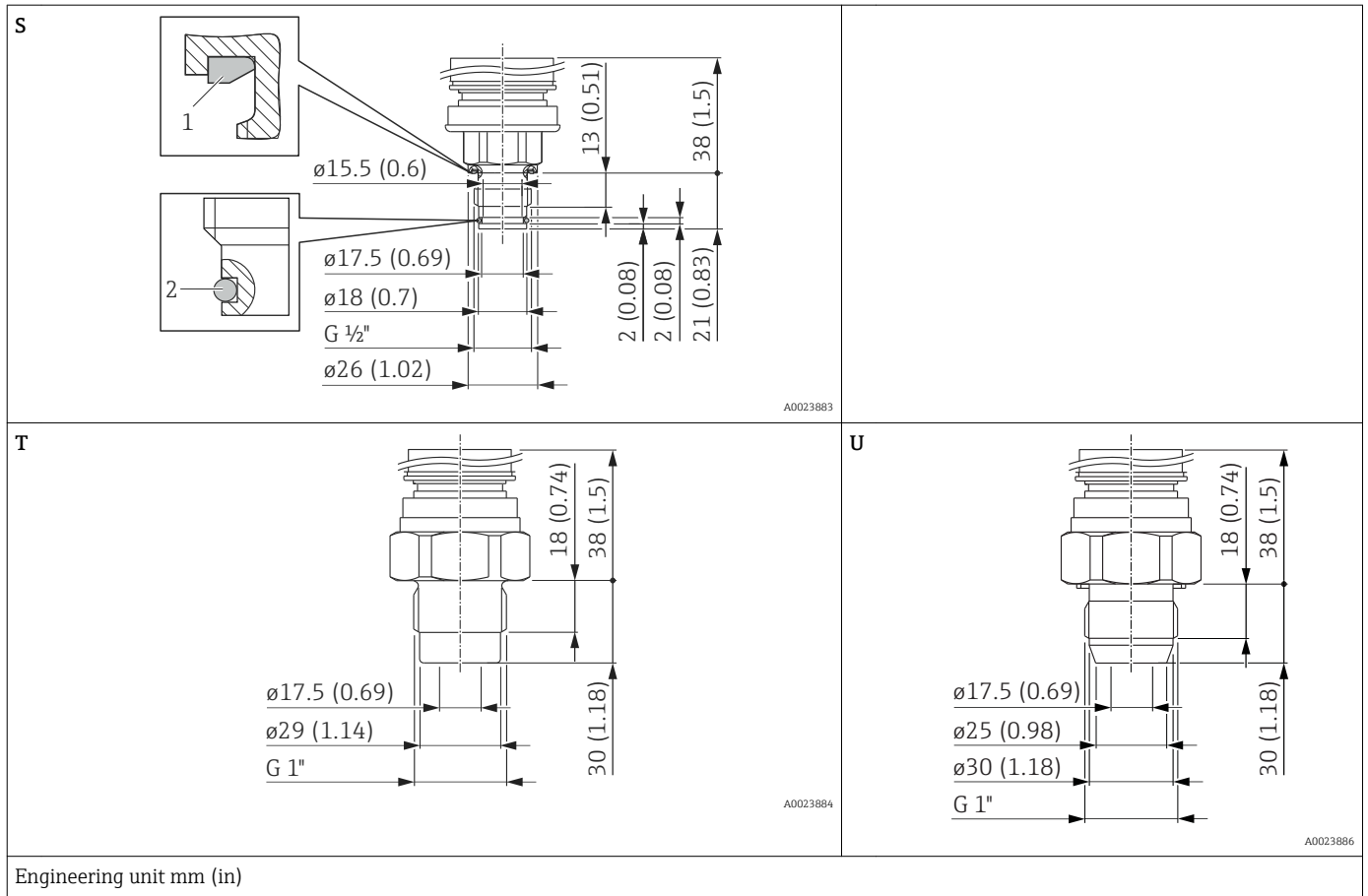


| Item <sup>1) 2)</sup> | Designation           | Nominal pressure | Boltholes |               | Weight<br>kg (lb) | Approval            | Option <sup>3)</sup> |
|-----------------------|-----------------------|------------------|-----------|---------------|-------------------|---------------------|----------------------|
|                       |                       |                  | Number    | 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)      | 1.2 (2.65)        | EHEDG, 3A, ASME-BPE | S4J                  |
| Q                     | DRD DN 50             | PN 25            | 4         | 11.5 (0.45)   | 1.0 (2.21)        | ASME-BPE            | TIJ                  |
| R                     | APV Inline DN 50      | PN 40            | 6         | 8.6 (0.34)    | 1.2 (2.65)        | 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  $\mu\text{in}$ ). Optionally available as an ASME-BPE-compliant version for use in biochemical processes, wetted surfaces  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.

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

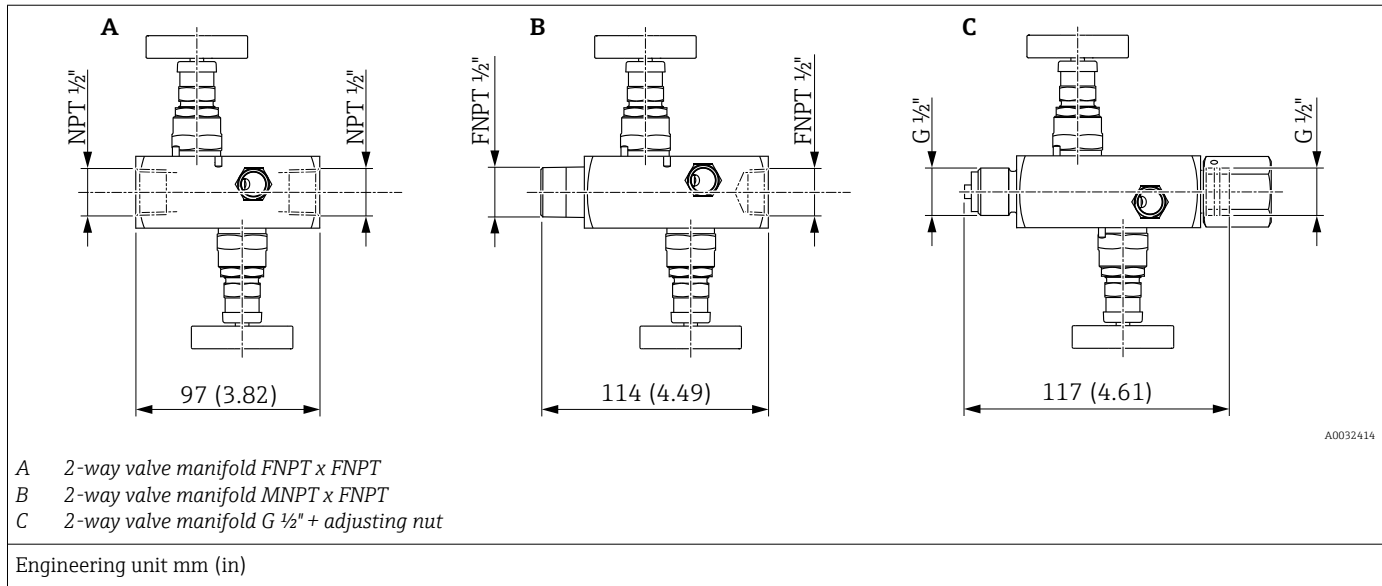


| Item <sup>1) 2)</sup> | Designation          | Seal |   | Nominal pressure | Weight<br>kg (lb) | Approval     | Option <sup>3)</sup> |
|-----------------------|----------------------|------|---|------------------|-------------------|--------------|----------------------|
|                       |                      | Item | Designation   |                  |                   |              |                      |
| S                     | Thread ISO228 G 1/2" | 1    | FKM form seal pre-installed   | PN 40            | 0.5 (1.1)         | ASME-BPE     | GOJ                  |
|                       |                      | 2    | FKM O-ring pre-installed  |                  |                   |              |                      |
| T                     | Thread ISO228 G1"    | -    | Sealing via O-ring. VMQ O-ring included with the accessories QE and QF. | PN 40            | 0.8 (1.76)        | 3A, ASME-BPE | GZj <sup>4)</sup>    |
| U                     | Thread ISO228 G1"    | 1    | Metal joint   | 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  $\mu\text{in}$ ). Optionally available as an ASME-BPE-compliant version for use in biochemical processes, wetted surfaces  $R_a 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, order code for "Process connection"
- 4) EHEDG in combination with EHEDG certified process adapter or weld in adapter; for details see TI00426F.

**Valve manifold DA63M-  
(optional)**

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



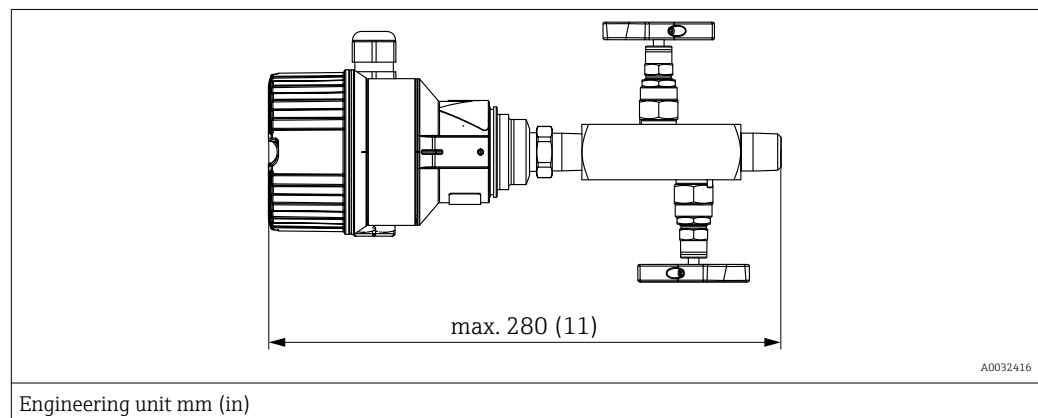
2-way valve manifolds in 316L or AlloyC can be

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

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

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

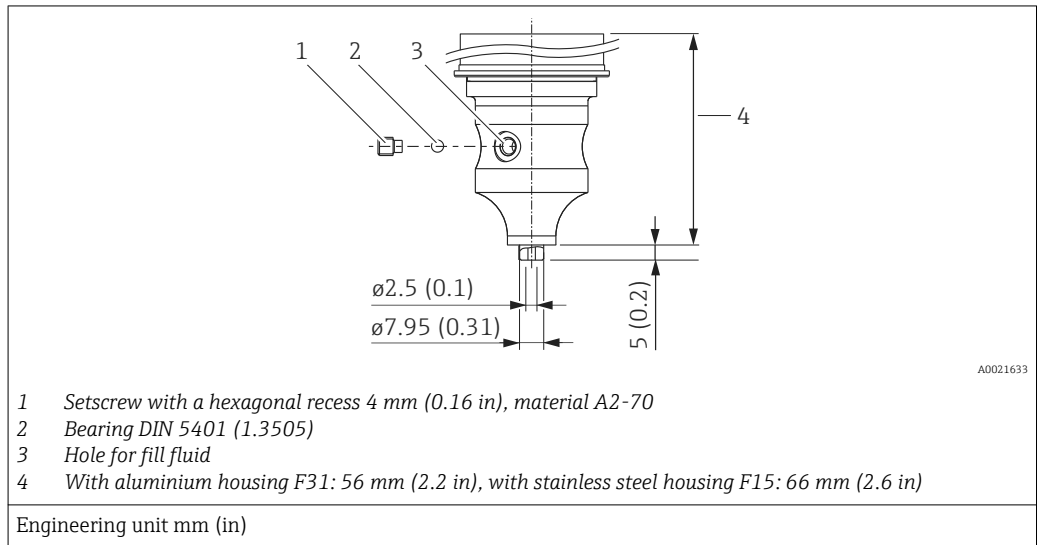
During the operating life of the valves, it may be necessary to re-tighten the packing.

**Mounting on valve manifold**

Ordering information:

Product Configurator, order code for "Accessories mounted".

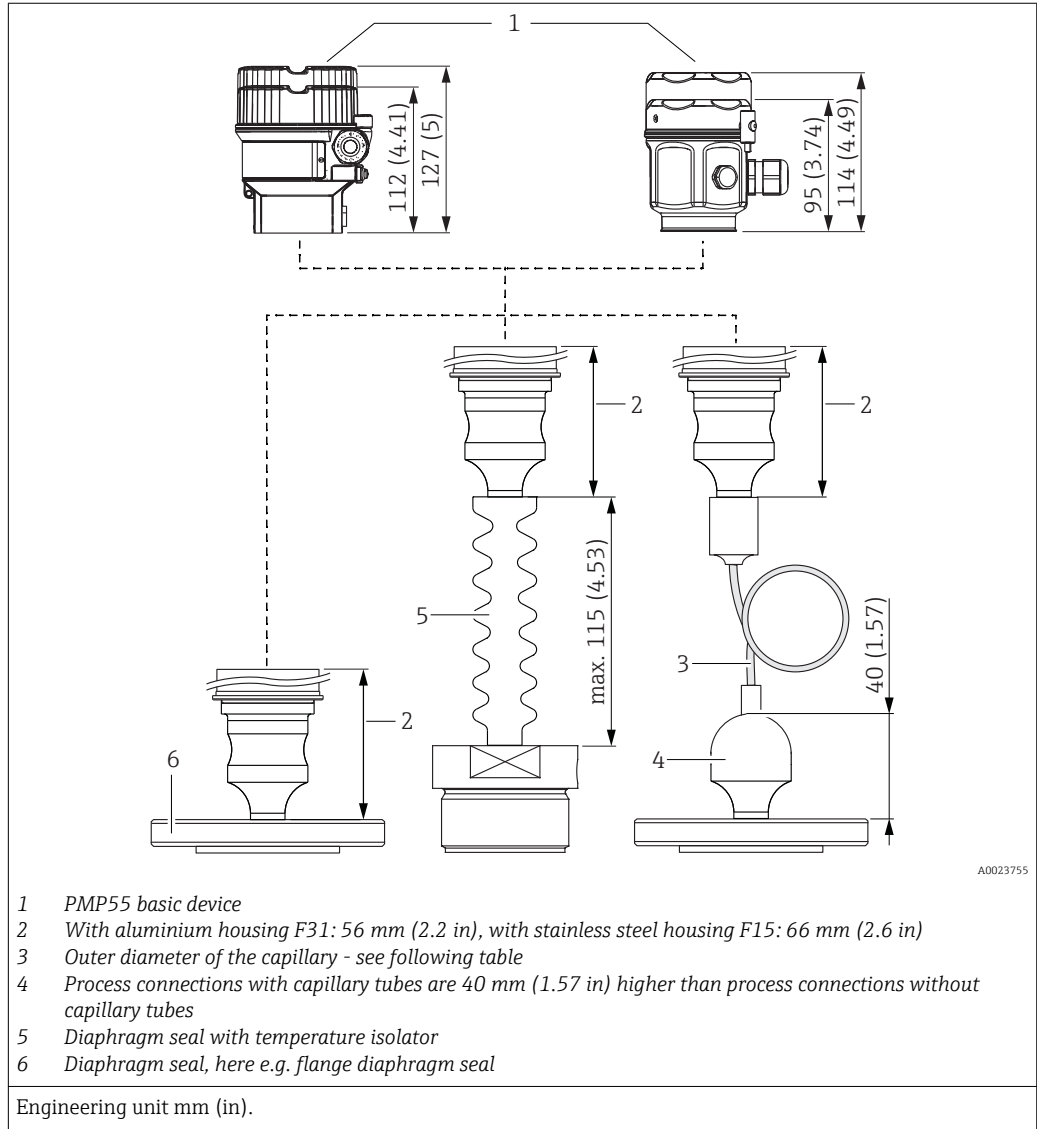
**PMP51: process connections**    **Prepared for diaphragm seal mount**



| Material           | Designation                       | Weight kg (lb) | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|--------------------|-----------------------------------|----------------|------------------------|----------------------|
| AISI 316L (1.4404) | Prepared for diaphragm seal mount | 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

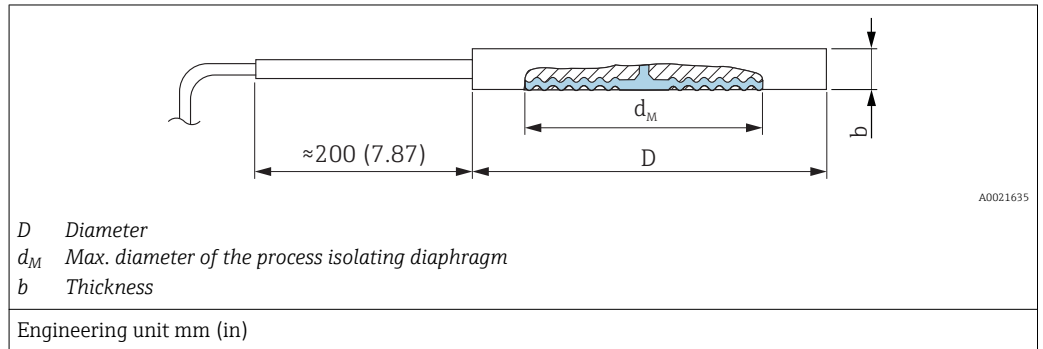
| Designation          | OptionProduct Configurator, "Diaphragm seal connection" ordering feature |
|----------------------|--|
| Direct               | A  |
| Temperature isolator | B  |
| ..... m capillary    | D  |
| ..... ft capillary   | E  |

**Process connections for PMP55 with flush-mounted process isolating diaphragm**



- The weights of the diaphragm seals are given in the tables. For weight of housing, see → 48
- The following drawings are schematic diagrams. In other words, the dimensions of a diaphragm seal supplied may deviate from the dimensions given in this document.
- Observe the information in the "Planning instructions for diaphragm seal systems" section → 113
- For further information please contact your local Endress+Hauser Sales Center.

**Diaphragm seal cell structure (Pancake)**

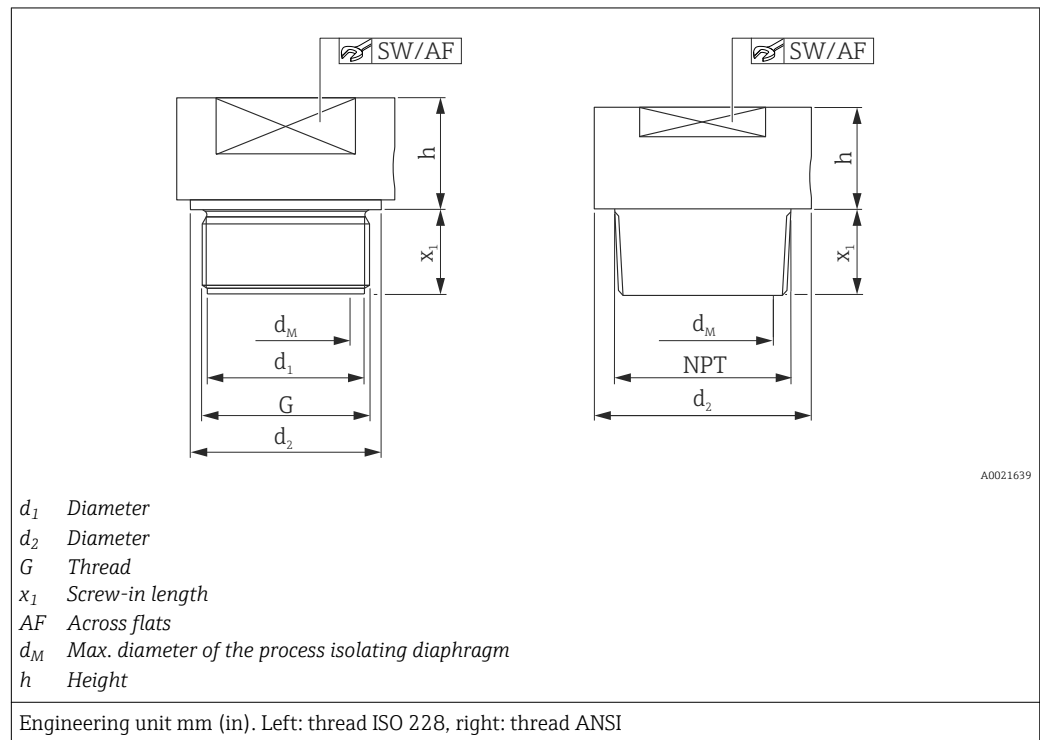


| Flange    |                  |                                | Diaphragm seal |           |                |            | Approval <sup>1)</sup> | Option <sup>2)</sup> |
|-----------|------------------|--------------------------------|----------------|-----------|----------------|------------|------------------------|----------------------|
| 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        | 59             | 1.3 (2.87) | -                      | UIJ <sup>5)</sup>    |
|           | DN 80            | PN 16-400 <sup>4)</sup>        | 138            | 20        | 89             | 2.3 (5.07) | -                      | UIJ <sup>5)</sup>    |
|           | DN 100           | PN 16-400 <sup>4)</sup>        | 162            | 20        | 89             | 3.1 (6.84) | -                      | UKJ                  |
|           | [in]             | [lb/sq.in]                     | [in (mm)]      | [in (mm)] | [in (mm)]      |            |                        |                      |
|           | 2                | 150-2500                       | 3.89 (99)      | 0.79 (20) | 2.32 (59)      | 1.3 (2.87) | CRN                    | ULJ <sup>5)</sup>    |
|           | 3                | 150-2500                       | 5.00 (127)     | 0.79 (20) | 3.50 (89)      | 2.3 (5.07) | CRN                    | UMJ <sup>5)</sup>    |
| 4         | 150-2500         | 6.22 (158)                     | 0.79 (20)      | 3.50 (89) | 3.1 (6.84)     | CRN        | URJ                    |                      |

- 1) CSA approval: Product Configurator, order code for "Approval"
- 2) Product Configurator, order code for "Process connection"
- 3) The specified nominal pressure applies to the diaphragm seal. The maximum pressure for the measuring device is dependent on the lowest-rated element, with regard to pressure, of the selected components → 47.
- 4) For PTFE coating MWP = 250 bar (3 625 psi), for details, see "Range of application of the PTFE foil" → 46
- 5) With TempC Membrane.

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

**Thread ISO 228 and ANSI**



| Threaded connection |           |                  |                |                |                |       | 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> | SW/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    | 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                  |

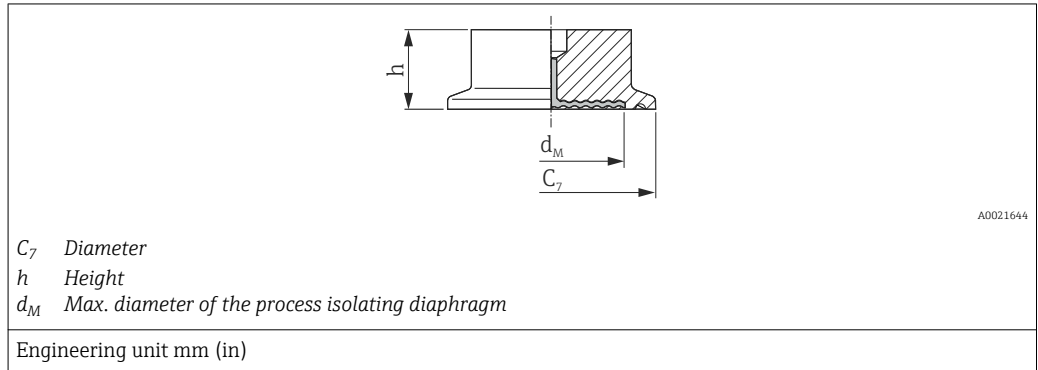
1) CSA approval: Product Configurator, order code for "Approval"

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



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

**Tri-Clamp ISO 2852**



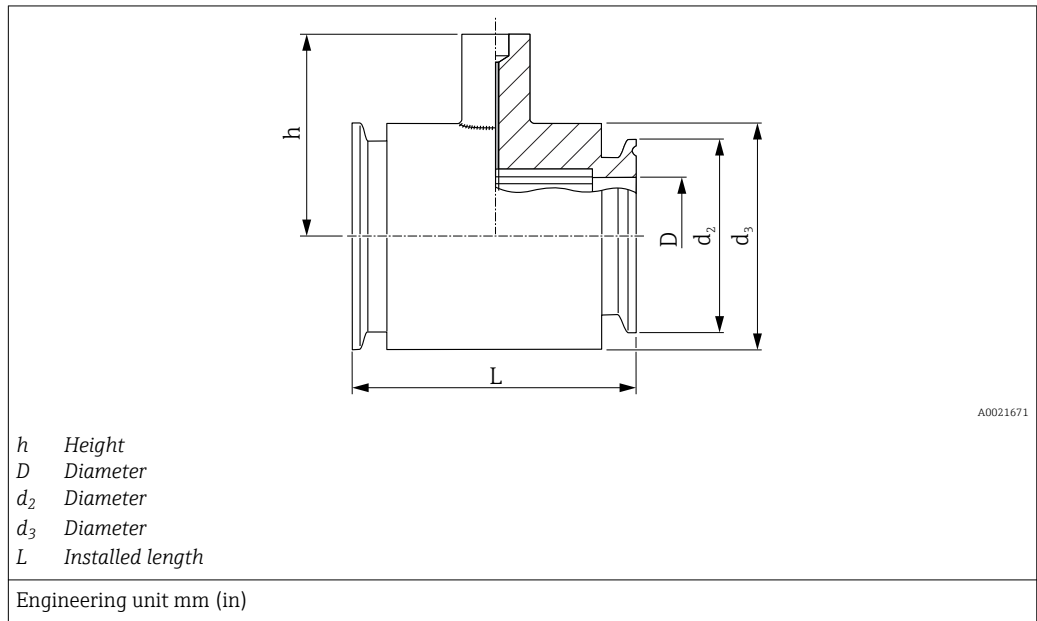
| Material <sup>1)</sup> | Nominal diameter ISO 2852 | Nominal diameter DIN 32676 | Nominal diameter<br>[in] | $C_7$<br>[mm] | $d_M$    |                     | $h$<br>[mm] | Weight<br>[kg (lb)] | Approval <sup>2)</sup>   | Option <sup>3)</sup> |
|------------------------|---------------------------|----------------------------|--------------------------|---------------|----------|---------------------|-------------|---------------------|--------------------------|----------------------|
|                        |                           |                            |                          |               | Standard | With TempC Membrane |             |                     |                          |                      |
|                        |                           |                            |                          |               | [mm]     | [mm]                |             |                     |                          |                      |
| 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**

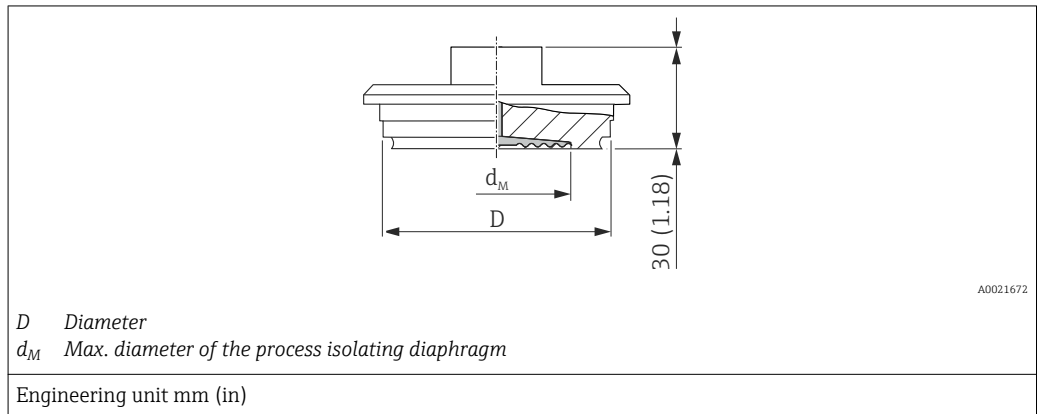


| Material <sup>1)</sup> | Nominal diameter ISO 2852 | Nominal diameter | Nominal pressure | D    | d <sub>2</sub> | d <sub>3</sub> | h    | L    | Weight     | Approval <sup>2)</sup> | Option <sup>3)</sup> |
|------------------------|---------------------------|------------------|------------------|------|----------------|----------------|------|------|------------|------------------------|----------------------|
|                        |                           | [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 flushmounted process isolating diaphragm**

**Varivent for pipes**

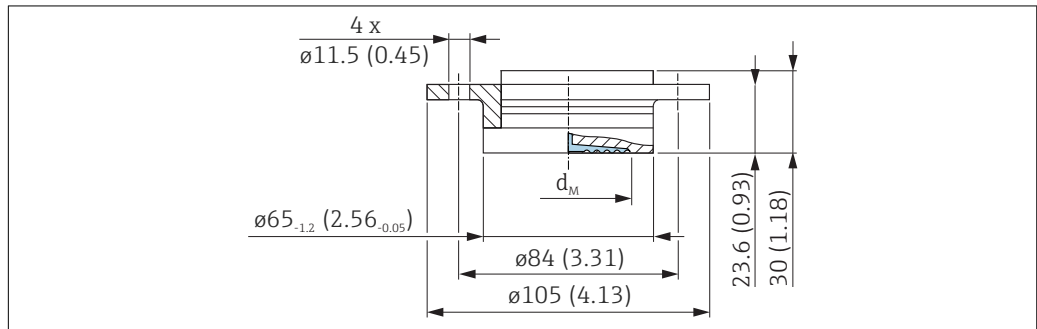


| Material <sup>1)</sup> | Designation                     | Nominal pressure | D  | d <sub>M</sub> |                      | Weight     | Approval            | Option <sup>2)</sup> |
|------------------------|---------------------------------|------------------|----|----------------|----------------------|------------|---------------------|----------------------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

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

**PMP55: hygienic process connections with flush mount process isolating diaphragm**

**DRD DN50 (65 mm)**



A0021673

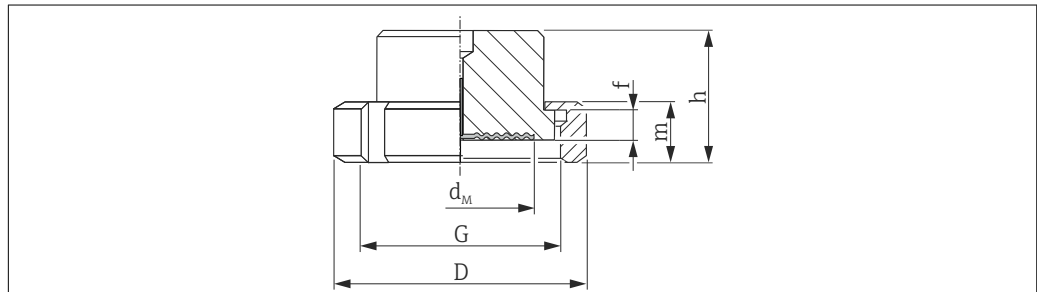
$d_M$  Max. diameter of the process isolating diaphragm

Engineering unit mm (in)

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

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

**SMS nozzles with coupling nut**



A0021674

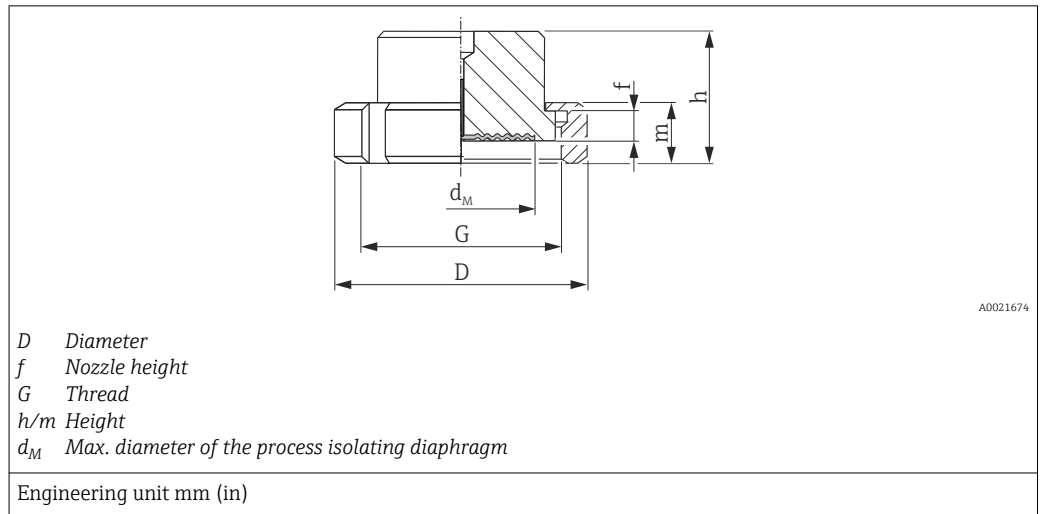
$D$  Diameter  
 $f$  Nozzle height  
 $G$  Thread  
 $h$  Height  
 $m$  Height  
 $d_M$  Max. diameter of the process isolating diaphragm

Engineering unit mm (in)

| Material <sup>1)</sup> | Nominal diameter | Nominal pressure | D    | f    | G           | m    | h    | $d_M$ | 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) Surface roughness of the surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"
- 3) Alternatively available with TempC Membrane.

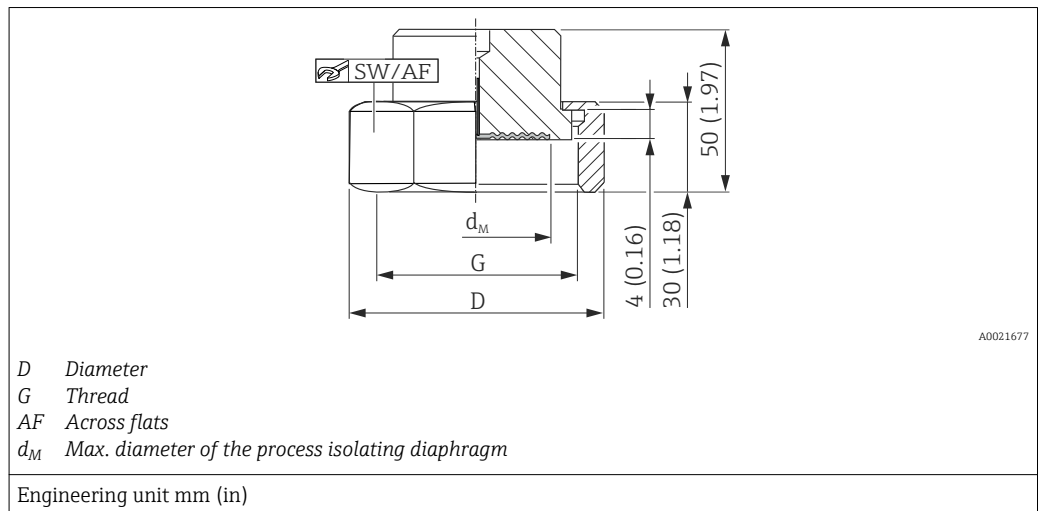
**APV-RJT nozzles with coupling nut**



| Material <sup>1)</sup> | Nominal diameter | Nominal pressure | D  | f   | G              | m  | h    | $d_M$ | Weight      | Option <sup>2)</sup> |
|------------------------|------------------|------------------|----|-----|----------------|----|------|-------|-------------|----------------------|
|                        | [in]             | [bar]            |    |     |                |    |      |       |             |                      |
| AISI 316L              | 1                | PN 40            | 77 | 6.5 | 1 13/16 - 1/8" | 22 | 42.6 | 21    | 0.45 (0.99) | 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) Surface roughness of the surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"

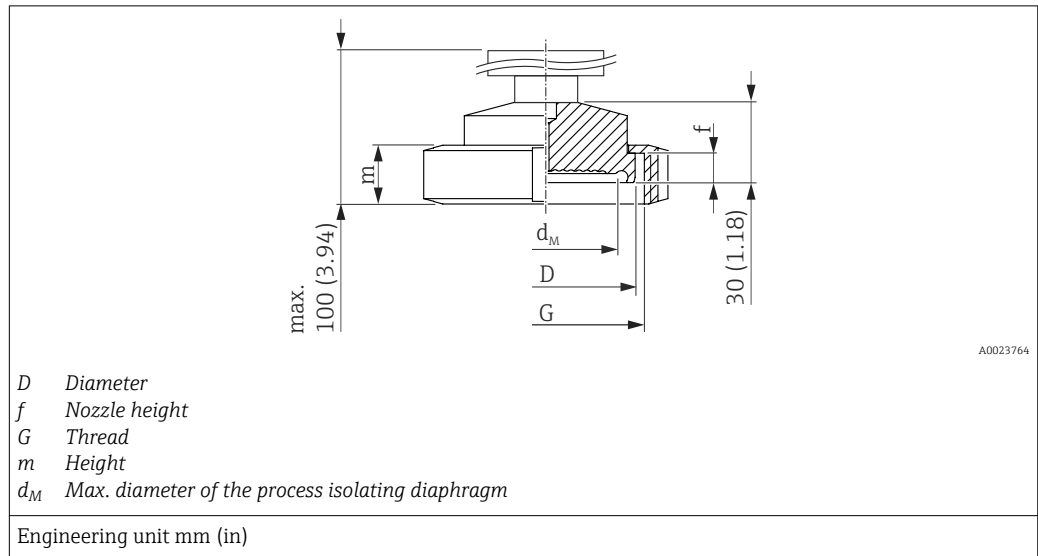
**APV-ISS nozzles with coupling nut**



| Material <sup>1)</sup> | Nominal diameter | Nominal pressure | D    | G           | SW/AF | $d_M$ | Weight     | Option <sup>2)</sup> |
|------------------------|------------------|------------------|------|-------------|-------|-------|------------|----------------------|
|                        | [in]             | [bar]            |      |             |       |       |            |                      |
| AISI 316L              | 1                | PN 40            | 54.1 | 1 ½" - 1/8" | 46.8  | 24    | 0.4 (0.88) | 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) Surface roughness of the surfaces in contact with the medium  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ) as standard.
- 2) Product Configurator, order code for "Process connection"

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

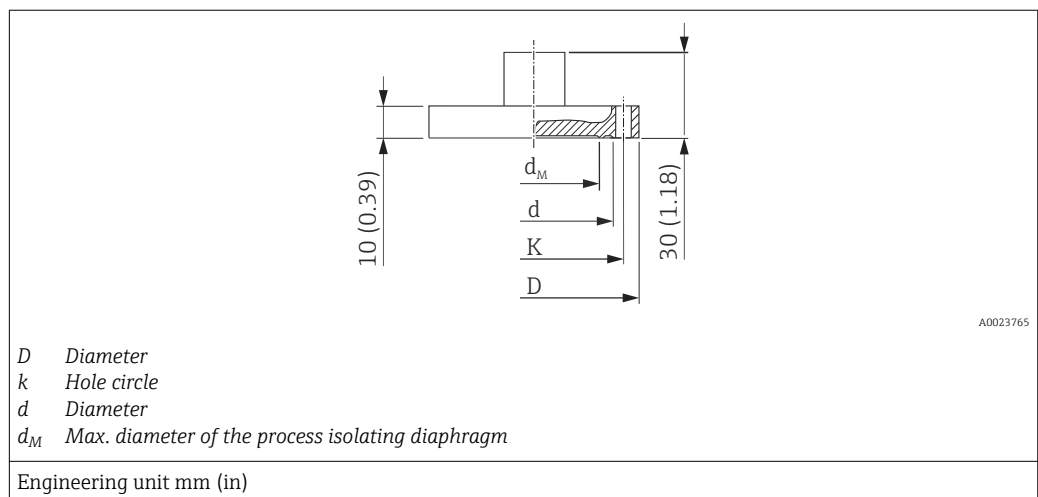


| Material <sup>1)</sup> | Nozzle           |                  |      |      | Slotted-nut  |    | Diaphragm seal |             | Approval            | Option <sup>2)</sup> |
|------------------------|------------------|------------------|------|------|--------------|----|----------------|-------------|---------------------|----------------------|
|                        | Nominal diameter | Nominal pressure | D    | f    | G            | m  | $d_M$          | 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) | EHEDG, 3A, ASME-BPE | NDJ                  |

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

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

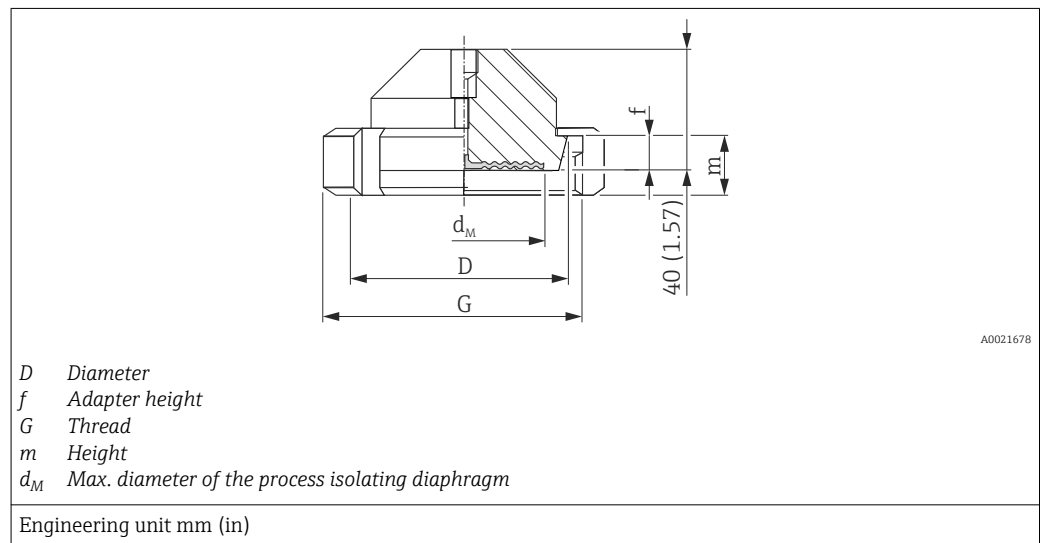
**Aseptic flange connection, DIN 11864-2 Form A; pipe DIN 11866-1**



| 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) |                     |                      | EHEDG, 3A, ASME-BPE | NXJ |
|                        | DN 50            |                  | 77   | 65.7 | 94   | 45             | 2.2 (4.85) |                     |                      |                     |     |

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

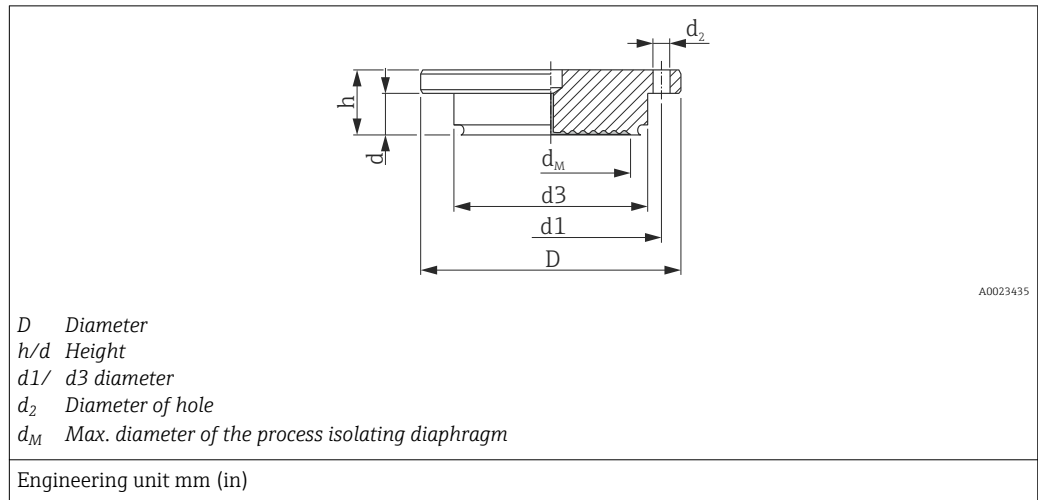
**Taper adapter with slotted-nut, DIN 11851**



| Material <sup>1)</sup> | Taper adapter    |                  |      |      | Slotted-nut   |      | Diaphragm seal |                     |             | Approval            | Option <sup>2)</sup> |
|------------------------|------------------|------------------|------|------|---------------|------|----------------|---------------------|-------------|---------------------|----------------------|
|                        | Nominal diameter | Nominal pressure | D    | f    | G             | m    | d <sub>M</sub> |                     | Weight      |                     |                      |
|                        |                  | PN               |      |      |               |      | 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) |                     | MZJ <sup>3)</sup>    |
|                        | DN 50            | PN 25            | 68.5 | 11   | Rd 78 x 1/6"  | 19   | 52             | 48                  | 1.1 (2.43)  |                     | MRJ <sup>3)</sup>    |
|                        | DN 65            | PN 25            | 86   | 12   | Rd 95 x 1/6"  | 21   | 66             | 61                  | 2.0 (4.41)  |                     | MSJ <sup>3)</sup>    |
|                        | DN 80            | PN 25            | 100  | 12   | Rd 110 x 1/4" | 26   | 81             | 61                  | 2.55 (5.62) |                     | MTJ <sup>3)</sup>    |

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

NEUMO BioControl

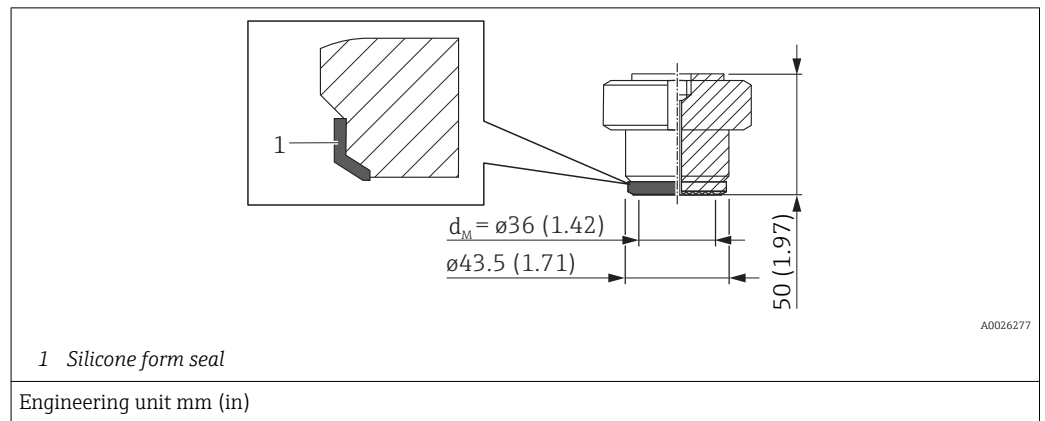


| Material <sup>1)</sup> | NEUMO BioControl<br>Process temperature range: -10 to +200 °C (+14 to +392 °F) |                  |      |      |                |                |                |      | Diaphragm seal |                     |               | Approval                      | Option <sup>2)</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        |                               |                      |
|                        |  |                  |      |      |                |                |                |      | Standard       | With TempC Membrane |               |                               |                      |
| [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<br>(2.43) | 3A,<br>ASME-<br>BPE           | S4J <sup>3)</sup>    |
|                        | DN 80  | PN 16            | 140  | 25   | 4 x Ø 11       | 87.4           | 115            | 37   | 61             | 61                  | 2.6<br>(5.73) | EHEDG,<br>3A,<br>ASME-<br>BPE | S6J <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) Product Configurator, order code for "Process connection"
- 3) Alternatively available with TempC Membrane.
- 4) With TempC Membrane



**Universal process adapter**

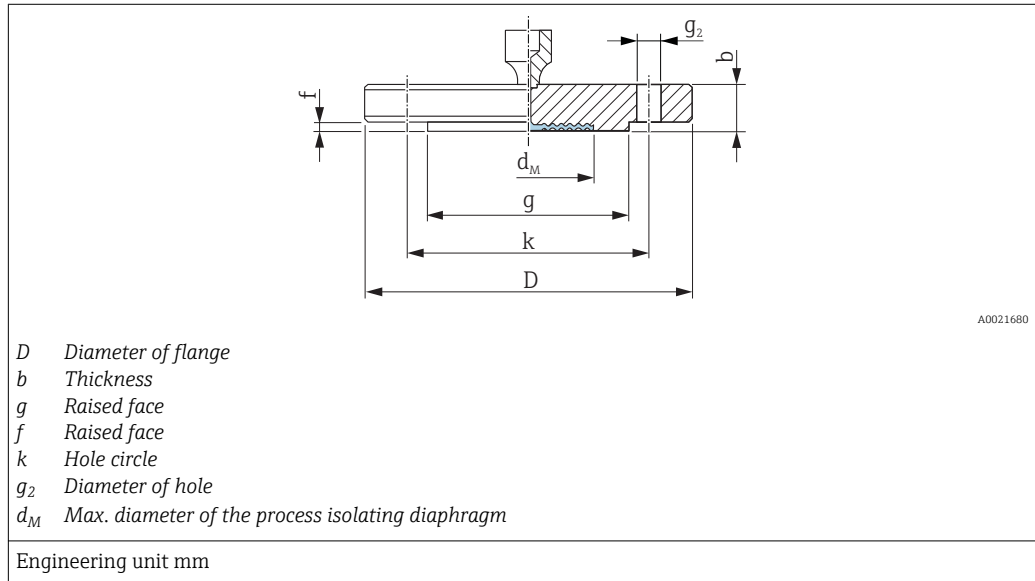


| Designation   | Nominal pressure | Material <sup>1)</sup> | Weight     | Approval <sup>2)</sup> | Option <sup>3)</sup> |
|---|------------------|------------------------|------------|------------------------|----------------------|
|   |                  |                        | [kg (lb)]  |                        |                      |
| Universal adapter with silicone form seal (spare part no.: 52023572) FDA 21CFR177.2600/USP Class VI | PN 10            | AISI 316L (1.4435)     | 0.8 (1.76) | EHEDG, 3A, ASME-BPE    | UPJ <sup>4) 5)</sup> |

- 1) The roughness of the surface in contact with the medium is  $R_a < 0.76 \mu\text{m}$  (29.9  $\mu\text{in}$ ). Optionally available as an ASME-BPE-compliant version for use in biochemical processes, surfaces in contact with medium  $R_a < 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ) electropolished, ordering information: Product Configurator, order code for "Service", option "HK"
- 2) EHEDG or 3A approval only with approved process connection.
- 3) Product Configurator, order code for "Process connection"
- 4) Endress+Hauser supplies these slotted-nuts in stainless steel AISI 304 (1.4301) or in AISI 304L (1.4307).
- 5) Alternatively available with TempC Membrane.

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

**EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527 and DIN 2501-1 A0021680**



| Flange <sup>1) 2) 3)</sup> |                  |                     |      |      |      |      | Boltholes |                |      | Diaphragm seal |              | Option <sup>4)</sup> |
|----------------------------|------------------|---------------------|------|------|------|------|-----------|----------------|------|----------------|--------------|----------------------|
| Nominal diameter           | Nominal pressure | Shape <sup>5)</sup> | D    | b    | g    | f    | Quantity  | g <sub>2</sub> | k    | d <sub>M</sub> | Weight       |                      |
|                            |                  |                     | [mm] | [mm] | [mm] | [mm] |           | [mm]           | [mm] | [mm]           | [mm]         |                      |
| DN 25                      | 10-40            | B1 (D)              | 115  | 18   | 68   | 3    | 4         | 14             | 85   | 32             | 2.1 (4.63)   | CNJ <sup>6)</sup>    |
| DN 25                      | 63-160           | B2 (E)              | 140  | 24   | 68   | 2    | 4         | 18             | 100  | 28             | 2.5 (5.51)   | QIJ                  |
| DN 25                      | 250              | B2 (E)              | 150  | 28   | 68   | 2    | 4         | 22             | 105  | 28             | 3.7 (8.16)   | QJJ                  |
| DN 25                      | 400              | B2 (E)              | 180  | 38   | 68   | 2    | 4         | 26             | 130  | 28             | 7.0 (15.44)  | QSJ                  |
| DN 32                      | 10-40            | B1 (D)              | 140  | 18   | 77   | 2.6  | 4         | 18             | 100  | 34             | 1.9 (4.19)   | CPJ                  |
| DN 40                      | 10-40            | B1 (D)              | 150  | 18   | 87   | 2.6  | 4         | 18             | 110  | 48             | 2.2 (4.85)   | CQJ                  |
| DN 50                      | 10-40            | B1 (D)              | 165  | 20   | 102  | 3    | 4         | 18             | 125  | 59             | 3.0 (6.62)   | CXJ <sup>6)</sup>    |
| DN 50                      | 63               | B2 (E)              | 180  | 26   | 102  | 3    | 4         | 22             | 135  | 59             | 4.6 (10.14)  | PDJ                  |
| DN 50                      | 100-160          | B2 (E)              | 195  | 30   | 102  | 3    | 4         | 26             | 145  | 59             | 6.2 (13.67)  | QOJ                  |
| DN 50                      | 250              | B2 (E)              | 200  | 38   | 102  | 3    | 8         | 26             | 150  | 59             | 7.7 (16.98)  | QMJ                  |
| DN 50                      | 400              | B2 (E)              | 235  | 52   | 102  | 3    | 8         | 30             | 180  | 59             | 14.7 (32.41) | QVJ                  |
| DN 80                      | 10-40            | B1 (D)              | 200  | 24   | 138  | 3.5  | 8         | 18             | 160  | 89             | 5.3 (11.69)  | CZJ <sup>6)</sup>    |
| DN 80                      | 100              | B2 (E)              | 230  | 32   | 138  | 4    | 8         | 24             | 180  | 89             | 8.9 (19.62)  | PPJ                  |
| DN 100                     | 100              | B2 (E)              | 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, rhodium>gold or PTFE is  $R_a < 0.8 \mu\text{m}$  (31.5  $\mu\text{in}$ ). Lower surface roughness on request.

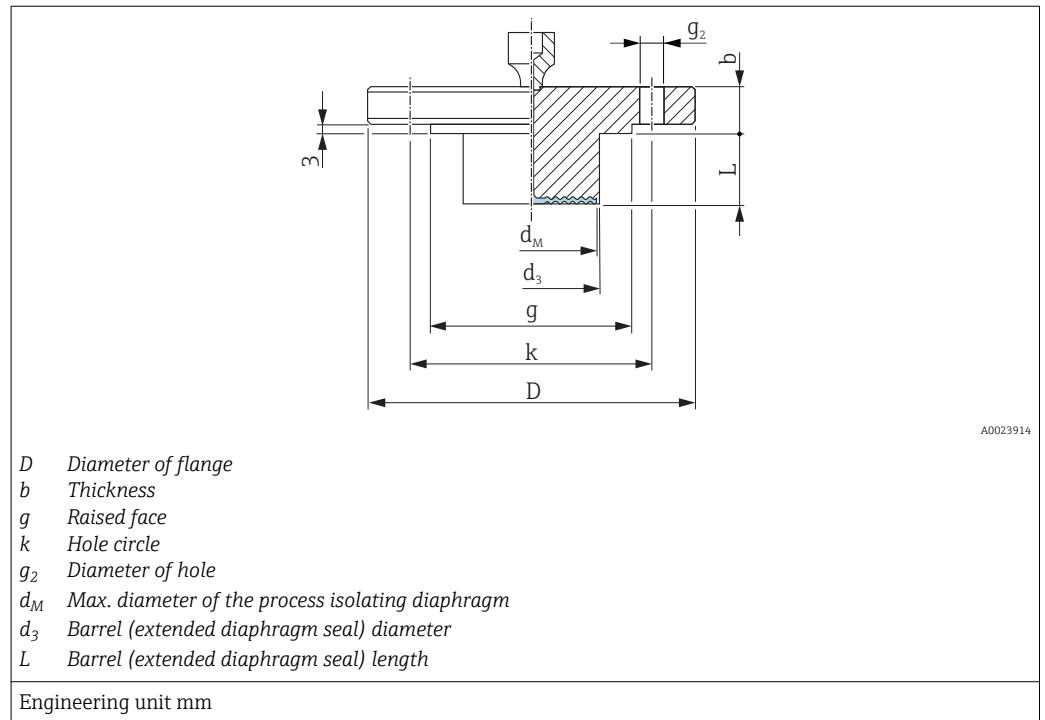
3) The flange raised face is made of the same material as the process isolating diaphragm.

4) Product Configurator, "Process connection" section

5) Description as per DIN 2527 provided in brackets

6) Alternatively available with TempC membrane. Diameter of process isolating diagram modified in TempC version: DN25: 28 mm; DN50: 61 mm.

EN/DIN flanges with barrel (extended diaphragm seal), connection dimensions as per EN 1092- 1/DIN 2527 and DIN 2501-1



| Flange <sup>1) 2)</sup> |                  |                     | Boltholes |      |      | Diaphragm seal |                | Option <sup>3)</sup> |                |                |                   |
|-------------------------|------------------|---------------------|-----------|------|------|----------------|----------------|----------------------|----------------|----------------|-------------------|
| Nominal diameter        | Nominal pressure | Shape <sup>4)</sup> | D         | b    | g    | Quantity       | g <sub>2</sub> | k                    | d <sub>M</sub> | Weight         |                   |
|                         |                  |                     | [mm]      | [mm] | [mm] |                | [mm]           | [mm]                 | [mm]           | d <sub>M</sub> |                   |
| DN 50                   | PN 10-40         | B1 (D)              | 165       | 20   | 102  | 4              | 18             | 125                  | 47             | <sup>5)</sup>  | FDJ <sup>5)</sup> |
| DN 80                   | PN 10-40         | B1 (D)              | 200       | 24   | 138  | 8              | 18             | 160                  | 72             | <sup>5)</sup>  | FEJ <sup>5)</sup> |

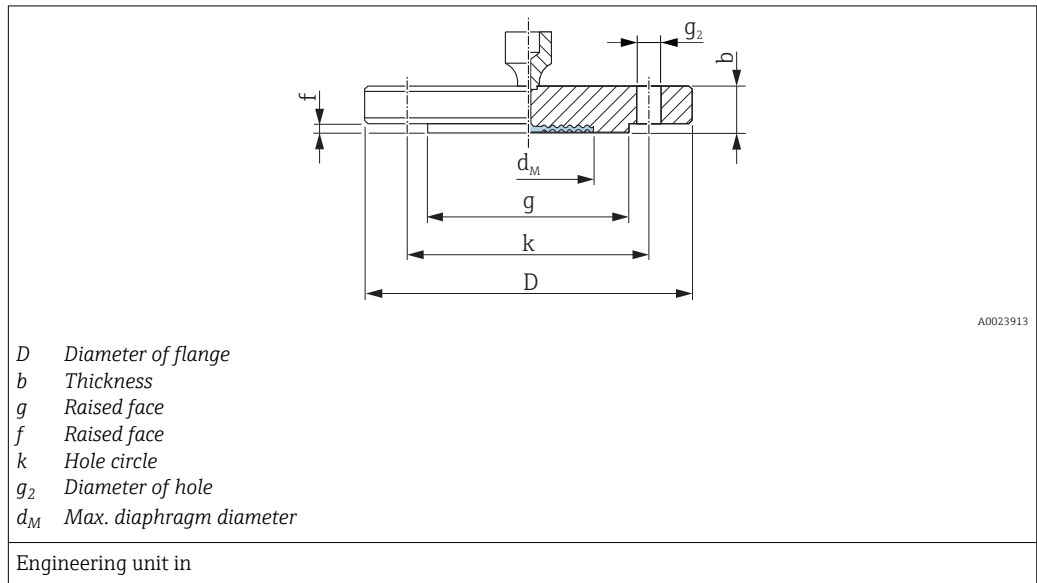
- 1) Material: AISI 316L
- 2) In the case of process isolating diaphragms made of Alloy C276, Monel or tantalum, the raised face of the flange and the barrel pipe are made of 316L
- 3) Product Configurator, "Process connection" section
- 4) Description as per DIN 2527 provided in brackets
- 5) Available with 50 mm (1.97 in), 100 mm (3.94 in) and 200 mm (7.87 in) barrel, (extended diaphragm seal), for barrel (extended diaphragm seal) diameter and weight see the following table

| Option <sup>1)</sup> | Nominal diameter | Nominal pressure | (L)            | d <sub>3</sub> | Weight                               |
|----------------------|------------------|------------------|----------------|----------------|--------------------------------------|
|                      |                  |                  | [mm]           | [mm]           | [kg (lb)]                            |
| 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, order code for "Process connection"

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

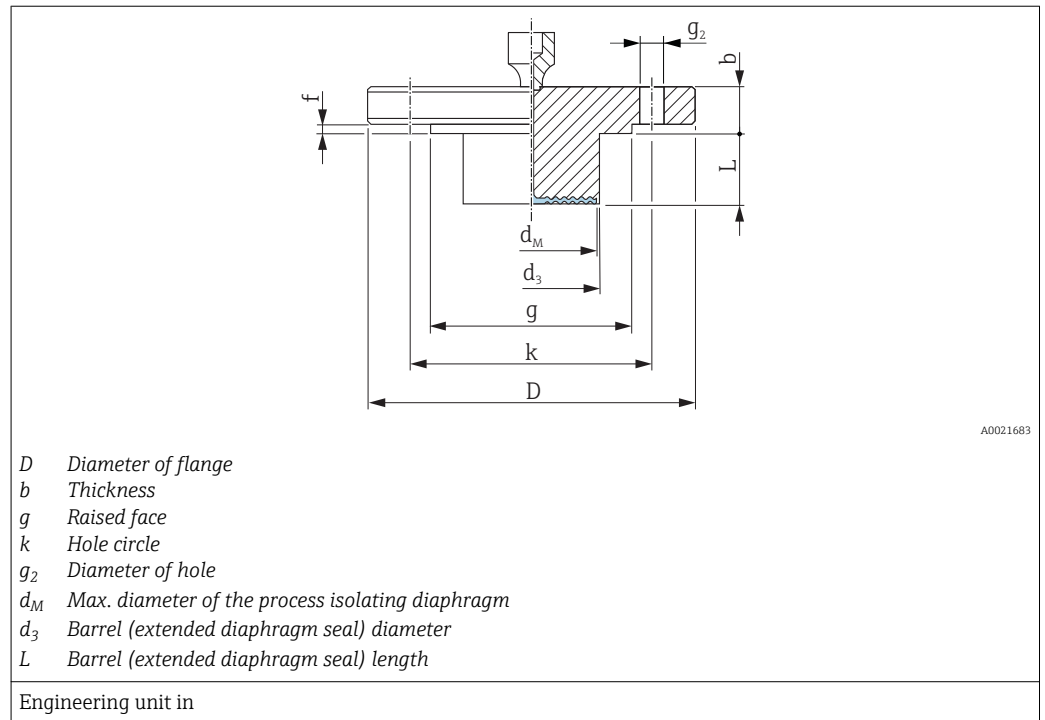
**ASME flanges, connection dimensions as per ASME B 16.5, raised face RF**



| 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, rhodium>gold or PTFE is  $R_a < 0.8 \mu\text{m}$  ( $31.5 \mu\text{in}$ ). Lower surface roughness on request.
- 3) The flange raised face is made of the same material as the process isolating diaphragm.
- 4) CSA approval: Product Configurator, order code for "Approval"
- 5) Product Configurator, order code for "Process connection"
- 6) CRN approval not for TempC membrane.
- 7) Alternatively available with TempC membrane. Diameter of process isolating diaphragm is modified in TempC version: nominal diameter 1": 1.1 in; 2": 2.40 in.

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



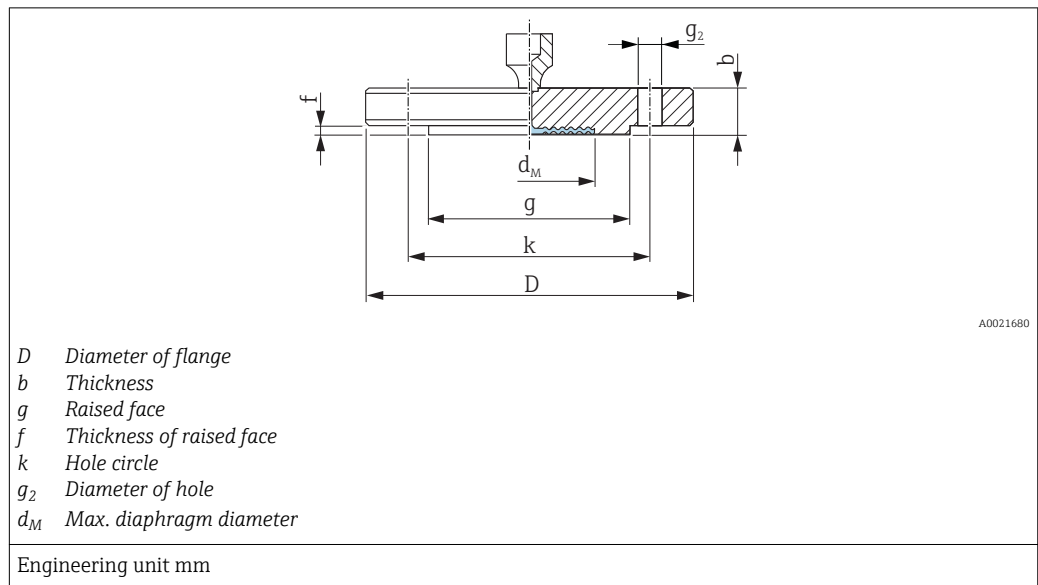
| Flange <sup>1) 2)</sup> |             |      |      |      |      | Boltholes |                |      | Diaphragm seal |               | Approval <sup>3)</sup> | Option <sup>4)</sup> |
|-------------------------|-------------|------|------|------|------|-----------|----------------|------|----------------|---------------|------------------------|----------------------|
| 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]           | [kg (lb)]     |                        |                      |
| 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 isolating diaphragms made of Alloy C276, Monel or tantalum, the raised face of the flange and the barrel pipe are made of 316L.
- 3) CSA approval: Product Configurator, "Approval" ordering feature
- 4) Product Configurator, "Process connection" section
- 5) Available with 2", 4", 6" and 8" barrel (extended diaphragm seal), for barrel (extended diaphragm seal) diameter and weight see the following table

| Option <sup>1)</sup> | Nominal diameter | Class       | (L)  | d <sub>3</sub> | Weight  |
|----------------------|------------------|-------------|--|----------------|---|
|                      | [in]             | [lb./sq.in] | in (mm)                                      | in (mm)        | [kg (lb)]   |
| 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, order code for "Process connection"

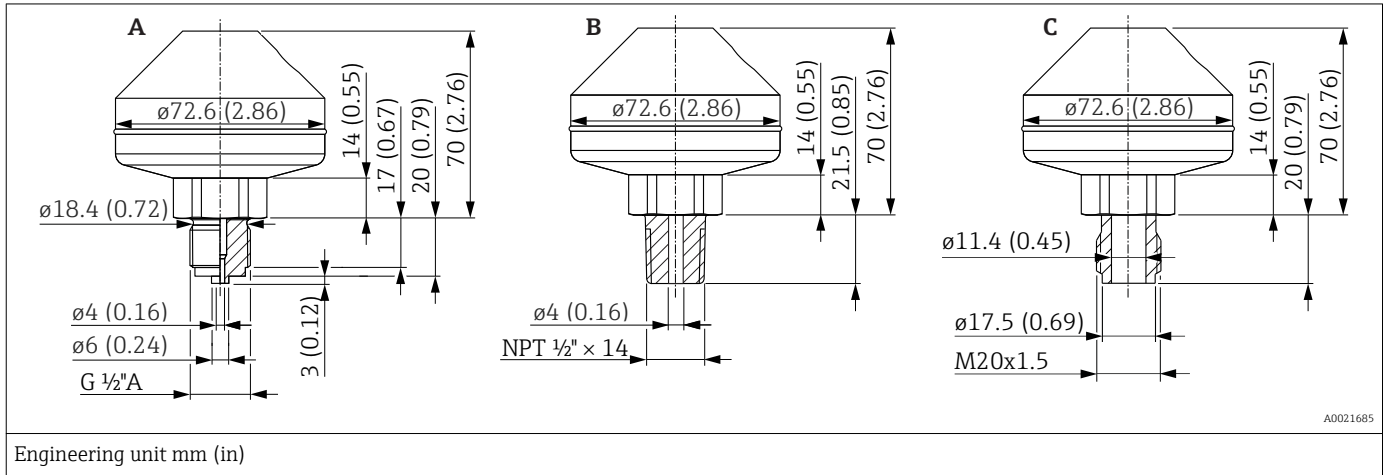
JIS flanges, connection dimensions as per JIS B 2220 BL, raised face RF



| 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, rhodium>gold or PTFE is  $R_a < 0.8 \mu\text{m}$  (31.5  $\mu\text{in}$ ). Lower surface roughness on request.
- 3) The flange raised face is made of the same material as the process isolating diaphragm.
- 4) Product Configurator, "Process connection" section

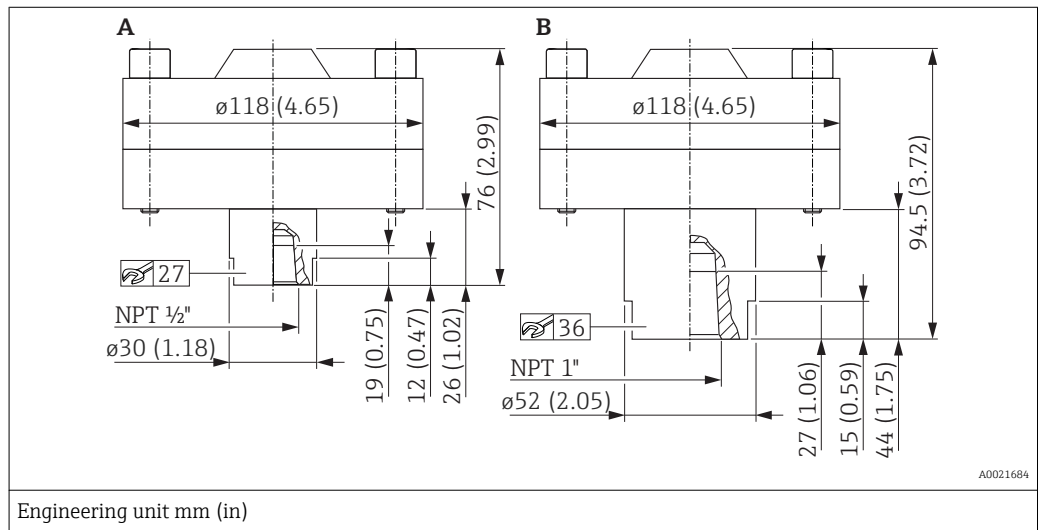
**PMP55 process connections    Welded separators**



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

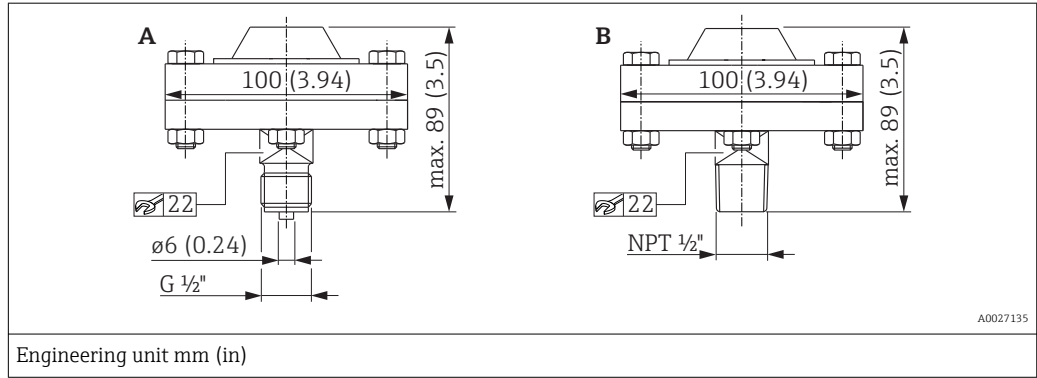
- 1) Product Configurator, order code for "Process connection"
- 2) CSA approval: Product Configurator, order code for "Approval"

**Threaded separators**



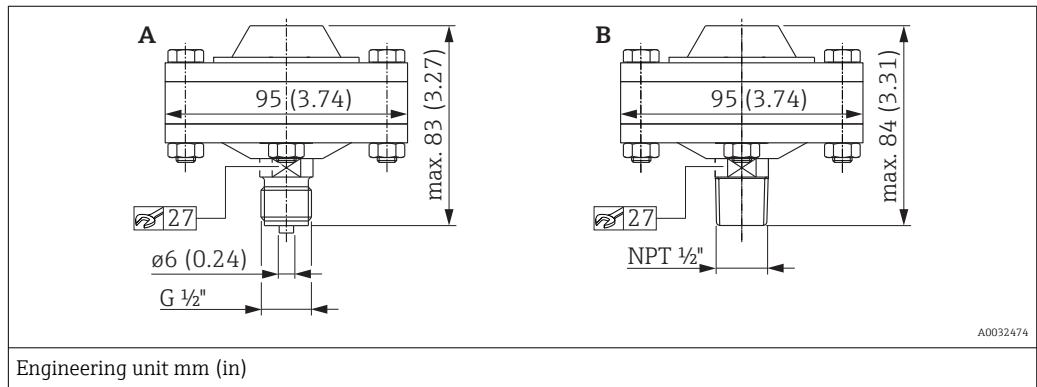
| Item | Designation  | Material                       | Measuring range<br>[bar (psi)] | Nominal pressure | Weight<br>[kg (lb)] | Option <sup>1)</sup> |
|------|--|--------------------------------|--------------------------------|------------------|---------------------|----------------------|
|   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

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



| Item | Designation   | Material                        | Measuring range | Nominal pressure | Weight      | Option <sup>1)</sup> |
|------|---|---------------------------------|-----------------|------------------|-------------|----------------------|
|      |   |                                 | [bar (psi)]     |                  | [kg (lb)]   |                      |
| A    | Threaded, ISO 228 G ½ A EN837 with PTFE seal<br>-40 to +260 °C (-40 to +500 °F) | AISI 316L,<br>screws made of A4 | ≤ 40 (580)      | PN 40            | 1.43 (3.15) | UDJ <sup>2)</sup>    |
| B    | Threaded, ANSI ½ MNPT with PTFE seal<br>-40 to +260 °C (-40 to +500 °F)         |                                 |                 |                  |             | UEJ <sup>2)</sup>    |

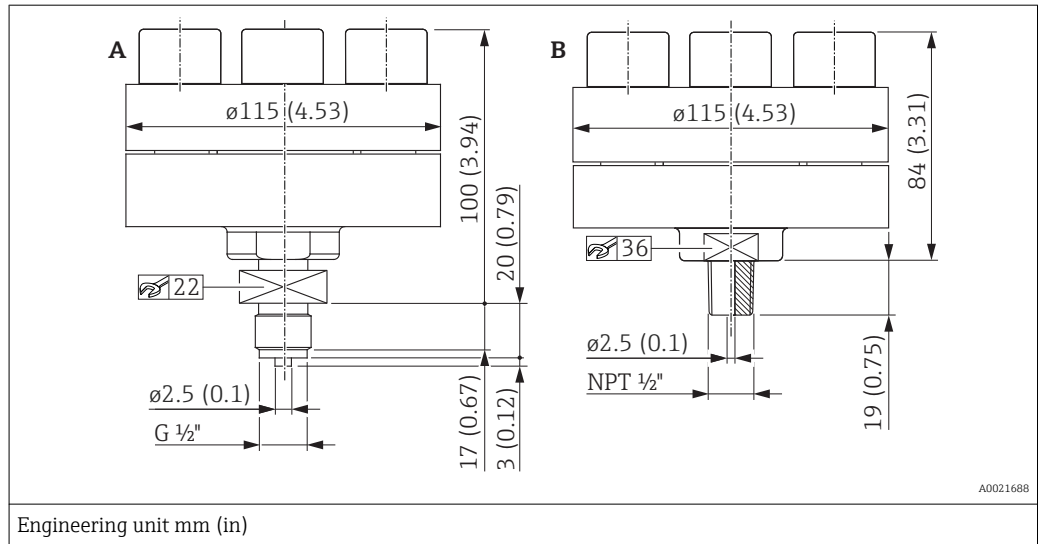
- 1) Product Configurator, order code for "Process connection"
- 2) In combination with silicone oil, inert oil and vegetable oil.



| Item | Designation  | Material                        | Measuring range | Nominal pressure | Weight            | Option <sup>1)</sup> |
|------|--|---------------------------------|-----------------|------------------|-------------------|----------------------|
|      |  |                                 | [bar (psi)]     |                  | [kg (lb)]         |                      |
| A    | Threaded, ISO 228 G ½ A EN837 with metal seal<br>(silver-plated) -60 to +400 °C (-76 to +752 °F) | AISI 316L,<br>screws made of A4 | ≤ 40 (580)      | PN 40            | 1.38 kg (3.04 lb) | UDJ <sup>2)</sup>    |
| B    | Threaded, ANSI ½ MNPT with metal seal (silver-plated)<br>-60 to +400 °C (-76 to +752 °F)         |                                 |                 |                  |                   | UEJ <sup>2)</sup>    |

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

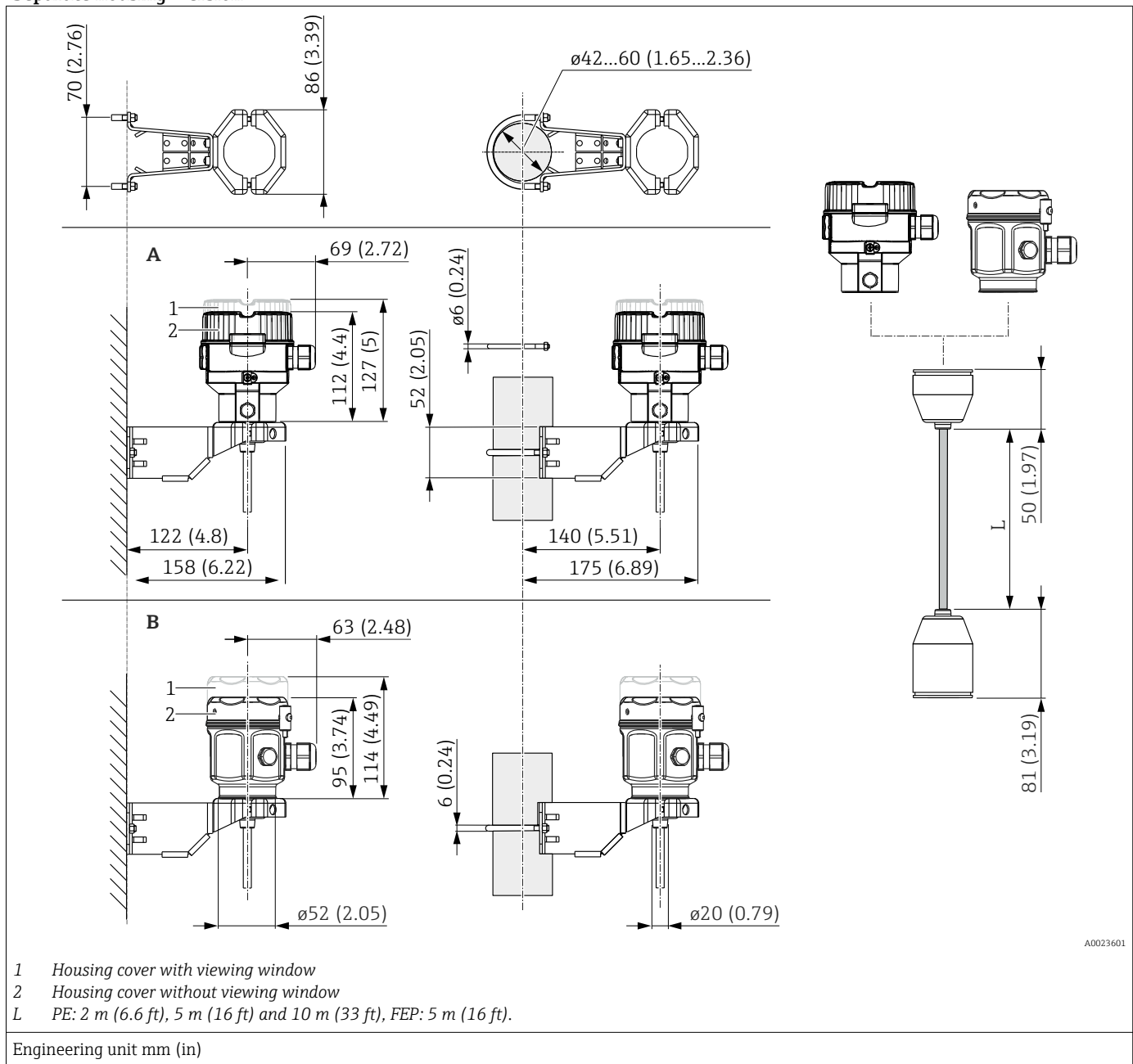




| Item | Designation   | Material                        | Measuring range | Nominal pressure <sup>1)</sup> | Weight       | Option <sup>2)</sup> |
|------|---|---------------------------------|-----------------|--------------------------------|--------------|----------------------|
|      |   |                                 | [bar (psi)]     |                                | [kg (lb)]    |                      |
| A    | Threaded, ISO 228 G ½ A EN837, with integrated seal lip -60 to +400 °C (-76 to +752 °F) | AISI 316L,<br>screws made of A4 | > 40 (580)      | PN 400                         | 4.75 (10.47) | UDJ                  |
| B    | Threaded, ANSI ½ 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, order code for "Process connection"

Wall and pipe mounting with  
"Separate housing" version



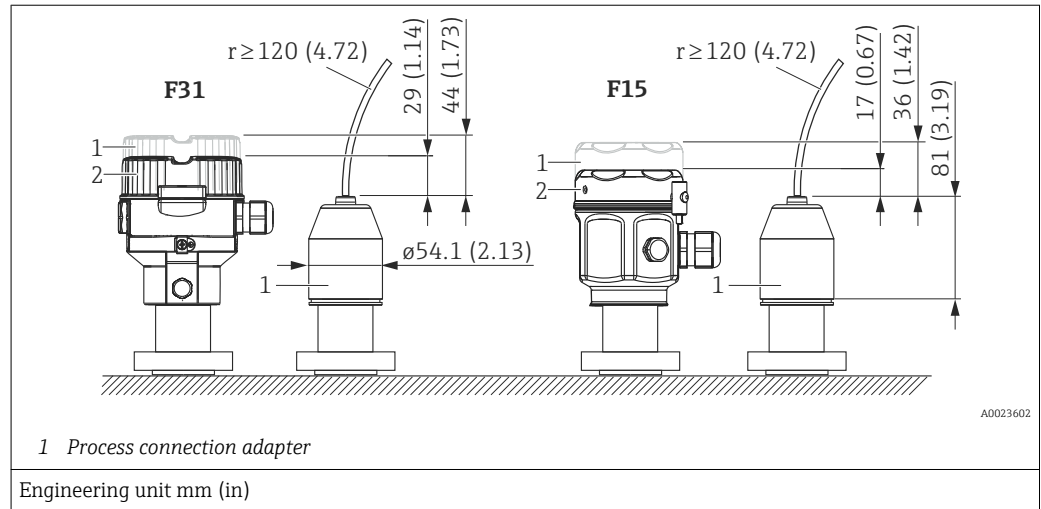
| Item | Designation                 | Weight (kg (lb))     |                  | Option <sup>1)</sup> |
|------|-----------------------------|----------------------|------------------|----------------------|
|      |                             | Housing (F31 or F15) | Mounting bracket |                      |
| A    | Dimensions with F31 housing | → 48                 | 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**

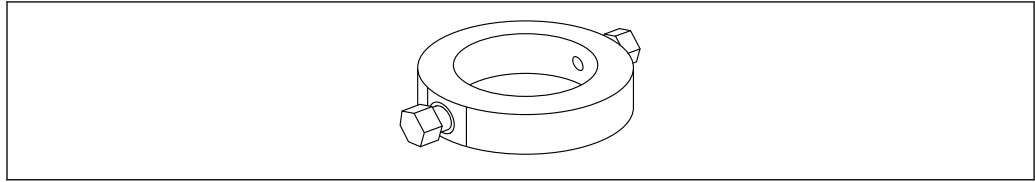
If the separate housing is used, the mounting height of the process connection is reduced compared to the dimensions of the standard version.



**Weight**

| Component part                                     | Weight   |
|--|--|
| Housing  | See "Housing" section  |
| Process connection                                 | See "Process connections" section                                    |
| Capillary with armoring made of AISI 316L (1.4404) | 0.16 kg/m (0.35 lb/m) + 0.2 kg (0.44 lb) (weight per capillary line) |
| Capillary with armoring made of AISI 316L (PVC)    | 0.21 kg/m (0.46 lb/m) + 0.2 kg (0.44 lb) (weight per capillary line) |
| Capillary with armoring made of AISI 316L (PTFE)   | 0.29 kg/m (0.64 lb/m) + 0.2 kg (0.44 lb) (weight per capillary line) |

**Flushing rings**



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

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

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

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

**Order options**

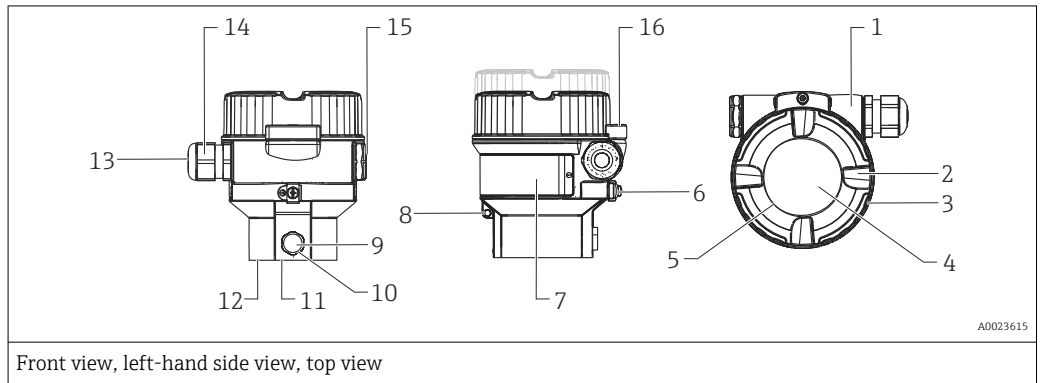
Flushing rings can be ordered as a separate accessory or as an order option for the device.

| Material  | Nominal diameter | Approval <sup>1)</sup> | Accessory <sup>2)</sup><br>Part number | Order option <sup>3) 4)</sup> |  |  |  |
|-----------|------------------|------------------------|--|-------------------------------|--|--|--|
|           |                  |                        |  | Cerabar                       |  |  |  |
|           |                  |                        |  | PMP55                         |  |  |  |
| AISI 316L | EN1092-1         |                        |  |                               |  |  |  |
|           | DN25             | -                      | 71377379                               | PO                            |  |  |  |
|           | DN50             | -                      | 71377380                               | PP                            |  |  |  |
|           | DN80             | -                      | 71377383                               | PQ                            |  |  |  |
|           | ASME B16.5       |                        |  |                               |  |  |  |
|           | NPS 1"           | -                      | 71377369                               | PK                            |  |  |  |
|           | NPS 2"           | CRN                    | 71377370                               | PL                            |  |  |  |
|           | NPS 3"           | CRN                    | 71377371                               | PM                            |  |  |  |

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

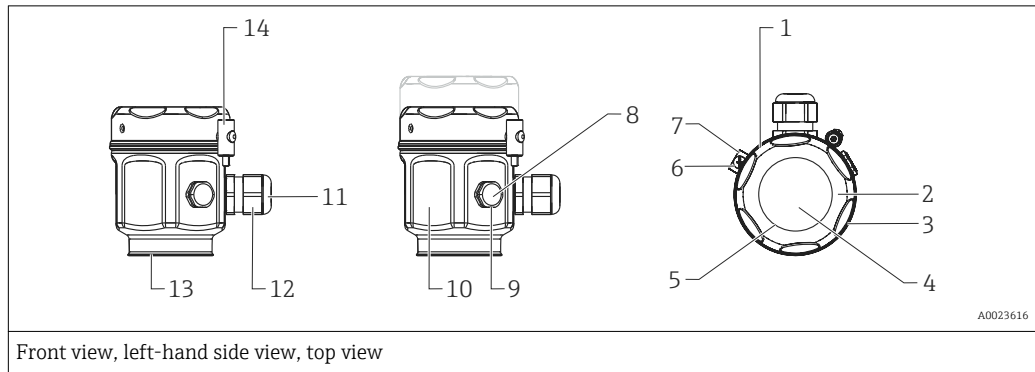
Endress+Hauser offers additional flushing rings as **Technical Special Products (TSP)**.

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



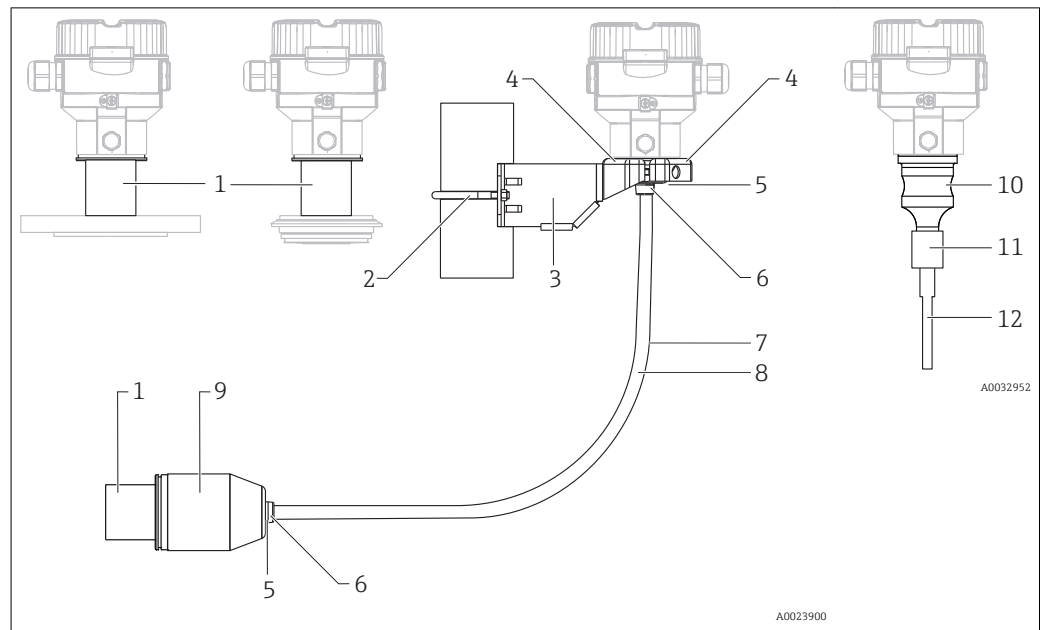
| Item number | Component part                       | Material   |
|-------------|--------------------------------------|--|
| 1           | F31 housing, RAL 5012 (blue)         | Die-cast aluminum with protective powder-coating on polyester base                 |
| 2           | Cover, RAL 7035 (gray)               | 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<br>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

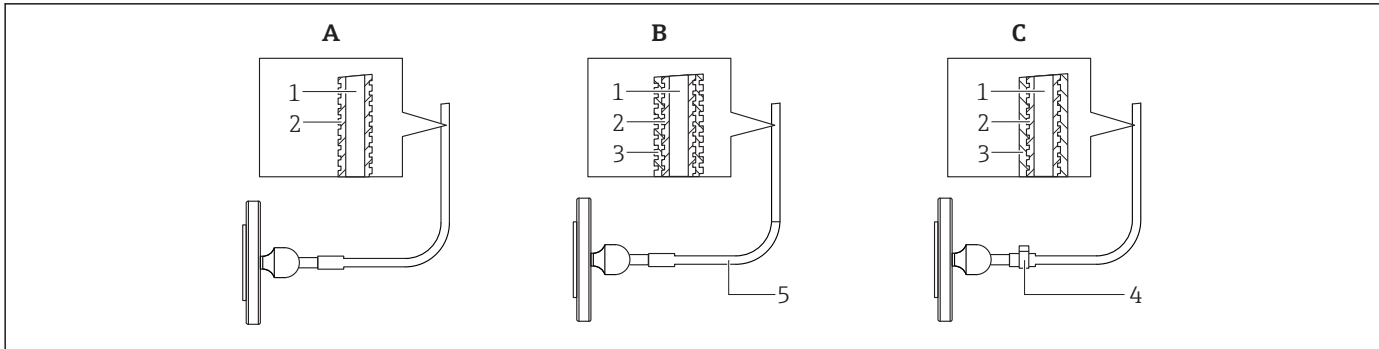


| Item number | Component part   | Material  |
|-------------|--|---|
| 1           | F15 housing  | AISI 316L (1.4404)  |
| 2           | Cover  |   |
| 3           | Cover seal   | Silicone with PTFE coating                                  |
| 4           | Sight glass for non-hazardous area, ATEX 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   |



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| Item | Component part                      | A<br>Standard <sup>1)</sup><br>Armor for capillary | B<br>PVC-coated<br>Armor for capillary | C<br>PTFE hose<br>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 the process

#### NOTICE

- ▶ The device components in contact with the process are specified in the "Mechanical construction" → 48 and "Ordering information" → 124 sections.

#### Delta-ferrite content

The delta-ferrite content of the wetted parts material can be guaranteed and certified to  $\leq 3\%$  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  $\leq 1\%$  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 process wetted device components:

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

#### 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 a threaded connection as well as DIN/ EN flanges made of stainless steel as per AISI 316L (DIN/EN material number 1.4404 or 1.4435). With regard to their stability-temperature property, the materials 1.4404 and 1.4435 are grouped together under 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 isolating diaphragm**

| 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 www.endress.com/ceraphire) | 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, order code for "Membrane material"
- 2) The US Food & Drug Administration (FDA) has no objections to the use of ceramics made from aluminum oxide as a surface material in contact with foodstuffs. This declaration is based on the FDA certificates of our ceramic suppliers.
- 3) The material of the flange raised face is made of the same material as the process isolating diaphragm.

**Seals**

| Type  | Designation   | Option <sup>1)</sup> |
|-------|---|----------------------|
| PMC51 | FKM Viton   | A                    |
|       | FKM Viton, 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, order code for "Fill fluid"

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| 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 FDA-approved filling oils for diaphragm seal devices with 3-A and EHEDG certification!

# Operability

## Operating concept

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

- Commissioning
- Operation
- Diagnosis
- Expert level

### Quick and safe commissioning

Guided menus for applications

### Reliable operation

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

### Efficient diagnostic behavior increases measurement availability

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

## Local operation

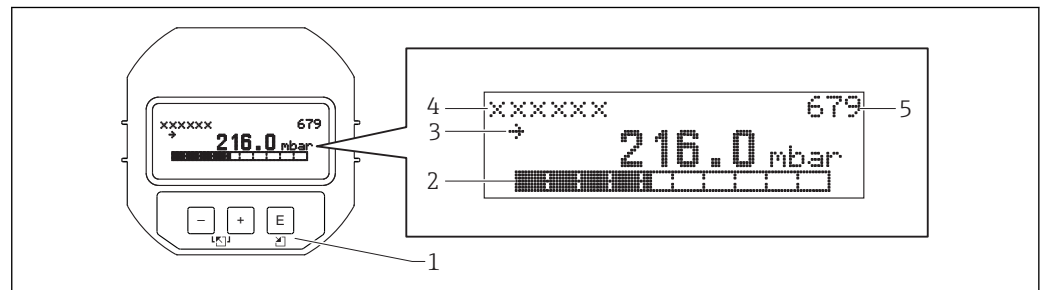
### Local display (optional) for devices with HART-, PROFIBUS PA- or FOUNDATION Fieldbus-Elektronik

A 4-line liquid crystal display (LCD) is used for display and operation. The local display shows measured values, dialog texts as well as fault and notice messages in plain text, thereby supporting the user at 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 including sign and decimal point, bar graph for 4 to 20 mA HART as current display; or for PROFIBUS PA as graphic display of the standardized value of the AI Block; for FOUNDATION Fieldbus as graphic display of the transducer output in relation to the set pressure range.
- 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
- Possibility of configuring the display to suit individual requirements and preferences, such as language, alternating display, contrast setting, display of other measured values such as sensor temperature etc.
- Comprehensive diagnostic functions (fault and warning message, peak-hold indicators etc.)

#### Overview



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

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

| Function   | Operation via display |      |             |                     |
|--|-----------------------|------|-------------|---------------------|
|  | Analog electronic     | HART | 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   | –                     | ✓    | ✓           | ✓                   |

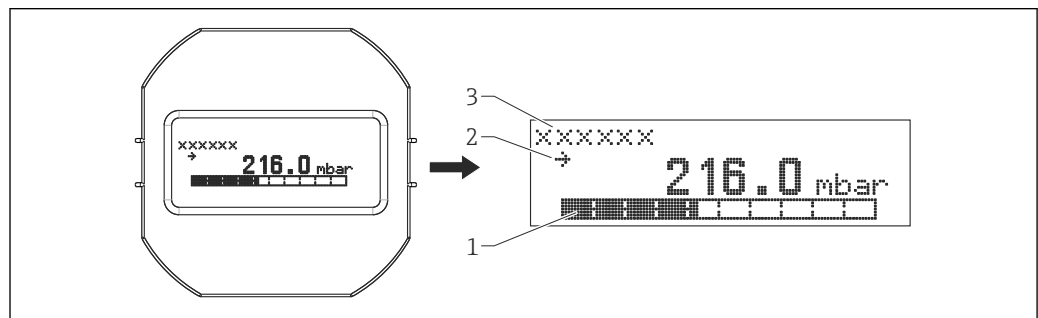
**Local display (optional) for devices with analog electronics**

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



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- 1 Bar graph
- 2 Symbol
- 3 Parameter name

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

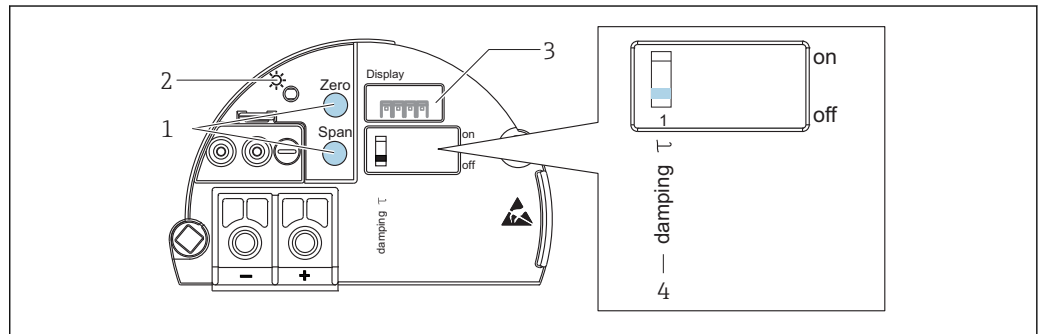
**Operating keys and elements located inside on the electronic insert**

| Function   | Operation with operating keys and elements on the electronic insert |      |             |                     |
|--|---|------|-------------|---------------------|
|  | Analog electronics  | HART | 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

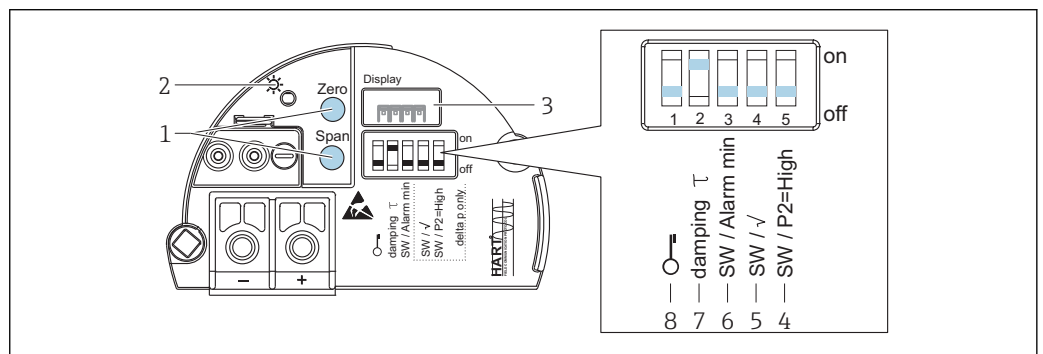
Analog



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- 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

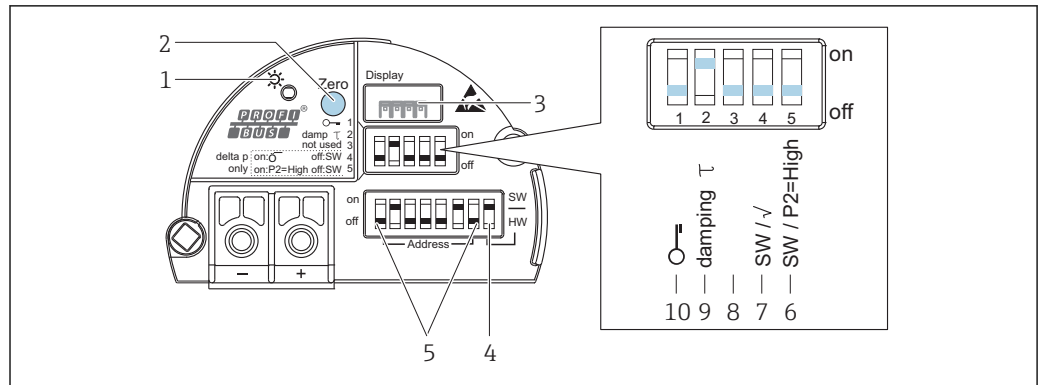
HART



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

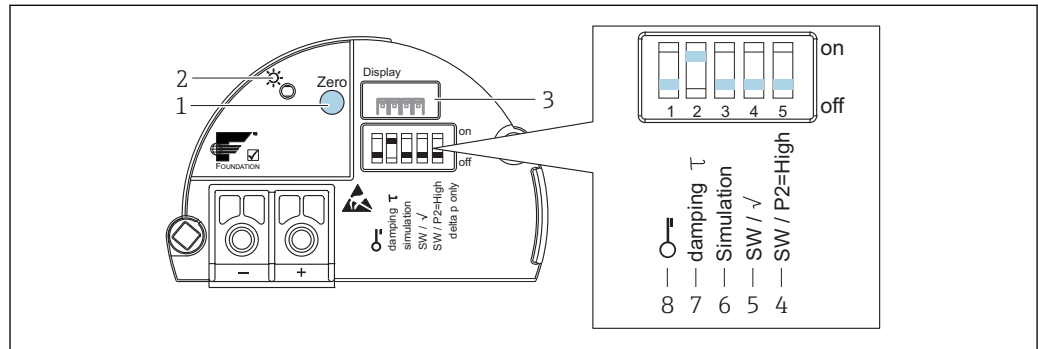
PROFIBUS PA



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

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

| Hardware and software for remote operation   | HART            | PROFIBUS PA     | FOUNDATION Fieldbus |
|--|-----------------|-----------------|---------------------|
| FieldCare →  111            | ✓ <sup>1)</sup> | ✓ <sup>2)</sup> | ✓                   |
| FieldXpert SFX100 →  111    | ✓               | —               | ✓                   |
| NI-FBUS Configurator →  112 | —               | —               | ✓                   |

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

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

### Field Xpert SFX100


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

### Commubox FXA195

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

### Commubox FXA291

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

 For the following Endress+Hauser devices you will need the "ToF Adapter FXA291" as an additional accessory:

- Cerabar M
- Deltabar M
- Deltapilot M

### ToF Adapter FXA291

The ToF adapter FXA291 connects the Commubox FXA291 with devices of the ToF platform, pressure equipment and Gammapilot via the USB interface of a personal computer or a notebook. For details refer to KA00271F.

**Profiboard**

For connecting a PC to the PROFIBUS.

**Proficard**

For connecting a laptop to the PROFIBUS.

**FF configuration program**

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

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

*Operation with NI-FBUS Configurator:*

The NI-FBUS Configurator is an easy-to-use graphical environment for creating linkages, loops, and a schedule based on the fieldbus concepts.

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

- Set block and device tags
- Set device addresses
- Create and edit function block control strategies (function block applications)
- Configure vendor-defined function and transducer blocks
- Create and edit schedules
- Reading and writing of data from control and regulation systems
- Invoke methods specified in the manufacturer-specific DD (e.g. basic device settings)
- Display DD menus (e.g. tab for calibration data)
- Download a configuration
- Verify a configuration and compare it to a saved configuration
- Monitor a downloaded configuration
- Replace 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> |
|-------------------------------------|----------------------|
| Tagging (TAG), see additional spec. | Z1                   |
| Bus address, see additional spec.   | Z2                   |

1) Product configurator "Marking" ordering feature



## Planning instructions for diaphragm seal systems

### NOTICE

#### Diaphragm seal systems sized/ordered incorrectly

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

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

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

**Function and design**

Diaphragm seals separate the measuring system from the process.

A diaphragm seal system consists of:

- A diaphragm seal
- A capillary tube or a temperature isolator if necessary
- Fill fluid and
- a pressure transmitter.

The process pressure acts via the process isolating diaphragm of a diaphragm seal on the liquid-filled system, which transfers the process pressure to the sensor of the pressure transmitter.

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

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

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

**Diameter of the process isolating diaphragm**

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

**Stiffness of the process isolating diaphragm**

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

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

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

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

Ordering information:

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

Selection in the Applicator:

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

**Capillary**

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

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

### Filling oil

Observe the temperatures and pressures during commissioning and cleaning. A further selection criterion is the compatibility of the filling oil with the requirements of the medium. For example, only filling oils that do not present a health hazard are used in the food industry, e.g. vegetable oil or silicone oil. (See also the following section "Diaphragm seal filling oils".)

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

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

### Pressure transmitter

The pressure transmitter influences the temperature 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 in order to pass through the complete measuring range.

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

### Diaphragm seal filling oils

| Medium               | $P_{\text{abs}} = 0.05 \text{ bar (0.725 psi)}^{1)}$ | $P_{\text{abs}} \geq 1 \text{ bar (14.5 psi)}^{2)}$ |
|----------------------|--|---|
| 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  $p_{\text{abs}} = 0.05 \text{ bar (0.725 psi)}$  (observe temperature limits of the device and the system!)
- 2) Permitted temperature range at  $p_{\text{abs}} \geq 1 \text{ bar (14.5 psi)}$  (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 line to prevent the capillary from bending (capillary bending radius  $\geq 100$  mm (3.94 in))

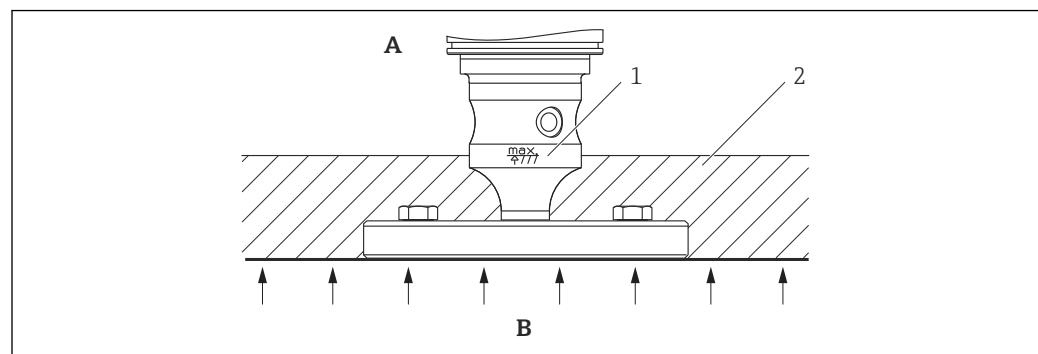
### Capillary

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)

### Thermal 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:

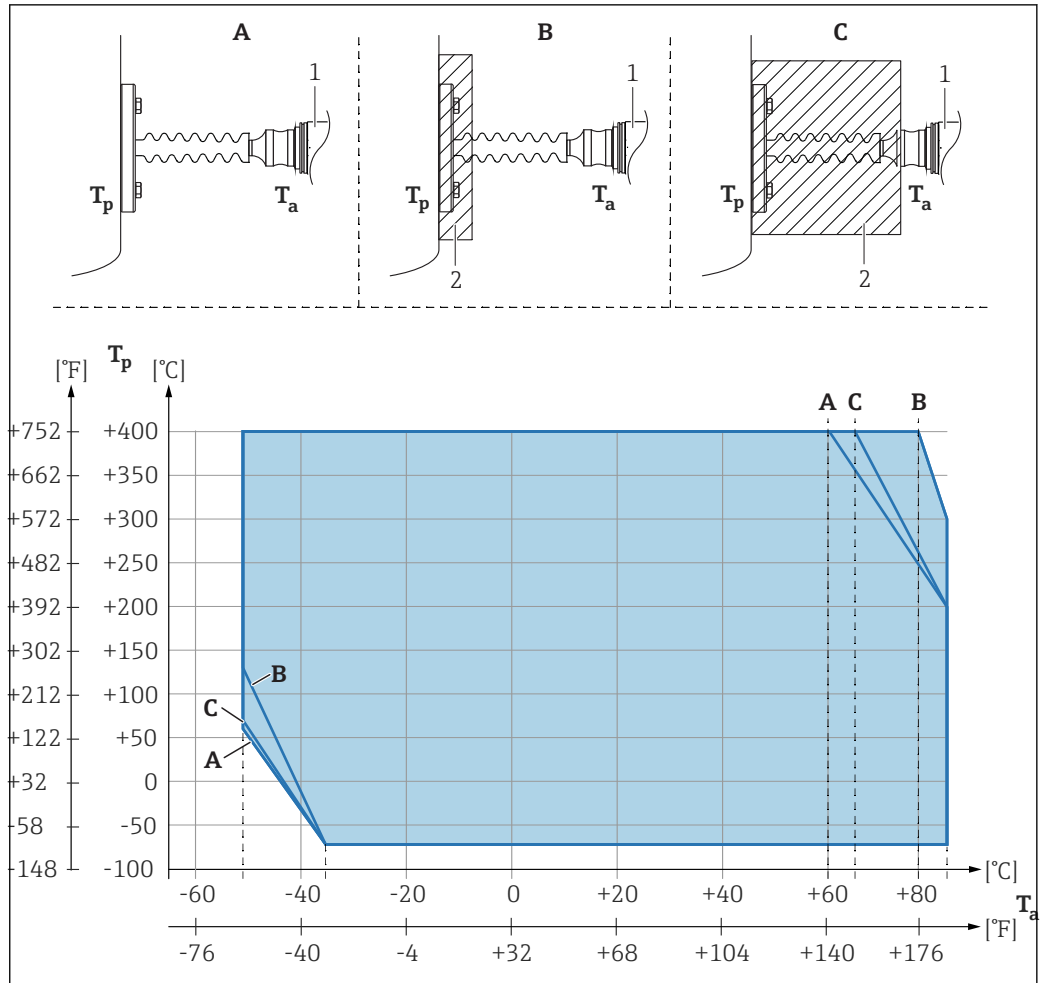


A0020474

- 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 lead to the maximum permissible electronics temperature of +85 °C (+185 °F) being exceeded. Depending on the filling oil used, diaphragm seal systems with temperature isolators can be used for maximum temperatures of up to +400 °C (+752 °F) → 115, "Diaphragm seal filling oils" section. 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

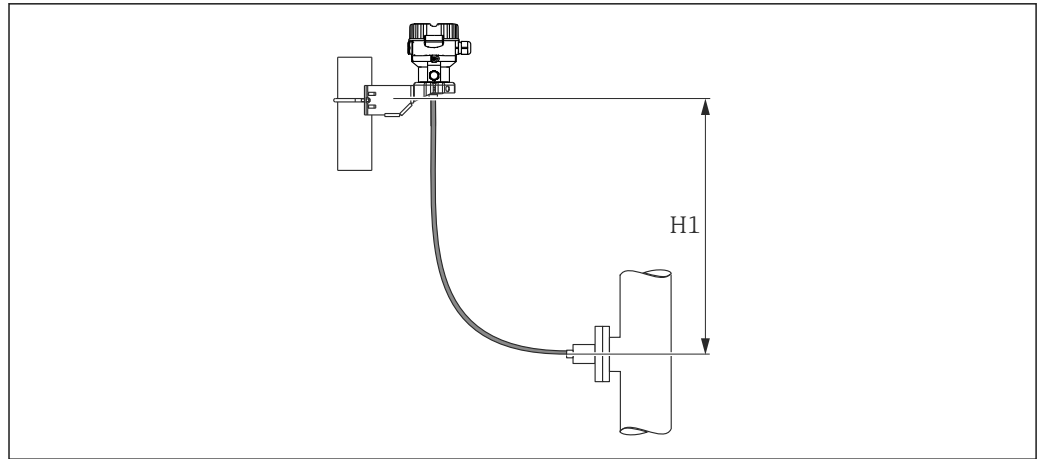
**Vacuum applications**

**Mounting instructions**

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

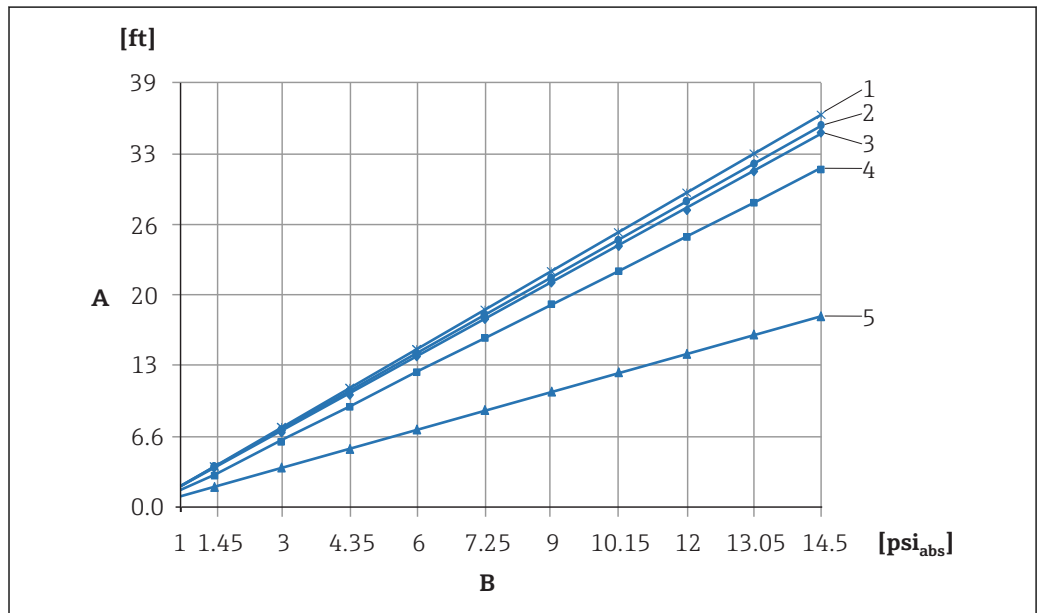
For applications under vacuum, Endress+Hauser recommends mounting the pressure transmitter below the diaphragm seal. This prevents vacuum loading of the diaphragm seal caused by the presence of fill fluid in the capillary.

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



A0023994



The maximum height difference depends on the density of the filling oil and the smallest ever pressure that is permitted to occur at the diaphragm seal (empty vessel), see illustration below. The following diagram depicts the maximum installation height above the 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-Tick marking</b>                  | <p>The supplied product or measuring system meets the ACMA (Australian Communications and Media Authority) requirements for network integrity, interoperability, performance characteristics as well as health and safety regulations. Here, especially the regulatory arrangements for electromagnetic compatibility are met. The products are labelled with the RCM- Tick marking on the name plate.</p> <div data-bbox="497 622 1533 757" style="border: 1px solid black; text-align: center; padding: 10px;">  </div> <p style="text-align: right; font-size: small;">A0029561</p>  |
| <b>Ex approvals</b>                      | <ul style="list-style-type: none"> <li>▪ ATEX</li> <li>▪ IECEx</li> <li>▪ FM</li> <li>▪ CSA</li> <li>▪ NEPSI</li> <li>▪ Also combinations of different approvals</li> </ul> <p>All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas →  128.</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>Endress+Hauser confirms successful testing of the device by affixing to it the EAC mark.</p>   |
| <b>Suitable for hygiene applications</b> | <p>The device has been developed for use in hygienic processes.</p> <p>The materials in contact with the process meet FDA requirements as well as the 3-A Sanitary Standard No. 74-XX. Endress+Hauser confirms compliance with the requirements by affixing the 3-A mark to the device.</p> <p>The following serial number-specific declarations (with a copy of the certification) can be ordered with the device (optional):</p> <p>Product Configurator, order code for "Additional approval" option "LD"</p> <p>Product Configurator, order code for "Additional approval" option "LB"</p> <p><b>NOTICE</b></p> <p><b>Risk of contamination if incorrect seals and parts are used!</b></p> <ul style="list-style-type: none"> <li>▶ To avoid the risk of contamination, the device must be installed in accordance with EHEDG "Hygienic Equipment Design Criteria (HDC)", "Subgroup Design Principles" Doc. 8.</li> <li>▶ Suitable assemblies and seals must be used to ensure hygiene-compliant design according to the specifications of 3-A SSI and EHEDG Position Paper (in their current version).</li> <li>▶ The leak-proof connections can be cleaned with the cleaning methods typical of this industry (CIP and SIP). Attention must be paid to the pressure and temperature specifications of the sensor and process connections for CIP and SIP processes (clean in place/sterilization in place).</li> <li>▶ For diaphragm seal devices with 3-A and EHEDG certificates, only select filling oils with FDA approval!</li> </ul> |



If cleaning in place (CIP) is required, adapters are available that comply with 3-A requirements. Information on 3-A and EHEDG-tested adapters can be found in the "Weld-in adapters, process adapters and flanges" documentation, TI00426F.

#### Certificate of current Good Manufacturing Practices (cGMP)

Product Configurator, order code for "Test, Certificate" option "JG"

- The certificate is only available in English
- Materials of construction of product wetted parts
- TSE compliance
- Polishing and surface finish
- Material/ compound compliance table (USP Class VI, FDA conformity)

#### Certificate of Compliance ASME BPE 2012

Ordering information:

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

#### Functional safety SIL

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.

Ordering information:

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

#### CRN approvals

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

Ordering information:

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 were also applied:

##### **IEC 62828-1 / DIN EN 60770 and IEC 62828-2 / DIN EN 60770:**

Transmitters for use in industrial-process control systems. Part 1: Methods for inspection and routine testing

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

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

##### **EN 61326-Series:**

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

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

Degrees of protection by housing (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 ≤ 200 bar (2 900 psi)**

Pressure equipment (having a maximum allowable pressure  $PS \leq 200$  bar (2 900 psi)) can be classified as pressurized equipment 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 (equipment with safety function in accordance with Pressure Equipment Directive 2014/68/EU, Article 2, point 4).

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

Pressure equipment designated for application in every process fluid having a pressurized volume of  $< 0,1$  l and a max. allowable pressure  $PS > 200$  bar (2 900 psi) 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:*

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

*Note:*

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

*The following also applies:*

- PMP51 /PMP55 with threaded connection and internal process isolating diaphragm PN > 200: Suitable for stable gases in group 1, category I, module A
- PMP55 with pipe diaphragm seal  $\geq 1.5$ "/PN40: Suitable for stable gases in group 1, category II, module A2
- PMP55 with separators PN400: 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                   |

| Designation              | Option <sup>1)</sup> |
|--------------------------|----------------------|
| 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                   |
| Pressure test, internal procedure, inspection certificate   | ✓     | ✓     | ✓     | KE                   |
| 3.1 Material certificate+Delta-Ferri 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                    |

| Designation                                       | Option <sup>1)</sup> |
|---|----------------------|
| Customized pressure; see additional specification | J                    |
| Customized level; see additional specification    | K                    |

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

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**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:<br>3 lines each with a maximum of 18 characters<br>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, PROFIBUS PA, FOUNDATION Fieldbus electronics)

#### 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) |

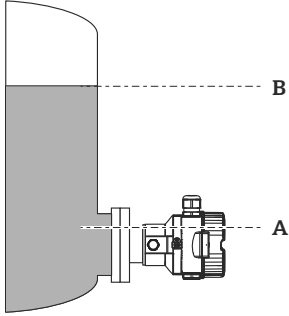
Lowest calibratable span (preset at factory) →  13

**Level**

If the option "K" 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   |  | Output unit (scaled unit)                         |                               |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
|---|--|---|-------------------------------|----------------------------|--|------|---------|--------|--------|---------|-----------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-------------------------------|--|-----------------------------|-----------------------------|---|--|--|--|-----------------------------|--|--|--|--|-----------------------------|--|--|--|--|-------------------------------|--|--|--|
| <input type="checkbox"/> mbar <input type="checkbox"/> mmH <sub>2</sub> O <input type="checkbox"/> mmHg <input type="checkbox"/> Pa<br><input type="checkbox"/> bar <input type="checkbox"/> mH <sub>2</sub> O <input type="checkbox"/> kgf/cm <sup>2</sup> <input type="checkbox"/> kPa<br><input type="checkbox"/> psi <input type="checkbox"/> ftH <sub>2</sub> O <input type="checkbox"/> inH <sub>2</sub> O <input type="checkbox"/> MPa | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Mass</td> <td style="padding: 2px;">Lengths</td> <td style="padding: 2px;">Volume</td> <td style="padding: 2px;">Volume</td> <td style="padding: 2px;">Percent</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/> kg</td> <td style="padding: 2px;"><input type="checkbox"/> m</td> <td style="padding: 2px;"><input type="checkbox"/> l</td> <td style="padding: 2px;"><input type="checkbox"/> gal</td> <td style="padding: 2px;"><input type="checkbox"/> %</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/> t</td> <td style="padding: 2px;"><input type="checkbox"/> dm</td> <td style="padding: 2px;"><input type="checkbox"/> hl</td> <td style="padding: 2px;"><input type="checkbox"/> lgal</td> <td></td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/> lb</td> <td style="padding: 2px;"><input type="checkbox"/> cm</td> <td style="padding: 2px;"><input type="checkbox"/> m<sup>3</sup></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="padding: 2px;"><input type="checkbox"/> mm</td> <td style="padding: 2px;"><input type="checkbox"/> ft<sup>3</sup></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="padding: 2px;"><input type="checkbox"/> ft</td> <td style="padding: 2px;"><input type="checkbox"/> in<sup>3</sup></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="padding: 2px;"><input type="checkbox"/> inch</td> <td></td> <td></td> <td></td> </tr> </table> |   |                               |                            |  | Mass | Lengths | Volume | Volume | Percent | <input type="checkbox"/> kg | <input type="checkbox"/> m | <input type="checkbox"/> l | <input type="checkbox"/> gal | <input type="checkbox"/> % | <input type="checkbox"/> t | <input type="checkbox"/> dm | <input type="checkbox"/> hl | <input type="checkbox"/> lgal |  | <input type="checkbox"/> lb | <input type="checkbox"/> cm | <input type="checkbox"/> m <sup>3</sup> |  |  |  | <input type="checkbox"/> mm | <input type="checkbox"/> ft <sup>3</sup> |  |  |  | <input type="checkbox"/> ft | <input type="checkbox"/> in <sup>3</sup> |  |  |  | <input type="checkbox"/> inch |  |  |  |
| Mass  | Lengths  | Volume  | Volume                        | Percent                    |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
| <input type="checkbox"/> kg   | <input type="checkbox"/> m   | <input type="checkbox"/> l                        | <input type="checkbox"/> gal  | <input type="checkbox"/> % |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
| <input type="checkbox"/> t  | <input type="checkbox"/> dm  | <input type="checkbox"/> hl                       | <input type="checkbox"/> lgal |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
| <input type="checkbox"/> lb   | <input type="checkbox"/> cm  | <input type="checkbox"/> m <sup>3</sup>           |                               |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
|   | <input type="checkbox"/> mm  | <input type="checkbox"/> ft <sup>3</sup>          |                               |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
|   | <input type="checkbox"/> ft  | <input type="checkbox"/> in <sup>3</sup>          |                               |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
|   | <input type="checkbox"/> inch  |   |                               |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
| Empty pressure [a]:<br>Low pressure value (empty)   | _____<br>[Pressure engineering unit]   | Empty calibration [a]:<br>Low level value (empty) | _____<br>[Scaled unit]        |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |
| Full pressure [b]:<br>High pressure value (full)  | _____<br>[Pressure engineering unit]   | Full calibration [b]:<br>High level value (full)  | _____<br>[Scaled unit]        |                            |  |      |         |        |        |         |                             |                            |                            |                              |                            |                            |                             |                             |                               |  |                             |                             |   |  |  |  |                             |  |  |  |  |                             |  |  |  |  |                               |  |  |  |

**Example**



A0024007

A    0 mbar / 0m  
 B    300 mbar (4.5 psi) /  
      3 m (9.8 ft)

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

1) Depending on sensor and communication version

| Damping  |                           |
|----------|---------------------------|
| Damping: | _____ sec (Default 2 sec) |

**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) →  13

## Additional documentation

**Field of Activities** Pressure measurement, powerful instruments for process pressure, differential pressure, level and flow:  
FA00004P/00/EN

**Technical Information**

- Deltabar M: TI00434P/00/EN
- Deltapilot M: TI00437P/00/EN
- EMC test procedures: TI00241F/00/EN
- Weld-in adapter, adapter and flanges: TI00426F/00/EN

**Special Documentation** Mechanical accessories for pressure measuring devices: SD01553P/00/EN

**Operating Instructions**

- 4...20 mA Analog: BA00385P/00/EN
- 4...20 mA HART: BA00382P/00/EN
- PROFIBUS PA: BA00383P/00/EN
- FOUNDATION Fieldbus: BA00384P/00/EN

**Brief operating instruction**

- 4...20 mA Analog: KA01036P/00/EN
- 4...20 mA HART: KA01030P/00/EN
- PROFIBUS PA: KA01031P/00/EN
- FOUNDATION Fieldbus: KA01032P/00/EN

**Functional safety manual (SIL)** Cerabar M (4...20 mA): SD00347P/00/EN

### Safety instructions

| Directive | Approval              | Category             | Type                    | Housing |     | Electronics                                       | Documentation | Option <sup>1)</sup> |
|-----------|-----------------------|----------------------|-------------------------|---------|-----|---|---------------|----------------------|
|           |                       |                      |                         | F31     | F15 |   |               |                      |
| ATEX      | Ex ia IIC             | II 1/2 G             | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00464P/00   | BA                   |
| ATEX      | Ex t IIC              | II 1/2 D             | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00466P/00   | BB                   |
| ATEX      | Ex d                  | II 2 G               | PMP51<br>PMP55          | ✓       | —   | 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus | XA00467P/00   | BC                   |
| ATEX      | Ex nA                 | II 3 G               | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus | XA00469P/00   | BD                   |
| ATEX      | Ex ia IIC             | II 2 G               | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00464P/00   | BE                   |
| ATEX      | Ex ia IIC             | II 1/2 D             | PMC51                   | ✓       | ✓   | 4 to 20 mA HART                                   | XA00465P/00   | BF                   |
| ATEX      | Ex ic IIC             | II 3 G               | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00489P/00   | BG                   |
| ATEX      | Ex ia<br>Ex ia IIC    | II 1/2 G<br>II 1/2 D | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00468P/00   | B1                   |
| ATEX      | Ex ia IIC             | II 2 G<br>II 1/2 G   | PMP51<br>PMP55          | ✓       | ✓   | 4 to 20 mA HART                                   | XA00468P/00   | B2                   |
| ATEX      | Ex d IIC<br>Ex ia IIC | II 2 G<br>II 1/2 G   | PMP51<br>PMP55          | ✓       | —   | 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus | XA00504P/00   | 8A                   |

1) Product Configurator, order code for "Approval"



| Directive | Approval                | EPL            | Type                    | Housing |     | Electronics                                       | Documentation | Option <sup>1)</sup> |
|-----------|-------------------------|----------------|-------------------------|---------|-----|---|---------------|----------------------|
|           |                         |                |                         | F31     | F15 |   |               |                      |
| IECEX     | Ex ia IIC               | Ga/Gb          | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00470P/00   | IA                   |
| IECEX     | Ex d IIC                | Gb             | PMP51<br>PMP55          | ✓       | –   | 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus | XA00471P/00   | IB                   |
| IECEX     | Ex t IIIC               | Da/Db          | PMP51<br>PMP55          | ✓       | ✓   | 4 to 20 mA HART                                   | XA00472P/00   | ID                   |
| IECEX     | Ex ic                   | Gc             | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00488P/00   | IE                   |
| IECEX     | Ex ia IIIC              | Da/Db          | PMC51                   | ✓       | ✓   | 4 to 20 mA HART                                   | XA00487P/00   | IF                   |
| IECEX     | Ex ia IIC<br>Ex ia IIIC | Ga/Gb<br>Da/Db | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART                                   | XA00473P/00   | I1                   |

1) Product Configurator, order code for "Approval"

| Directive | Approval       | Type                    | Housing |     | Electronics     | Documentation | Option <sup>1)</sup> |
|-----------|----------------|-------------------------|---------|-----|-----------------|---------------|----------------------|
|           |                |                         | F31     | F15 |                 |               |                      |
| NEPSI     | Ex ia IIC T6   | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART | XA00533P/00   | NA                   |
| NEPSI     | Ex d IIC T6 Gb | PMP51<br>PMP55          | ✓       | –   | 4 to 20 mA HART | XA00515P/00   | NB                   |

1) Product Configurator, order code for "Approval"

| Directive | Approval   | Electronics  | Documentation | Option <sup>1)</sup> |
|-----------|--|--|---------------|----------------------|
| INMETRO   | Ex ia IIC T6...T4 Ga/Gb<br>Ex ia IIC T6...T3 Ga/Gb | 4 to 20 mA HART, PROFIBUS PA,<br>FOUNDATION Fieldbus | XA01302P/00   | MA                   |
| INMETRO   | Ex d IIC T6/T4 Gb                                  | 4 to 20 mA HART, PROFIBUS PA,<br>FOUNDATION Fieldbus | XA01284P/00   | MR                   |

1) Product Configurator, order code for "Approval"

### Installation/Control Drawings

| Directive | Approval  | Type                    | Housing |     | Electronics   | Documentation  | Option <sup>1)</sup> |
|-----------|---|-------------------------|---------|-----|---|--|----------------------|
|           |   |                         | F31     | F15 |   |  |                      |
| FM        | FM IS Cl.I,II,III Div.1 Gr.A-G, AEx ia<br>FM NI Cl.I Div.2 Gr.A-D<br>FM IS: Zone 0,1,2,20,21,22/FM NI: Zone 2 | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | <ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul>           | <ul style="list-style-type: none"> <li>■ XA00563P/00</li> <li>■ XA00564P/00</li> </ul> | FA                   |
| FM        | FM XP Cl.I, II Div.1 Gr.A-D, AEx d<br>(Factory sealed) Zone 1,2   | PMP51<br>PMP55          | ✓       | –   | <ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA</li> <li>■ FOUNDATION Fieldbus</li> </ul> | XA01163P/00  | FB                   |
| FM        | FM DIP Cl.II, III Div.1 Gr.A-D Zone 21, 22  | PMP51<br>PMP55          | ✓       | ✓   | 4 to 20 mA HART   | In preparation   | FC                   |
| FM        | FM NI Cl.I Div.2 Gr.A-D, Zone 2   | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | 4 to 20 mA HART   | FM3035394  | FD                   |

| Directive | Approval  | Type                    | Housing |     | Electronics   | Documentation  | Option <sup>1)</sup> |
|-----------|---|-------------------------|---------|-----|---|--|----------------------|
|           |   |                         | F31     | F15 |   |  |                      |
| FM        | FM IS/XP Cl.I, II Div.1 Gr.A-G, Zone 1,2  | PMP51<br>PMP55          | ✓       | –   | <ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul> | <ul style="list-style-type: none"> <li>■ XA01160P/00</li> <li>■ XA00567P/00</li> </ul> | F1                   |
| CSA       | C/US IS Cl.I,II,III Div.1 Gr.A-G,<br>C/US IS Cl.I Div.2 Gr.A-D, Ex ia   | PMC51<br>PMP51<br>PMP55 | ✓       | ✓   | <ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul> | <ul style="list-style-type: none"> <li>■ XA00556P/00</li> <li>■ XA00558P/00</li> </ul> | CA                   |
| CSA       | CSA C/US CP Cl.I, II Div.1 Gr.B-G, Ex d<br>(factory sealed) Zone 1,2  | PMP51<br>PMP55          | ✓       |     | 4 to 20 mA HART   | XA00577P/00  | CB                   |
| CSA       | CSA C/US Cl.II, III Div.1 Gr.E-G, Zone 21,22  | PMP51<br>PMP55          | ✓       | ✓   | 4 to 20 mA HART   | In preparation   | CC                   |
| CSA       | CSA C/US IS/XP Cl.I, II Div.1 Gr.A-G/B-G, Zone 1,2  | PMP51<br>PMP55          | ✓       | –   | <ul style="list-style-type: none"> <li>■ 4 to 20 mA HART</li> <li>■ PROFIBUS PA, FOUNDATION Fieldbus</li> </ul> | <ul style="list-style-type: none"> <li>■ XA00577P/00</li> <li>■ XA00561P/00</li> </ul> | C1                   |
| FM<br>CSA | FM/CSA IS + XP Cl.I, II Div.1 Gr.A-D/B-G<br>FM IS/FM XP Cl.I, II Div.1 Gr.A-G+<br>CSA IS/XP Cl.I, II Div.1 Gr.A-G, Zone 1,2 | PMP55                   | ✓       | –   | 4 to 20 mA HART   | In preparation   | 8B                   |

1) Product Configurator, order code for "Approval"

#### Combination certificate

| Directive         | Approval  | Type  | Electronics   | Documentation                | Option <sup>1)</sup> |
|-------------------|---|-------|---|------------------------------|----------------------|
| KEMA/ FM /<br>CSA | ATEX II Ex ia + FM/CSA IS ATEX II 1/2G Ex ia IIC T6 +<br>FM/CSA IS Cl.I Div.1 Gr.AD, FM/CSA: Zone 0,1,2 | PMC51 | 4 to 20 mA HART,<br>PROFIBUS PA,<br>FOUNDATION Fieldbus | XA00464P/00                  | 8C                   |
|                   |   |       | 4 to 20 mA HART   | XA00556P/00 +<br>XA00536P/00 |                      |
|                   |   |       | PROFIBUS PA,<br>FOUNDATION Fieldbus                     | XA00564P/00                  |                      |

1) Product Configurator, order code for "Approval"

| Directive      | Approval   | Electronics                         | Documentation  | Option <sup>1)</sup> |
|----------------|--|-------------------------------------|--|----------------------|
| KEMA/ FM / CSA | ATEX II Ex ia + FM/CSA IS<br>ATEX II 1/2G Ex ia IIC T6 +<br>FM/CSA IS Cl.I Div.1 Gr.A-D,<br>FM/CSA: Zone 0,1,2 | 4 to 20 mA HART                     | <ul style="list-style-type: none"> <li>■ ZD00236P/00</li> <li>■ ZD00239P/00</li> </ul> | 8C                   |
|                |  | PROFIBUS PA,<br>FOUNDATION Fieldbus | XA00474P/00  |                      |

1) Product Configurator, order code for "Approval"

## Accessories

### Manifolds

→  76

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 Burell, 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** →  40

**M12 connector** →  22

| Service-specific accessories | Accessories       | Description   |
|------------------------------|-------------------|---|
|                              | DeviceCare SFE100 | Configuration tool for HART, PROFIBUS and FOUNDATION Fieldbus field devices<br> Technical Information TI01134S<br> DeviceCare is available for download at <a href="http://www.software-products.endress.com">www.software-products.endress.com</a> . You need to register in the Endress+Hauser software portal to download the application. |
|                              | FieldCare SFE500  | FDT-based plant asset management tool<br>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.<br> Technical Information TI00028S  |

## Registered trademarks

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**FOUNDATION™Fieldbus** Registered trademark of the FieldComm Group, Austin, USA

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