

Technical Information

Cerabar M

PMC51, PMP51, PMP55

Process pressure measurement



Pressure transmitter with ceramic and metallic 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 measurements 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 (6000 psi)
- International usage thanks to a wide range of approvals

Your benefits

- Very good reproducibility and long-term stability
- High reference accuracy: up to $\pm 0.15\%$, as PLATINUM version: $\pm 0.075\%$
- Turn down up to 100:1
- Standardized platform for differential pressure, hydrostatics, and pressure (Deltabar S – Deltapilot S – Cerabar S)
- Simple, fast commissioning through a user interface designed for real-world applications
- Used for process pressure monitoring up to SIL2, certified to IEC 61508 Edition 2.0 and IEC 61511 by TÜV NORD
- New TempC diaphragm for diaphragm seals: Minimum temperature effects, maximum diaphragm thickness and short recovery times
- Device versions compliant with ASME-BPE

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Document information

Symbols used






Safety symbols

| Symbol | Meaning |
|--|--|
|  A0011189-EN | DANGER! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury. |
|  A0011190-EN | WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury. |
|  A0011191-EN | CAUTION! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury. |
|  A0011192-EN | NOTE! This symbol contains information on procedures and other facts which do not result in personal injury. |









Electrical symbols

| Symbol | Meaning |
|---|--|
|  A0018335 | Direct current A terminal at which DC voltage is present or through which direct current flows. |
|  A0018336 | Alternating current A terminal at which alternating voltage is present or through which alternating current flows. |
|  A0018337 | Direct current and alternating current <ul style="list-style-type: none"> ▪ A terminal at which alternating voltage or DC voltage is present. ▪ A terminal through which alternating current or direct current flows. |
|  A0018338 | Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system. |
|  A0018339 | Protective ground connection A terminal which must be connected to ground prior to establishing any other connections. |
|  A0011201 | Equipotential connection A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice. |



Tool symbols

| Symbol | Meaning |
|---|---------------------------|
|  A0011219 | Phillips head screwdriver |
|  A0011220 | Flat-blade screwdriver |
|  A0013442 | Torx screwdriver |
|  A0011222 | Hexagon wrench |
|  A0011221 | Allen screw |

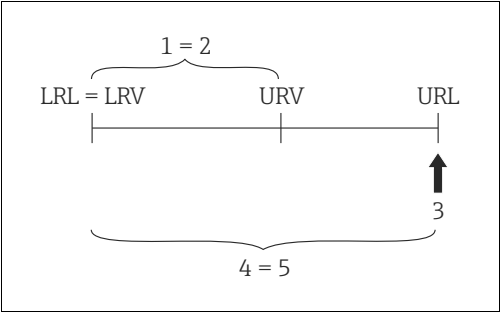
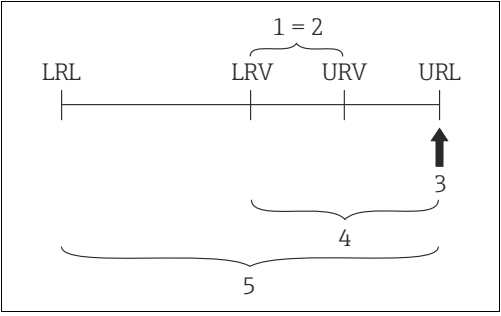
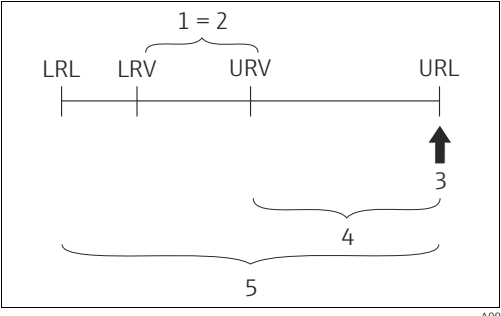
Symbols for certain types of information

| Symbol | Meaning |
|--|---|
|  A0011182 | Permitted Indicates procedures, processes or actions that are permitted. |
|  A0011183 | Preferred Indicates procedures, processes or actions that are preferred. |
|  A0011184 | Forbidden Indicates procedures, processes or actions that are forbidden. |
|  A0011193 | Tip Indicates additional information. |
|  A0015483 | Reference to documentation Refers to the corresponding device documentation. |
|  A0015484 | Reference to page Refers to the corresponding page number. |
|  A0015486 | Reference to graphics Refers to the corresponding graphic number and page number. |
| 1. , 2. , ... | Series of steps |
|  A0015488 | Help in the event of a problem |

Symbols in graphics

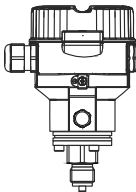
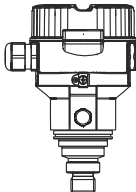
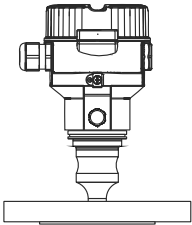
| Symbol | Meaning |
|---|---|
| 1, 2, 3, 4 etc. | Numbering for main items |
| 1. , 2. , ... | Series of steps |
| A, B, C, D etc. | Views |
| A-A, B-B, etc. | Sections |
|  A0011187 | Hazardous area Indicates the hazardous area. |
|  A0011188 | Safe area (non-hazardous area) Indicates the non-hazardous area. |

Terms and abbreviations

| Term/abbreviation | Explanation |
|--|---|
| MWP | The MWP (maximum working pressure) for the individual 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. Pay attention to the pressure-temperature dependence also. For the relevant standards and additional notes, see section " → 40". |
| OPL | The OPL (over pressure limit = sensor overload limit) for the sensor 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. Pay attention to the pressure-temperature dependence also. For the relevant standards and additional notes, see section " → 40". |
| LRL | Lower range limit |
| URL | Upper range limit |
| LRV | Lower range value |
| URV | Upper range value |
| TD | Turn down |
| <p>Case 1:</p> <ul style="list-style-type: none"> ▪ $\text{Lower range value (LRV)} \leq \text{Upper range value (URV)}$ <p>Example:</p> <ul style="list-style-type: none"> ▪ Lower range value (LRV) = 0 bar ▪ Upper range value (URV) = 0.5 bar (7.5 psi) ▪ Nominal value (URL) = 1 bar (15 psi) <p>Turn down:</p> <ul style="list-style-type: none"> ▪ $\text{TD} = \text{URL} / \text{URV} = 2:1$ <p>Set span:</p> <ul style="list-style-type: none"> ▪ $\text{URV} - \text{LRV} = 0.5 \text{ bar (7.5 psi)}$ ▪ This span is based on the zero point. |  <p style="text-align: right; font-size: small;">A0023672</p> <p>Example: 1 bar (15 psi) measuring cell</p> |
| <p>Case 2:</p> <ul style="list-style-type: none"> ▪ $\text{Lower range value (LRV)} \leq \text{Upper range value (URV)}$ <p>Example:</p> <ul style="list-style-type: none"> ▪ Lower range value (LRV) = 0 bar ▪ Upper range value (URV) = 0.5 bar (7.5 psi) ▪ Nominal value (URL) = 1 bar (15 psi) <p>Turn down:</p> <ul style="list-style-type: none"> ▪ $\text{TD} = \text{URL} / \text{URV} = 2:1$ <p>Set span:</p> <ul style="list-style-type: none"> ▪ $\text{URV} - \text{LRV} = 0.5 \text{ bar (7.5 psi)}$ ▪ This span is based on the zero point. |  <p style="text-align: right; font-size: small;">A0019783</p> <p>Example: 1 bar (15 psi) measuring cell</p> |
| <p>Case 3:</p> <ul style="list-style-type: none"> ▪ $\text{Lower range value (LRV)} \geq \text{Upper range value (URV)}$ <p>Example:</p> <ul style="list-style-type: none"> ▪ Lower range value (LRV) = -0.6 bar (-9 psi) ▪ Upper range value (URV) = 0 bar ▪ Nominal value (URL) = 1 bar (15 psi) <p>Turn down:</p> <ul style="list-style-type: none"> ▪ $\text{TD} = \text{URL} / \text{LRV} = 1.67:1$ <p>Set span:</p> <ul style="list-style-type: none"> ▪ $\text{URV} - \text{LRV} = 0.6 \text{ bar (9 psi)}$ ▪ This span is based on the zero point. |  <p style="text-align: right; font-size: small;">A0016451</p> <p>Example: 1 bar (15 psi) measuring cell</p> <ol style="list-style-type: none"> 1 Set span 2 Span based on zero point 3 Nominal value $\hat{=}$ upper range limit (URL) 4 Nominal measuring range 5 Sensor measuring range |

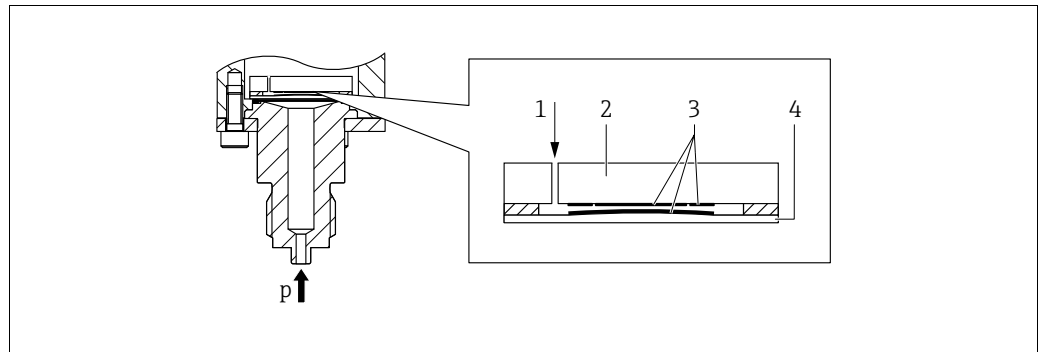
Function and system design

Device selection

| Cerabar M – Product family | PMC51  <small>A0023673</small> With capacitive measuring cell and ceramic process isolating diaphragm (Ceraphire®) | PMP51  <small>A0023675</small> With piezoresistive measuring cell and metallic welded process isolating diaphragm | PMP55  <small>A0023676</small> With diaphragm seal |
|----------------------------|---|--|---|
| Field of application | - Gauge pressure and absolute pressure - Level | | |
| Process connections | - Thread - EN flanges DN 25 – DN 80 - ANSI flanges 1" – 4" - JIS flanges 50 A – 100 A - Flush-mounted hygienic connections | - Thread - EN flanges DN 25 – DN 80 - ANSI flanges 1" – 4" - Prepared for diaphragm seal mount - Flush-mounted hygienic connections | - Wide range of diaphragm seals |
| Measuring ranges | From -100/0 to 100 mbar (-1.5/0 to 1.5 psi) to -1/0 to 40 bar (-15/0 to 600 psi) | From -400/0 to 400 mbar (-6/0 to 6 psi) to -1/0 to 400 bar (-15/0 to 6000 psi) | |
| OPL | Max. 60 bar (900 psi) | Max. 600 bar (9000 psi) | |
| Process temperature range | -40 to +130 °C (-40 to +266°F) For a maximum of 60 minutes: +150 °C (+302°F) | -40 to +130 °C (-40 to +266°F) For a maximum of 60 minutes: +150 °C (+302°F) | -70 to 400 °C (-94 to +752°F) depending on the filling oil |
| Ambient temperature range | - Without LCD display: -40 to +85 °C (-40 to +185°F) - With LCD display: -20 to +70 °C (-4 to +158°F) (extended temperature application range (-40 to 85 °C (-40 to 185°F)) with restrictions in optical properties such as display speed and contrast) - Separate housing: -20 to +60 °C (-4 to +140°F) - Diaphragm seal systems depending on the version | | |
| Reference accuracy | - Up to ±0.15% of the set span - PLATINUM version: up to ±0.075% of the set span | | Up to ±0.15% 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 | | |
| Options | - PMP51, PMP55: NACE-compliant materials - PMC51, PMP51, PMP55: 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 | | |
| Specialties | - Metal-free measurement with PVDF connection - Special cleaning of the transmitter to remove paint-wetting substances, for use in paint shops | - Process connections with minimum oil volume - Gas-tight, elastomer-free | - Wide range of diaphragm seals - For extreme medium temperatures - Process connections with minimum oil volume - Completely welded versions |

Measuring principle

Ceramic process isolating diaphragm used in PMC51 (Ceraphire®)



A0020465

Ceramic sensor

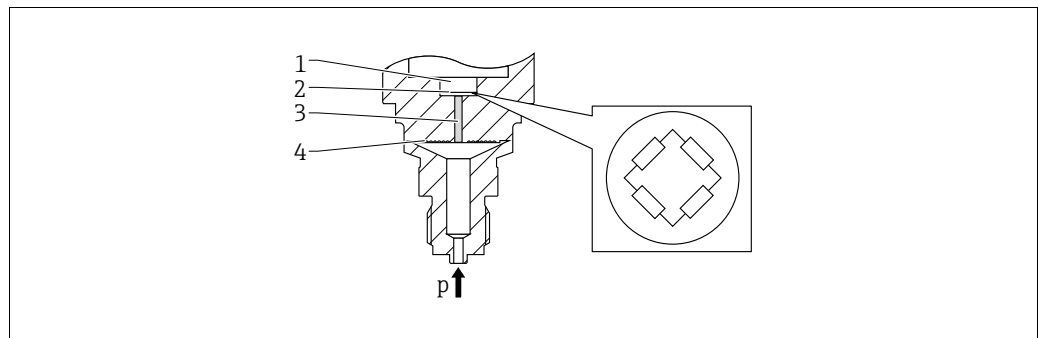
- 1 Air pressure (gauge pressure sensors)
- 2 Ceramic substrate
- 3 Electrodes
- 4 Ceramic process isolating diaphragm

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
 - less relaxation
 - high mechanical stability
- Can be used in absolute vacuum
- Outstanding surface finish, $R_a \leq 0.3 \mu\text{m}$ (11.8 μin)

Metallic process isolating diaphragm used in PMP51 and PMP55



A0016448

Metallic sensor

- 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 (6000 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

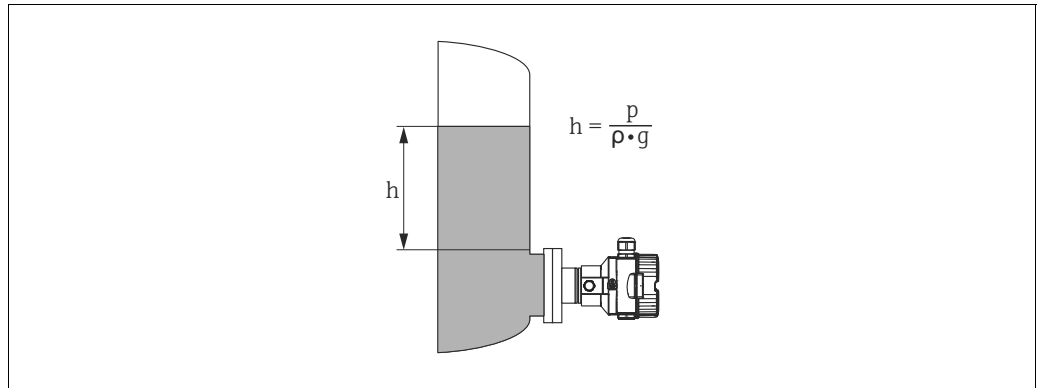
The operating pressure acts on the process isolating diaphragm of the diaphragm seal and is transferred to the process isolating diaphragm of the sensor by a diaphragm seal fill fluid. The process isolating diaphragm is deflected and a fill fluid transfers the pressure to a resistance bridge. The pressure-dependent 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 (6000 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)

Function and design



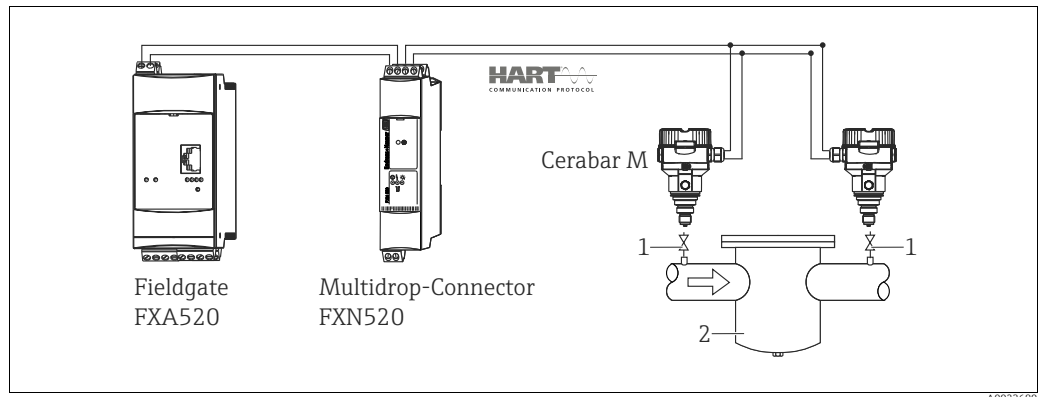
Level measurement

| | |
|--------|-----------------------|
| 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 vessel 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 vessels with agitators or screen fittings
 - in the event of liquid gases

Electrical differential pressure measurement with gauge pressure sensors



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 and data processing

- 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 the 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 Cerabar M for Ex ia, CSA IS and FM IS applications
 - up to 31 Cerabar M 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 the 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 Cerabar M for Ex ia, CSA IS and FM IS applications
 - up to 22 Cerabar M 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

- Analog electronics: Absolute pressure and gauge pressure
- HART electronics: 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

| Nominal value | Range limit | | Smallest calibratable span (preset at the factory) ¹⁾ | MWP | OPL | Vacuum resistance | Option ²⁾ |
|---------------------|----------------------------|----------------------------|--|--------------|----------|-------------------|----------------------|
| | lower (LRL) [bar (psi)] | upper (URL) [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

| Nominal value | Range limit | | Smallest calibratable span (preset at the factory) ¹⁾ | MWP | OPL | Vacuum resistance | Option ²⁾ |
|---------------------|---|---|--|--------------|----------|-------------------|----------------------|
| | lower (LRL) [bar _{abs} (psi _{abs})] | upper (URL) [bar _{abs} (psi _{abs})] | | | | | |
| 100 mbar (15 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

| Nominal value | Range limit | | Smallest calibratable span (preset at the factory) ¹⁾ | MWP | OPL | Vacuum resistance ²⁾ Silicone oil/ Inert oil/ Synthetic oil | Option ³⁾ |
|--------------------|----------------------------|----------------------------|--|--------------|------------|---|----------------------|
| | lower (LRL) [bar (psi)] | upper (URL) [bar (psi)] | | | | | |
| 400 mbar (6 psi) | -0.4 (-6) | +0.4 (+6) | 0.02 (0.3) | 4 (60) | 6 (90) | 0.01/0.04/0.01 (0.15/0.6/0.15) | 1F |
| 1 bar (15 psi) | -1 (-15) | +1 (+15) | 0.05 (1) | 6.7 (100) | 10 (150) | | 1H |
| 2 bar (30 psi) | -1 (-15) | +2 (+30) | 0.1 (1.5) | 13.3 (200) | 20 (300) | | 1K |
| 4 bar (60 psi) | -1 (-15) | +4 (+60) | 0.2 (3) | 18.7 (280.5) | 28 (420) | | 1M |
| 10 bar (150 psi) | -1 (-15) | +10 (+150) | 0.5 (7.5) | 26.7 (400.5) | 40 (600) | | 1P |
| 40 bar (600 psi) | -1 (-15) | +40 (+600) | 2 (30) | 100 (1500) | 160 (2400) | | 1S |
| 100 bar (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) Factory calibration turn down: Max 20:1, higher on request or configurable in the device.
- 2) The vacuum resistance applies to the measuring cell at reference conditions. The pressure and temperature application limits of the selected filling oil must also be observed for the PMP55. → 101, "Diaphragm seal filling oils" ordering feature.
- 3) Product Configurator, "Sensor range" ordering feature

PMP51 and PMP55 – metallic process isolating diaphragm for absolute pressure

| Nominal value | Range limit | | Smallest calibratable span (preset at the factory) ¹⁾ | MWP | OPL | Vacuum resistance ²⁾ Silicone oil/ Inert oil/ Synthetic oil | Option ³⁾ |
|--------------------|---|---|--|--------------|------------|---|----------------------|
| | lower (LRL) [bar _{abs} (psi _{abs})] | upper (URL) [bar _{abs} (psi _{abs})] | | | | | |
| 400 mbar (6 psi) | 0 | +0.4 (+6) | 0.02 (0.3) | 4 (60) | 6 (90) | 0.01/0.04/0.01 (0.15/0.6/0.15) | 2F |
| 1 bar (15 psi) | 0 | +1 (+15) | 0.05 (1) | 6.7 (100) | 10 (150) | | 2H |
| 2 bar (30 psi) | 0 | +2 (+30) | 0.1 (1.5) | 13.3 (200) | 20 (300) | | 2K |
| 4 bar (60 psi) | 0 | +4 (+60) | 0.2 (3) | 18.7 (280.5) | 28 (420) | | 2M |
| 10 bar (150 psi) | 0 | +10 (+150) | 0.5 (7.5) | 26.7 (400.5) | 40 (600) | | 2P |
| 40 bar (600 psi) | 0 | +40 (+600) | 2 (30) | 100 (1500) | 160 (2400) | | 2S |
| 100 bar (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) Factory calibration turn down: Max 20:1, higher on request or configurable in the device.
- 2) The vacuum resistance applies to the measuring cell at reference conditions. The pressure and temperature application limits of the selected filling oil must also be observed for the PMP55. → 101, "Diaphragm seal filling oils" ordering feature.
- 3) Product Configurator, "Sensor range" ordering feature

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 ¹⁾ |
|---------------------|----------------------|
| 4 to 20mA | 1 |
| 4 to 20mA HART | 2 |
| PROFIBUS PA | 3 |
| FOUNDATION Fieldbus | 4 |

1) Product Configurator, "Output" ordering feature

Signal range

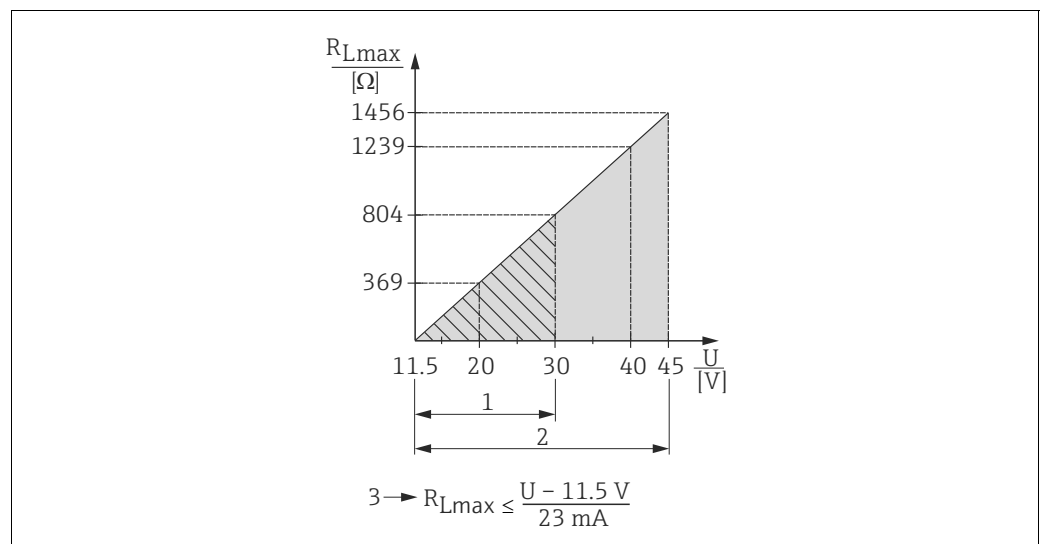
4 to 20 mA analog, 4 to 20 mA HART: 3.8 to 20.5 mA

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 and 4 to 20 mA HART



Load diagram

- 1 Power supply 11.5 to 30 V DC for intrinsically safe device versions
- 2 Power supply 11.5 to 45 V DC (versions with plug-in connector 35 V DC) for other types of protection and for uncertified device versions
- 3 R_{Lmax} Maximum load resistance
- U Supply voltage

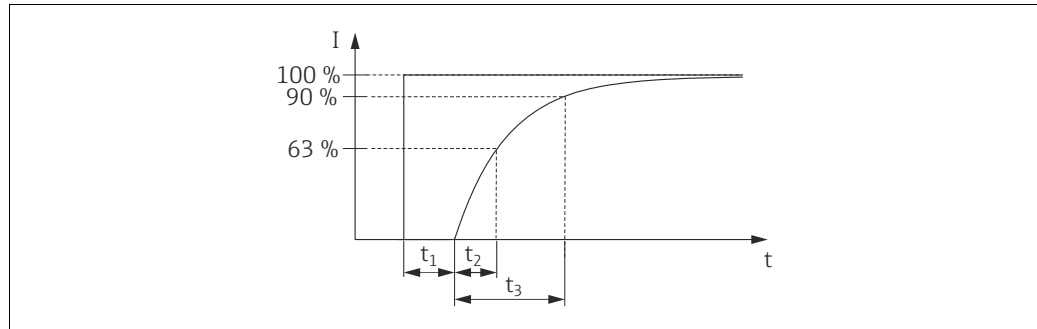


When operating via a handheld terminal or via a PC with an operating program, a minimum communication resistance of 250 Ω must be taken into account.

Resolution

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

Dead time, Time constant



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Presentation of the dead time and the time constant

Dynamic behavior: current output (analog electronics)

| | Type | Dead time (t ₁) [ms] | Time constant T63 (= t ₂) [ms] | Time constant T90 (= t ₃) [ms] |
|------|-------|---|--|--|
| Max. | PMC51 | 60 | 40 | 50 |
| Max. | PMP51 | 40 | 40 | 50 |
| Max. | PMP55 | PMP51 + influence of the diaphragm seal | | |

Dynamic behavior: current output (HART electronics)

| | Type | Dead time (t ₁) [ms] | Time constant T63 (= t ₂) [ms] | Time constant T90 (= t ₃) [ms] |
|------|-------|---|--|--|
| Max. | PMC51 | 50 | 85 | 200 |
| Max. | PMP51 | 70 | 80 | 185 |
| Max. | PMP55 | PMP51 + influence of the diaphragm seal | | |

Dynamic behavior: digital output (HART electronics)

| | Type | Dead time (t ₁) [ms] | Dead time (t ₁) [ms] + Time constant T63 (= t ₂) [ms] | Dead time (t ₁) [ms] + Time constant T90 (= t ₃) [ms] |
|------|-------|---|---|---|
| min. | PMC51 | 210 | 295 | 360 |
| Max. | | 1010 | 1095 | 1160 |
| min. | PMP51 | 210 | 285 | 345 |
| Max. | | 1010 | 1085 | 1145 |
| 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 Cerabar M commands the BURST MODE function for cyclic value transmission via the HART communication protocol.

Cycle time (update time)

Cyclic (Burst): min. 300 ms

Response time

- Acyclic: min. 330 ms, typical 590 ms (depends on command # and number of preambles)
- Cyclic (Burst): min. 160 ms, typical 350 ms (depends on command # and number of preambles)

**Dynamic behavior:
PROFIBUS PA**

| | Type | Dead time (t ₁) [ms] | Dead time (t ₁) [ms] + Time constant T63 (= t ₂) [ms] | Dead time (t ₁) [ms] + Time constant T90 (= t ₃) [ms] |
|------|-------|---|---|---|
| min. | PMC51 | 85 | 170 | 235 |
| Max. | | 1185 | 1270 | 1335 |
| min. | PMP51 | 85 | 160 | 220 |
| Max. | | 1185 | 1260 | 1320 |
| Max. | PMP55 | PMP51 + influence of the diaphragm seal | | |

Reading cycle

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

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.

Response time

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

**Dynamic behavior:
FOUNDATION Fieldbus**

| | Type | Dead time (t ₁) [ms] | Dead time (t ₁) [ms] + Time constant T63 (= t ₂) [ms] | Dead time (t ₁) [ms] + Time constant T90 (= t ₃) [ms] |
|------|-------|---|---|---|
| min. | PMC51 | 95 | 180 | 245 |
| Max. | | 1095 | 1180 | 1245 |
| min. | PMP51 | 95 | 170 | 230 |
| Max. | | 1095 | 1170 | 1230 |
| Max. | PMP55 | PMP51 + influence of the diaphragm seal | | |

Reading cycle

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

Cycle time (update time)

Cyclic: min. 100 ms

Response time

- Cyclic: max. 20 ms (for standard bus parameter settings)
- Acyclic: typical 70 ms (for standard bus parameter settings)

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 ¹⁾ |
|---------------------------------|----------------------|
| 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"> ▪ 01 (netherlands) ▪ 02 (russian) |
| Device description files (DTM, DD) | Information and files can be found: <ul style="list-style-type: none"> ▪ www.endress.com ▪ www.hartcomm.org |
| HART load | Min. 250 Ω |
| HART device variables | The measured values can be freely assigned to the device variables: <p>Measured values for PV (primary variable)</p> <ul style="list-style-type: none"> ▪ Pressure ▪ Level ▪ Tank content <p>Measured values for SV, TV (second and third variable)</p> <ul style="list-style-type: none"> ▪ Pressure ▪ Level <p>Measured values for QV (fourth variable)</p> <ul style="list-style-type: none"> ▪ Temperature |
| Supported functions | <ul style="list-style-type: none"> ▪ Burst mode ▪ Additional Transmitter Status ▪ Device Locking ▪ Alternative operating modes |

PROFIBUS PA

| | |
|-----------------|--|
| Manufacturer ID | 17 (11 hex) |
| Ident number | 1554 hex |
| Profile Version | 3.02 <ul style="list-style-type: none"> ▪ SW Version 01.00.zz |
| GSD Revision | 5 |
| DD Revision | 1 |
| GSD File | Information and files can be found: <ul style="list-style-type: none"> ▪ www.endress.com ▪ www.profibus.org |
| DD Files | |
| Output values | <p>Measured values for PV (über Analog Input Function Block)</p> <ul style="list-style-type: none"> ▪ Pressure ▪ Flow ▪ Level ▪ Tank content <p>Measured values for SV</p> <ul style="list-style-type: none"> ▪ Pressure ▪ Temperature |
| Input values | Input value sent from PLC, can be shown on display |

| | |
|---------------------|--|
| Supported functions | <ul style="list-style-type: none"> ▪ Identification & Maintenance Simple device identification via control system and nameplate ▪ Condensed status¹⁾ ▪ Automatic ident number adaptation and switchable to following ident numbers¹⁾: <ul style="list-style-type: none"> - 9700: Profile-specific transmitter identification number with the "Classic" or "Condensed" status". - 151C: Compatibility mode for the old Cerabar M (PMC41, PMC45, PMP41, PMP45, PMP46, PMP48). - 1553: Identification number for the new Cerabar M (PMC51, PMP51, PMP55). ▪ Device locking: The device can be locked by hardware or software. |
|---------------------|--|

1) Only with Profile Version 3.02

Data of the FOUNDATION Fieldbus interface

Basic data

| | |
|---------------------------------------|------------------------------------|
| Device Type | 0x1019 |
| Device Revision | 01 (hex) |
| DD Revision | 0x01021 |
| CFR 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"> ■ Pressure or level (channel 1) ■ Process temperature (channel 2) ■ Measured pressure value (channel 3) ■ Max. pressure (channel 4) ■ Level before linearization (channel 5) |
| Diagnostic Block | Contains diagnostic information | <ul style="list-style-type: none"> ■ Error code via DI channels (channel 10 to 15) |
| Display Block | Contains parameters to configure the onsite display | No output values |

Function blocks

| Block | Content | Number of blocks | Execution time | Functionality |
|--|---|------------------|----------------|---------------|
| Resource Block | The Resource Block contains all the data that uniquely identify the device. It is an electronic version of a nameplate of the device. | 1 | | enhanced |
| Analog Input Block 1 Analog Input Block 2 | The AI Block receives the measuring data from the Sensor Block, (selectable via a channel number) and makes the data available to other function blocks at its output. Enhancement: digital outputs for process alarms, fail safe mode. | 2 | 25 ms | enhanced |
| Digital Input Block | This block contains the discrete data of the 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 and Channel 21 resets the Totalizer. | 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 |

| Block | Content | Number of blocks | Execution time | Functionality |
|------------------|---|------------------|----------------|---------------|
| 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 instantiate blocks | 20 |

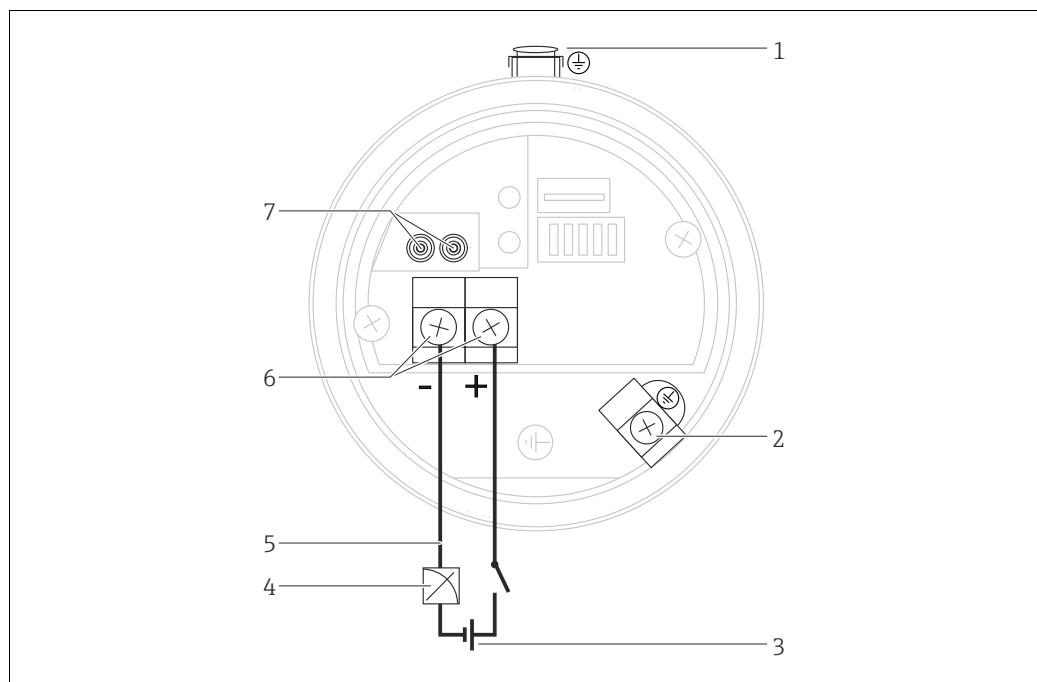
Power supply

⚠ WARNING

Incorrect connection can limit electrical safety!

- ▶ When using the measuring device in hazardous areas, installation must comply with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings. → 111 ff, "Safety instructions" and "Installation/Control Drawings" ordering features.
- ▶ All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is provided with all Ex-systems as standard → 111 ff, "Safety instructions" and "Installation/Control Drawings" ordering features.
- ▶ According to IEC/EN61010 a suitable disconnector has to be installed for the device
- ▶ HART: Overvoltage protection HAW569-DA2B for the non-hazardous area, ATEX II 2 (1) Ex ia IIC and IEC Ex ia can be ordered as an option (see "Ordering information" ordering feature).
- ▶ Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.
- ▶ The digital communication signal is transmitted to the bus via a 2-wire connection. The bus also provides the power supply.

Terminal assignment



A0023505

Electrical connection

- 1 External grounding terminal
- 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"

Supply voltage

4 to 20 mA HART

| Type of protection | Supply voltage |
|--|--|
| <ul style="list-style-type: none"> ▪ Intrinsically safe | 11.5 ... 30 V DC |
| <ul style="list-style-type: none"> ▪ Other types of protection ▪ Devices without certificate | 11.5 to 45 V DC (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 21
- FOUNDATION Fieldbus: 16 mA ± 1 mA, switch-on current corresponds to IEC 61158-2, Clause 21

Electrical connection

| Cable entry | Degree of protection | Option ¹⁾ |
|---------------------------|---|----------------------|
| M20 gland | IP66/68 NEMA 4X/6P | A |
| G ½" thread | IP66/68 NEMA 4X/6P | C |
| NPT ½" thread | IP66/68 NEMA 4X/6P | D |
| M12 plug | IP66/67 NEMA 4X/6P | I |
| 7/8" plug | IP66/68 NEMA 4X/6P | M |
| HAN7D connector, 90 deg | IP65 | P |
| PE cable 5m ²⁾ | IP66/68 NEMA4X/6P + pressure compensation via cable | S |
| M16 valve connector | IP64 | V |

- Product Configurator, "Electrical connection" ordering feature
- Only for FMB50

PROFIBUS PA

The digital communication signal is transmitted to 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 to 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

For wire cross-sections of 0.5 to 2.5 mm² (20 to 14 AWG).

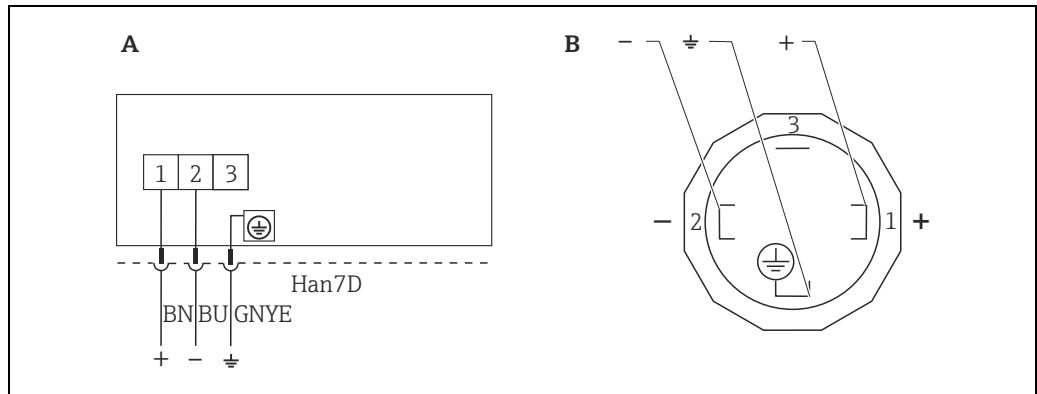
Cable entry

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

For other technical data, see the housing section → 41 ff'.

Connector

Devices with valve connector



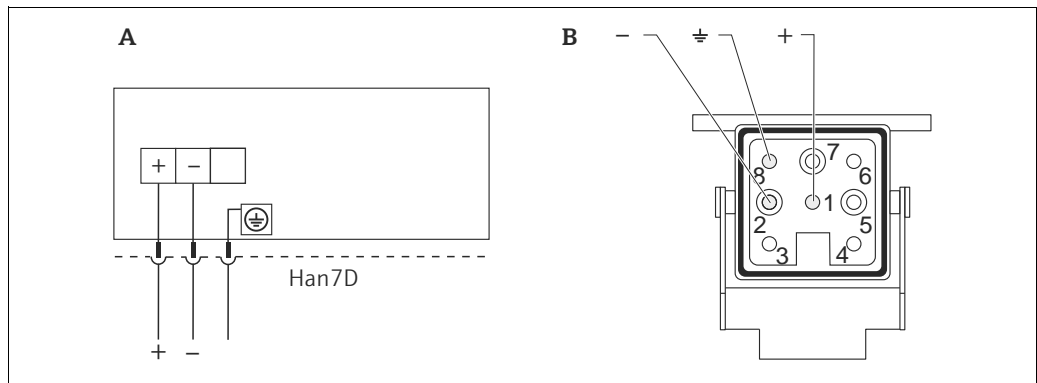
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BN = brown, BU = blue, GNYE = green/yellow

A Electrical connection for devices with valve connector
 B View of the connection on the device

Material: PA 6.6

Devices with Harting plug Han7D

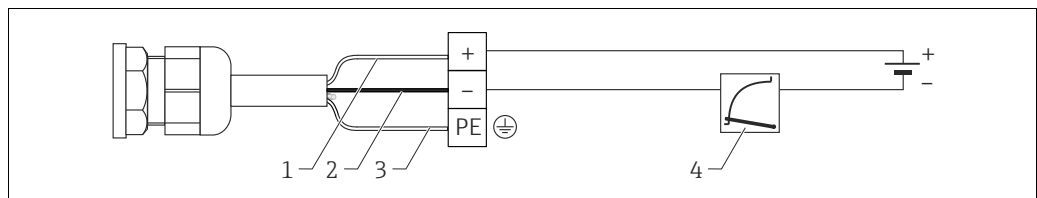


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A Electrical connection for devices with Harting plug Han7D
 B View of the connection on the device

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

Connecting the cable version

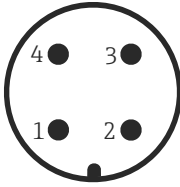


A0019991

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

Devices with M12 plug

PIN assignment for M12 connector

| PIN assignment for M12 connector | PIN | Meaning |
|---|-----|--------------|
|  | 1 | Signal + |
| | 2 | Not assigned |
| | 3 | Signal - |
| | 4 | Earth |

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

Plug-in jack M 12x1, straight

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

Plug-in jack M 12x1, elbowed

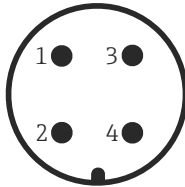
- Material: body PBT/PA; coupling nut GD-Zn, nickel-plated
- Degree of protection (fully locked): IP66/67
- Order number: 71114212

Cable 4x0.34 mm² (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

PIN assignment for 7/8" connector

| PIN assignment for 7/8" connector | PIN | Meaning |
|---|-----|--------------|
|  | 1 | Signal - |
| | 2 | Signal + |
| | 3 | Not assigned |
| | 4 | Shield |

External thread: 7/8 - 16 UNC

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

Cable specification

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



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



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

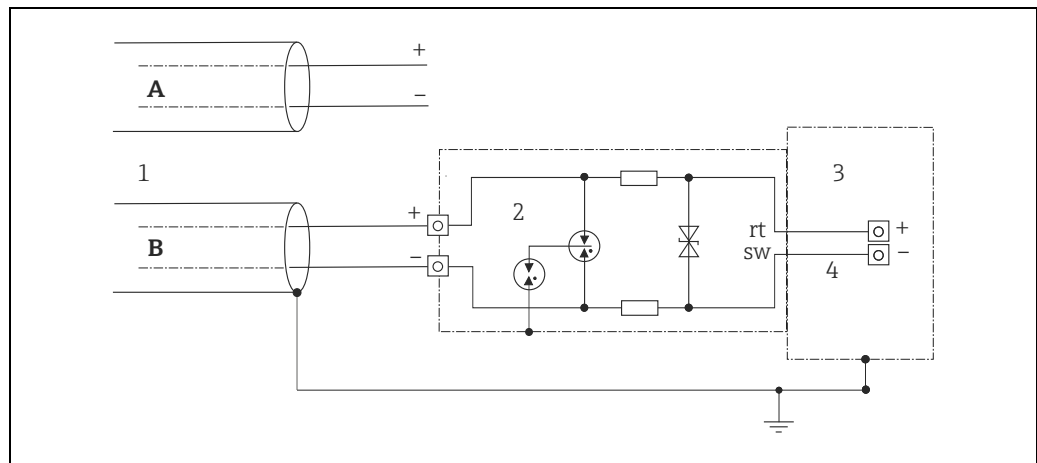
Overvoltage protection (optional)

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 TI001013KEN, XA01003KA3 and BA00304KA2.

Ordering information:

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



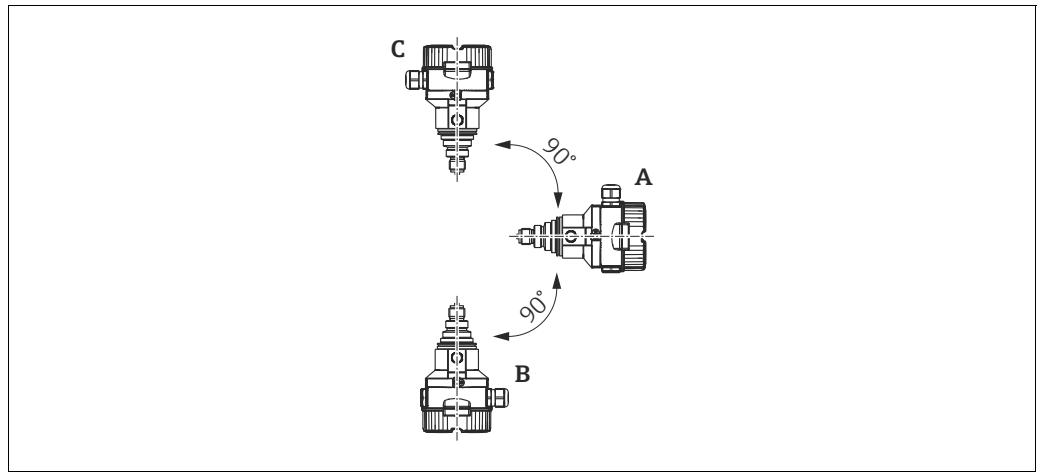
- A Without direct shield grounding
- B With direct shield grounding
- 1 Incoming connection cable
- 2 HAW569-DA2B
- 3 Unit to be protected
- 4 Connection cable

Performance characteristics of the ceramic process isolating diaphragm

Reference operating conditions

- As per IEC 60770
- Ambient temperature T_A = constant, in the range of: +21 to +33 °C (+70 to +91°F)
- Humidity φ = constant, in the range of: 5 to 80 % RH
- Ambient pressure p_A = constant, in the range of: 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
- Span based on zero point
- Material of the process isolating diaphragm: Al_2O_3 (aluminum-oxide ceramic, Ceraphire®)
- Supply voltage: 24 V DC \pm 3 V DC
- Load with HART: 250 Ω

Influence of orientation



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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) |
|--|--|--|
| Calibration position, no measuring error | < +0.2 mbar (0.003 psi) | < -0.2 mbar (0.003 psi) |



Position-dependent zero point shift can be corrected at the device. → 34, "General installation instructions" ordering feature and → 102 ff, "Installation instructions" ordering feature.

Uncertainty of measurement for small absolute pressure ranges

- The smallest expanded uncertainty of measurement that can be returned by our standards is:
- 0.4% of the measured value in the range of 1 to 30 mbar
 - 1% of the measured value in the range < 1 mbar.

Reference accuracy – PMC51

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

| Gauge pressure sensors | | |
|--|---|--|
| Measuring cell | Standard reference accuracy | Platinum reference accuracy |
| 100 mbar (1.5 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.075 % ▪ TD > 10:1 to TD 20:1 = ±0.0075 x TD |
| 250 mbar (3.75 psi), 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.075 % ▪ TD > 10:1 to TD 20:1 = ±0.1 % |
| 40 bar (600 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.075 % ▪ TD > 10:1 to TD 20:1 = ±0.0075 x TD |

| Absolute pressure sensors | | |
|--|--|--|
| Measuring cell | Standard reference accuracy | Platinum reference accuracy |
| 100 mbar (1.5 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.015 x TD | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 5:1 = ±0.075 % ▪ TD > 5:1 to TD 20:1 = ±0.015 x TD |
| 250 mbar (3.75 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.075 % ▪ TD > 10:1 to TD 13:1 = ±0.1 % |
| 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.075 % ▪ TD > 10:1 to TD 20:1 = ±0.1 % |
| 40 bar (600 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.15 % ▪ TD > 10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to ≤ TD 10:1 = ±0.075 % ▪ TD > 10:1 to TD 20:1 = ±0.0075 x TD |

Thermal change in the zero output and the output span – PMC51
PMC51 with thread or flange

| Signal output | Measuring cell | % of the calibrated measuring span | | |
|--|--|------------------------------------|----------------------------------|----------------------------------|
| | | -40 to -20 °C (-40 to -4°F) | -10 to +60 °C (+14 to +140°F) | -20 to +100 °C (-4 to +212°F) |
| HART, PROFIBUS PA, FOUNDATION Fieldbus | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ±(0.6 + 0.45 x TD) | ±0.2 + 0.275 x TD | ±(0.4 + 0.425 x TD) |
| | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ±0.5 + 0.35 x TD | ±0.1 + 0.15 x TD | ±(0.225 + 0.525 x TD) |
| Analog (4 to 20 mA) | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ±(0.6 + 0.45 x TD) | ±0.4 + 0.275 x TD | ±0.7 + 0.425 x TD |
| | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ±0.5 + 0.35 x TD | ±0.3 + 0.15 x TD | ±0.525 + 0.525 x TD |

PMC51 with hygienic process connection

| Signal output | Measuring cell | % of the calibrated measuring span | |
|---|--|------------------------------------|----------------------------------|
| | | -10 to +60 °C (+14 to +140°F) | -20 to +130 °C (-4 to +266°F) |
| HART, PROFIBUS PA, FOUNDATION Fieldbus | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ±(0.4 + 0.275 x TD) | ±(0.7 + 0.425 x TD) |
| | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ±(0.3 + 0.15 x TD) | ±(0.525 + 0.525 x TD) |
| Analog (4 to 20 mA) | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ±(0.4 + 0.275 x TD) | ±(0.7 + 0.425 x TD) |
| | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ±(0.3 + 0.15 x TD) | ±(0.525 + 0.525 x TD) |

Total performance – PMC51

The "Total performance" specification comprises the non-linearity including hysteresis, non-reproducibility as well as the thermal change in the zero point. All specifications apply to the temperature range -10 to +60 °C (+14 to +140°F) and Turndown 1:1.

| Signal output | Measuring cell | % URL |
|--|---|--------|
| HART, PROFIBUS PA, FOUNDATION Fieldbus | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ±0.575 |
| | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ±0.5 |
| Analog (4 to 20 mA) | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ±0.775 |
| | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ±0.7 |

Long-term stability

For devices with thread or flange:

| Measuring range | Long-term stability of URL / 1 year | Long-term stability of URL / 5 years | Long-term stability of URL / 10 years |
|------------------|--|---|--|
| ≤ 1 bar (15 psi) | ±0.2 % | ±0.4 % | ±0.5 % |
| > 1 bar (15 psi) | ±0.1 % | ±0.25 % | ±0.4 % |

For devices with hygienic process connections:

| Measuring range | Long-term stability of URL / 1 year |
|------------------|--|
| ≤ 1 bar (15 psi) | ±0.35 % |
| > 1 bar (15 psi) | ±0.2 % |

Total error - PMC51

The total error comprises the long-term stability and the total performance. All specifications apply to the temperature range -10 to $+60$ °C ($+14$ to $+140$ °F) and Turndown 1:1.

| | Signal output | Measuring cell | % URL |
|--|--|--|-------------|
| | | | 1 year |
| PMC51 with thread or flange | HART, PROFIBUS PA, FOUNDATION Fieldbus | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ± 0.55 |
| | | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ± 0.47 |
| | Analog (4 to 20 mA) | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ± 0.75 |
| | | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ± 0.67 |
| PMC51 with hygienic process connection | HART, PROFIBUS PA, FOUNDATION Fieldbus | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ± 0.925 |
| | | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ± 0.7 |
| | Analog (4 to 20 mA) | 100 mbar (1.5 psi), 250 mbar (3.75 psi), 400 mbar (6 psi) | ± 1.125 |
| | | 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | ± 0.9 |

Warm-up period

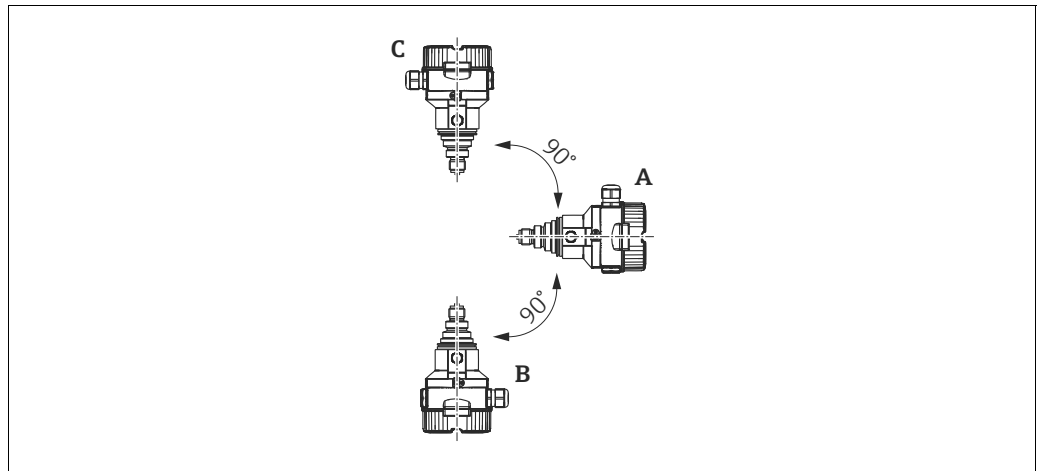
- 4 to 20 mA analog: ≤ 1.5 s
- 4 to 20 mA HART: ≤ 5 s
- PROFIBUS PA: ≤ 8 s
- FOUNDATION Fieldbus: ≤ 20 s (after a TOTAL-reset ≤ 45 s)

Performance characteristics of the metallic process isolating diaphragm

Reference operating conditions

- As per IEC 60770
- Ambient temperature T_A = constant, in the range of: +21 to +33 °C (+70 to +91°F)
- Humidity ϕ = constant, in the range of: 5 to 80 % RH
- Ambient pressure p_A = constant, in the range of: 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
- Span based on zero point
- Material of the process isolating diaphragm: AISI 316L
- Filling oil: NSF-H1 synthetisk oil according to FDA 21 CFR 178.3570
- Supply voltage: 24 V DC \pm 3 V DC
- Load with HART: 250 Ω

Influence of orientation



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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 process connections $\frac{1}{2}$ " thread and Silicone oil | Calibration position, no measuring error | < +4 mbar (0.06 psi) | < -4 mbar (0.06 psi) |
| PMP51 with process connections > thread $\frac{1}{2}$ " and flanges | | < +10 mbar (0.145 psi) This value is doubled for inert oil. | < -10 mbar (0.145 psi) This value is doubled for inert oil. |



Position-dependent zero point shift can be corrected at the device. → 34, "General installation instructions" ordering feature and → 102 ff, "Installation instructions" ordering feature.

Uncertainty of measurement for small absolute pressure ranges

- The smallest expanded uncertainty of measurement that can be returned by our standards is:
- 0.4% of the measured value in the range of 1 to 30 mbar
 - 1% of the measured value in the range < 1 mbar.

**Reference accuracy –
PMP51, PMP55**

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

Gauge pressure sensors/absolute pressure sensors

| Measuring cell | PMP51 and PMP55 without capillary | |
|---------------------------------------|---|--|
| | Standard reference accuracy | Platinum reference accuracy ¹⁾ |
| 400 mbar (6 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 = ±0.15 % ▪ TD >1:1 to TD 20:1 = ±0.15 % x TD | Not available |
| | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 = ±0.3 % ▪ TD >1:1 to TD 10:1 = ±0.3 % x TD | Not available |
| 1 bar (15 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 5:1 = ±0.15 % ▪ TD >5:1 to TD 20:1 = ±0.03 % x TD | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 2.5:1 = ±0.075 % ▪ TD >2.5:1 to TD 20:1 = ±0.03 % x TD |
| | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 = ±0.3 % ▪ TD >1:1 to TD 10:1 = ±0.3 % x TD | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 = ±0.2 % ▪ TD >1:1 to TD 10:1 = ±0.2 % x TD |
| 2 bar (30 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.015 % x TD | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 5:1 = ±0.075 % ▪ TD >5:1 to TD 20:1 = ±0.015 % x TD |
| | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 to TD ≤5:1 = ±0.15 % ▪ TD >5:1 to TD ≤10:1 = ±0.2 % | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 to TD ≤5:1 = ±0.075 % ▪ TD >5:1 to TD ≤10:1 = ±0.1 % |
| 4 bar (60 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.075 % ▪ TD 10:1 to TD 20:1 = ±0.0075 % x TD |
| | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 to TD ≤10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 to TD ≤10:1 = ±0.075 % ▪ TD >10:1 to TD 20:1 = ±0.1 % |
| 10 bar (150 psi), 40 bar (600 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.075 % ▪ TD 10:1 to TD 20:1 = ±0.1 % |
| | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 to TD ≤10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % | PMP51 with hygienic process connection: <ul style="list-style-type: none"> ▪ TD 1:1 to TD ≤10:1 = ±0.075 % ▪ TD >10:1 to TD 20:1 = ±0.1 % |
| 100 bar (1500 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.075 % ▪ TD 10:1 to TD 20:1 = ±0.15 % |
| 400 bar (6000 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 5:1 = ±0.15 % ▪ TD >5:1 to TD 20:1 = ±(0.03 % x TD) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 5:1 = ±0.15 % ▪ TD >5:1 to TD 20:1 = ±(0.03 % x TD) |

1) Only PMP51, PMP55 with direct diaphragm seal mounting

Gauge pressure sensors/absolute pressure sensors

| Measuring cell | PMP55 with capillary |
|---------------------------------------|--|
| 400 mbar (6 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 = ±0.15 % ▪ TD >1:1 to TD 20:1 = ±0.15 % x TD |
| 1 bar (15 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 3.75:1 = ±0.15 % ▪ TD >3.75:1 to TD 20:1 = ±0.04 % x TD |
| 2 bar (30 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 3.75:1 = ±0.15 % ▪ TD >3.75:1 to TD 20:1 = ±0.04 % x TD |
| 4 bar (60 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % |
| 10 bar (150 psi), 40 bar (600 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % |
| 100 bar (1500 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 10:1 = ±0.15 % ▪ TD >10:1 to TD 20:1 = ±0.2 % |
| 400 bar (6000 psi) | <ul style="list-style-type: none"> ▪ TD 1:1 to TD 5:1 = ±0.15 % ▪ TD >5:1 to TD 20:1 = ±(0.03 % x TD) |

Thermal change in the zero output and the output span – PMP51 and PMP55



When using a PMP55, the influence from the respective diaphragm seal must also be taken into account (→ 99 ff "Planning instructions for diaphragm seal systems").

PMP51 and PMP55 (basic device)

| Measuring cell | -10 to +60 °C (+14 to +140°F) | -40 to -10 °C, +60 to +85 °C (-40 to +14°F, +140 to +185°F) |
|---|-------------------------------------|--|
| | % of the calibrated measuring span | |
| 400 mbar (6 psi), 1 bar (15 psi), 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi), 100 bar (1500 psi) | $\pm(0.34 + 0.15 \times \text{TD})$ | $\pm(0.4 + 0.25 \times \text{TD})$ |
| 400 bar (6000 psi) | $\pm(0.3 + 0.35 \times \text{TD})$ | $\pm(0.3 + 0.7 \times \text{TD})$ |

PMP51 with hygienic process connection

| Signal output | Measuring cell | -10 to +60 °C (+14 to +140°F) | -40 to -10 °C, +60 to +125 °C (-40 to +14°F, +140 to +257°F) |
|--|---|------------------------------------|---|
| | | % of the calibrated measuring span | |
| HART, PROFIBUS PA, FOUNDATION Fieldbus | Clamp 1/2" / 400 mbar (6 psi) | $\pm(0.1 + 0.4 \times \text{TD})$ | $\pm(0.8 + 1.5 \times \text{TD})$ |
| | 400 mbar (6 psi), 1 bar (15 psi) | $\pm(0.1 + 0.25 \times \text{TD})$ | $\pm(0.1 + 1.1 \times \text{TD})$ |
| | 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | $\pm(0.1 + 0.2 \times \text{TD})$ | $\pm(0.1 + 0.5 \times \text{TD})$ |
| Analog (4 to 20 mA) | Clamp 1/2" / 400 mbar (6 psi) | $\pm(0.3 + 0.4 \times \text{TD})$ | $\pm(1.1 + 1.5 \times \text{TD})$ |
| | 400 mbar (6 psi), 1 bar (15 psi) | $\pm(0.3 + 0.25 \times \text{TD})$ | $\pm(0.4 + 1.1 \times \text{TD})$ |
| | 2 bar (30 psi), 4 bar (60 psi), 10 bar (150 psi), 40 bar (600 psi) | $\pm(0.3 + 0.2 \times \text{TD})$ | $\pm(0.4 + 0.5 \times \text{TD})$ |

Total performance – PMP51

The "Total performance" specification comprises the non-linearity including hysteresis, non-reproducibility as well as the thermal change in the zero point. All specifications apply to the temperature range -10 to +60 °C (+14 to +140°F) and Turndown 1:1.

| Signal output | Measuring cell | PMP51 | PMP51 with hygienic process connection | PMP51 with gold/rhodium-coated process isolating diaphragm |
|---|---------------------------------------|----------|--|--|
| | | % of URL | | |
| HART, PROFIBUS PA, FOUNDATION Fieldbus | 400 mbar (6 psi) | ±0.34 | ±0.34 | ±1.25 |
| | 1 bar (15 psi) | | ±0.25 | ±0.75 |
| | 2 bar (30 psi) | | ±0.25 | ±0.45 |
| | 4 bar (60 psi) | ±0.30 | ±0.25 | ±0.3 |
| | 10 bar (150 psi), 40 bar (600 psi) | ±0.25 | ±0.25 | ±0.25 |
| | 100 bar (1500 psi) | ±0.25 | - | ±0.25 |
| | 400 bar (6000 psi) | ±0.4 | - | ±0.4 |
| Analog (4 to 20 mA) | 400 mbar (6 psi) | ±0.34 | ±0.54 | ±1.25 |
| | 1 bar (15 psi) | | ±0.54 | ±0.75 |
| | 2 bar (30 psi) | | ±0.45 | ±0.45 |
| | 4 bar (60 psi) | ±0.30 | ±0.45 | ±0.3 |
| | 10 bar (150 psi), 40 bar (600 psi) | ±0.25 | ±0.45 | ±0.25 |
| | 100 bar (1500 psi) | ±0.25 | - | ±0.25 |
| | 400 bar (6000 psi) | ±0.4 | - | ±0.4 |

Long-term stability**For devices with thread or flange:**

| | Measuring range | Long-term stability of URL / 1 year | Long-term stability of URL / 5 years | Long-term stability of URL / 10 years |
|-------|------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|
| PMP51 | ≤ 1 bar (15 psi) | ±0.2 % | ±0.4 % | ±0.5 % |
| | > 1 bar...10 bar (15...150 psi) | ±0.1 % | ±0.175 % | ±0.4 % |
| | 40 bar (600 psi) | ±0.1 % | ±0.2 % | ±0.4 % |
| | 100 bar (1500 psi) | ±0.1 % | ±0.25 % | ±0.2 % |
| | 400 bar (6000 psi) | ±0.1 % | ±0.25 % | ±0.1 % |

For devices with hygienic process connections:

| | Measuring range | Long-term stability of URL / 1 year |
|-------|------------------------------------|-------------------------------------|
| PMP51 | ≤ 1 bar (15 psi) | ±0.25 % |
| | > 1 bar...10 bar (15...150 psi) | ±0.1 % |
| | 40 bar (600 psi) | ±0.1 % |
| | 100 bar (1500 psi) | ±0.1 % |
| | 400 bar (6000 psi) | ±0.1 % |

Total error - PMP51

The total error comprises the long-term stability and the total performance. All specifications apply to the temperature range -10 to +60 °C (+14 to +140°F) and Turndown 1:1.

| Signal output | Measuring cell | % of URL/year |
|--|--|---------------|
| HART, PROFIBUS PA, FOUNDATION Fieldbus | 400 mbar (6 psi) | ±0.59 |
| | ≥1 bar to 40 bar (15 psi to 600 psi) | ±0.35 |
| | ≥40 bar to 100 bar (600 psi to 1500 psi) | ±0.35 |
| | 400 bar (6000 psi) | ±0.5 |
| Analog (4 to 20 mA) | 400 mbar (6 psi) | ±0.79 |
| | ≥1 bar to 40 bar (15 psi to 600 psi) | ±0.55 |
| | ≥40 bar to 100 bar (600 psi to 1500 psi) | ±0.55 |
| | 400 bar (6000 psi) | ±0.5 |

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


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)

▲ WARNING

Risk of explosion!

In hazardous areas, comply strictly with the safety instructions when the housing cover is closed and open.

- Endress+Hauser offers a mounting bracket for installing the device on pipes or walls, see also →  34, "Wall and pipe mounting" ordering feature.
- 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. Preferably mount the Cerabar S 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

→  99, "Planning instructions for diaphragm seal systems" ordering feature.

Wall and pipe mounting

Endress+Hauser offers a mounting bracket for installing the device on pipes or walls. The mounting bracket is

- included in the delivery for devices with a separate housing (available for order via feature 600)
- available for order as a separate accessory (Part No.: 71102216).

For the dimensions, see →  86.

"Separate housing" version

With the "separate housing" version, you are able to mount the housing with the electronics insert at a distance from the measuring point. This version allows for trouble-free measurement:

- Under particularly difficult measuring conditions (at installation locations that are cramped or difficult to access)
- If quick cleaning of the measuring point is required
- If the measuring point is exposed to vibrations

You can choose between different cable versions:

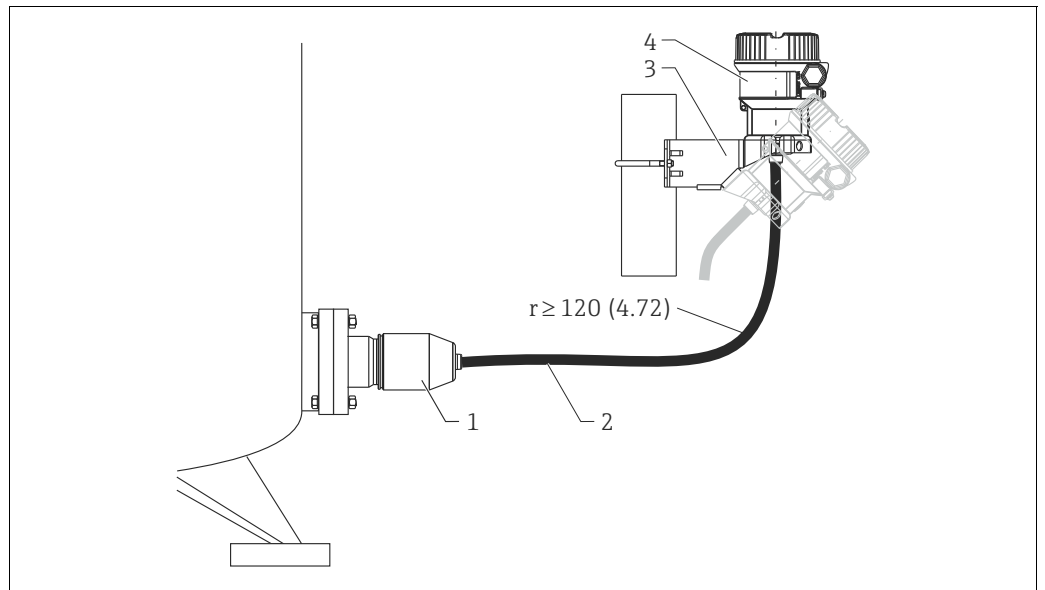
- PE (2 m (6.6 ft), 5 m (16 ft) and 10 m (33 ft))
- FEP (5 m (16 ft)).

Ordering information:

Product Configurator, "Separate housing" ordering feature or

Product Configurator, "Enclosed accessories" ordering feature, option PA

For the dimensions, see → 86.



Engineering unit mm (in)

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

- 1 Process connection with sensor - see the following section for the degrees of protection
- 2 Cable, both ends are fitted with a socket
- 3 Mounting bracket provided, suitable for pipe and wall mounting (for pipes from 1 1/4" up to 2" diameter)
- 4 Housing with electronic insert - degrees of protection → 37 ff

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

- FEP cable:
 - IP 69K
 - IP 66 NEMA 4/6P
 - IP 68 (1.83 mH₂O for 24 h) NEMA 4/6P
- PE cable:
 - IP 66 NEMA 4/6P
 - IP 68 (1.83 mH₂O for 24 h) NEMA 4/6P

Technical data of the PE and FEP cable:

- Minimum bending radius: 120 mm (4.72 in)
- Cable extraction force: max. 450 N (101 lbf)
- Resistance to UV light

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. As a result, the following are some of the precautions that must be taken:

- All components of the system, such as measuring devices, must be cleaned in accordance with the BAM (DIN 19247) requirements.
- Depending on the materials used, a certain maximum temperature and maximum pressure must not be exceeded for oxygen applications.

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

| Ordering code for devices ¹⁾ cleaned for oxygen applications | p_{\max} for oxygen applications | T_{\max} for oxygen applications |
|---|---|--|
| PMC51 ²⁾ – devices with sensors, nominal value < 10 bar (150 psi) | Over pressure limit (OPL) of sensor ^{3), 4)} | 60 °C (140°F) |
| PMC51 ²⁾ – devices with sensors, nominal value ≥ 10 bar (150 psi) | 40 bar (600 psi) | 60 °C (140°F) |
| PMP51 PMP55 ²⁾ | Depends on the lowest-rated element, with regard to pressure, of the selected components: over pressure limit (OPL) of sensor ³⁾ , process connection (1.5 x PN) or fill fluid (160 bar (2320 psi)) | 85 °C (185°F) |

- 1) Only device, not accessory or enclosed accessory
- 2) Product Configurator, "Service" ordering feature, option "HB"
- 3) Product Configurator, "Sensor range" ordering feature
- 4) PMC51 with PVDF thread or PVDF flange $p_{\max} = 15$ bar (225 psi)

PWIS cleaning

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

Ordering information:

Product Configurator, "Service" ordering feature, option HC

The resistance of the materials used must be checked before the materials are used in the medium.

**Ultrapure gas applications
(PMC51 and 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
(PMP51 and PMP55)**

With regard to materials in which hydrogen formation takes place (e.g. digested sludge), hydrogen atoms can diffuse through the metallic process isolating diaphragm. This can result in incorrect measurement results.

Endress+Hauser offers process isolating diaphragms with a gold/rhodium coating for such instances.

Ordering information:

Product Configurator, "Process isolating diaphragm material" ordering feature, option L

NOTICE

To reduce hydrogen formation, you should not use galvanized assemblies.

Environment

Ambient temperature range

| Version | PMC51 | PMP51 | PMP55 |
|--------------------------------|--|-------|-------|
| Without LCD display | -40 °C to +85 °C (-40°F to +185°F) | | |
| With LCD display ¹⁾ | -20 °C to +70 °C (-4°F to +158°F) | | |
| With M12 plug , elbowed | -25 °C to +85 °C (-13°F to +185°F) | | |
| With separate housing | -20 °C to +60 °C (-4°F to +140°F) (installation without insulation) | | — |
| Diaphragm seal systems | — | — | → 99 |

1) Extended temperature application range (-40 °C to +85 °C (-40°F to +185°F)) with restrictions in optical properties such as display speed and contrast

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" ordering feature → 34).

Storage temperature range

| Version | PMC51 | PMP51 | PMP55 |
|-------------------------|------------------------------------|-------|-------|
| Without LCD display | -40 °C to +90 °C (-40°F to +194°F) | | |
| With LCD display | -40 °C to +85 °C (-40°F to +185°F) | | |
| With M12 plug , elbowed | -25 °C to +85 °C (-13°F to +185°F) | | |
| With separate housing | -40 °C to +60 °C (-40°F to +140°F) | | — |
| Diaphragm seal systems | — | — | → 99 |

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

- F31 housing: IP 68 (1.83 mH₂O for 24 h)
- Ordering information:
Product Configurator, "Electrical connection" ordering feature
- Separate housing (→ 35)

Vibration resistance

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

NOTICE**Strong vibrations can destroy the device!**

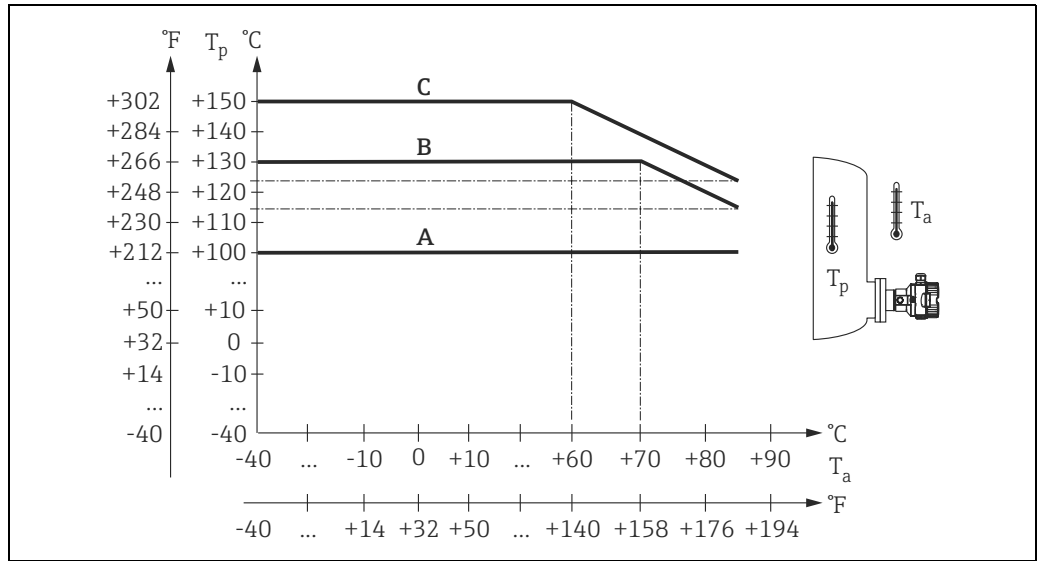
For high-vibration applications, either a PMC51/PMP51 with a separate housing or a PMP55 with a capillary can be used. We recommend a suitable bracket for mounting (see "Wall and pipe mounting" ordering feature on →  34).

Electromagnetic compatibility

- Electromagnetic compatibility as per all the relevant requirements of the EN 61326 series and NAMUR Recommendation EMC (NE21). Details can be found in the Declaration of Conformity (in the Download area of "www.de.endress.com", "search area - Approvals and Certificates", "Manufact. Declaration").
- Maximum deviation: < 0.5 % of span

Process

Process temperature range PMC51



A, B and C, see next section.

T_a Ambient temperature
 T_p Process temperature

Process temperature limits **PMC51 (with ceramic process isolating diaphragm)**

- A: -40 to +100 °C (-40 to +212°F) for threaded process connections or flange process connections
- B: -40 to +130 °C (-40 to +266°F) for hygienic process connections
- C: For a maximum of 60 minutes: +150 °C (+302°F) for hygienic process connections
- Observe the process temperature range of the seal. See also the following table.

| Seal | Notes | Process temperature range | | Option ¹⁾ |
|-------------------------|--|--------------------------------|-------------------------------|----------------------|
| | | 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 ²⁾ |
| FKM Viton | FDA ³⁾ , 3A Class I, USP Class VI | -5 to +100 °C (+23 to +212°F) | -5 to +150 °C (+23 to +302°F) | B |
| NBR | FDA ³⁾ | -10 to +100 °C (-14 to +212°F) | - | F |
| NBR, low temperature | - | -40 to +100 °C (-40 to +212°F) | - | H |
| HNBR | FDA ³⁾ , 3A Class I, KTW, AFNOR, BAM | -25 to +100 °C (-13 to +212°F) | -20 to +125 °C (-4 to +257°F) | G |
| EPDM 70 | FDA ³⁾ | -40 to +100 °C (-40 to +212°F) | - | J |
| EPDM 291 | FDA ³⁾ , 3A Class II, USP Class VI, DVGW, KTW, W270, WRAS, ACS, NSF61 | - | -15 to +150 °C (+5 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 ³⁾ , USP Class VI | -5 to +100 °C (+23 to +212°F) | -5 to +150 °C (+23 to +302°F) | N |
| Fluoroprene XP40 | FDA ³⁾ , 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 ³⁾ | -35 to +85 °C (-31 to +185°F) | -20 to +85 °C (-4 to +185°F) | S |

1) Product Configurator, "Seal" ordering feature

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

3) Suitable for foods FDA 21 CFR 177.2600

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 metallic process isolating diaphragm)

| Description | Temperature operating range |
|--|--|
| Process connections with internal process isolating diaphragm | -40 to +125 °C (-40 to +257°F) |
| Process connections with flush-mounted process isolating diaphragm, G 1 A, G 1 ½" A, G 2 A, 1 NPT, 1 ½" NPT, 2 NPT, M44x1.25, EN/DIN, ANSI flanges | -40 to +100 °C (-40 to +212°F) |
| Process connections with flush-mounted process isolating diaphragm, G ½" A | -20 to +85 °C (-4 to +185°F) |
| Hygienic process connections | -40 to +130 °C (-40 to +266°F) For a maximum of 60 minutes: +150 °C (+302°F) |

PMP55 (with diaphragm seal)

Depending on the diaphragm seal and filling oil from -70 °C (-94°F) up to +400 °C (+752°F). Observe the temperature application limits → 99.

NOTICE**The use of incorrect process isolating diaphragms can destroy the device!**

- ▶ The PTFE foil used is designed to protect the unit against abrasion. It does not provide protection against corrosive media.
- ▶ Do not use diaphragm seals with 0.25 mm (0.01 in) PTFE foil on AISI 316L (1.4435/1.4404) for vacuum applications, upper temperature limit +204 °C (+399°F).
- ▶ For oxygen applications, observe → 36, "Oxygen applications" ordering feature.

Pressure specifications**⚠ WARNING**

The maximum pressure for the measuring device depends on the lowest-rated element with regard to pressure → 11 ff, "Measuring range" ordering feature and → 41 ff "Mechanical construction" ordering feature

- ▶ Only operate the measuring device within the prescribed limits!
- ▶ The MWP (maximum working pressure) is specified on the nameplate. This value refers to a reference temperature of +20 °C (68°F), or 100°F (38 °C) for ANSI flanges, and may be applied to the device for an unlimited time. Observe temperature dependency of the MWP.
- ▶ Please refer to the following standards for pressure values permitted at higher temperatures: EN 1092-1: 2001 Tab. 18 ¹⁾, ASME B 16.5a – 1998 Tab. 2-2.2 F316, ASME B 16.5a – 1998 Tab. 2.3.8 N10276, JIS B 2220.
- ▶ The test pressure corresponds to the over pressure limit of the device (OPL = 1.5 x MWP) ²⁾ and may be applied for only a limited time period in order to avoid permanent damage.
- ▶ The Pressure Equipment Directive (EC Directive 97/23/EC) uses the abbreviation "PS". The abbreviation "PS" corresponds to the MWP (maximum working pressure) of the measuring device.
- ▶ In the case of sensor range and process connection combinations where the OPL (over pressure limit) of the process connection is smaller than the nominal value of the sensor, the device is set at the factory, at the very maximum, to the OPL value of the process connection. If you want to use the entire sensor range, select a process connection with a higher OPL value (1.5 x PN; PN = MWP).
- ▶ In oxygen applications, the values for "p_{max} and T_{max} for oxygen applications" as per → 36, "Oxygen applications" may not be exceeded.
- ▶ Avoid steam hammering! Steam hammering can cause zero point drift.
Recommendation: Residue (such as condensation or drops of water) can remain at the process isolating diaphragm after CIP cleaning and lead to local steam hammering if immediately steam is introduced. 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.

1) With regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under 13EO in EN 1092-1 Tab. 18. The chemical composition of the two materials can be identical.

2) The equation does not apply for PMP51 and PMP55 with a 40 bar (600 psi) - or a 100 bar (1500 psi) - measuring cell.

Mechanical construction

Device height

The device height is calculated from

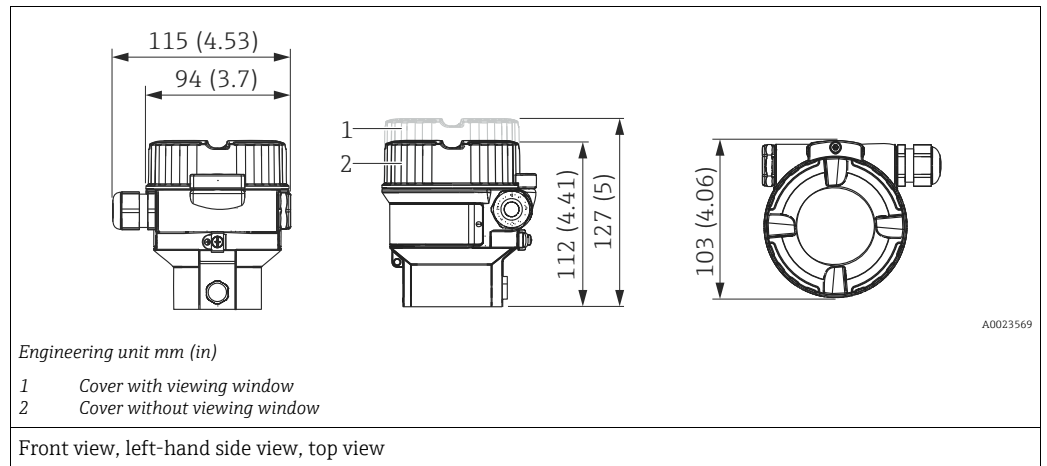
- the height of the housing and
- the height of the individual process connection.

The individual heights of the components are listed in the following sections. To calculate the device height simply add up the individual heights of the components. Where applicable also take into consideration the installation distance (space that is used to install the device).

You can use the following table for this purpose:

| Section | Page | Height |
|-----------------------|---------|--------|
| Housing height | → 41 ff | |
| Process connections | → 43 ff | |
| Installation distance | | |
| Device height | | |

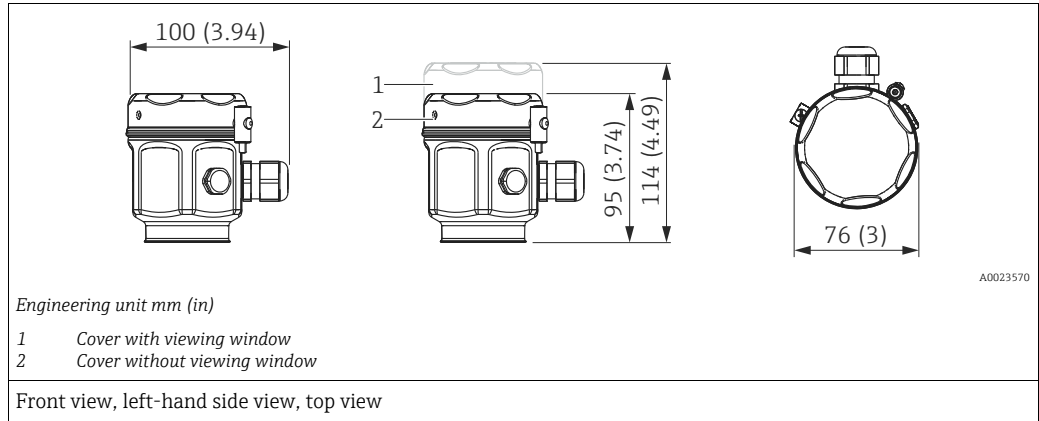
F31 housing, aluminum



| Material | Weight kg (lbs) | | Option ¹⁾ |
|------------------------------------|-----------------|-----------------|----------------------|
| | With display | Without display | |
| Aluminum | 1.1 (2.43) | 1.0 (2.21) | I |
| Aluminum with glass viewing window | | | J |

1) Product Configurator, "Housing" ordering feature

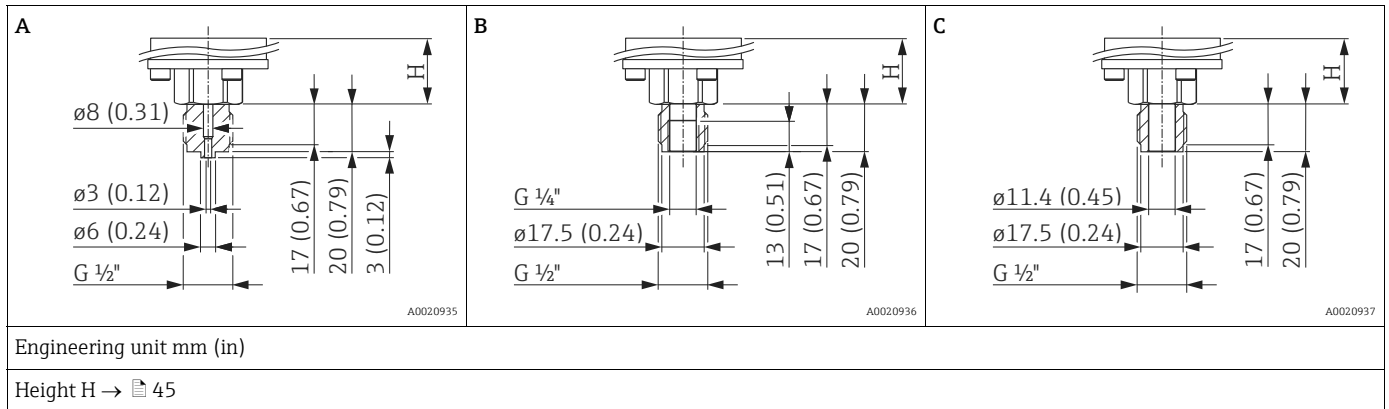
F15 housing, stainless steel (hygienic)



| Material | Weight kg (lbs) | | Option ¹⁾ |
|---|-----------------|-----------------|----------------------|
| | With display | Without display | |
| Stainless steel | 1.1 (2.43) | 1.0 (2.21) | Q |
| Stainless steel with glass viewing window | | | R |
| Stainless steel with plastic viewing window | | | S |

1) Product Configurator, "Housing" ordering feature

PMC51: process connections ISO 228 G threaded connection with internal process isolating diaphragm



| Item | Designation | Material | Approval ¹⁾ | Weight kg (lbs) | Option ²⁾ |
|------|---|---|------------------------|-----------------|----------------------|
| A | Thread ISO 228 G 1/2" A EN 837 | AISI 316L | CRN | 0.63 (1.39) | G CJ |
| | | Alloy C276 (2.4819) | CRN | | G CC |
| | | PVDF <ul style="list-style-type: none"> ■ Mount only with enclosed mounting bracket ■ MWP 10 bar (150 psi), OPL max. 15 bar (225 psi) ■ Process temperature range: +10 to +60 °C (+14 to +140°F) | - | | G CF |
| B | Thread ISO 228 G 1/2" A G 1/4" (female) EN 837 | AISI 316L | CRN | | GL J |
| | | Alloy C276 (2.4819) | CRN | | GL C |
| C | Thread ISO 228 G 1/2" A EN 837, Bore 11.4 mm (0.45 in) | AISI 316L | CRN | GM J | |
| | | Alloy C276 (2.4819) | CRN | GM C | |

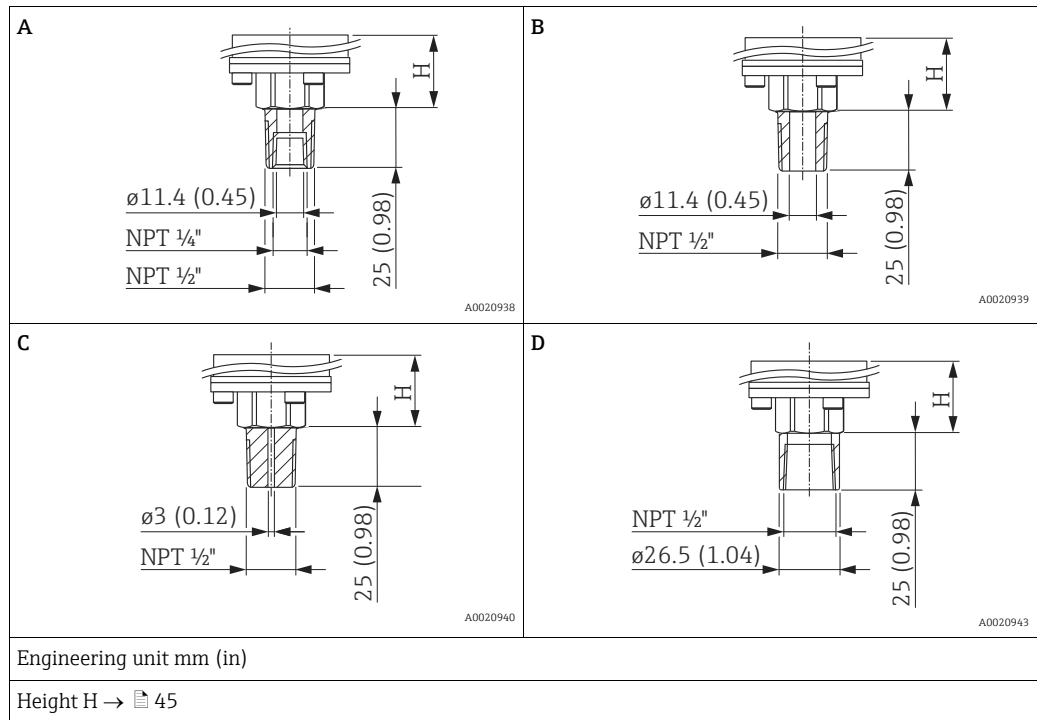
- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature



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

PMC51: process connections with internal process isolating diaphragm

ANSI threaded connection



| Item | Designation | Material | Weight kg (lbs) | Approval ¹⁾ | Option ²⁾ |
|------|--|--|-----------------|------------------------|----------------------|
| 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, Bore 11.4 mm (0.45 in) | AISI 316L | | CRN | RKJ |
| | | Alloy C276 (2.4819) | | CRN | RKC |
| C | ANSI 1/2" MNPT, Bore 3 mm (0.12 in) | PVDF <ul style="list-style-type: none"> Mount only with enclosed mounting bracket MWP 10 bar (150 psi), OPL max. 15 bar (225 psi) Process temperature range: +10 to +60 °C (+14 to +140°F) | | - | RJF |
| D | ANSI 1/2" FNPT Bore 11.4 mm (0.45 in) | AISI 316L | | CRN | R1J |
| | | Alloy C276 (2.4819) | CRN | R1C | |

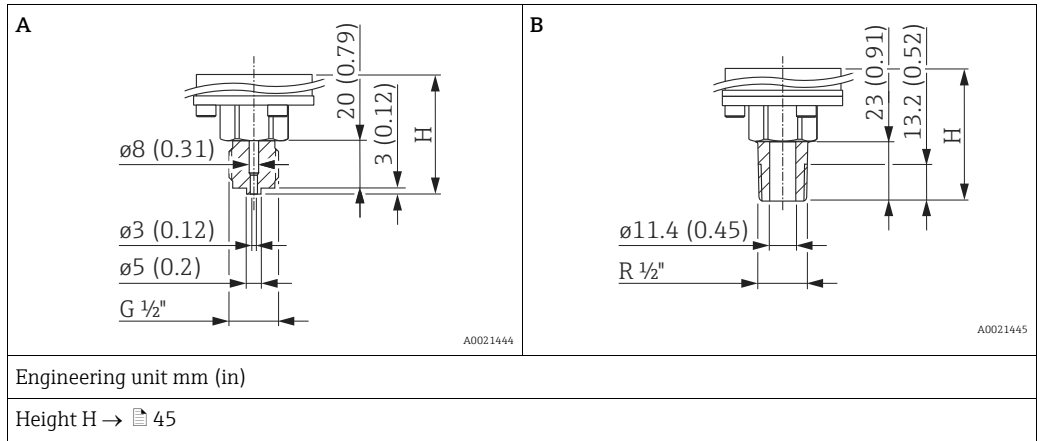
- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature



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

PMC51: process connections with internal process isolating diaphragm

JIS threaded connection



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

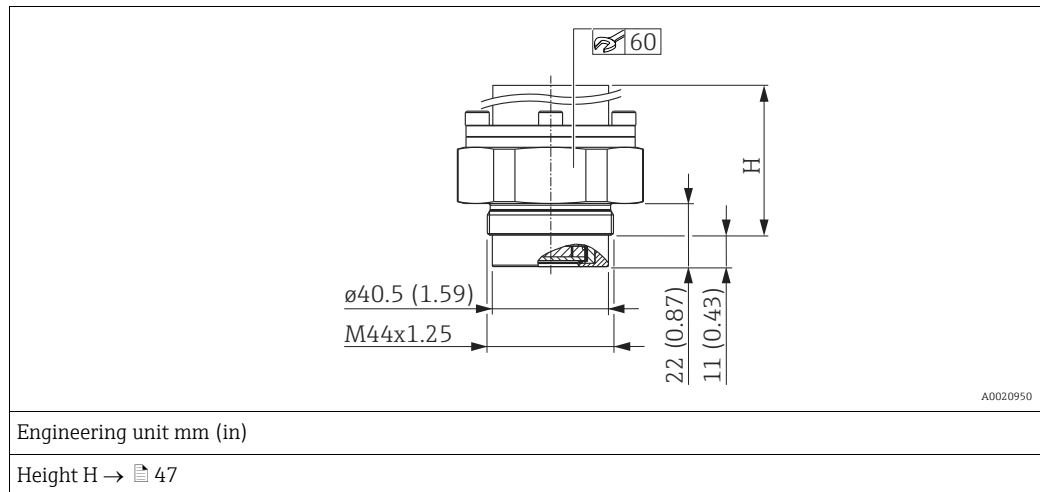
1) Product Configurator, "Process connection" ordering feature

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

| F31 housing | F15 housing |
|----------------|----------------|
| 89 mm (3.5 in) | 81 mm (3.2 in) |

PMC51: process connections with flush-mounted process isolating diaphragm

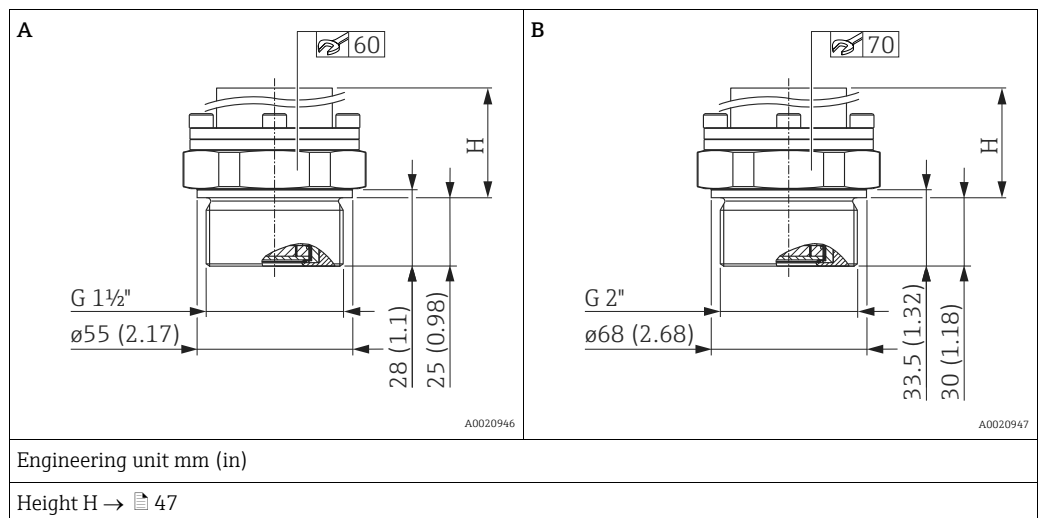
DIN 13 threaded connection



| Designation | Material | Weight kg (lbs) | Option ¹⁾ |
|-------------------|-----------|-----------------|----------------------|
| DIN 13 M44 x 1.25 | AISI 316L | 0.63 (1.39) | G4J |

1) Product Configurator, "Process connection" ordering feature

ISO 228 G threaded connection

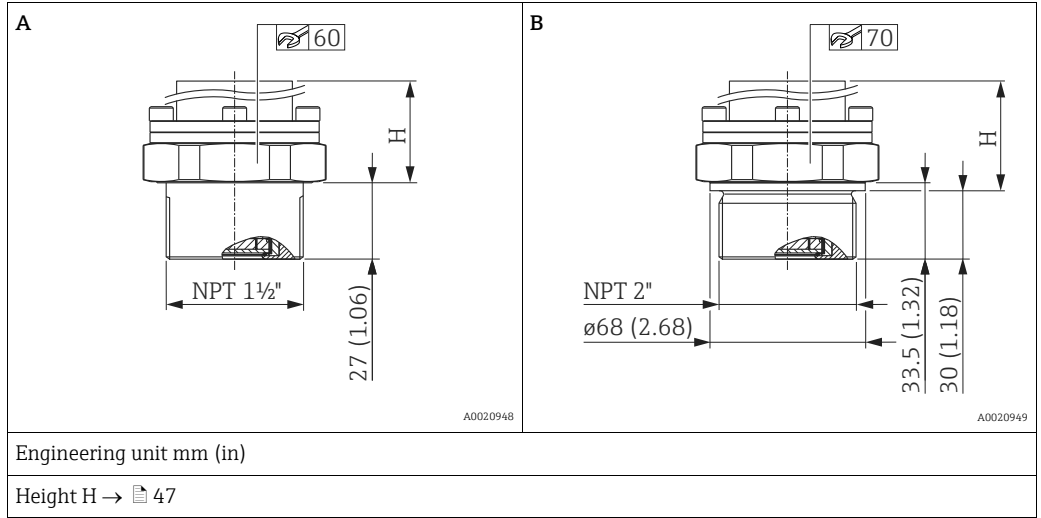


| Item | Designation | Material | Weight kg (lbs) | Option ¹⁾ |
|------|---------------------------|-----------|-----------------|----------------------|
| A | Thread ISO 228 G 1 1/2" A | AISI 316L | 0.63 (1.39) | GVJ |
| B | Thread ISO 228 G 2" A | AISI 316L | | GWJ |

1) Product Configurator, "Process connection" ordering feature

PMC51: process connections with flush-mounted process isolating diaphragm

ANSI threaded connection



| Item | Designation | Material | Weight kg (lbs) | Approval ¹⁾ | Option ²⁾ |
|------|-------------------------|-----------|-----------------|------------------------|----------------------|
| 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, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature



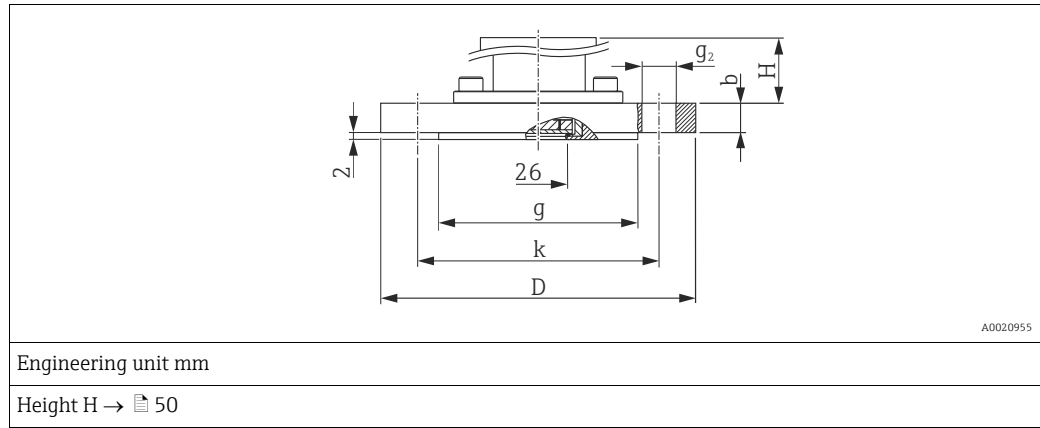
Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. These devices are fitted with a separate plate bearing the registration number OF10525.5C.

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

| F31 housing | F15 housing |
|----------------|----------------|
| 89 mm (3.5 in) | 81 mm (3.2 in) |

PMC51: process connections with flush-mounted process isolating diaphragm

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

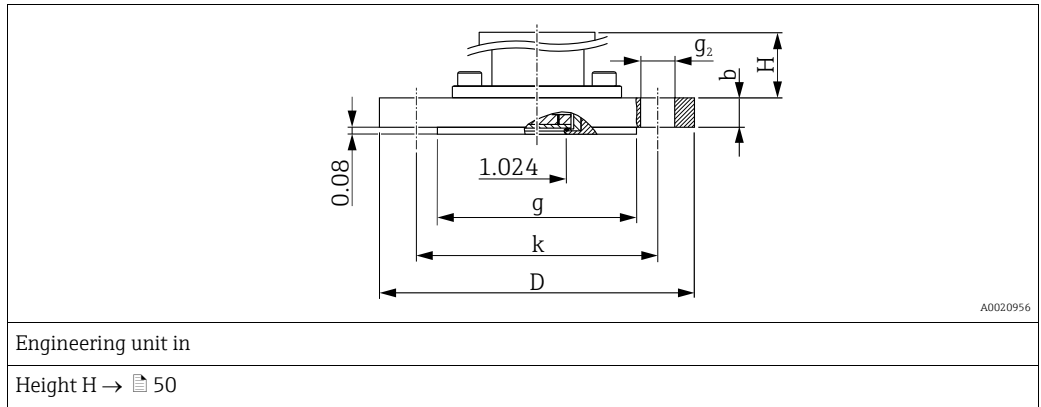


| Flange | | | | | | | Boltholes | | | Weight | Option ¹⁾ |
|---------------------|------------------|------------------|---------------------|---------------|----------------|------------------|-----------|----------------------------|------------------|-------------|----------------------|
| Material | Nominal diameter | Nominal pressure | Shape ²⁾ | Diameter D | Thickness b | Raised face g | Quantity | Diameter g ₂ | Hole circle k | | |
| | | | | [mm] | [mm] | [mm] | | [mm] | [mm] | [kg] | |
| 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 ⁴⁾ | DN 40 | PN 10-40 | B1 (D) | 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 ³⁾ | DN 50 | PN 10-16 | B1 (D) | 165 | 21.4 | 102 | 4 | 18 | 125 | 0.6 (1.32) | CFF |
| ECTFE ⁴⁾ | DN 50 | PN 25-40 | B1 (D) | 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 ⁴⁾ | DN 80 | PN 25-40 | B1 (D) | 200 | 24 | 138 | 8 | 18 | 160 | 5.5 (12.13) | CSP |

- 1) Product Configurator, "Process connection" ordering feature
- 2) Designation as per DIN 2527 in brackets
- 3) Mount only with mounting bracket. MWP 10 bar (150 psi), OPL max. 15 bar (225 psi). Process temperature range -10 to +60 °C (+14 to +140°F).
- 4) ECTFE coating on AISI 316L (1.4404). When operating in hazardous areas, avoid electrostatic charging of the plastic surfaces.

PMC51: process connections with flush-mounted process isolating diaphragm

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



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

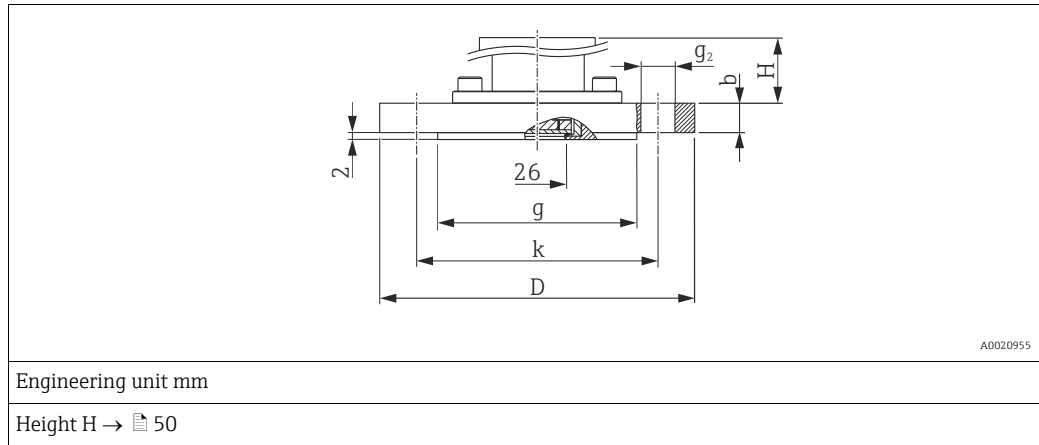
- 1) CSA approval: Product Configurator, “Approval” ordering feature
- 2) Product Configurator, “Process connection” ordering feature
- 3) Screws must be 15 mm (0.59 in) longer than the standard flange screws.
- 4) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical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



Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. These devices are fitted with a separate plate bearing the registration number 0F10525.5C.

PMC51: process connections with flush-mounted process isolating diaphragm

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



| Flange | | | | | | Boltholes | | | Weight | Option ¹⁾ |
|-----------------------|------------------|------------------|----------|-----------|-------------|-----------|----------------|-------------|------------|----------------------|
| Material | Nominal diameter | Nominal pressure | Diameter | Thickness | Raised face | Quantity | Diameter | Hole circle | | |
| | | | D | b | g | | g ₂ | k | [kg (lbs)] | |
| | | | [mm] | [mm] | [mm] | | [mm] | [mm] | | |
| AISI 316L (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, "Process connection" ordering feature

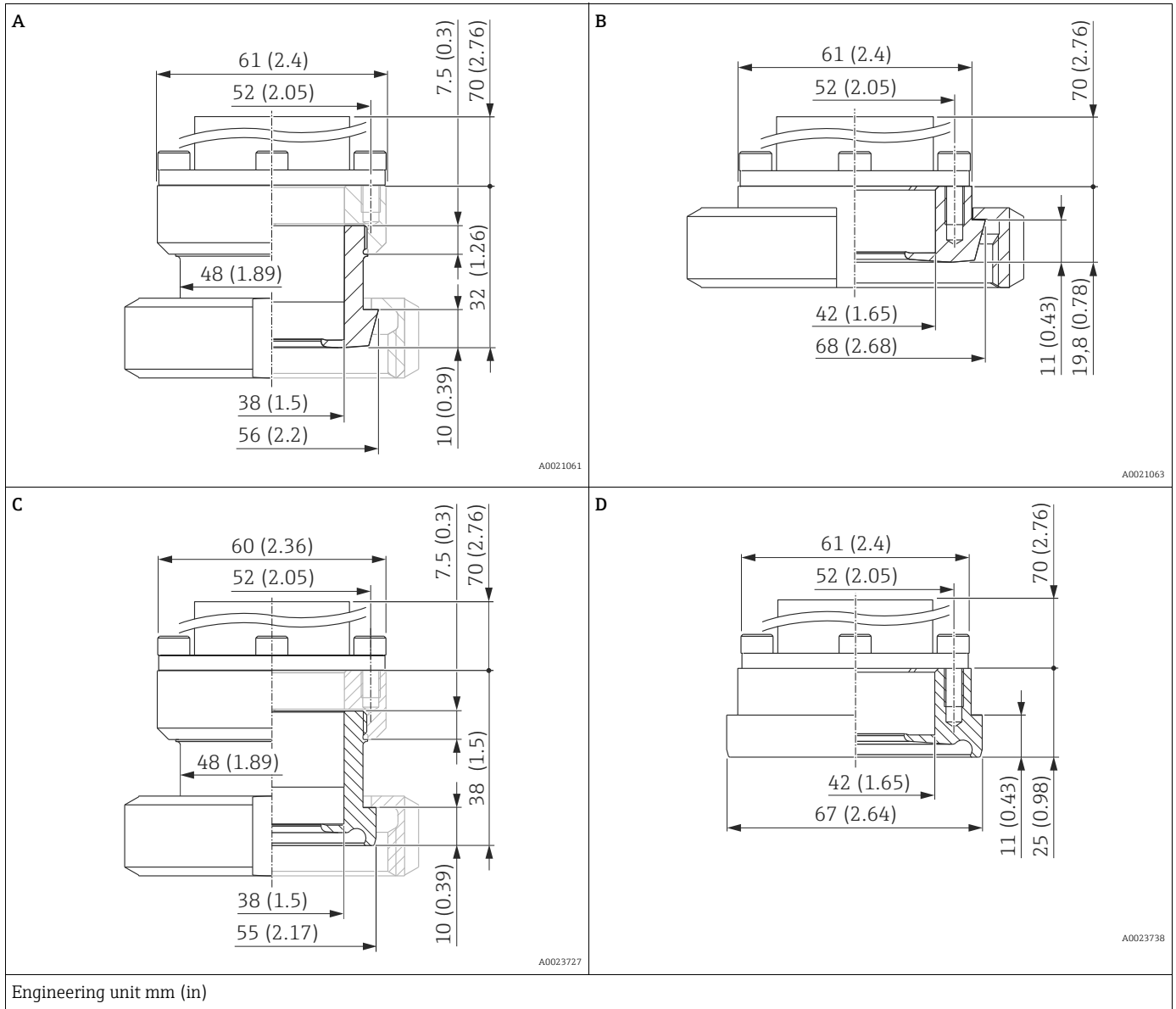
PMC51: process connections with flush-mounted process isolating diaphragm - height H

| F31 housing | F15 housing |
|----------------|----------------|
| 89 mm (3.5 in) | 81 mm (3.2 in) |

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

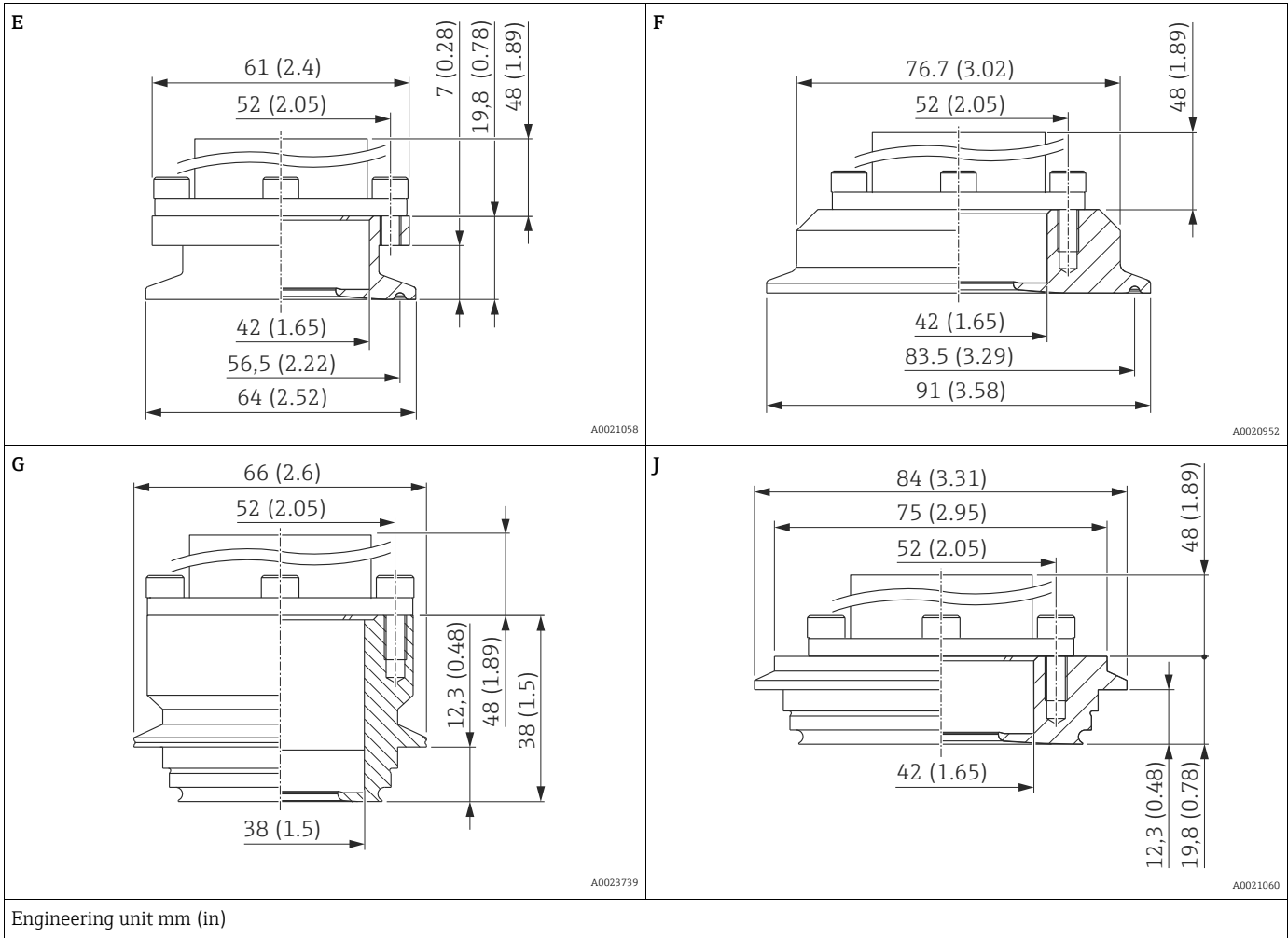
In order to guarantee a hygiene approval, a seal with appropriate approval must be selected for the hygienic process connection:

- For 3A approval, you require a seal made of EPDM or HNBR (→ 39).
- For EHEDG approval, you require a seal made of VMQ silicone, FFKM Kalrez, Hyjoin (→ 39).



| Item | Designation | Nominal pressure | Material ¹⁾ | Weight kg (lbs) | Approval ²⁾ | Option ³⁾ |
|------|----------------------------------|------------------|------------------------|-----------------|--|----------------------|
| A | DIN 11851 DN40 | PN 25 | AISI 316L (1.4435) | 0.7 (1.54) | EHEDG, 3A with seal FDA, ASME-BPE, CRN | MZJ ⁴⁾ |
| B | DIN 11851 DN50 | PN 25 | | 0.9 (1.98) | EHEDG, 3A with seal FDA, ASME-BPE, CRN | MRJ ⁴⁾ |
| C | DIN 11864 DN40, pipe DIN 11866-A | PN 16 | | 0.66 (1.46) | EHEDG, 3A with seal FDA, ASME-BPE | NCJ ⁴⁾ |
| D | DIN 11864 DN50, pipe DIN 11866-A | PN 16 | | 0.29 (0.64) | EHEDG, 3A with seal FDA, ASME-BPE | NDJ ⁴⁾ |

- 1) Delta ferrite content <1 %. The roughness of the surface in contact with the medium is R_a 0.76 μ m (30 μ in).
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 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).

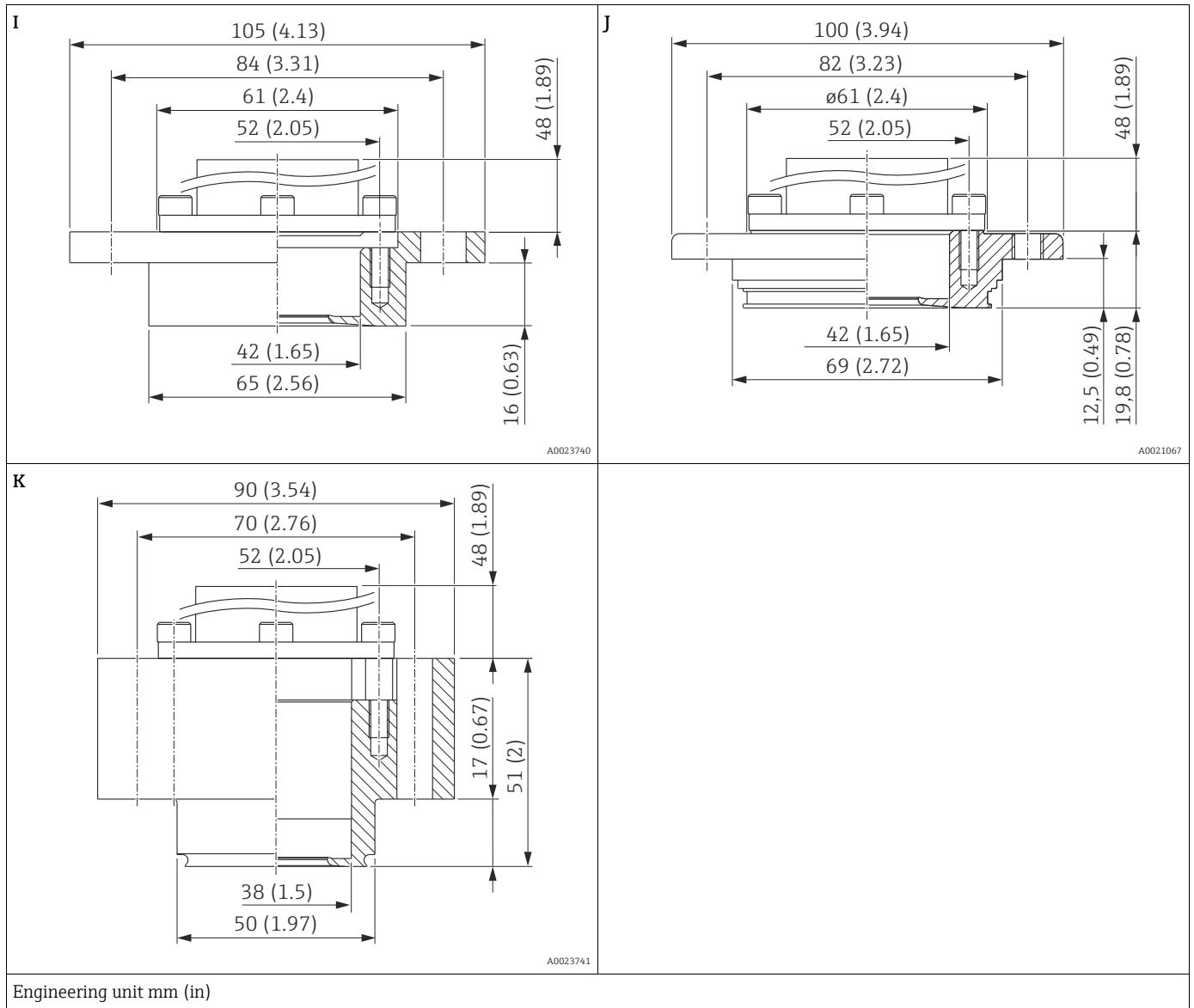


| Item | Designation | Nominal pressure | Material ¹⁾ | Weight kg (lbs) | Approval ²⁾ | Option ³⁾ |
|------|------------------------------------|------------------|------------------------|-----------------|--|----------------------|
| E | Tri-Clamp ISO 2852, DN40-DN51 (2") | PN 40 | AISI 316L (1.4435)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

- 1) Delta ferrite content <1 %. The roughness of the surface in contact with the medium is R_a 0.76 μm (30 μin).
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 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).

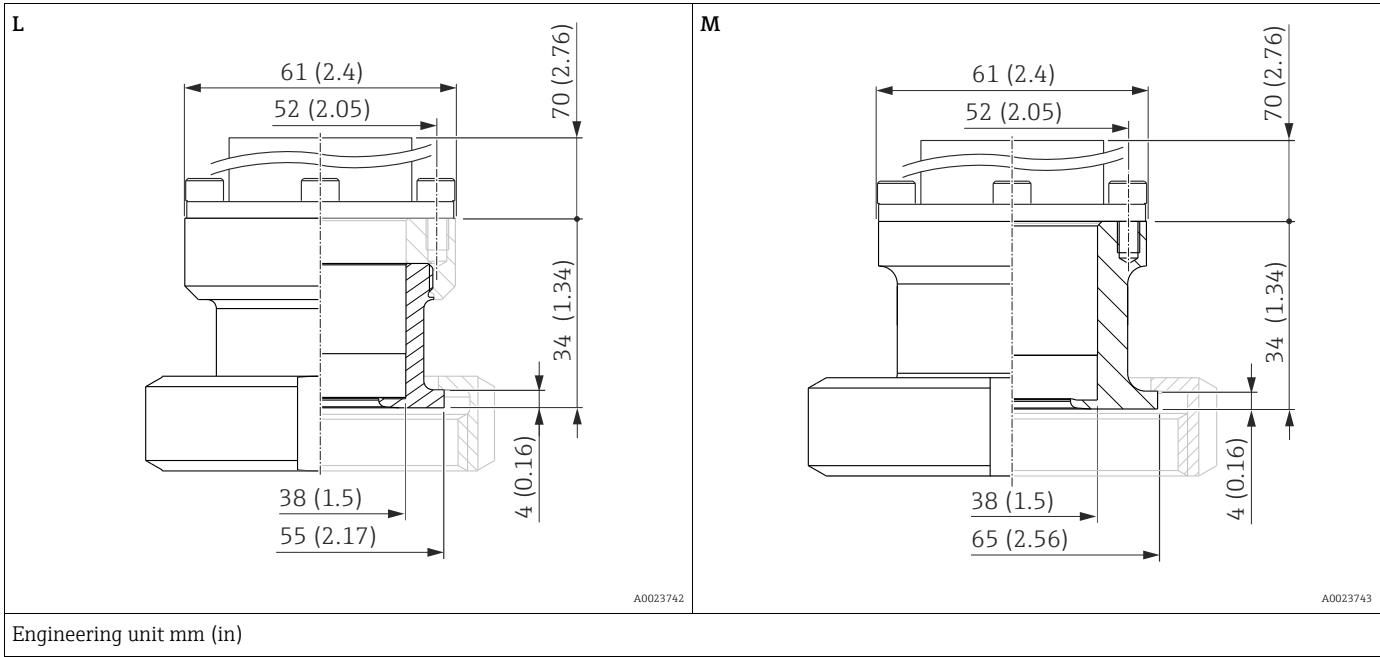


Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. These devices are fitted with a separate plate bearing the registration number OF10525.5C.



| Item | Designation | Nominal pressure | Material ¹⁾ | Weight kg (lbs) | Approval | Option ²⁾ |
|------|------------------------|------------------|------------------------|-----------------|---------------------------------|----------------------|
| I | DRD, DN50 (65 mm) | PN 25 | AISI 316L (1.4435) | 0.9 (1.98) | ASME-BPE | TIJ ³⁾ |
| 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 ⁴⁾ |

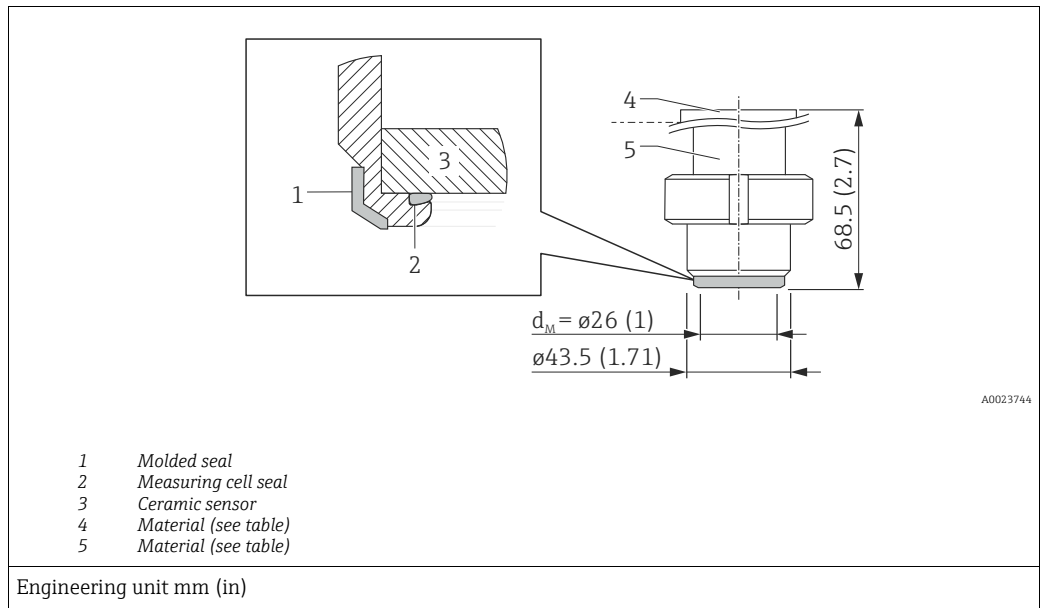
- 1) Delta ferrite content <1 %. The roughness of the surface in contact with the medium is R_a 0.76 µm (30 µin).
- 2) Product Configurator, "Process connection" ordering feature
- 3) Endress+Hauser supplies these slotted nuts in stainless steel AISI 304 (DIN/EN material number 1.4301) or in AISI 304L (DIN/EN material number 1.4307).
- 4) 4 screws DIN912 M8 x 45 are enclosed (material A4-80)



| Item | Designation | Nominal pressure | Material ¹⁾ | Weight kg (lbs) | Approval | Option ²⁾ |
|------|-------------|------------------|------------------------|-----------------|---------------------|----------------------|
| L | SMS 1 ½" | PN 25 | AISI 316L (1.4435) | 0,65 (1.43) | EHEDG, 3A, ASME-BPE | TXJ ³⁾ |
| M | SMS 2" | PN 25 | | 0,65 (1.43) | | T7J ³⁾ |

- 1) Delta ferrite content <1 %. The roughness of the surface in contact with the medium is R_a 0.76 µm (30 µin).
- 2) Product Configurator, "Process connection" ordering feature
- 3) 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).

Universal adapter



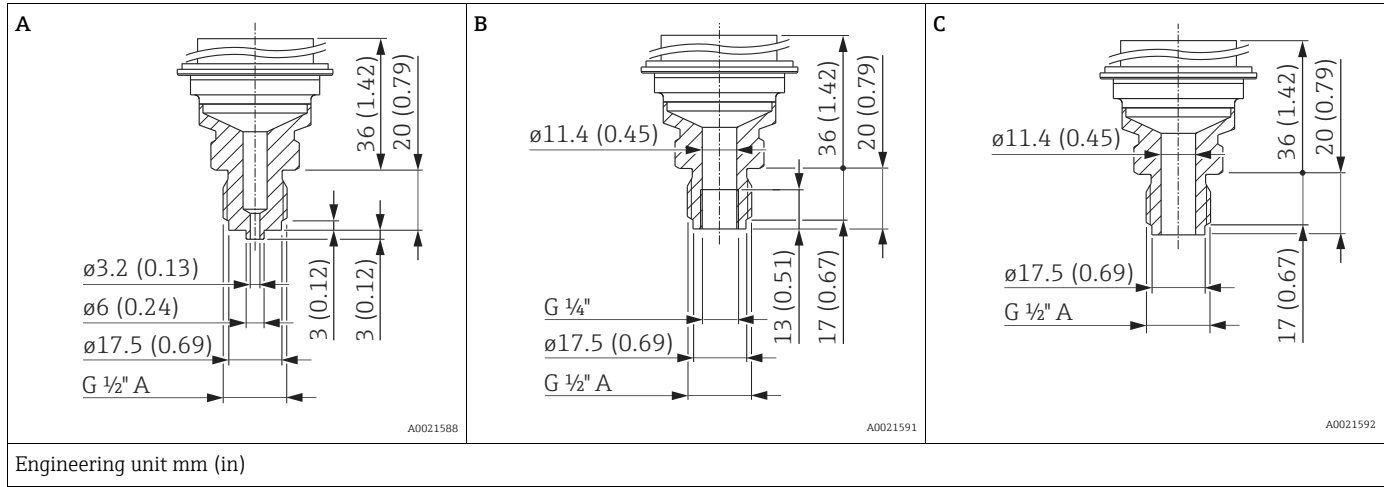
| Designation | Nominal pressure | Material ¹⁾²⁾ | Weight [kg/lbs] | Approval Process connection ³⁾ | Option ⁴⁾ |
|---|------------------|---|-----------------|---|----------------------|
| Universal adapter with pre-installed silicone molded seal | PN 10 | <ul style="list-style-type: none"> ■ 4: top section AISI 316L (1.4404) ■ 5: bottom section AISI 316L (1.4435) | 0.74 (1.63) | EHDG, 3A with seal FDA, ASME-BPE | UPJ |
| Universal adapter with pre-installed EPDM molded seal | | | | EHDG, ASME-BPE | UNJ |

- 1) The roughness of the surface in contact with the medium is R_a 0.76 μ m (30 μ in).
- 2) Endress+Hauser supplies these slotted nuts in stainless steel AISI 304 (1.4301) or in AISI 304L (1.4307).
- 3) EHDG or 3A approval only with approved process connection.
- 4) Product Configurator, "Process connection" ordering feature

| Material of the molded seal (changeable seal) | Material of the measuring cell seal at the ceramic sensor (seal not changeable) | Approval of measuring cell seal | Option ¹⁾ |
|---|---|--|----------------------|
| Silicone (Spare part order no.: 52023572) | EPDM | FDA ²⁾ 3A Class II, USP Class VI. DVGW, KTW, W270, WRAS, ACS, NSF61 | K |
| EPDM (Spare part order no.: 71100719) | EPDM | FDA ²⁾ | J |

- 1) Product Configurator, "Seal" ordering feature
- 2) Suitable for foods FDA 21 CFR 177.2600

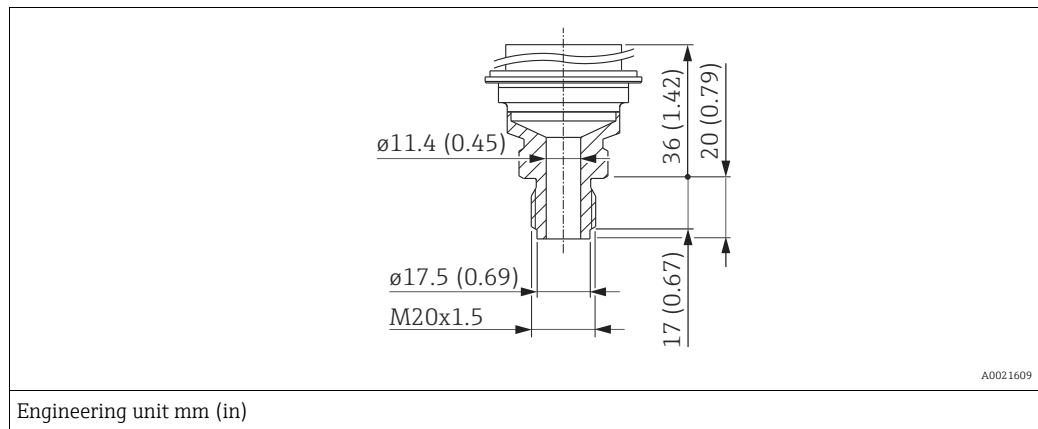
PMP51: process connections ISO 228 G threaded connection with internal process isolating diaphragm



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

1) Product Configurator, "Process connection" ordering feature

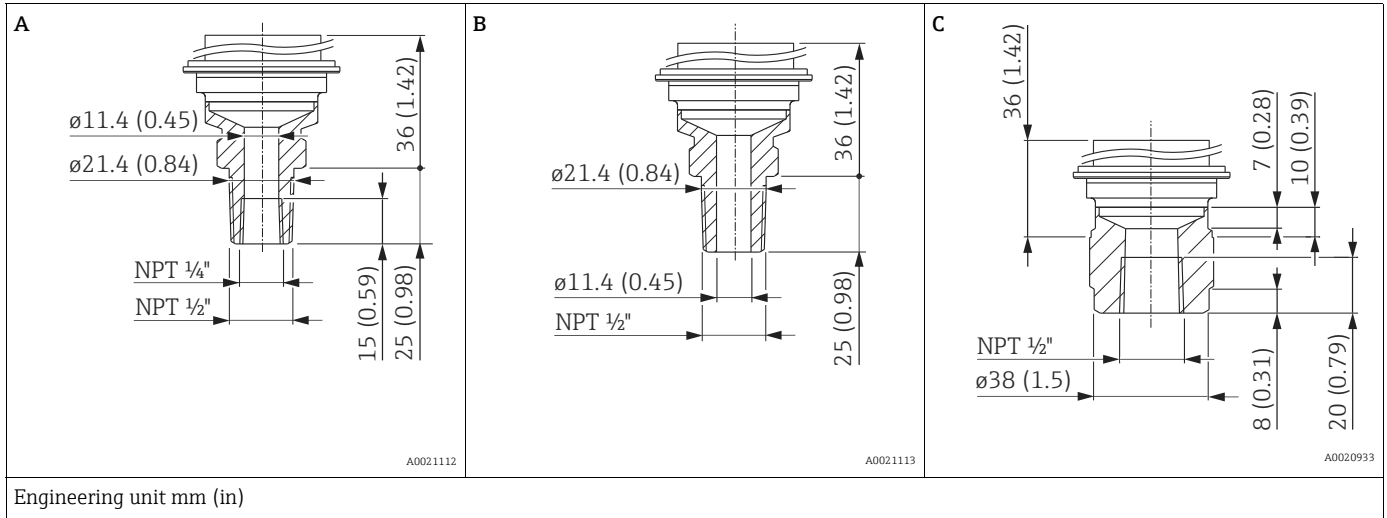
DIN 13 threaded connection



| Designation | Material | Weight kg (lbs) | Option ¹⁾ |
|--|-----------|-----------------|----------------------|
| DIN 13 M20 x 1.5, EN 837 Bore 11.4 mm (0.45 in) | AISI 316L | 0.6 (1.32) | G1J |

1) Product Configurator, "Process connection" ordering feature

**PMP51: process connections ANSI threaded connection
with internal process
isolating diaphragm**



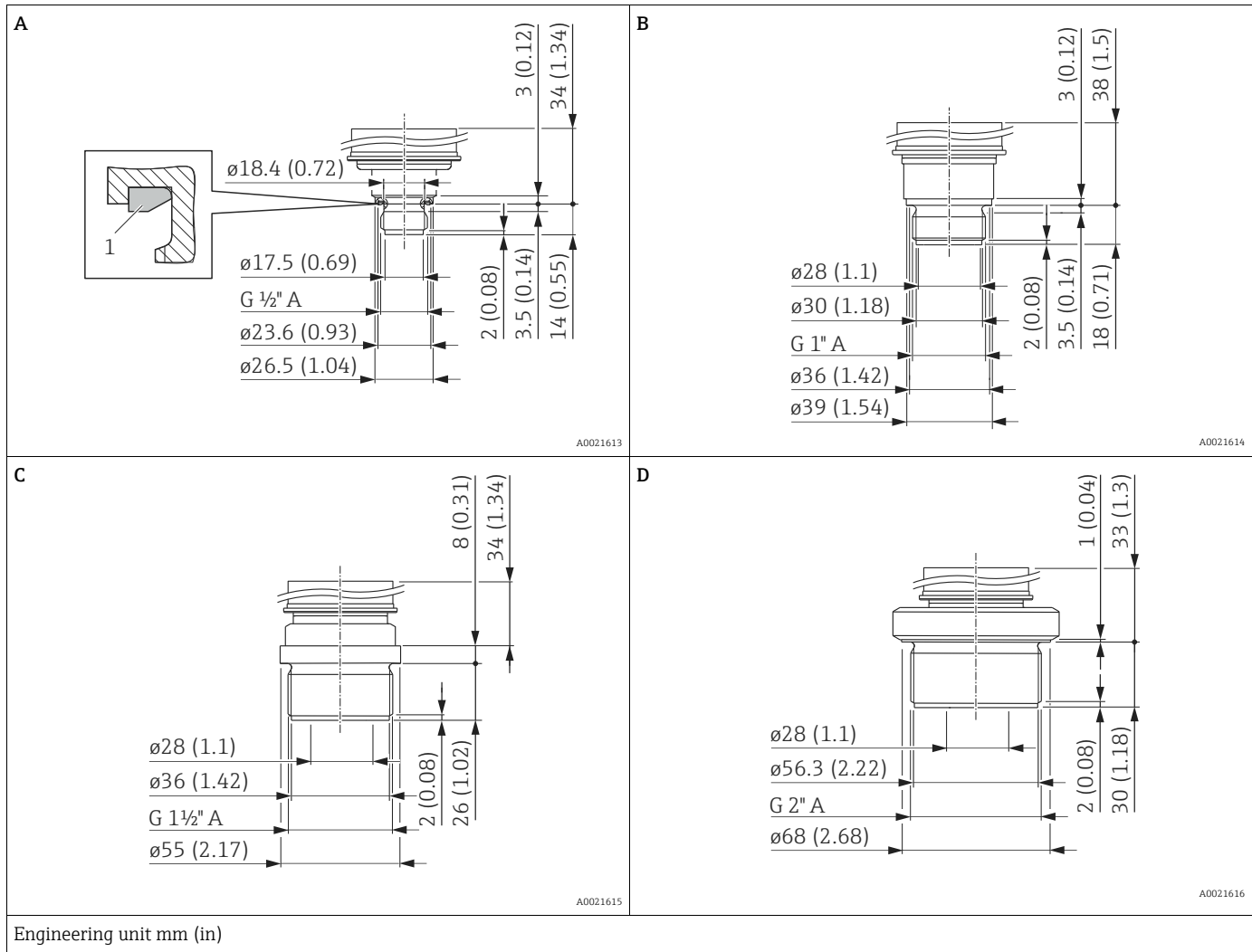
| Item | Designation | Material | Weight kg (lbs) | Approval ¹⁾ | Option ²⁾ |
|------|--|---------------------|-----------------|------------------------|----------------------|
| A | ANSI ½" MNPT, ¼" FNPT | AISI 316L | 0.63 (1.39) | CRN | RLJ |
| | | Alloy C276 (2.4819) | | CRN | RLC |
| B | ANSI ½" MNPT, Bore 11.4 mm (0.45 in) (400 bar (6000 psi)) | AISI 316L | 0.63 (1.39) | CRN | RKJ |
| | | Alloy C276 (2.4819) | | CRN | RKC |
| C | ANSI ½" FNPT | AISI 316L | 0.7 (1.54) | CRN | R1J |
| | | Alloy C276 (2.4819) | | CRN | R1C |

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



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

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

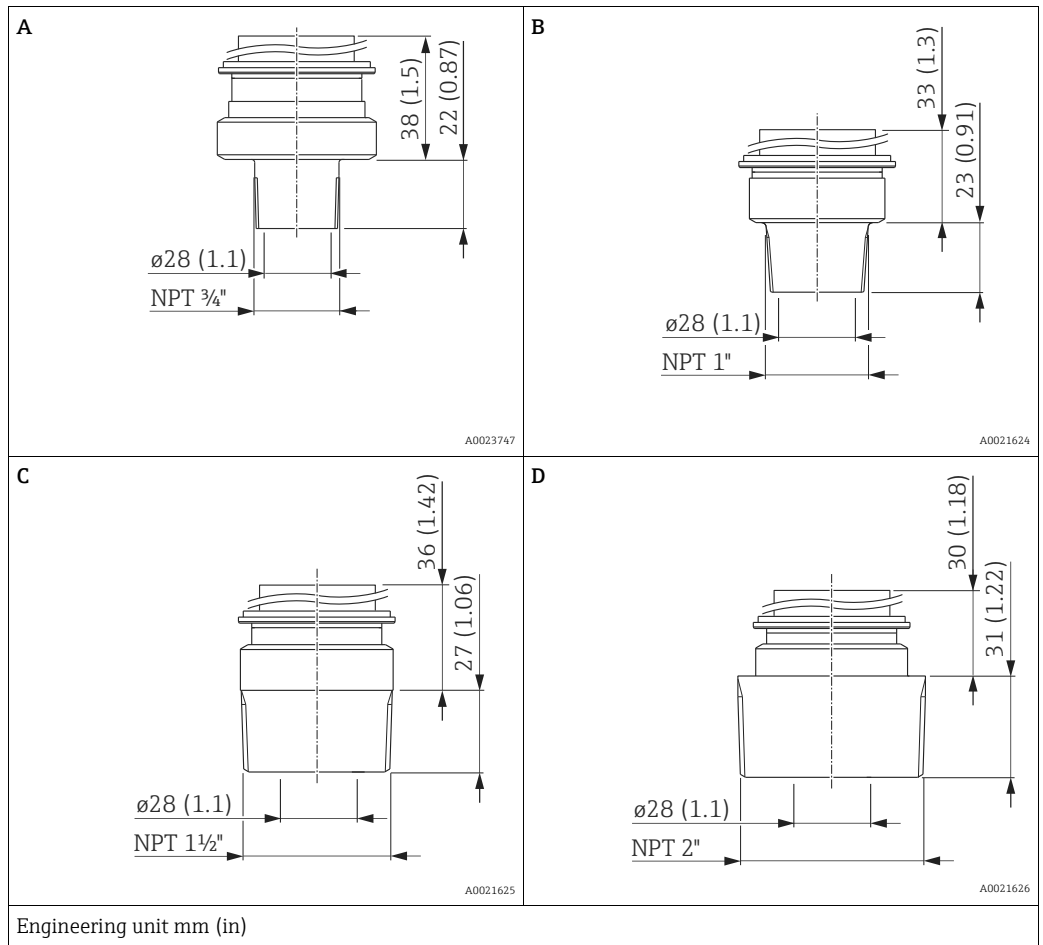


| Item | Designation | Material | Weight kg (lbs) | Option ¹⁾ |
|------|---|---------------------|-----------------|----------------------|
| A | Thread ISO 228 G 1/2" A DIN 3852 FKM seal (item 1) pre-installed | AISI 316L | 0.4 (0.88) | GRJ |
| | | Alloy C276 (2.4819) | | GRC |
| B | Thread ISO 228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

1) Product Configurator, "Process connection" ordering feature

PMP51: process connections with flush-mounted process isolating diaphragm

ANSI threaded connection



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

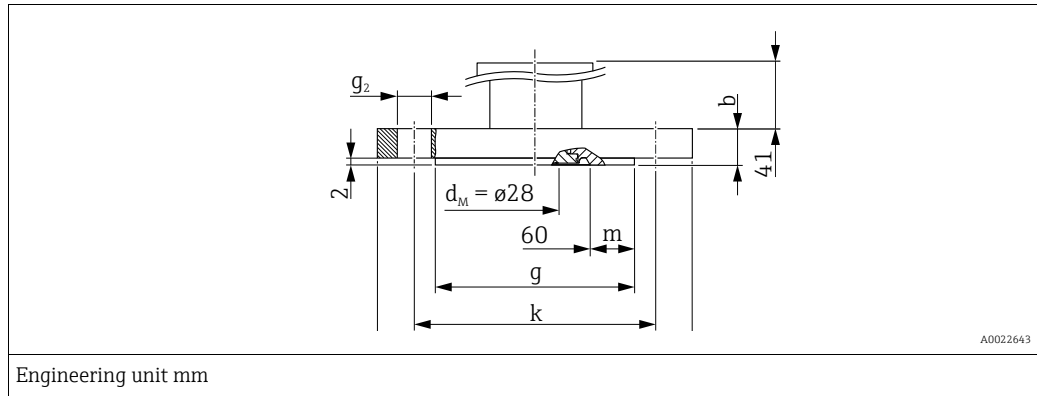
- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature



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

PMP51: process connections with flush-mounted process isolating diaphragm

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

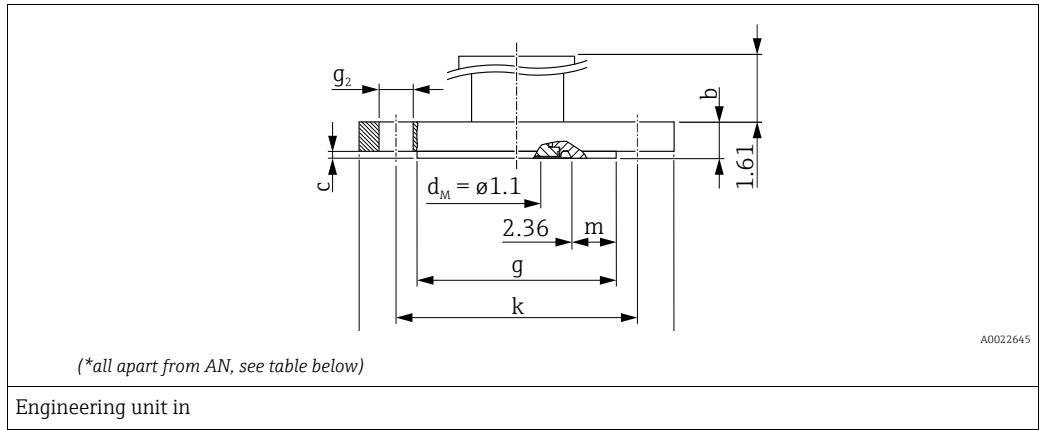


| Flange ^{1) 2)} | | | | | | | Boltholes | | | Flange weight | Option ³⁾ |
|-------------------------|------------------|---------------------|---------------|----------------|------------------|---------------------------------|-----------|----------------------------|------------------|---------------|----------------------|
| Nominal diameter | Nominal pressure | Shape ⁴⁾ | Diameter D | Thickness b | Raised face g | Width of the raised face (m) | Quantity | Diameter g ₂ | Hole circle k | | |
| | | | [mm] | [mm] | [mm] | [mm] | | [mm] | [mm] | [kg (lbs)] | |
| DN 25 | PN 10-40 | B1 (D) | 115 | 18 | 68 ⁵⁾ | 4 | 4 | 14 | 85 | 1.2 (2.65) | CNJ |
| DN 32 | PN 10-40 | B1 (D) | 140 | 18 | 78 ⁵⁾ | 9 | 4 | 18 | 100 | 1.9 (4.19) | CPJ |
| DN 40 | PN 10-40 | B1 (D) | 150 | 18 | 88 ⁵⁾ | 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) The roughness of the surface in contact with the medium including the raised face of the flange (all standards) is Ra <0.8 µm (31.5 µin). Lower surface roughness available on request.
- 2) Material: AISI 316L
- 3) Product Configurator, "Process connection" ordering feature
- 4) Designation as per DIN 2527 in brackets
- 5) 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. Contact a seal manufacturer or your local Endress+Hauser Sales Center.

PMP51: process connections with flush-mounted process isolating diaphragm

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



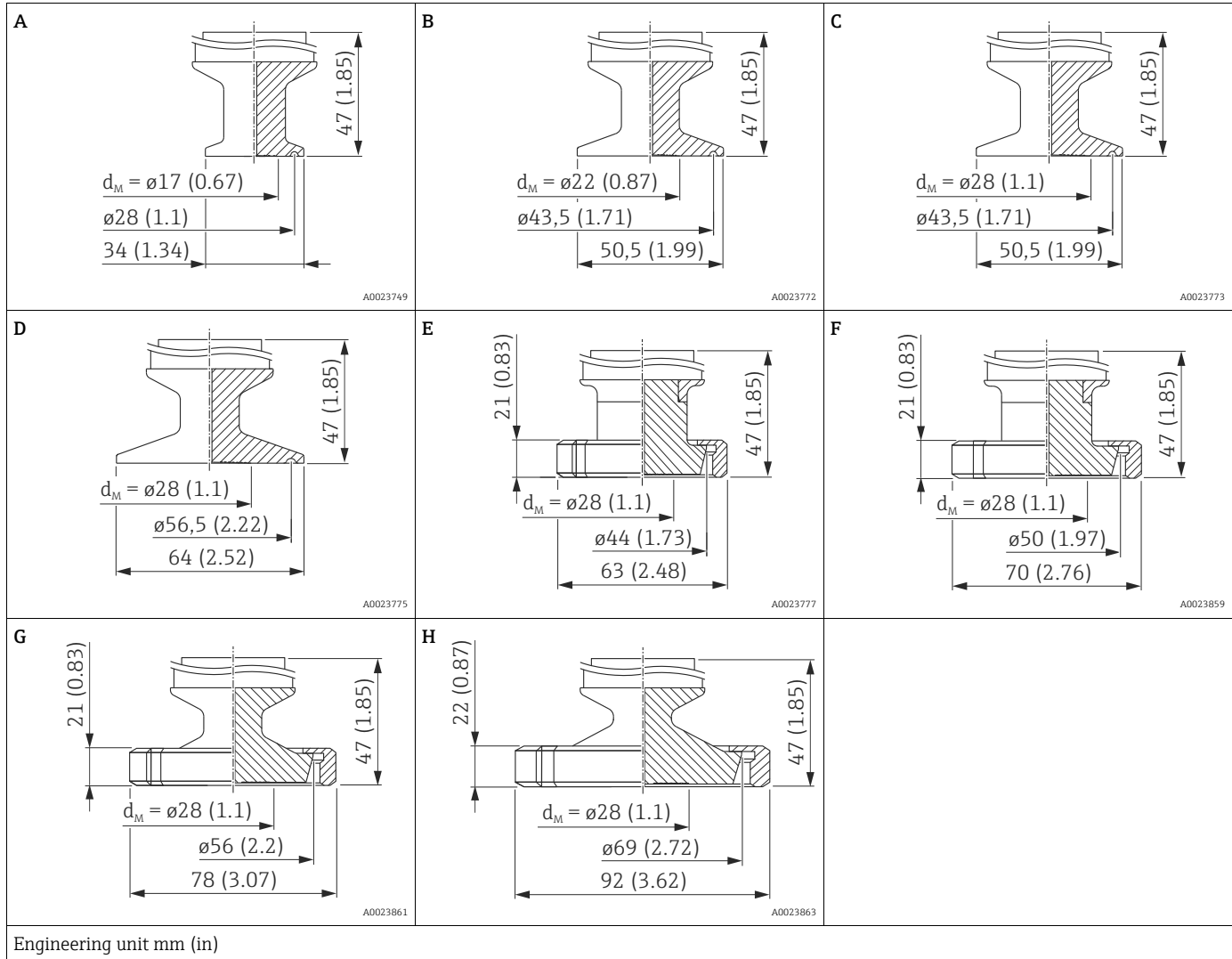
| Flange ^{1) 2)} | | | | | | | Boltholes | | | Weight | Approval ³⁾ | Option ⁴⁾ |
|-------------------------|----------------------------|----------|-----------|-------------------------|--------------------------|----------------------|-----------|---------------------|-------------|--------------|------------------------|----------------------|
| Nominal diameter | Class/ Nominal pressure | Diameter | Thickness | Diameter of raised face | Thickness of raised face | Width of raised face | Quantity | Diameter | Hole circle | | | |
| [in] | [lb./sq.in] | D [in] | b [in] | g [in] | c [in] | (m) [in] | | g ₂ [in] | k [in] | [kg (lbs)] | | |
| 1 | 300 | 4.88 | 0.69 | 2 ⁵⁾ | 0.06 | 0.2 | 4 | 0.75 | 3.5 | 1.3 (2.87) | CRN | ANJ |
| 1 ½ | 150 | 5 | 0.69 | 2.88 ⁵⁾ | 0.08 | 0.52 | 4 | 0.62 | 3.88 | 1.5 (3.31) | CRN | AEJ |
| 1 ½ | 300 | 6.12 | 0.81 | 2.88 ⁵⁾ | 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) The roughness of the surface in contact with the medium including the raised face of the flange (all standards) is Ra <0.8 µm (31.5 µin). Lower surface roughness available on request.
- 2) Material: AISI 316/316L; combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 3) CSA approval: Product Configurator, “Approval” ordering feature
- 4) Product Configurator, “Process connection” ordering feature
- 5) 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. Contact a seal manufacturer or your local Endress+Hauser Sales Center.



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

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

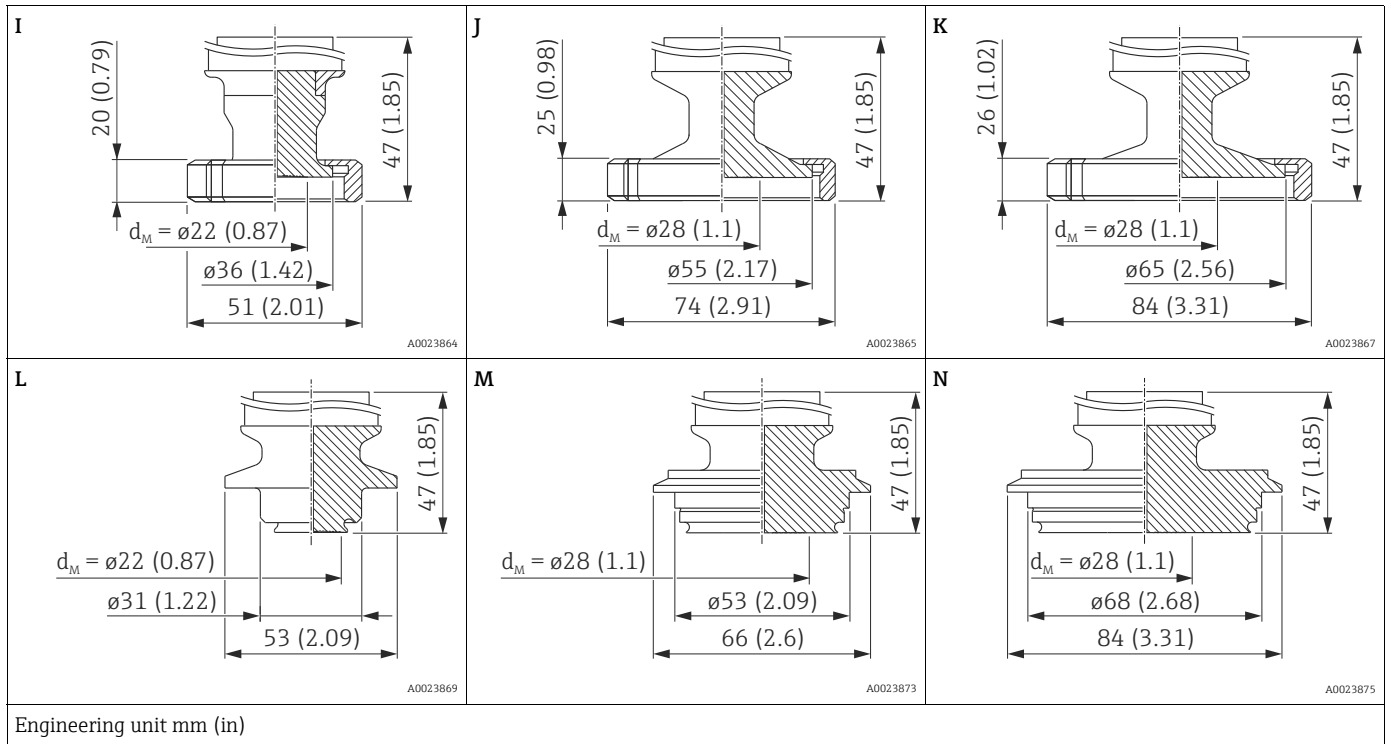


| Item ^{1) 2)} | Designation | Nominal pressure | Weight kg (lbs) | Approval | Option ³⁾ |
|-----------------------|--|------------------|-----------------|---------------------|----------------------|
| A | Clamp ISO2852, DN 18-22, DIN 32676 DN 15-20 | PN 40 | 0.5 (1.10) | EHEDG, 3A, ASME-BPE | TBJ |
| 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 25 | 0.7 (1.54) | EHEDG, 3A, ASME-BPE | MXJ |
| F | DIN 11851 DN 32 | PN 25 | 0.8 (1.76) | EHEDG, 3A, ASME-BPE | MIJ |
| G | DIN 11851 DN 40 | PN 25 | 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)

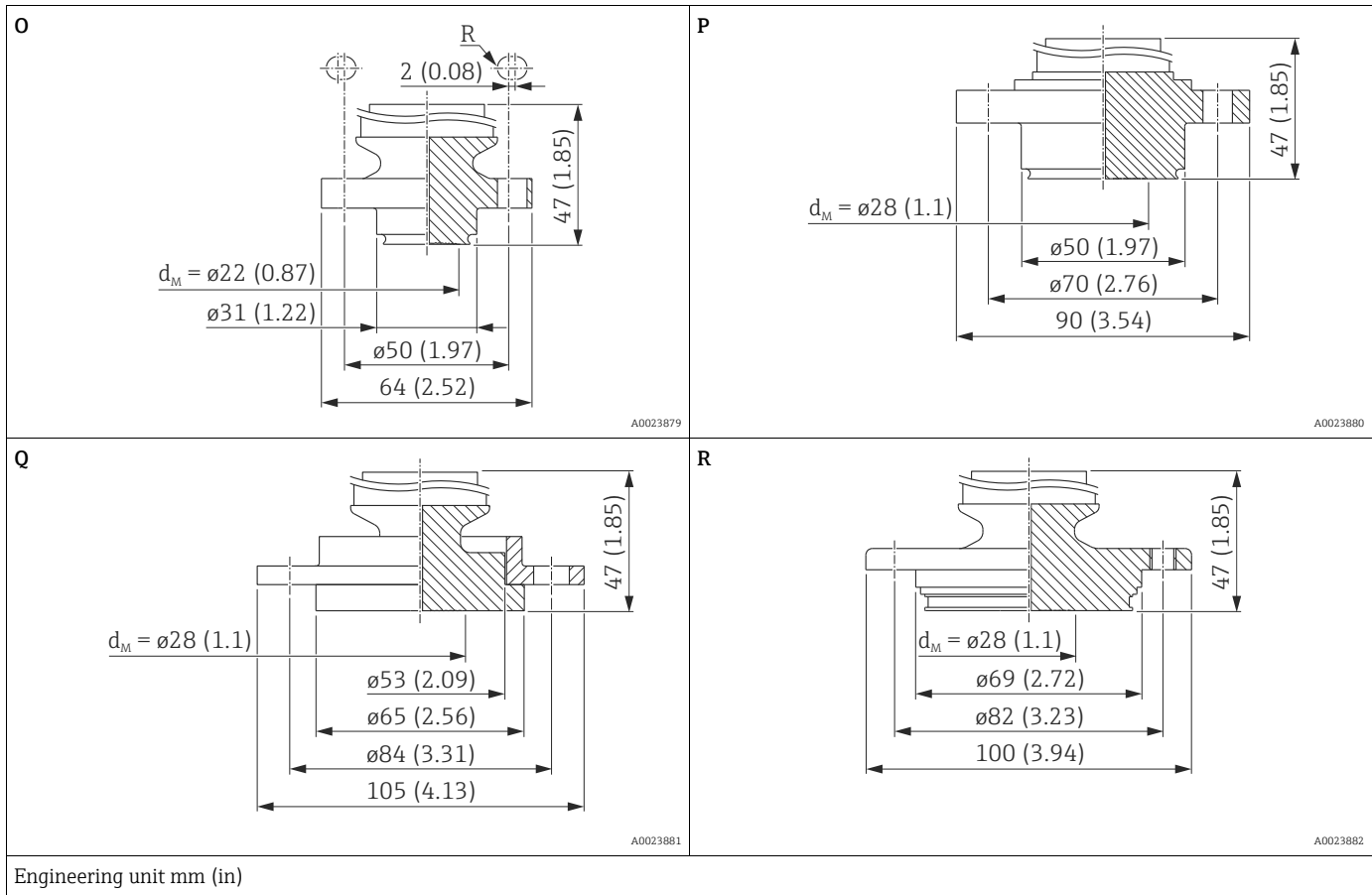
2) The roughness of the surface in contact with the medium is R_a 0.76 μ m (30 μ in). Version optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a 0.38 μ m (15 μ in), electropolished; to be ordered using order feature 570 "Service", option "HR" in the order code.

3) Product Configurator, "Process connection" ordering feature



| Item ^{1) 2)} | Designation | Nominal pressure | Weight | Approval | Option ³⁾ |
|-----------------------|---------------------------|------------------|------------|---------------------|----------------------|
| | | | kg (lbs) | | |
| I | SMS 1" | PN 25 | 0.7 (1.54) | EHEDG, 3A, ASME-BPE | T6J |
| J | SMS 1½" | PN 25 | 0.8 (1.76) | EHEDG, 3A, ASME-BPE | T7J |
| K | SMS 2" | PN 25 | 0.9 (1.98) | EHEDG, 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 μm (30 μin). Version optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a 0.38 μm (15 μin), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, "Process connection" ordering feature



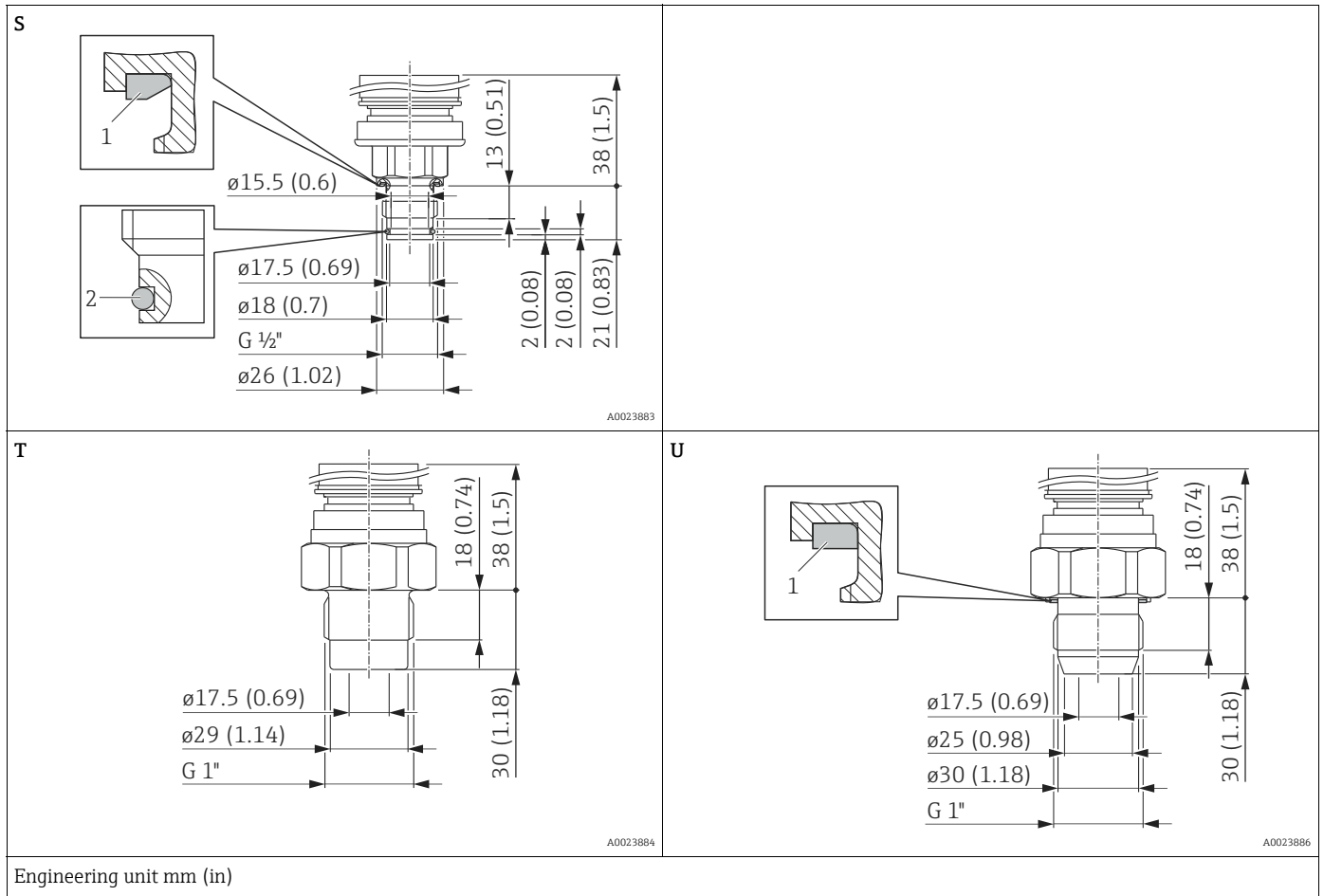
Engineering unit mm (in)

| Item ^{1) 2)} | Designation | Nominal pressure | Boltholes | | Weight kg (lbs) | Approval | Option ³⁾ |
|-----------------------|-----------------------|------------------|-----------|---------------------|--------------------|---------------------|----------------------|
| | | | Quantity | Diameter | | | |
| O | NEUMO BioControl D 25 | PN 16 | 4 | R: 3.5 mm (0.14 in) | 0.8 (1.76) | EHEDG, 3A, ASME-BPE | S1J |
| P | NEUMO BioControl D 50 | PN 16 | 4 | 9 mm (0.35 in) | 1.2 (2.65) | EHEDG, 3A, ASME-BPE | S4J |
| Q | DRD DN 50 | PN 25 | 4 | 11.5 mm (0.45 in) | 1.0 (2.21) | ASME-BPE | TIJ |
| R | APV Inline DN 50 | PN 40 | 6 | 8.6 mm (0.34 in) | 1.2 (2.65) | EHEDG, ASME-BPE | TMJ |
| | | | 2 | M8 | | | |

1) Material: AISI 316L (1.4435)

2) The roughness of the surface in contact with the medium is R_a 0.76 μ m (30 μ in). Version optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a 0.38 μ m (15 μ in), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.

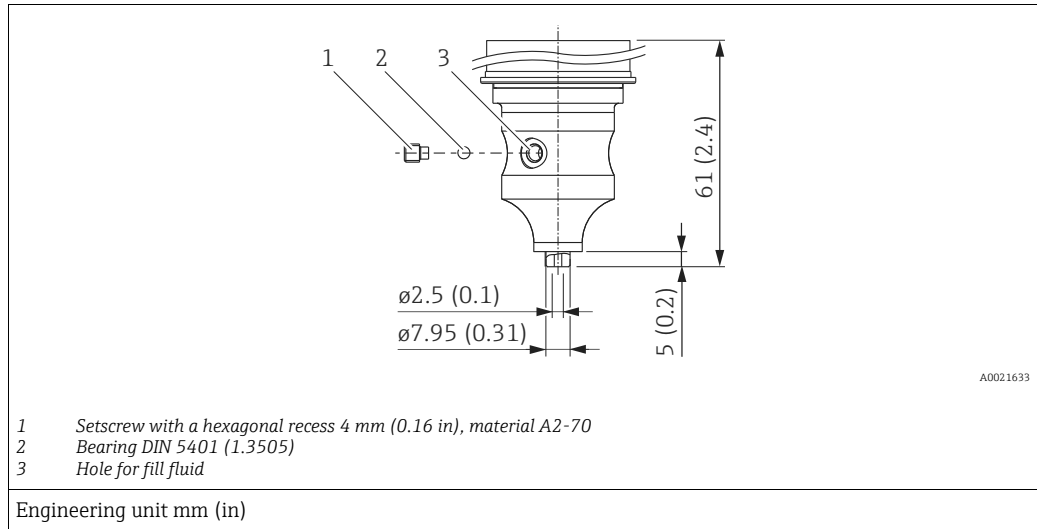
3) Product Configurator, "Process connection" ordering feature



| Item ^{1) 2)} | Designation | Seal | | Nominal pressure | Weight kg (lbs) | Approval | Option ³⁾ |
|-----------------------|----------------------|------|---|------------------|-----------------|--------------|----------------------|
| | | Item | Designation | | | | |
| S | Thread ISO228 G 1/2" | 1 | FKM molded seal pre-installed | PN 40 | 0.5 (1.1) | ASME-BPE | G0J |
| | | 2 | FKM O-ring pre-installed | | | | |
| T | Thread 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 |
| U | Thread ISO228 G1" | 1 | Metall joint FKM molded seal pre-installed | PN 100 | 0.8 (1.76) | ASME-BPE | GXJ |

- 1) Material: AISI 316L
- 2) The roughness of the surface in contact with the medium is R_a 0.76 μ m (30 μ in). Version optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a 0.38 μ m (15 μ in), electropolished; to be ordered using order feature 570 "Service", option "HK" in the order code.
- 3) Product Configurator, "Process connection" ordering feature

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



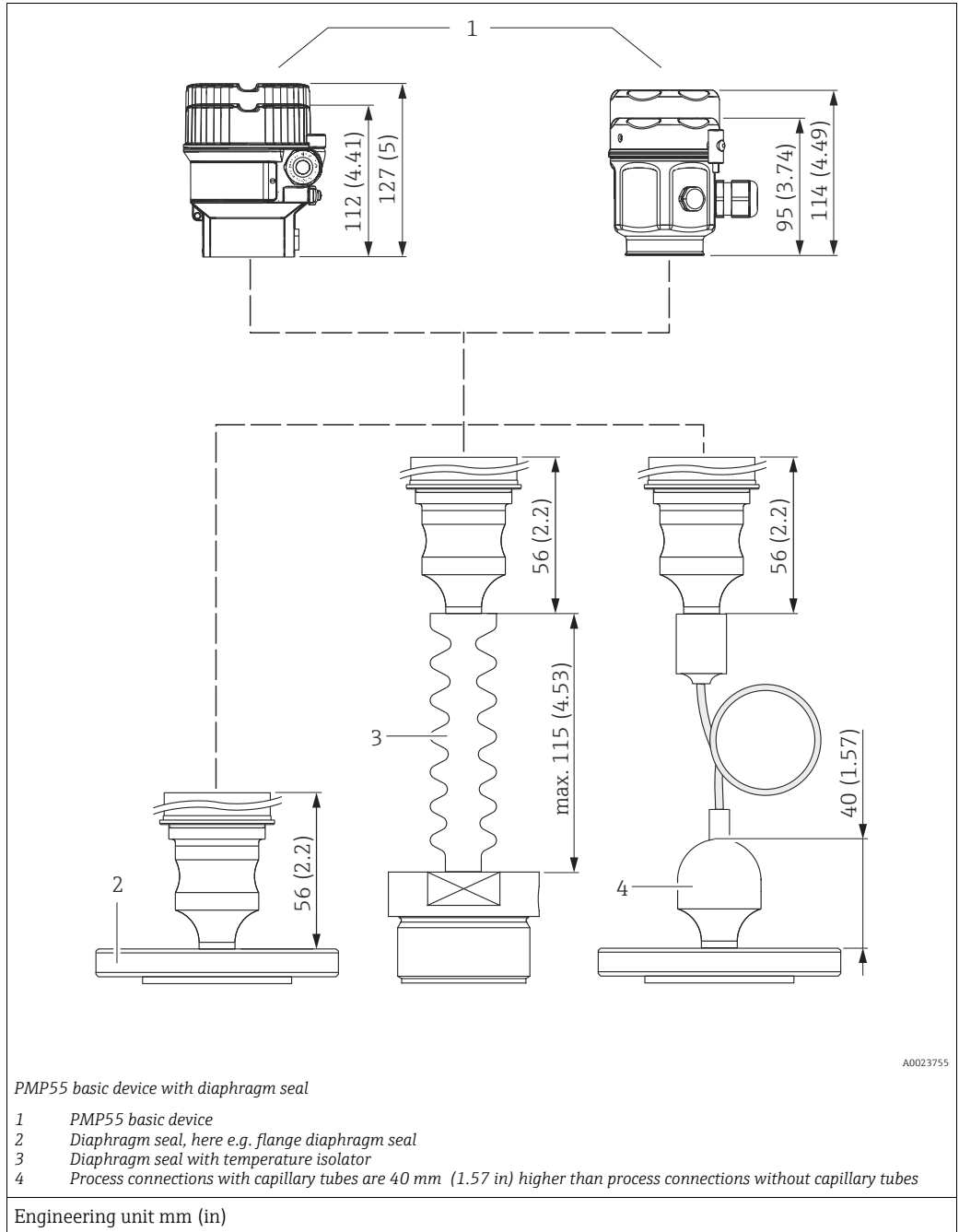
| Material | Designation | Weight kg (lbs) | Approval ¹⁾ | Option ²⁾ |
|--------------------|-----------------------------------|-----------------|------------------------|----------------------|
| AISI 316L (1.4404) | Prepared for diaphragm seal mount | 1.9 (4.19) | CRN | XSJ |

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



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

PMP55 basic device - examples



Diaphragm seal connection

| Designation | Option ¹⁾ |
|----------------------|----------------------|
| Direct | A |
| Temperature isolator | B |
| m capillary | D |
| ft capillary | E |

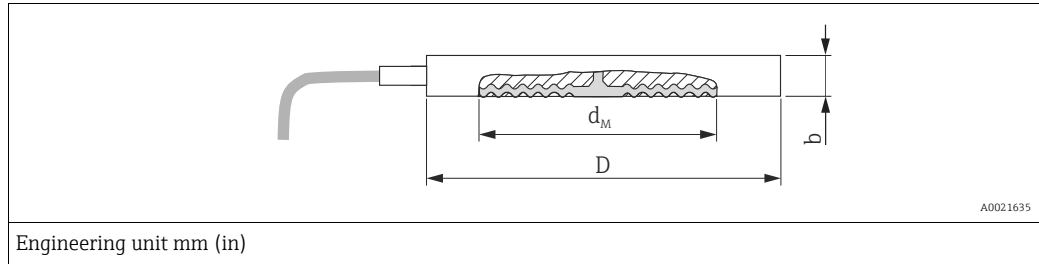
1) Product Configurator, "Diaphragm seal connection" ordering feature

PMP55: process connections with flush-mounted process isolating diaphragm



- The weights of the diaphragm seals are given in the tables. See → 41 ff for the weight of the housing.
- 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.
- When using high-temperature oils the design can deviate significantly.
- Observe the information in the "Planning instructions for diaphragm seal systems" ordering feature → 99 ff.
- For further information please contact your local Endress+Hauser Sales Center.

Diaphragm seal cell structure (Pancake)



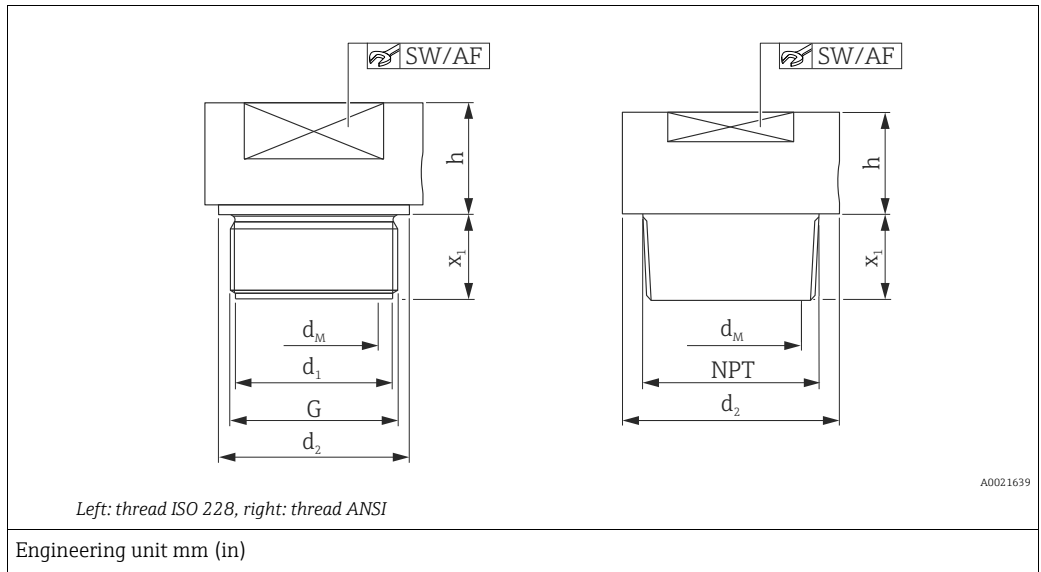
| Flange | | | | | Diaphragm seal | | Approval ¹⁾ | Option ²⁾ |
|-----------|------------------|--------------------------------|--------------------|----------------|--|-------------------------------|------------------------|----------------------|
| Material | Nominal diameter | Nominal pressure ³⁾ | Max. Diameter D | Thickness b | Max. diameter of the process isolating diaphragm d _M | Weight of two diaphragm seals | | |
| | | | [mm] | [mm] | [mm] | [kg (lbs)] | | |
| AISI 316L | DN 50 | PN 16-400 | 102 | 20 | 59 | 2.6 (5.73) | - | UIJ |
| | DN 80 | PN 16-400 | 138 | 20 | 89 | 4.6 (10.14) | - | UJJ |
| | DN 100 | PN 16-400 | 162 | 20 | 89 | 6.2 (13.67) | - | UKJ |
| | [in] | [lb/sq.in] | [in (mm)] | [in (mm)] | [in (mm)] | [kg] | | |
| | 2 | 150-2500 | 4.01 (102) | 0.79 (20) | 2.32 (59) | 2.6 (5.73) | CRN | ULJ |
| | 3 | 150-2500 | 5.35 (136) | 0.79 (20) | 3.50 (89) | 4.6 (10.14) | CRN | UMJ |
| | 4 | 150-2500 | 6.22 (158) | 0.79 (20) | 3.50 (89) | 6.2 (13.67) | CRN | URJ |

- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature
- 3) The specified nominal pressure applies to the diaphragm seal. The maximum pressure for the measuring device is dependent on the lowest-rated element, with regard to pressure, of the selected components (see also → 40, "Pressure specifications" ordering feature).



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

PMP55: process connections with flush-mounted process isolating diaphragm Thread ISO 228 and ANSI



| Threaded connection | | | | | | | Diaphragm seal | | | Approval ¹⁾ | Option ²⁾ |
|---------------------|-----------|------------------------|------------------------------------|------------------------------------|---|-----------------------|---|---------------------|----------------------|------------------------|----------------------|
| Material | Thread | Nominal pressure PN | Diameter d ₁ [mm] | Diameter d ₂ [mm] | Screw-in length x ₁ [mm] | Across flats SW/AF | Max. diaphragm diameter d _M [mm] | Height h [mm] | Weight [kg (lbs)] | | |
| AISI 316L | G 1" A | 400 | 30 | 39 | 21 ³⁾ | 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 | - | 48 | 28 | 41 | 24 | 37 | 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 | | | | | | | | | 1.0 (2.21) | CRN | U7C |
| AISI 316L | 2" MNPT | 400 | - | 78 | 30 | 65 | 38 | 35 | 1.8 (3.97) | CRN | U8J |
| Alloy C276 | | | | | | | | | 2.0 (4.41) | CRN | U8C |

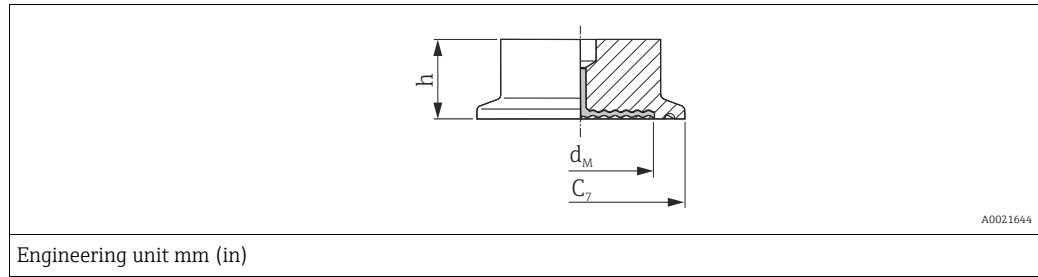
- 1) CSA approval: Product Configurator, "Approval" ordering feature
- 2) Product Configurator, "Process connection" ordering feature
- 3) 28 mm (1.1 in) in conjunction with high-temperature oil



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

PMP55: process connections with flush-mounted process isolating diaphragm

Tri-Clamp ISO 2852



| Material ¹⁾ | Nominal diameter ISO 2852 | Nominal diameter DIN 32676 | Nominal diameter [in] | Diameter C ₇ [mm] | Max. diaphragm diameter | | Height h [mm] | Weight [kg (lbs)] | Approval ²⁾ | Option ³⁾ |
|------------------------|---------------------------|----------------------------|-----------------------|------------------------------|------------------------------|--|---------------|-------------------|--------------------------|----------------------|
| | | | | | Standard d _M [mm] | With TempC diaphragm d _M [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 ^{4) 5)} |
| | ND 40 / 51 | DN 50 | 2 | 64 | 48 | 41 | 30 | 1.1 (2.43) | EHEDG, 3A, CRN, ASME-BPE | TDJ ^{4) 5)} |
| | ND 63.5 | - | 2 ½ | 77.5 | 61 | 61 | 30 | 0.7 (1.54) | EHEDG, 3A, ASME-BPE | TEJ ⁶⁾ |
| | ND 76.1 | - | 3 | 91 | 73 | 61 | 30 | 1.2 (2.65) | EHEDG, 3A, CRN, ASME-BPE | TFJ ⁵⁾ |

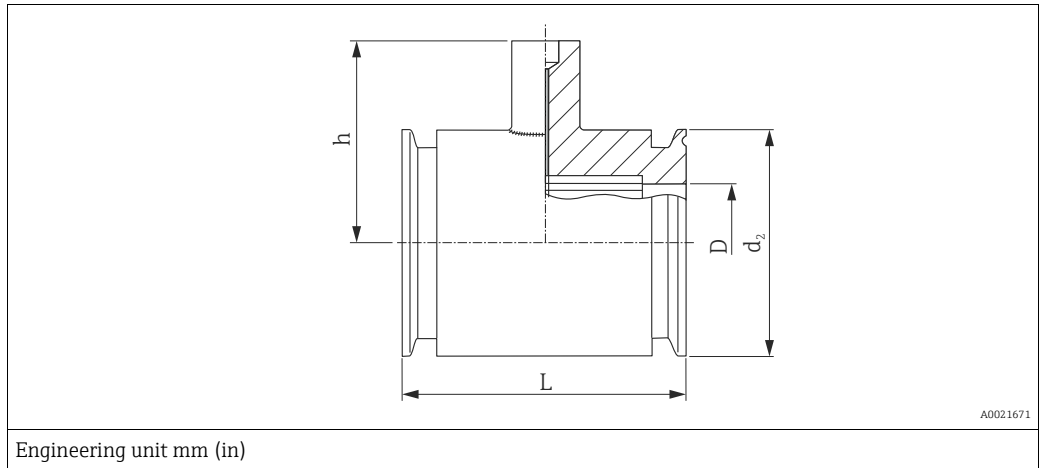
- 1) Surface roughness of the surfaces in contact with the medium $R_a \leq 0.76 \mu\text{m}$ (29.9 μin) as standard. Lower surface roughness available on request.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) Process connections without TempC diaphragm: diaphragm seal versions optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces $R_a \leq 0.38 \mu\text{m}$ (0.15 μin), electropolished; to be ordered using feature 110 "Additional options", option P in the order code.
- 5) Alternatively available with TempC diaphragm.
- 6) With TempC diaphragm



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

PMP55: process connections with flush-mounted process isolating diaphragm

Pipe diaphragm seal Tri-Clamp ISO 2852



| Material ¹⁾ | Nominal diameter ISO 2852 | Nominal diameter | Nominal pressure | Diameter | Diameter | Height | Face-to-face length | Weight | Approval ²⁾ | Option ³⁾ |
|------------------------|---------------------------|------------------|------------------|----------|---------------------|--------|---------------------|------------|------------------------|----------------------|
| | | [in] | | D [in] | d ₂ [mm] | h [mm] | L [mm] | [kg (lbs)] | | |
| AISI 316L | DN 25 | 1 | PN 40 | 22.5 | 50.5 | 67 | 126 | 1.7 (3.75) | 3A, CRN | SBJ |
| | DN 38 | 1 ½ | PN 40 | 35.5 | 50.5 | 67 | 126 | 1.0 (2.21) | 3A, CRN | SCJ ⁴⁾ |
| | DN 51 | 2 | PN 40 | 48.6 | 64 | 79 | 100 | 1.7 (3.75) | 3A, CRN | SDJ ⁴⁾ |
| | DN 10 | ¾ | PN 40 | 10.3 | 25 | 42 | 138.5 | 0.6 (1.32) | 3A, CRN | SIJ |
| | DN 16 | ¾ | PN 40 | 15.7 | 25 | 67 | 116 | 0.9 (1.98) | 3A | SJJ |

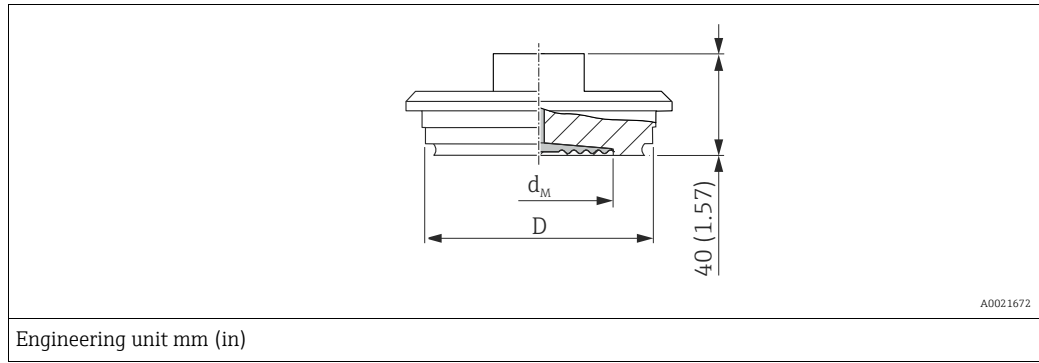
- 1) Surface roughness of the surfaces in contact with the medium $R_a \leq 0.8 \mu\text{m}$ (31.5 μin) as standard.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) incl. 3.1 and pressure test according to Pressure Equipment Directive, Category II



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

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

Varivent for pipes



| Material ¹⁾ | Designation | Nominal pressure | Diameter | Max. diaphragm diameter | | Weight | Approval | Option ²⁾ |
|------------------------|---------------------------------|------------------|----------|-------------------------|----------------------|------------|---------------------|----------------------|
| | | | | Standard | With TempC diaphragm | | | |
| | | | D | d _M [mm] | d _M [mm] | [kg (lbs)] | | |
| AISI 316L | Type F for tubes DN 25 - DN 32 | PN 40 | 71 | 34 | 36 | 0.4 (0.88) | EHEDG, 3A, ASME-BPE | TQJ ³⁾ |
| AISI 316L | Type N for tubes DN 40 - DN 162 | PN 40 | 68 | 58 | 61 | 0.8 (1.76) | EHEDG, 3A, ASME-BPE | TRJ ⁴⁾⁵⁾ |

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

2) Product Configurator, "Process connection" ordering feature

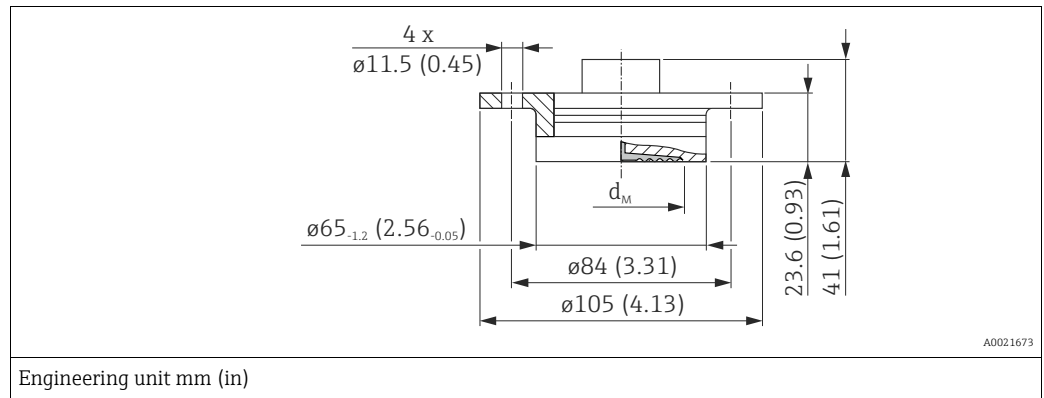
3) With TempC diaphragm

4) Diaphragm seal versions optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces $R_a \leq 0.38 \mu\text{m}$ (15 μin), electropolished; ordering information: Product Configurator "Service" ordering feature, option HK. In combination with the option "electropolished", the wetted parts of the Varivent connection are made of 316L (1.4435) with a delta-ferrite content of < 1% (welding seams excluded).

5) Alternatively available with TempC diaphragm.

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

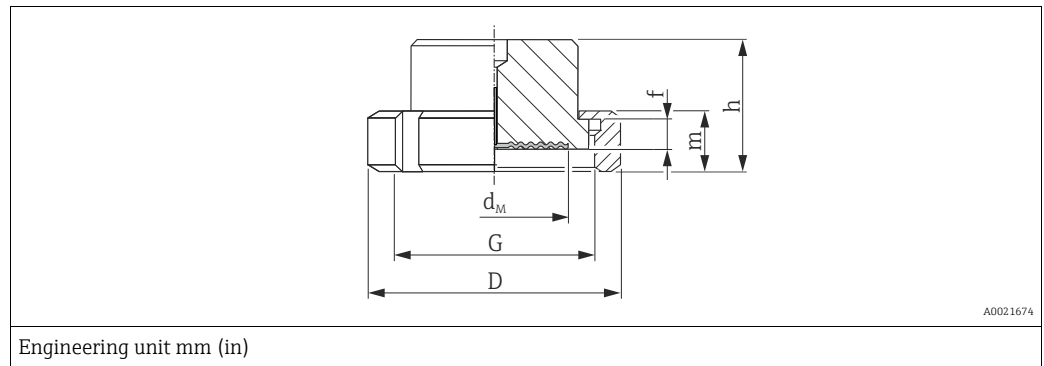
DRD DN50 (65 mm)



| Material ¹⁾ | Nominal pressure | Max. diaphragm diameter | | Weight | Option ²⁾ |
|------------------------|------------------|-------------------------|----------------------|-------------|----------------------|
| | | Standard | With TempC diaphragm | | |
| | | d _M [mm] | d _M [mm] | [kg (lbs)] | |
| AISI 316L | PN 25 | 50 | 48 | 0.75 (1.65) | TIJ ³⁾ |

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

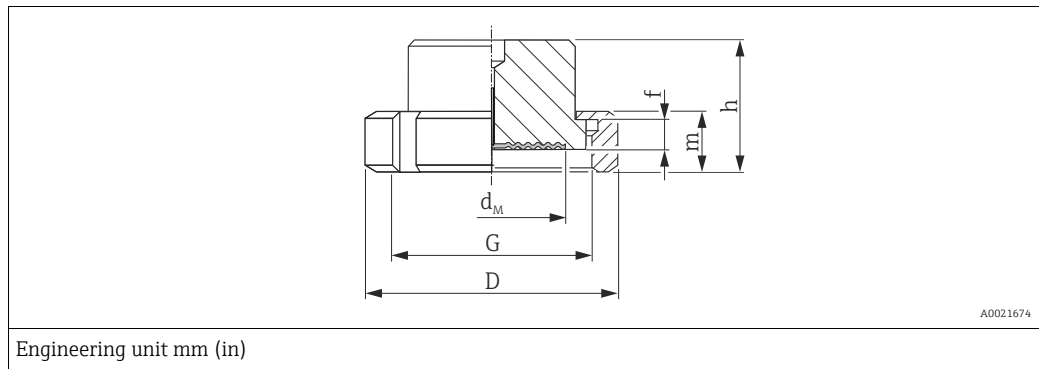
SMS nozzles with coupling nut



| Material ¹⁾ | Nominal diameter | Nominal pressure | Diameter | Adapter height | Thread | Height | Height | Max. diaphragm diameter | Weight | Approval | Option ²⁾ |
|------------------------|------------------|------------------|----------|----------------|-------------|--------|--------|-------------------------|-------------|---------------------|----------------------|
| | [in] | [bar] | D | f | G | m | h | d _M | [kg (lbs)] | | |
| AISI 316L | 1 | PN 25 | 54 | 3.5 | Rd 40 - 1/6 | 20 | 42.5 | 24 | 0.25 (0.55) | EHEDG, 3A, ASME-BPE | T6J |
| | 1 ½ | PN 25 | 74 | 4 | Rd 60 - 1/6 | 25 | 57 | 36 | 0.65 (1.43) | EHEDG, 3A, ASME-BPE | T7J ³⁾ |
| | 2 | PN 25 | 84 | 4 | Rd 70 - 1/6 | 26 | 62 | 48 | 1.05 (2.32) | EHEDG, 3A, ASME-BPE | TXJ ³⁾ |

- 1) Surface roughness of the surfaces in contact with the medium $R_a \leq 0.76 \mu\text{m}$ (29.9 μin) as standard.
- 2) Product Configurator, "Process connection" ordering feature
- 3) With TempC diaphragm

APV-RJT nozzles with coupling nut

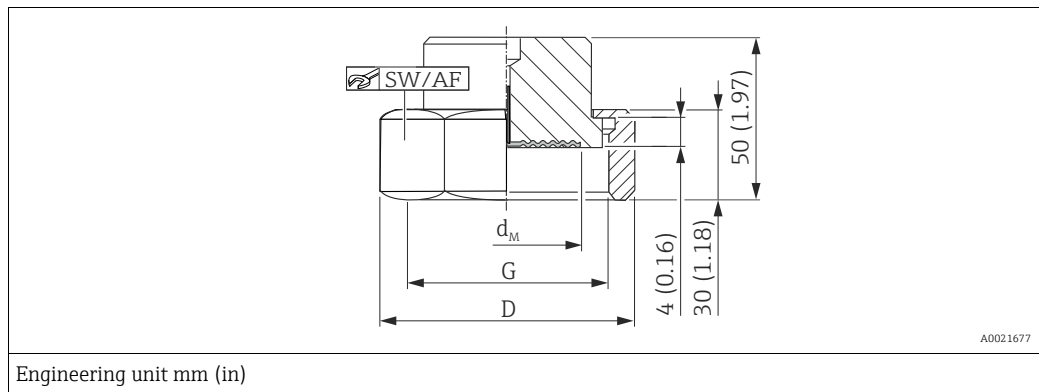


| Material ¹⁾ | Nominal diameter | Nominal pressure | Diameter | Adapter height | Thread | Height | Height | Max. diaphragm diameter | Weight | Option ²⁾ |
|------------------------|------------------|------------------|----------|----------------|----------------|--------|--------|-------------------------|-------------|----------------------|
| | [in] | [bar] | [mm] | f | G | m | h | d _M | [kg (lbs)] | |
| 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 $R_a \leq 0.8 \mu\text{m}$ (31.5 μin) as standard.

2) Product Configurator, "Process connection" ordering feature

APV-ISS nozzles with coupling nut



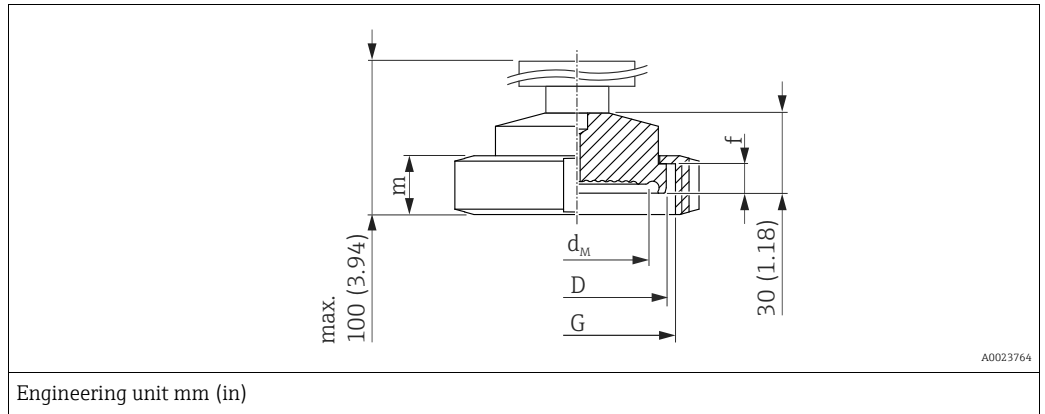
| Material ¹⁾ | Nominal diameter | Nominal pressure | Diameter | Thread | Across flats | Max. diaphragm diameter | Weight | Option ²⁾ |
|------------------------|------------------|------------------|----------|-------------|--------------|-------------------------|------------|----------------------|
| | [in] | [bar] | D | G | AF | d _M | [kg (lbs)] | |
| 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 $R_a \leq 0.8 \mu\text{m}$ (31.5 μin) as standard.

2) Product Configurator, "Process connection" ordering feature

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

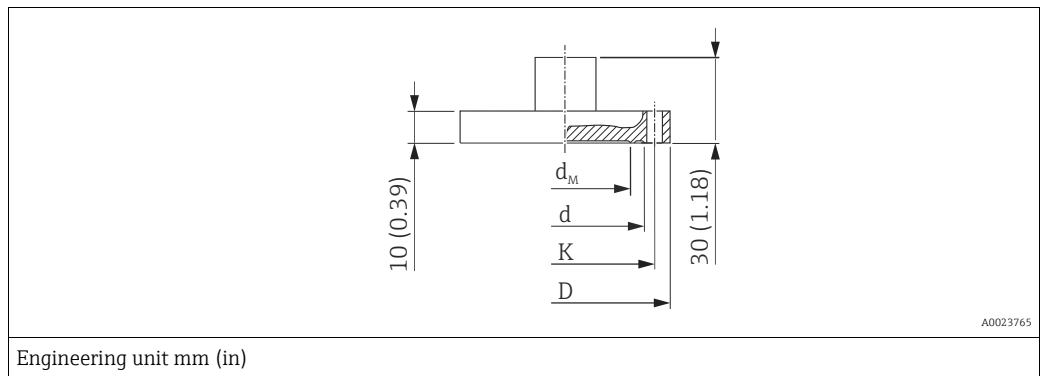
Aseptic screwed union, nozzle, DIN 11864-1 Form A; pipe DIN 11866-A



| Material ¹⁾ | Taper adapter | | | | Slotted nut | | Diaphragm seal | | Approval | Option ²⁾ |
|------------------------|------------------|------------------|---------------|---------------------|--------------|-------------|---|-----------------------|---------------------|----------------------|
| | Nominal diameter | Nominal pressure | Diameter D | Adapter height f | Thread G | Height m | Max. diaphragm diameter d _M | Weight Diaphragm seal | | |
| | | | [mm] | [mm] | | [mm] | [mm] | [kg (lbs)] | | |
| 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 $R_a \leq 0.8 \mu\text{m}$ (31.5 μin) as standard.
- 2) Product Configurator, "Process connection" ordering feature

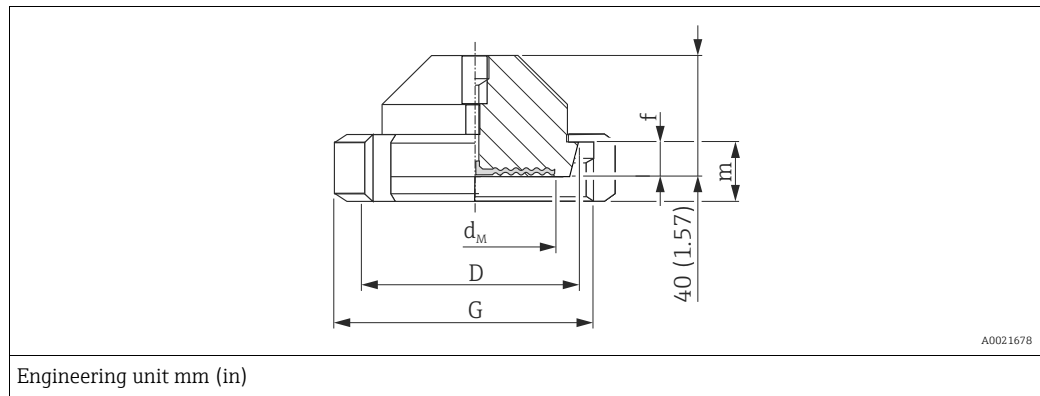
Aseptic flange connection, DIN 11864-2 Form A; pipe DIN 11866-1



| Material ¹⁾ | Collar flange | | | | | Diaphragm seal | | Approval | Option ²⁾ |
|------------------------|------------------|------------------|---------------------------|--------------------|---------------------|---|-----------------------|---------------------|----------------------|
| | Nominal diameter | Nominal pressure | Hole circle diameter K | Seal diameter d | Outer diameter D | Max. diaphragm diameter d _M | Weight Diaphragm seal | | |
| | | | [mm] | [mm] | [mm] | [mm] | [kg] | | |
| 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) | EHEDG, 3A, ASME-BPE | NZJ |

- 1) Surface roughness of the surfaces in contact with the medium $R_a \leq 0.8 \mu\text{m}$ (31.5 μin) as standard.
- 2) Product Configurator, "Process connection" ordering feature

Taper adapter with coupling nut, DIN 11851



| Material ¹⁾ | Taper adapter | | | | Slotted nut | | Diaphragm seal | | | Approval | Option ²⁾ |
|------------------------|------------------|------------------|----------|----------------|---------------|--------|-------------------------|----------------------|-------------|---------------------|----------------------|
| | Nominal diameter | Nominal pressure | Diameter | Adapter height | Thread | Height | Max. diaphragm diameter | | Weight | | |
| | | | D | f | G | m | Standard | With TempC diaphragm | | | |
| | | | [mm] | [mm] | | [mm] | d _M [mm] | d _M [mm] | [kg (lbs)] | | |
| 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 ³⁾ |
| | DN 40 | PN 40 | 56 | 10 | Rd 65 x 1/6" | 21 | 38 | 36 | 0.45 (0.99) | EHEDG, 3A, ASME-BPE | MZJ ³⁾ |
| | DN 50 | PN 25 | 68.5 | 11 | Rd 78 x 1/6" | 19 | 52 | 48 | 1.1 (2.43) | EHEDG, 3A, ASME-BPE | MRJ ⁴⁾ |
| | DN 65 | PN 25 | 86 | 12 | Rd 95 x 1/6" | 21 | 66 | 61 | 2.0 (4.41) | EHEDG, 3A, ASME-BPE | MSJ ⁴⁾ |
| | DN 80 | PN 25 | 100 | 12 | Rd 110 x 1/4" | 26 | 81 | 61 | 2.55 (5.62) | EHEDG, 3A, ASME-BPE | MTJ ⁴⁾ |

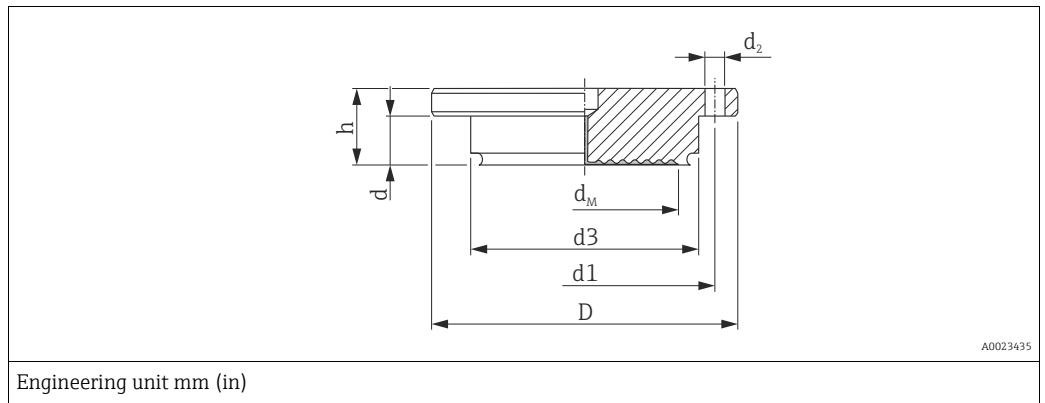
1) Surface roughness of the surfaces in contact with the medium $R_a \leq 0.76 \mu\text{m}$ (29.9 μin) as standard.

2) Product Configurator, "Process connection" ordering feature

3) With TempC diaphragm

4) Alternatively available with TempC diaphragm.

NEUMO BioControl

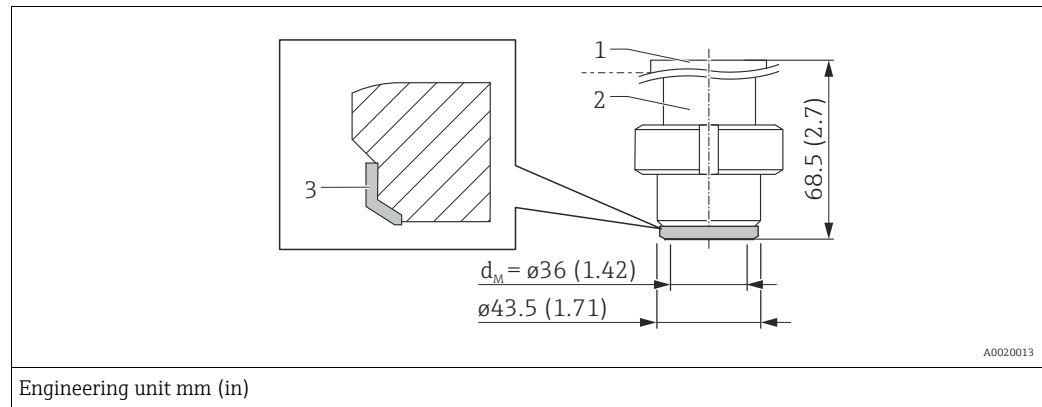


| Material ¹⁾ | Threaded adapter | | | | | | | | Diaphragm seal | | | Approval | Option ²⁾ |
|------------------------|------------------|------------------|------|------|----------------|----------------|----------------|----------|-------------------------|---------------------|------------|---------------------|----------------------|
| | Nominal diameter | Nominal pressure | D | d | d ₁ | d ₂ | d ₃ | Height h | Max. diaphragm diameter | | Weight | | |
| | | | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | d _M [mm] | d _M [mm] | [kg] | | |
| AISI 316L | DN 50 | PN 16 | 90 | 17 | 70 | 4 x Ø 9 | 50 | 27 | 40 | 41 | 1.1 (2.43) | 3A, ASME-BPE | S4J ³⁾ |
| | DN 80 | PN 16 | 140 | 25 | 115 | 4 x Ø 11 | 87.4 | 37 | - | 61 | 2.6 (5.73) | EHEDG, 3A, ASME-BPE | S6J ³⁾ |

- 1) Surface roughness of the surfaces in contact with the medium $R_a \leq 0.76 \mu\text{m}$ (29.9 μin) as standard.
- 2) Product Configurator, "Process connection" ordering feature
- 3) With TempC diaphragm

Temperature application range
 -10 °C to +200 °C (14 °F to +392 °F)

Universal adapter

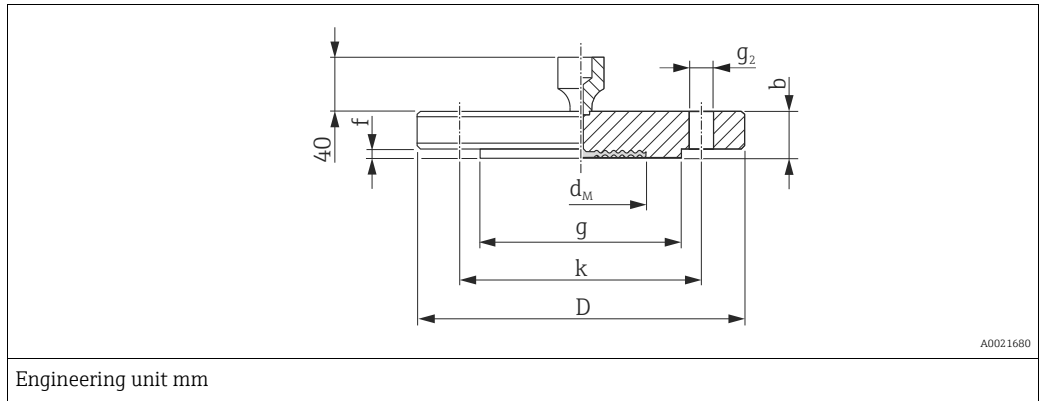


| Designation | Nominal pressure | Material ¹⁾²⁾ | Weight [kg/lbs] | Approval ³⁾ | Option ⁴⁾ |
|--|------------------|---|-----------------|------------------------|----------------------|
| Universal adapter with pre-installed silicone ⁵⁾ molded seal (item 3) | PN 10 | <ul style="list-style-type: none"> ■ Item 1: top section AISI 316L (1.4404) ■ Item 2: bottom section AISI 316L (1.4435) | 0.8 (1.76) | EHEDG, 3A, ASME-BPE | UPJ ⁶⁾ |

- 1) The roughness of the surface in contact with the medium is R_a 0.76 μm (30 μin). Version optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a 0.38 μm (15 μin), electropolished; ordering information: Product Configurator, "Service" ordering feature, option "HK".
- 2) Endress+Hauser supplies these slotted nuts in stainless steel AISI 304 (1.4301) or in AISI 304L (1.4307).
- 3) EHEDG or 3A approval only with approved process connection.
- 4) Product Configurator, "Process connection" ordering feature
- 5) Molded seal FDA 21CFR177.2600/USP Class VI-70C, EHEDG, 3A, spare part no.: 52023572
- 6) Alternatively available with TempC diaphragm.

PMP55: process connections with flush-mounted process isolating diaphragm

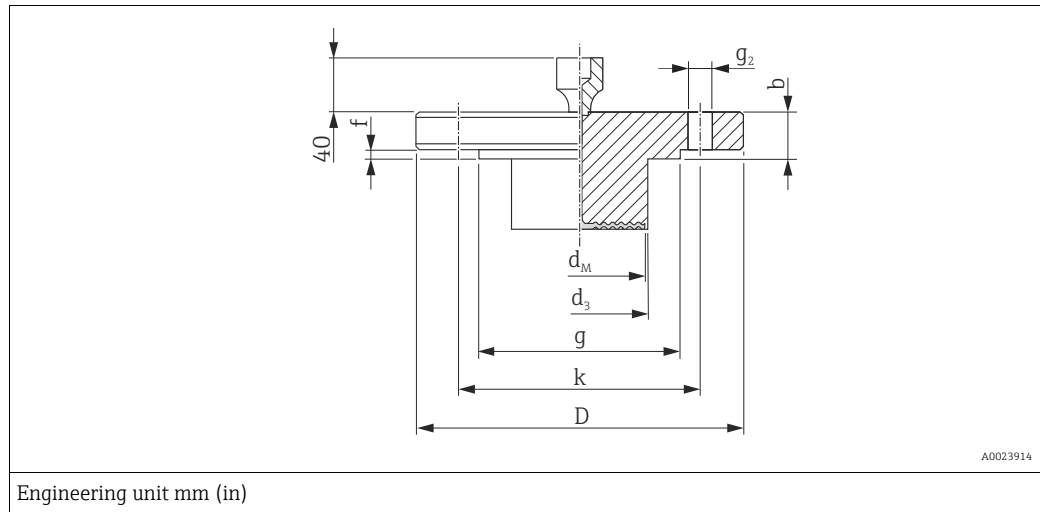
EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527 and DIN 2501-1



| Flanges ^{1) 2)} | | | | | | | | Boltholes | | | Diaphragm seal | | Option ³⁾ |
|--------------------------|------------------|------------------|---------------------|---------------|---------------------|-------------|-----|-----------|----------------------------|---------------------|---|--------------|----------------------|
| Material | Nominal diameter | Nominal pressure | Shape ⁴⁾ | Diameter D | Thick- ness b | Raised face | | Quantity | Diameter g ₂ | Hole circle k | Max. diaphragm diameter d _M | Weight | |
| | | | | | | g | f | | | | | | |
| AISI 316L | DN 25 | 10-40 | B1 (D) | 115 | 18 | 68 | 3 | 4 | 14 | 85 | 32 | 2.1 (4.63) | CNJ |
| | 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 |
| | 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 |
| | 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) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards) made of Alloy C, Monel or tantalum is Ra <0.8 μm (31.5 μin). Lower surface roughness available on request.
- 2) In the case of process isolating diaphragms made of Alloy C, Monel or tantalum, the flange raised face is made of the same material as the process isolating diaphragm.
- 3) Product Configurator, "Process connection" ordering feature
- 4) Designation as per DIN 2527 in brackets

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



| Flanges ¹⁾ | | | | | | | | Boltholes | | | Diaphragm seal | | Option ²⁾ |
|-----------------------|------------------|------------------|---------------------|----------|------------|-------------|------|-----------|----------------|-------------|-------------------------|---------------|----------------------|
| Material | Nominal diameter | Nominal pressure | Shape ³⁾ | Diameter | Thickn ess | Raised face | | Quant ity | Diameter | Hole circle | Max. diaphragm diameter | Weight | |
| | | | | D | b | g | f | | g ₂ | k | d _M | | |
| | | | | [mm] | [mm] | [mm] | [mm] | | [mm] | [mm] | [mm] | [kg (lbs)] | |
| AISI 316L | DN 50 | PN 10-40 | B1 (D) | 165 | 20 | 102 | 3 | 4 | 18 | 125 | 47 | ⁴⁾ | FDJ ⁴⁾ |
| | DN 80 | PN 10-40 | B1 (D) | 200 | 24 | 138 | 3.5 | 8 | 18 | 160 | 72 | ⁴⁾ | FEJ ⁴⁾ |

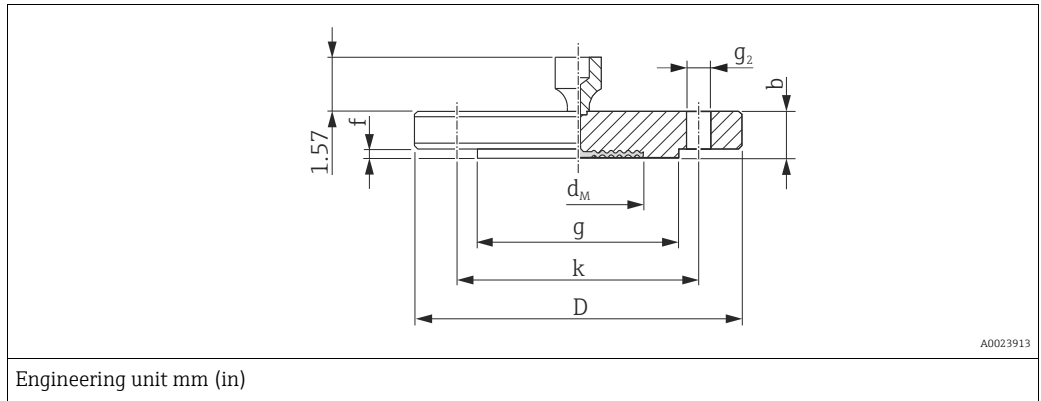
- 1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards) made of Alloy C, Monel or tantalum is Ra < 0.8 μm (31.5 μin). Diaphragm seal versions optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a ≤ 0.38 μm (15 μin), electropolished; ordering information: Product Configurator "Service" ordering feature, option HK.
- 2) Product Configurator, "Process connection" ordering feature
- 3) Designation as per DIN 2527 in brackets
- 4) Available with 50 mm (1.97 in), 100 mm (3.94 in) or 200 mm (7.87 in) barrel (extended diaphragm seal), for barrel (extended diaphragm seal) diameter and weight see the following table

| Option ¹⁾ | Nominal diameter | Nominal pressure | Barrel (extended diaphragm seal) length (L) | Barrel (extended diaphragm seal) diameter d ₃ | Weight |
|----------------------|------------------|------------------|---|--|--------------------------------------|
| | | | [mm] | [mm] | [kg (lbs)] |
| FDJ | DN 50 | PN 10-40 | 50 / 100 / 200 | 48.3 | 3.2 (7.1) / 3.8 (8.4) / 4.4 (9.7) |
| FEJ | DN 80 | PN 10-40 | 50 / 100 / 200 | 76 | 6.2 (13.7) / 6.7 (14.8) / 7.8 (17.2) |

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

PMP55: process connections with flush-mounted process isolating diaphragm

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



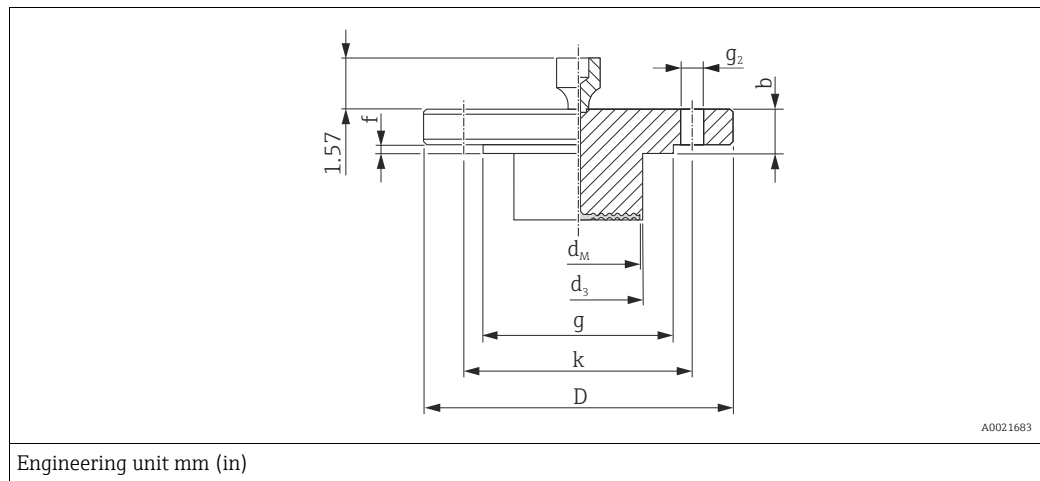
| Material ¹⁾ | Flange ^{2) 3)} | | | | | | Boltholes | | | Diaphragm seal | | Approval ⁴⁾ | Option ⁵⁾ |
|------------------------|-------------------------|-------------|---------------|----------------|-------------|------|-----------|----------------------------|------------------|---|--------------|------------------------|----------------------|
| | Nominal diameter | Class | Diameter D | Thickness b | Raised face | | Quantity | Diameter g ₂ | Hole circle k | Max. diaphragm diameter d _M | Weight | | |
| | | | | | g | f | | | | | | | |
| | [in] | [lb./sq.in] | [in] | [in] | [in] | [in] | | [in] | [in] | [in] | [kg (lbs)] | | |
| AISI 316/ 316L | 1 | 150 | 4.25 | 0.56 | 2 | 0.08 | 4 | 0.62 | 3.12 | 1.26 | 1.2 (2.65) | CRN | ACJ |
| | 1 | 300 | 4.88 | 0.69 | 2 | 0.08 | 4 | 0.75 | 3.5 | 1.26 | 1.3 (2.87) | CRN | ANJ |
| | 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 |
| | 2 | 300 | 6.5 | 0.88 | 3.62 | 0.06 | 8 | 0.75 | 5 | 2.32 | 3.4 (7.5) | CRN | ARJ |
| | 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 | 3.50 | 5.1 (11.25) | CRN | AGJ |
| | 3 | 300 | 8.25 | 1.12 | 5 | 0.06 | 8 | 0.75 | 6 | 3.50 | 7.0 (15.44) | CRN | ASJ |
| | 4 | 150 | 9 | 0.94 | 6.19 | 0.06 | 8 | 0.75 | 7.5 | 3.50 | 7.2 (15.88) | CRN | AHJ |
| | 4 | 300 | 10 | 1.25 | 6.19 | 0.06 | 8 | 0.88 | 7.88 | 3.50 | 11.7 (25.8) | CRN | ATJ |

- 1) 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 C, Monel or tantalum is Ra <0.8 µm (31.5 µin). Lower surface roughness available on request.
- 3) In the case of process isolating diaphragms made of Alloy C, Monel or tantalum, the flange raised face is made of the same material as the process isolating diaphragm.
- 4) CSA approval: Product Configurator, "Approval" ordering feature
- 5) Product Configurator, "Process connection" ordering feature



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

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



| Flange ¹⁾ | | | | | | | Boltholes | | | Diaphragm seal | | Approval ²⁾ | Option ³⁾ |
|------------------------|------------------|-------------|----------|-----------|-------------|------|-----------|----------------|-------------|-------------------------|---------------|------------------------|----------------------|
| Material ⁴⁾ | Nominal diameter | Class | Diameter | Thickness | Raised face | | Quantity | Diameter | Hole circle | Max. diaphragm diameter | Weight | | |
| | [in] | [lb./sq.in] | D | b | g | f | | g ₂ | k | d _M | [kg (lbs)] | | |
| AISI 316/ 316L | 2 | 150 | 6 | 0.75 | 3.62 | 0.06 | 4 | 0.75 | 4.75 | 1.85 | ⁵⁾ | CRN | FMJ ⁵⁾ |
| | 3 | 150 | 7.5 | 0.94 | 5 | 0.06 | 4 | 0.75 | 6 | 2.83 | ⁵⁾ | CRN | FNJ ⁵⁾ |
| | 3 | 300 | 8.25 | 1.12 | 5 | 0.06 | 8 | 0.88 | 6.62 | 2.83 | ⁵⁾ | CRN | FWJ ⁵⁾ |
| | 4 | 150 | 9 | 0.94 | 6.19 | 0.06 | 8 | 0.75 | 7.5 | 3.50 | ⁵⁾ | CRN | FOJ ⁵⁾ |
| | 4 | 300 | 10 | 1.25 | 6.19 | 0.06 | 8 | 0.88 | 7.88 | 3.50 | ⁵⁾ | CRN | FXJ ⁵⁾ |

- 1) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards) made of Alloy C, Monel or tantalum is Ra 0.8 µm (31.5 µin). Diaphragm seal versions optionally in conformity with ASME-BPE for use in biochemical processes, wetted surfaces R_a ≤ 0.38 µm (15 µin), electropolished; ordering information: Product Configurator "Service" ordering feature, option HK.
- 2) CSA approval: Product Configurator, "Approval" ordering feature
- 3) Product Configurator, "Process connection" ordering feature
- 4) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)
- 5) Available with 2", 4", 6" and 8" barrel (extended diaphragm seal), for barrel (extended diaphragm seal) diameter and weight see the following table

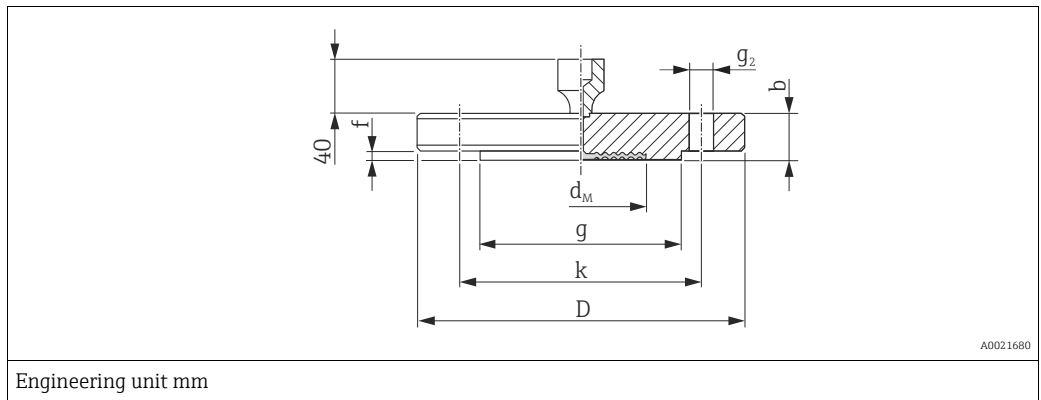


Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. These devices are fitted with a separate plate bearing the registration number OF10525.5C.

| Option ¹⁾ | Nominal diameter | Class | Barrel (extended diaphragm seal) length (L) | Barrel (extended diaphragm seal) diameter d ₃ | Weight |
|----------------------|------------------|-------------|--|--|---|
| | [in] | [lb./sq.in] | in (mm) | in (mm) | [kg (lbs)] |
| FMJ | 2 | 150 | 2 (50.8) / 4 (101.6) / 6 (152.4) / 8 (203.2) | 1.9 (48.3) | 3.0 (6.6) / 3.4 (7.5) / 3.9 (8.6) / 4.4 (9.7) |
| FNJ | 3 | 150 | 2 (50.8) / 4 (101.6) / 6 (152.4) / 8 (203.2) | 2.99 (76) | 6.0 (13.2) / 6.6 (14.5) / 7.1 (15.7) / 7.8 (17.2) |
| FWJ | 3 | 300 | 2 (50.8) / 4 (101.6) / 6 (152.4) / 8 (203.2) | 2.99 (76) | 7.9 (17.4) / 8.5 (18.7) / 9.0 (19.9) / 9.6 (21.2) |
| FOJ | 4 | 150 | 2 (50.8) / 4 (101.6) / 6 (152.4) / 8 (203.2) | 3.7 (94) | 8.6 (19) / 9.9 (21.8) / 11.2 (24.7) / 12.4 (27.3) |
| FXJ | 4 | 300 | 2 (50.8) / 4 (101.6) / 6 (152.4) / 8 (203.2) | 3.7 (94) | 13.1 (28.9) / 14.4 (31.6) / 15.7 (34.6) / 16.9 (37.3) |

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

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

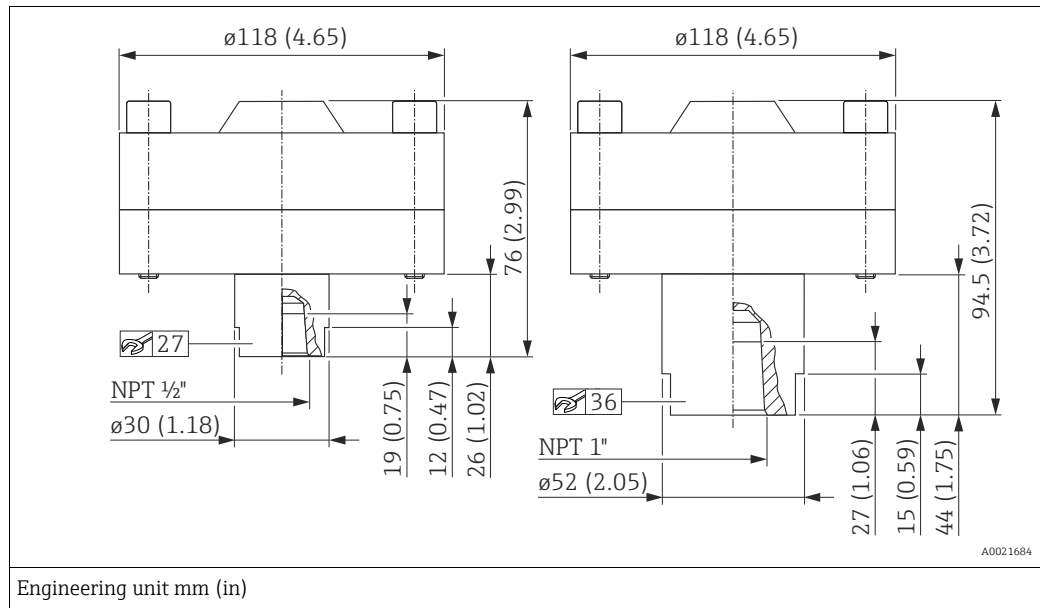


| Flange ^{1) 2)} | | | | | | | Boltholes | | | Diaphragm seal | | Option ³⁾ |
|-------------------------|------------------|------------------|----------|-----------|-------------------------|-----------------------|-----------|----------------|-------------|-------------------------|------------|----------------------|
| Material | Nominal diameter | Nominal pressure | Diameter | Thickness | Diameter of raised face | Height of raised face | Quantity | Diameter | Hole circle | Max. diaphragm diameter | Weight | |
| | | | D | b | g | f | | g ₂ | k | d _M | [kg (lbs)] | |
| | | | [mm] | [mm] | [mm] | [mm] | | [mm] | [mm] | [mm] | | |
| AISI 316L | 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) The roughness of the surface in contact with the medium, including the raised face of the flanges (all standards) made of Alloy C, Monel or tantalum is Ra 0.8 µm (31.5 µin). Lower surface roughness available on request.
- 2) In the case of process isolating diaphragms made of Alloy C, Monel or tantalum, the flange raised face is made of the same material as the process isolating diaphragm.
- 3) Product Configurator, "Process connection" ordering feature

PMP55: process connections with flush-mounted process isolating diaphragm

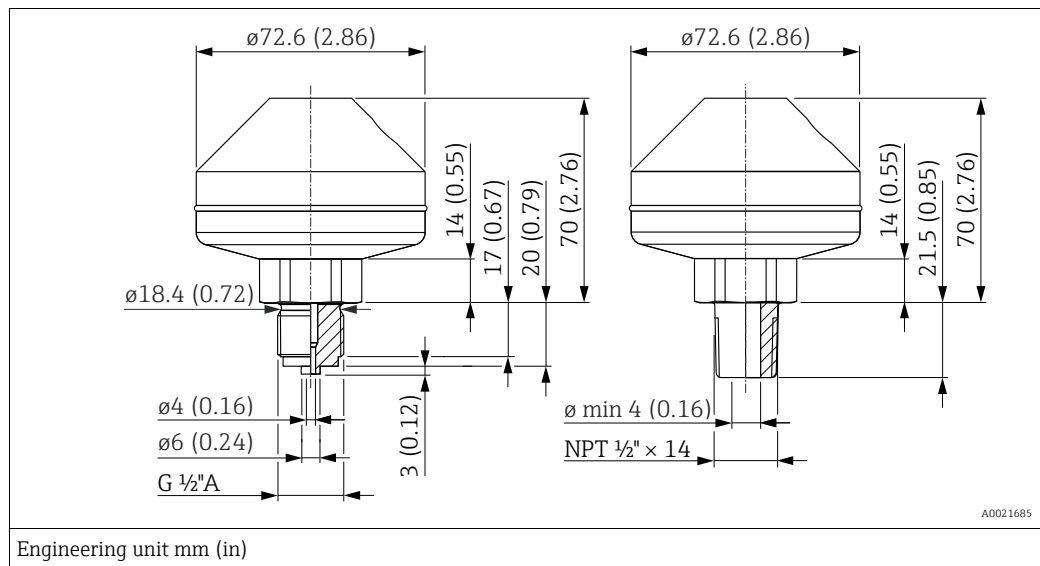
Thread ½ NPT and 1 NPT, separator



| Material | Designation | Measuring range [bar (psi)] | Nominal pressure | Weight [kg (lbs)] | Option ¹⁾ |
|-----------|----------------------------------|-----------------------------|------------------|-------------------|----------------------|
| AISI 316L | Threaded, ½" NPT with Viton seal | ≤ 250 (3625) | PN 250 | 4.75 (10.47) | UGJ |
| | Threaded, 1" NPT with Viton seal | | PN 250 | 5.0 (11.03) | UHJ |

1) Product Configurator, "Process connection" ordering feature

Thread ISO 228 G ½ A and ANSI ½ MNPT, separator



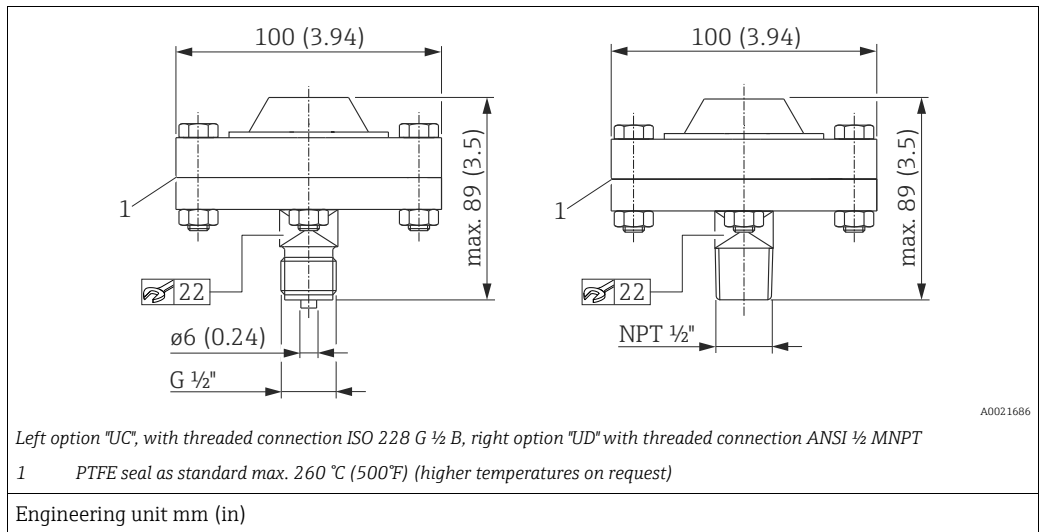
| Material | Designation | Measuring range [bar (psi)] | Nominal pressure | Weight [kg (lbs)] | Approval | Option ¹⁾ |
|-----------|-----------------------------|-----------------------------|------------------|-------------------|-------------------|----------------------|
| AISI 316L | Welded, ISO 228 G ½ A EN837 | ≤ 160 (2320) | PN 160 | 1.43 (3.15) | - | UBJ |
| | Welded, ANSI ½ MNPT | | PN 160 | | CRN ²⁾ | UCJ |

1) Product Configurator, "Process connection" ordering feature

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

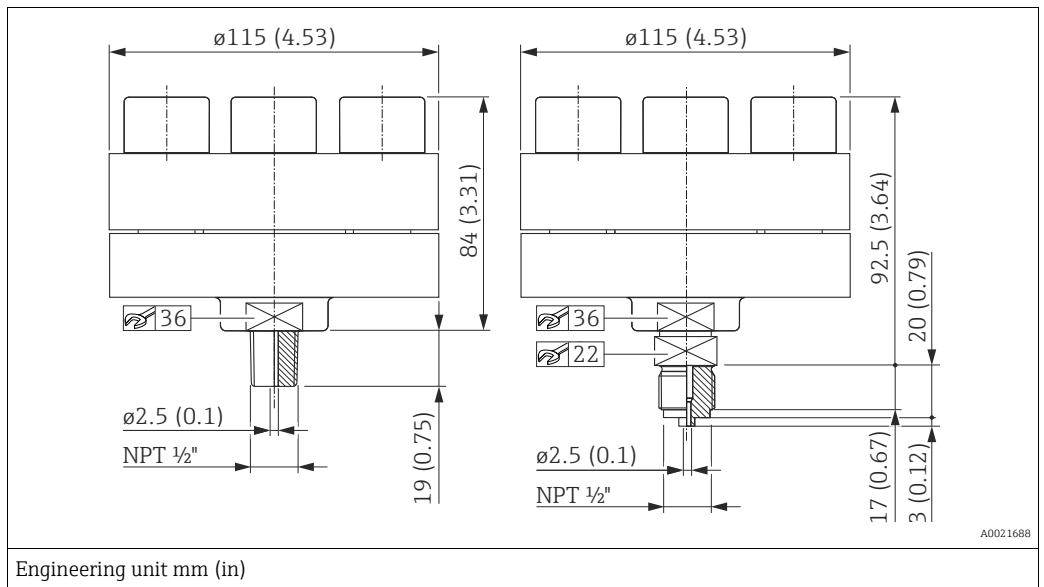


Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device. These devices are fitted with a separate plate bearing the registration number OF10525.5C.



| Material | Designation | Measuring range [bar (psi)] | Nominal pressure | Weight [kg (lbs)] | Option ¹⁾ |
|---|-----------------------|-----------------------------|------------------|-------------------|----------------------|
| AISI 316L (1.4404), screws made of 1.4571 | ISO 228 G 1/2 B EN837 | ≤ 40 (580) | PN 40 | 1.43 (3.15) | UDJ |
| | ANSI 1/2 MNPT | ≤ 40 bar (580) | PN 40 | | UEJ |

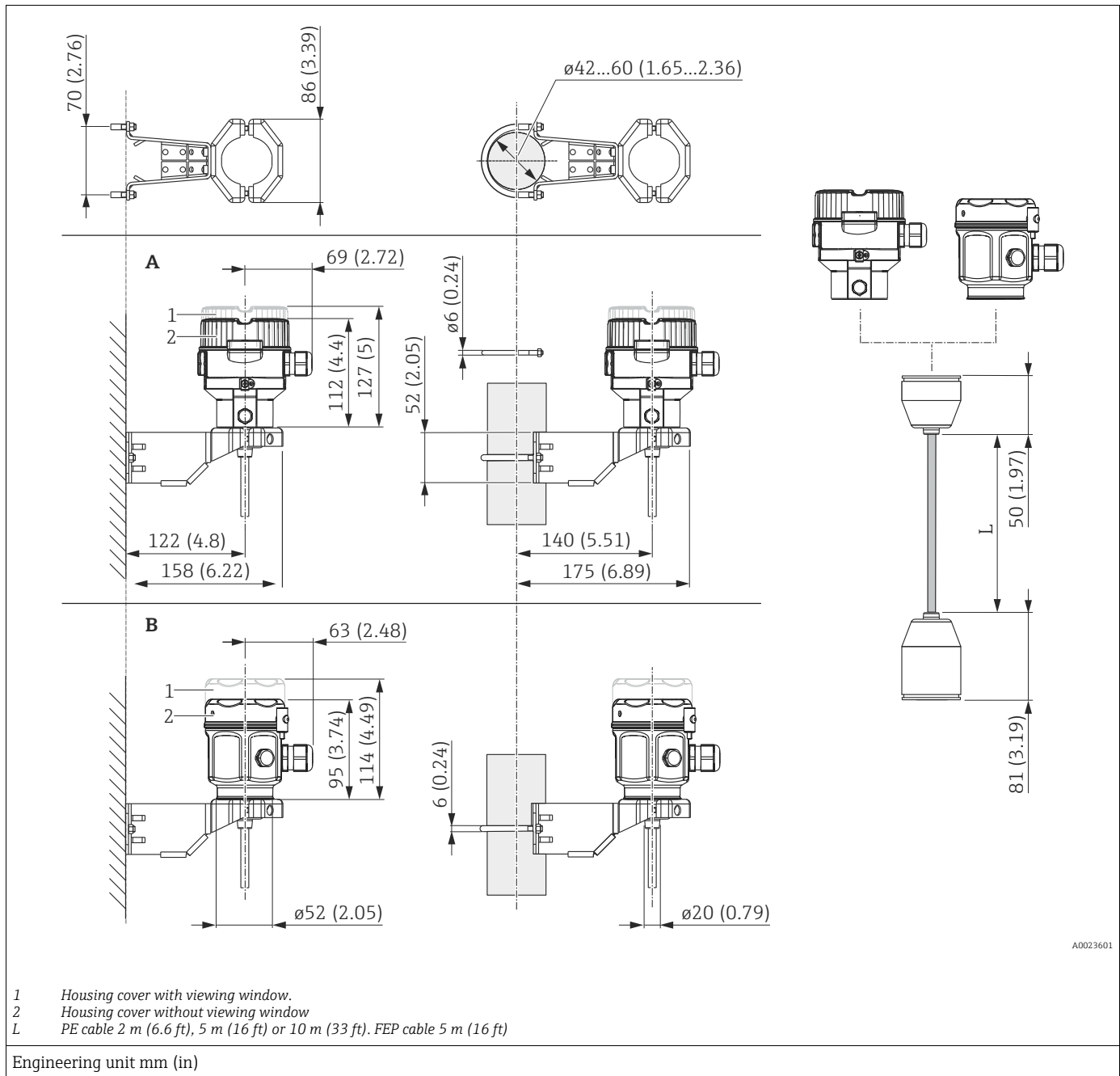
1) Product Configurator, "Process connection" ordering feature



| Material | Designation | Measuring range [bar (psi)] | Nominal pressure | Weight [kg (lbs)] | Option ¹⁾ |
|---|---|-----------------------------|------------------|-------------------|----------------------|
| AISI 316L (1.4404), screws made of 1.4571 | Threaded, ISO 228 G 1/2 B EN837, with integrated seal lip | > 40 (580) | PN 400 | 4.75 (10.47) | UDJ |
| | Threaded, ANSI 1/2 MNPT, with integrated seal lip | > 40 (580) | PN 400 | | UEJ |

1) Product Configurator, "Process connection" ordering feature

Wall and pipe mounting with mounting bracket



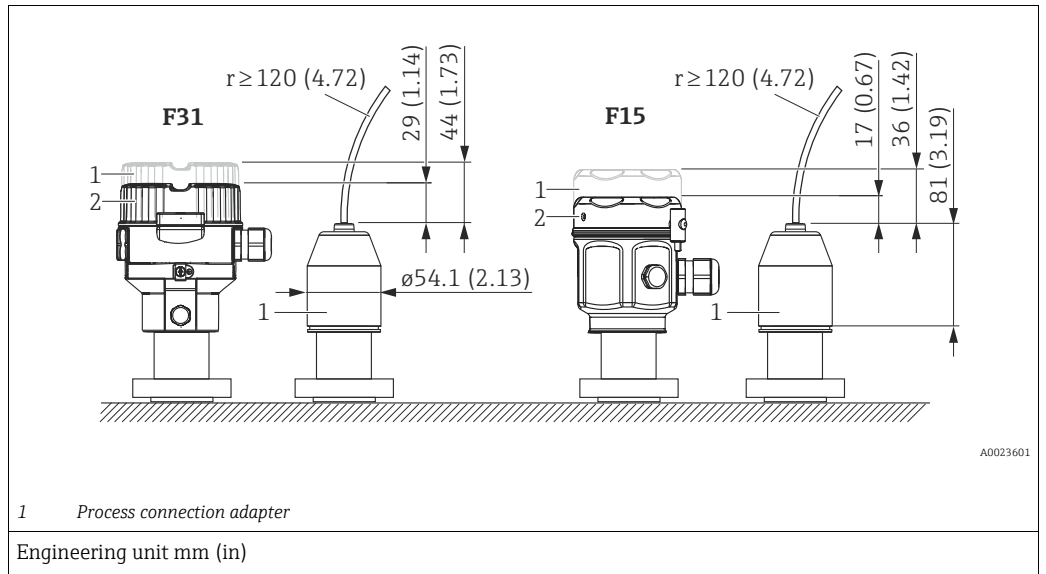
| Item | Designation | Weight | | Option ¹⁾ |
|------|-----------------------------|----------------------|------------------|----------------------|
| | | Housing (F31 or F15) | Mounting bracket | |
| A | Dimensions with F31 housing | → 41 ff | 0.5 kg (1.10) | U |
| B | Dimensions with F15 housing | | | |

1) Product Configurator, "Separate housing" ordering feature

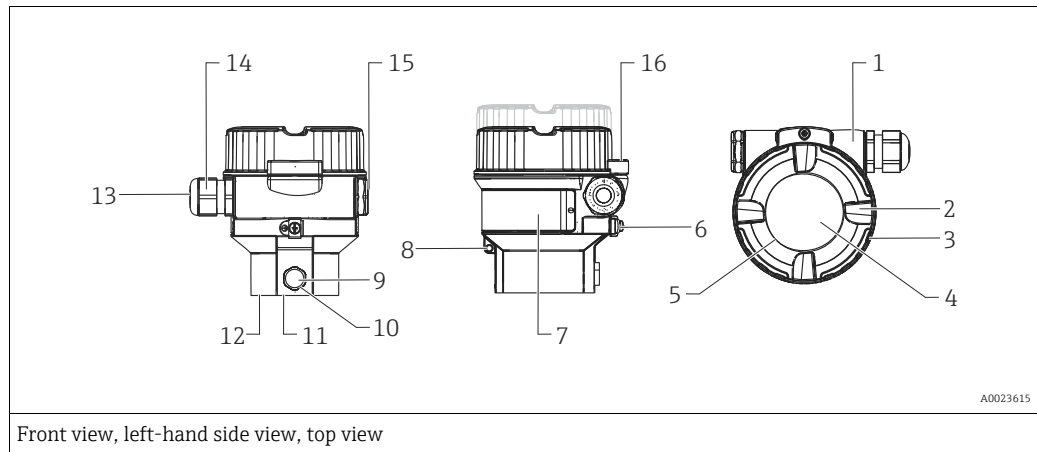
Also available for order as a separate accessory: part number 71102216

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.



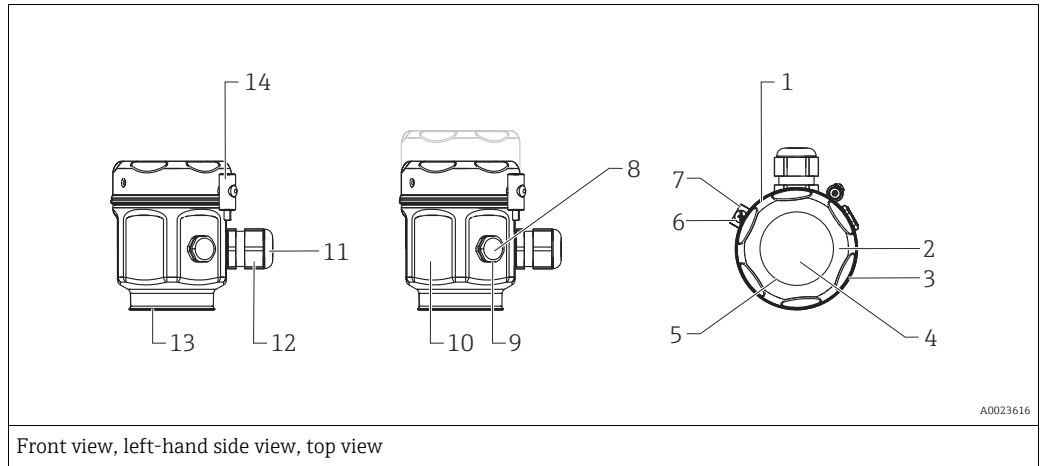
Materials not in contact with process F31 housing



Front view, left-hand side view, top view

| 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 | Attachement for tie-on label | AISI 304 (1.4301)/ AISI 316 (1.4401) |
| 9 | Pressure compensation filter | AISI 316L (1.4404) and PBT-FR |
| 10 | Pressure compensation filter, O-ring | VMQ or EPDM |
| 11 | Sealing ring | EPDM |
| 12 | Snap ring | PC Plastic |
| 13 | Seal of cable gland and blind plug | EPDM/NBR |
| 14 | Cable gland | Polyamide (PA), for dust ignition-proof: CuZn nickel-plated |
| 15 | Blind plug | PBT-GF30 FR for dust ignition-proof, Ex d, FM XP and CSA XP: AISI 316L (1.4435) |
| 16 | Cover clamp | Clamp AISI 316L (1.4435), screw A4 |

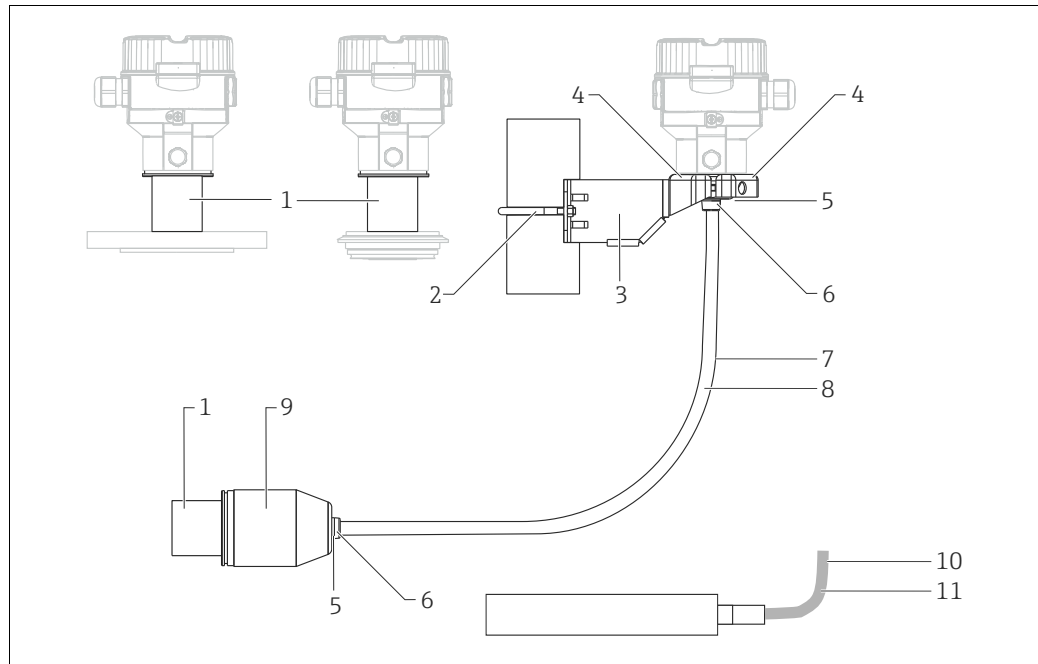
F15 housing



Front view, left-hand side view, top view

| Item number | Component part | Material |
|-------------|--|---|
| 1 | F15 housing | AISI 316L (1.4404) |
| 2 | Cover | |
| 3 | Cover seal | Silicone with PTFE coating |
| 4 | Sight glass for non-hazardous area, ATEX Ex ia, NEPSI Zone 0/1 Ex ia, IECEx Zone 0/1 Ex ia, FM NI, FM IS, CSA IS | Polycarbonate (PC) |
| 4 | Sight glass for ATEX 1/2 D, ATEX 1/3 D, ATEX 1 GD, ATEX 1/2 GD, ATEX 3 G, FM DIP, CSA dust ignition-proof | Mineral glass |
| 5 | Sight glass seal | Silicone (VMQ) |
| 6 | External ground terminal | AISI 304 (1.4301) |
| 7 | Attachement for tie-on label | 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 |
| 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



A0023900

| 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 | Gland for cable from separate housing: Screws: | AISI 316L (1.4404) A2 |
| 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 | Capillary | AISI 316 Ti (1.4571) |
| 11 | Protective hose for capillary | AISI 304 (1.4301) |

Fill fluid

| Designation | Option PMP51 ¹⁾ | Option PMP55 ¹⁾ |
|---|----------------------------|----------------------------|
| Silicone oil | 1 | 1 |
| Inert oil | 2 | 2 |
| NSF-H1 synthetik oil according to FDA 21 CFR 178.3570 | 3 | - |

| Designation | Option PMP51 ¹⁾ | Option PMP55 ¹⁾ |
|----------------------|----------------------------|----------------------------|
| Vegetable oil, FDA | - | 4 |
| High-temperature oil | - | 5 |
| Low-temperature oil | - | 6 |

1) Product Configurator, "Fill fluid" ordering feature

Materials in contact with the process



The wetted device components are listed in the "Mechanical construction" (→ 41 ff) and "Ordering information" (→ 108 ff) sections.

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" ordering feature): AISI 316L (DIN/EN material number 1.4435)
- Endress+Hauser supplies process connections with threaded connections and DIN/ EN flanges made of stainless steel as per AISI 316L (DIN/EN material number 1.4404 (AISI 316) or 14435). With regard to their stability-temperature property, the materials 1.4404 and 1.4435 are grouped together under 13E0 in EN 1092-1 Tab.18. The chemical composition of the two materials can be identical.
- Some process connections are also available in the material Alloy C276 (DIN/EN material number 2.4819). See the information in the "Mechanical construction" ordering feature.

Process isolating diaphragm

| Type | Designation | Option ¹⁾ |
|-------|--|----------------------|
| PMC51 | Al ₂ O ₃ aluminum oxide ceramic (FDA 21CFR186.1256, USP Class VI), 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 foil (not for vacuum applications) | S |
| | Alloy C276 (DIN/EN material number 2.4819) | B ²⁾ |
| | Monel | C ²⁾ |
| | Tantalum | D ²⁾ |

1) Product Configurator, "Material of the process isolating diaphragm" ordering feature

2) The flange raised face is made from the same material as the process isolating diaphragm.

Seals

| Type | Designation | Option ¹⁾ |
|-------|---|----------------------|
| PMC71 | FKM Viton | A |
| | FKM Viton, FDA, 3A Class I, USP Class VI | B |
| | 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, 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, 3A Class I | P |
| | VMQ Silicone, FDA | S |

1) Product Configurator, "Seal" ordering feature

Operability

Operating concept

Operator-oriented menu structure for user-specific tasks

- Commissioning
- Operation
- Diagnostics
- Expert level

Quick and safe commissioning

Guided menus for applications

Reliable operation

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

Efficient diagnostics increase measurement availability

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

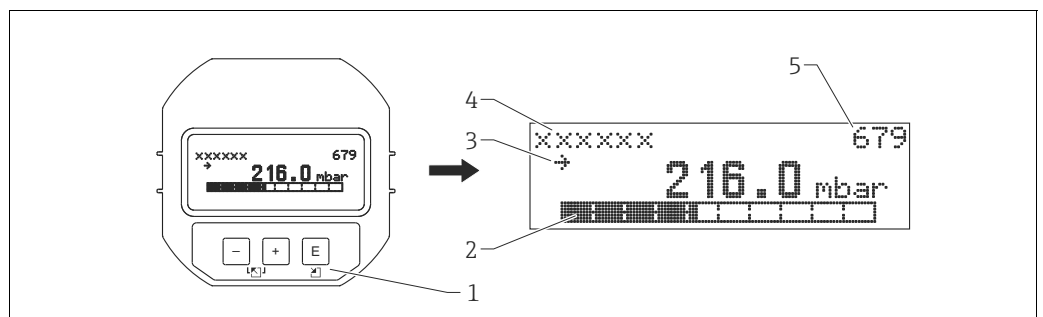
Onsite operation

Local display (optional) for devices with HART, PROFIBUS PA or FOUNDATION Fieldbus electronics

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.)



A0016498

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

Ordering information: Product Configurator, "Output" ordering feature

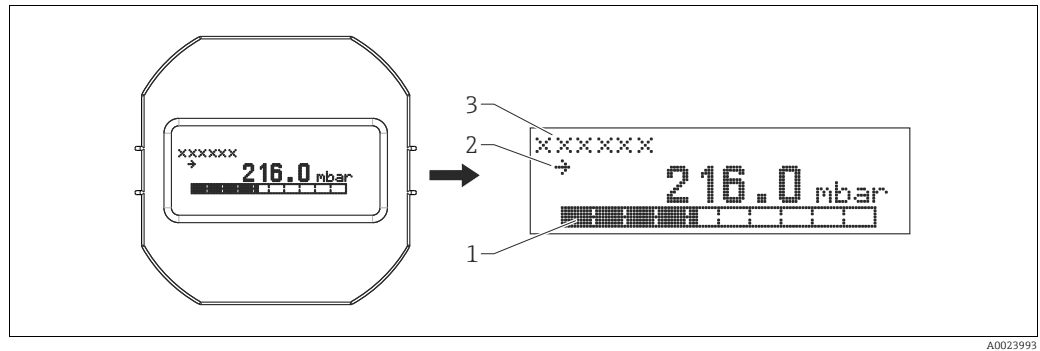
| Function | Operation with display | | | |
|--|------------------------|------|-------------|---------------------|
| | Analog electronics | HART | PROFIBUS PA | FOUNDATION Fieldbus |
| Position adjustment (zero point correction) | – | ✓ | ✓ | ✓ |
| Setting lower range value and upper range value - 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 | – | ✓ | ✓ | ✓ |

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.

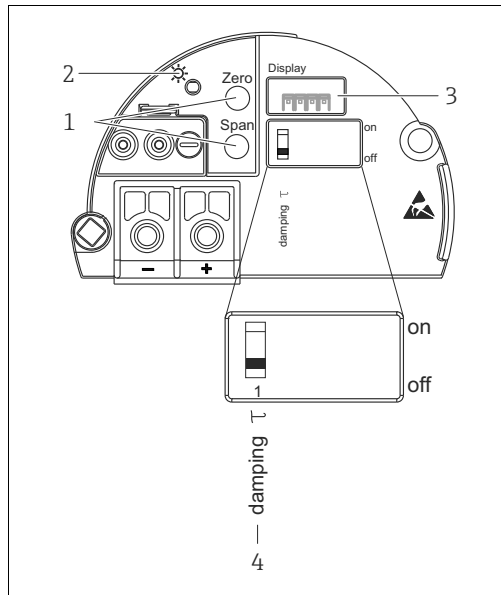
Functions:

- 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.)



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

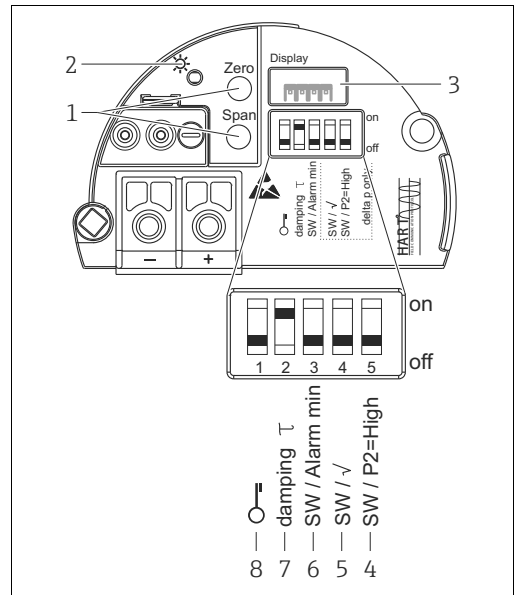
Operating keys and elements located inside on the electronic insert



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Analog electronic insert

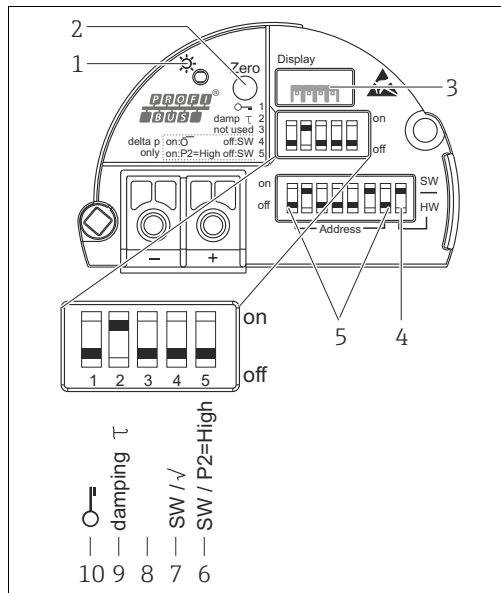
- 1 Operating keys for lower range value (zero), upper range value (span), position zero adjustment or reset
- 2 Green LED to indicate successful operation
- 3 Slot for optional local display
- 4 DIP switch for switching damping on/off



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HART electronic insert

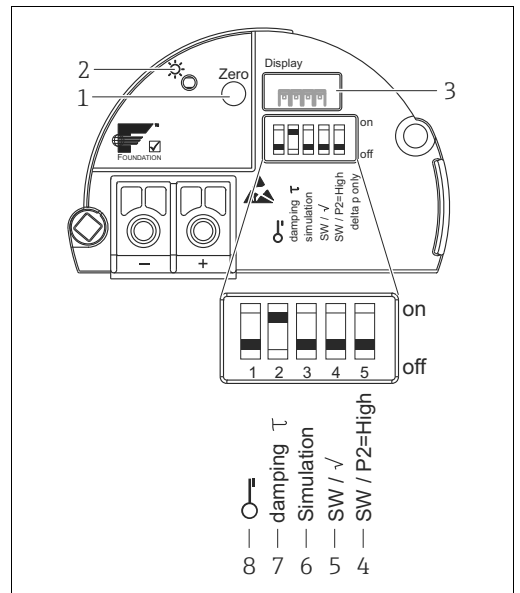
- 1 Operating keys for lower range value (zero) and upper range value (span)
- 2 Green LED to indicate successful operation
- 3 Slot for optional local display
- 4 DIP switch only for Deltabar M
- 5 DIP switch only for Deltabar M
- 6 DIP switch for alarm current SW / Alarm Min (3.6 mA)
- 7 DIP switch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



A0023126

PROFIBUS PA electronic insert

- 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



A0023127

FOUNDATION Fieldbus electronic insert

- 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

| 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" ordering feature

Operating languages

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

| Designation | Option ¹⁾ |
|--------------------|----------------------|
| English | AA |
| German | AB |
| French | AC |
| Spanish | AD |
| Italian | AE |
| Dutch | AF |
| Chinese simplified | AK |
| Japanese | AL |

1) Product Configurator, "Additional operating 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 → 96 ff | ✓ ¹⁾ | ✓ ²⁾ | ✓ |
| FieldXpert SFX100 → 97 ff | ✓ | – | ✓ |
| NI-FBUS Configurator → 97 ff | – | – | ✓ |

1) Commubox FXA195 required → 97 ff

2) Profiboard or Proficard required → 97 ff

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)
- HistoROM[®]/M-DAT analysis
- Documentation of the measuring point

Connection options:

- HART via Commubox FXA195 and the USB port on 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 or via WiFi and Endress+Hauser's Fieldgate FXA520. Field Xpert also works as a stand-alone device for asset management applications. For details refer to BA00060S/00/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) and the USB port of a computer or laptop. For details, see TI00405C/07/EN.



For the following Endress+Hauser devices, you also need the "ToF adapter FXA291" accessory:

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

ToF adapter FXA291

The ToF adapter FXA291 connects the Commubox FXA291 to devices in the ToF platform, pressure devices and Gammapilot via the USB port of a computer or laptop. For details, see KA00271F.

Profiboard

For connecting a PC to PROFIBUS.

Proficard

For connecting a laptop to PROFIBUS.

FF configuration program

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

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

Remote operation via:

- Operation with NI-FBUS Configurator:
 - The NI-FBUS Configurator is an easy-to-use graphical environment for creating linkages, loops, and a schedule based on the fieldbus concepts.
 - You can use the NI-FBUS Configurator to configure a fieldbus network as follows:
 - Set block and device tags
 - Set device addresses
 - Create and edit function block control strategies (function block applications)
 - Configure vendor-defined function and transducer blocks
 - Create and edit schedules
 - Read and write to function block control strategies (function block applications)
 - Invoke Device Description (DD) methods
 - Display DD menus
 - Download a configuration
 - Verify a configuration and compare it to a saved configuration
 - Monitor a downloaded configuration
 - Replace a 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 ¹⁾ |
|---|----------------------|
| Measuring point (TAG), see additional spec. | Z1 |
| Bus address, see additional spec. | Z2 |

1) Product Configurator, "Identification" 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 or can be ordered on a DVD.

- 1 My Applicator - Configuration of the Applicator settings
- 2 Applicator help
- 3 Mouse-Over help - slide with the mouse pointer over these fields and get short informations

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
- 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 new TempC diaphragm: maximum accuracy and process safety during pressure and differential pressure measurement with diaphragm seals

To measure with even greater accuracy in these applications and increase process safety, Endress+Hauser has developed the TempC 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 diaphragm can be used at temperatures between -40 °C (-40°F) and +250 °C (+482°F). This guarantees maximum process safety even in the event of very long sterilization and cleaning cycles (SIP/CIP) in tanks and pipes at high temperatures.
- Smaller instrumentation is possible thanks to the TempC diaphragm. With a smaller process connection, the new diaphragm measures at least as accurately as a conventional diaphragm with a larger diameter.
- Short recovery times following thermal shocks allow shorter downtimes during batch processes and therefore a far higher level of availability of the production facilities.
- In addition, the TempC diaphragm excels in terms of improved hygienic cleanability and its insensitivity to large changes in the pressure load.

Ordering information:

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

Selection in the Applicator:

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

Capillary

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

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

Filling oil

When selecting the filling oil, the medium temperature and ambient temperature, as well as the process pressure, are of crucial importance. Observe the temperatures and pressures during commissioning and cleaning. A further selection criterion is the compatibility of the 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

| Filling oil | Permissible temperature range ¹⁾ at 0.05 bar (0.725 psi) ≤ p _{abs} ≤ 1 bar (14.5 psi) | Permissible temperature range ²⁾ at p _{abs} ≥ 1 bar (14.5 psi) | Density [g/cm ³] / [SGU] | Viscosity [mm ² /s] / [cSt] at 25 °C (77°F) | Thermal expansion coefficient ²⁾ [1/K] | Notes | Option ³⁾ |
|------------------------------------|---|--|--------------------------------------|--|---|---|----------------------|
| Silicone oil | -40 to +180 °C (-40 to +356°F) | -40 to +250 °C (-40 to +482°F) | 0.96 | 100 | 0.00096 | Suitable for foods FDA 21 CFR 175.105 | 1 |
| Inert oil | -40 to +80 °C (-40 to +176°F) | -40 to +175 °C (-40 to +347°F) | 1.87 | 27 | 0.000876 | For ultrapure gas and oxygen applications | 2 |
| Vegetable oil | -10 to +120 °C (+14 to +248°F) | -10 to +200 °C (+14 to +392°F) | 0.94 | 9.5 | 0.00101 | Suitable for foods FDA 21 CFR 172.856 | 4 |
| High-temperature oil ⁴⁾ | -10 to +200 °C (+14 to +392°F) | -10 to +400 °C (+14 to +752°F) | 1.07 | 37 | 0.0007 | High temperatures | 5 |
| Low-temperature oil | -70 to +80 °C (-94 to +176°F) | -70 to +180 °C (-94 to +356°F) | 0.92 | 4.4 | 0.00108 | Low temperatures | 6 |

- 1) Observe temperature limits of the device (→ 39) and of the system (→ 99).
- 2) Please refer to the "Applicator Sizing Diaphragm Seal" tool for the thermal change of the diaphragm seal and other important technical features.
- 3) Product Configurator, "Fill fluid" ordering feature
- 4) When simultaneously using the diaphragm seal systems at high process temperatures and low absolute pressures, Endress+Hauser recommends the vacuum service (Product Configurator, "Service" ordering feature, option "HG").

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 using diaphragm seal systems with a capillary, sufficient strain relief must be ensured in order to prevent the capillary bending down (bending radius ≥ 100 mm (3.94 in)).

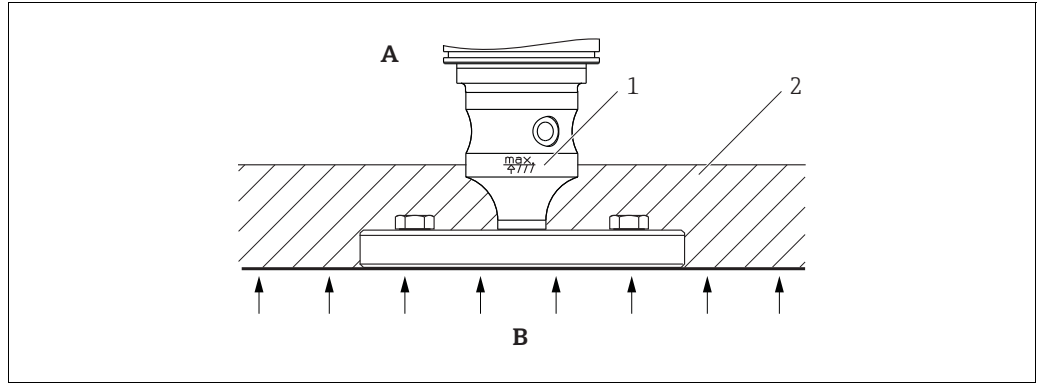
Capillary

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 of ≥ 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 $\leq 0.04 \text{ W}/(\text{m} \times \text{K})$ and to the maximum permitted ambient and process temperature. The data were determined under the most critical application "quiescent air".



Maximum permitted insulation height, here indicated on a PMP55 with a flange

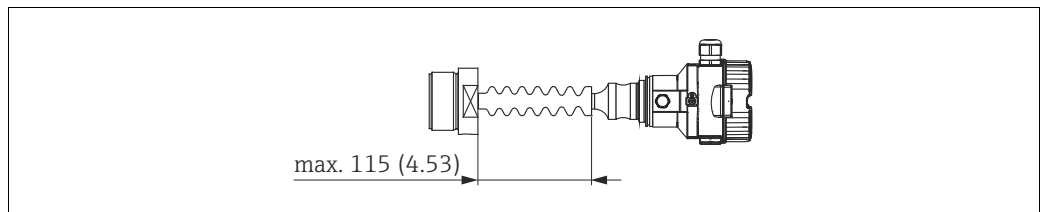
- A Ambient temperature: $\leq 70 \text{ }^\circ\text{C}$ (158°F)
- B Process temperature: max. $400 \text{ }^\circ\text{C}$ (752°F), depending on the diaphragm seal filling oil used
- 1 Maximum permitted insulation height
- 2 Insulation material

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 $+85 \text{ }^\circ\text{C}$ ($+185 \text{ }^\circ\text{F}$) being exceeded.

Depending on the filling oil used, diaphragm seal systems with temperature isolators can be used for maximum temperatures of up to $260 \text{ }^\circ\text{C}$ ($+500 \text{ }^\circ\text{F}$). → For the temperature application limits, see → 101, "Diaphragm seal filling oils" ordering feature.

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 maximum zero point shift of 21 mbar (0.315 psi) due to the hydrostatic column in the temperature isolator. You can correct this zero point shift at the device.



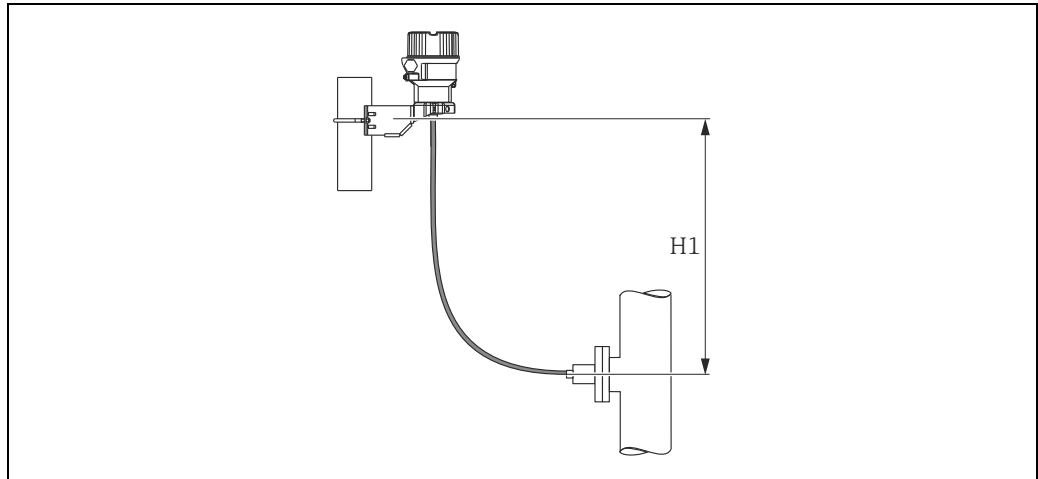
PMP55 with temperature isolator, material 316L (1.4404)

Vacuum applications

Mounting instructions

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.

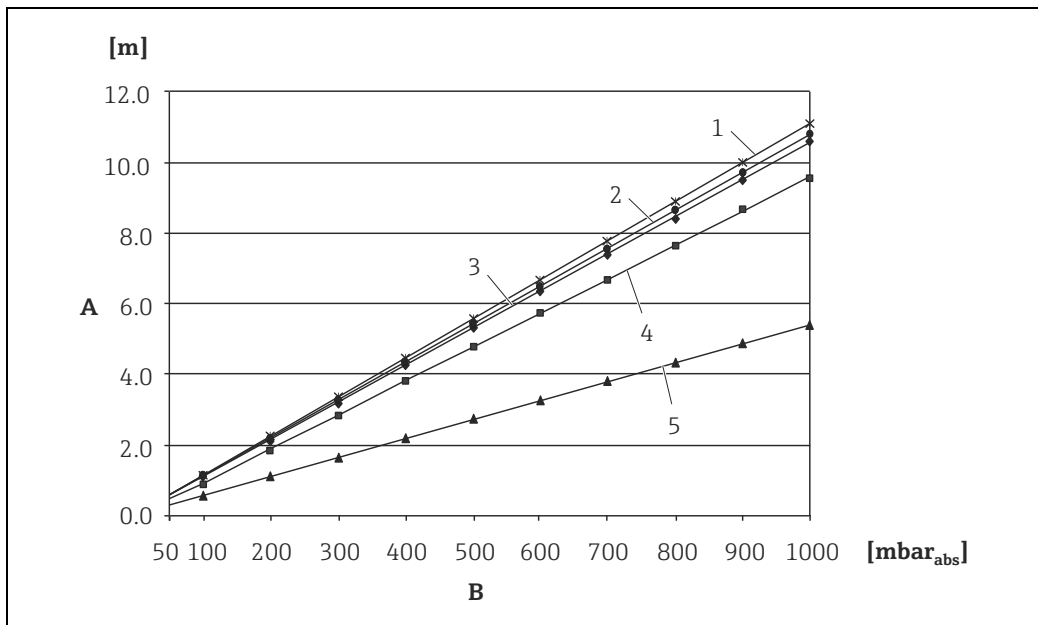
When the pressure transmitter is mounted above the diaphragm seal, the maximum height difference H1 in accordance with the illustrations below must not be exceeded.



A0023994

Installation above the lower diaphragm seal

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:


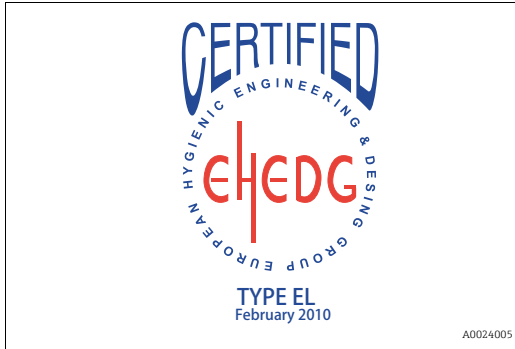
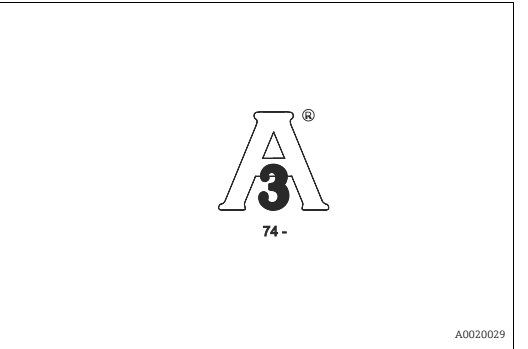



A0023986-en

Diagram of maximum installation height above the lower diaphragm seal for vacuum applications depending on the pressure at the diaphragm seal on the positive side

- 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

| | |
|--|---|
| CE mark | The device meets the legal requirements of the relevant EC directives. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark. |
| C-tick symbol | The measuring system complies with the EMC requirements of the "Australian Communications and Media Authority (ACMA)". |
| Ex approvals | <ul style="list-style-type: none"> ▪ ATEX ▪ IECEx ▪ FM ▪ CSA ▪ Also combinations of different approvals <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. →  111 ff, "Safety Instructions" and "Installation/Control Drawings" ordering features.</p> |
| Suitable for hygiene applications | <p>All materials in contact with foodstuffs comply with framework Regulation (EC) 1935/2004. The device is available with hygienic process connections (overview: see order code).</p> <p>⚠ CAUTION</p> <p>Contamination in the process! Risk of contamination if incorrect seals and parts are used!</p> <ul style="list-style-type: none"> ▶ To avoid the risk of contamination, when installing the device comply with the design principles of EHEDG, Guideline 37 "Hygienic Design and Application of Sensors" and Guideline 16 "Hygienic Pipe Couplings". ▶ Suitable assemblies and seals must be used to ensure hygienic design in accordance with 3-A SSI and EHEDG specifications. ▶ 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/sterilize in place). |
|   | |
| <p> The gap-free connections can be cleaned of all residue using the typical cleaning methods within this industry.</p> | |
| Pharma (CoC) | <p>Certificate of Compliance (CoC) (according to ASME BPE-2007)</p> <p>Ordering information: Product Configurator, "Additional approval" ordering feature, option "LW"</p> |
| Functional safety SIL | <p>The Cerabar M with 4 to 20 mA output signal has been developed to assessed and certified by TÜV NORD CERT as per IEC 61508 Edition 2.0 and IEC 61511. These devices can be used to monitor the process level and pressure up to SIL 2. For a detailed description of the safety functions with Cerabar M, settings and functional safety data, see the "Functional safety manual - Cerabar M" SD00347P.</p> <p>Ordering information: Product Configurator, "Additional approval" ordering feature, option "LA"</p> |

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

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

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

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

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

Pressure Equipment Directive (PED) The devices PMC51, PMP51 and PMP55 correspond to Article 3 (3) of the EC directive 97/23/EC (Pressure Equipment Directive) and have been designed and manufactured according to good engineering practice.

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
- PMP55 with pipe diaphragm seal $\geq 1.5"/\text{PN}40$:
Suitable for stable gases in group 1, category II
- PMP55 with separators PN400:
Suitable for stable gases in group 1, category I

Marine approval

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

1) Product Configurator, "Additional approval" ordering feature

Drinking water approval NSF 61 - approval for PMC51 and PMP51
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 ¹⁾ |
|---|-------|-------|-------|----------------------|
| 3.1 Material certificate, wetted metallic parts, EN10204-3.1 inspection certificate | ✓ | ✓ | ✓ | JA |

| Designation | PMC51 | PMP51 | PMP55 | Option ¹⁾ |
|--|-------|-------|-------|----------------------|
| Conformity to NACE MR0175, wetted metallic parts | ✓ | ✓ | ✓ | JB |
| Conformity to NACE MR0103, wetted metallic parts | ✓ | ✓ | ✓ | JE |
| 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-Ferrit measurement, internal procedure, wetted metallic parts, EN10204-3.1 inspection certificate | ✓ | ✓ | ✓ | KF |
| 3.1 Material certificate+PMI test (XRF), internal procedure, wetted metallic parts, EN10204-3.1 inspection certificate | – | ✓ | ✓ | KG |

1) Product Configurator, "Test, certificate" ordering feature

Calibration; unit

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

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

Calibration

| Designation | Option ¹⁾ |
|--|----------------------|
| Factory calibration, 5-point | F1 |
| DKD/DAkkS calibration certificate 10-point | F2 |

1) Product Configurator, "Calibration" ordering feature

Service

| Designation | Option ¹⁾ |
|--|----------------------|
| Oil and grease removed ²⁾ | HA |
| Cleaned for oxygen service ²⁾ | HB |
| Cleaned from PWIS (PWIS = paint wetting impairment substances) ²⁾ | HC |
| Configured min alarm current | IA |
| Configured 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 from the following sources:

- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select instrument → Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide



Product Configurator - the tool for individual product configuration

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

Configuration data sheet
(HART, PROFIBUS PA,
FOUNDATION Fieldbus
electronics)

Pressure

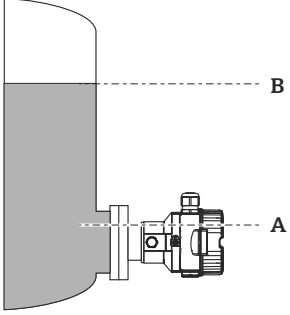
The following configuration data sheet has to be filled in and included with the order if the option "J" has been selected in the Product Configurator, "Calibration; Unit" ordering feature.

| Pressure Engineering Unit | |
|---|---|
| <input type="checkbox"/> mbar | <input type="checkbox"/> mmH ₂ O |
| <input type="checkbox"/> bar | <input type="checkbox"/> mH ₂ O |
| <input type="checkbox"/> psi | <input type="checkbox"/> inH ₂ O |
| <input type="checkbox"/> mmHg | <input type="checkbox"/> Pa |
| <input type="checkbox"/> kgf/cm ² | <input type="checkbox"/> kPa |
| | <input type="checkbox"/> MPa |
| Calibration Range / Output | |
| Low range value (LRV): _____ | [pressure engineering unit] |
| Upper range value (URV): _____ | [pressure engineering unit] |
| Display | |
| 1st Value Display ¹⁾ | 2nd Value Display ¹⁾ |
| <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 variant | |
| Damping | |
| Damping: _____ sec (Default 2 sec) | |

Smallest calibratable span (preset at the factory) → 11 ff.

Level

The following configuration data sheet has to be filled in and included with the order if the option "K" has been selected in the Product Configurator, "Calibration; Unit" ordering feature.

| Pressure Engineering Unit | Output Unit (Scaled unit) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|-------------------------------|----------------------------|--------|---------|-----------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-------------------------------|--|-----------------------------|-----------------------------|---|--|--|--|-----------------------------|--|--|--|--|-----------------------------|--|--|--|--|-------------------------------|--|--|--|
| <input type="checkbox"/> mbar <input type="checkbox"/> mmH ₂ O <input type="checkbox"/> mmHg <input type="checkbox"/> Pa <input type="checkbox"/> bar <input type="checkbox"/> mH ₂ O <input type="checkbox"/> kgf/cm ² <input type="checkbox"/> kPa <input type="checkbox"/> psi <input type="checkbox"/> inH ₂ O <input type="checkbox"/> MPa | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr style="border-bottom: 1px solid black;"> <th style="width: 20%;">Mass</th> <th style="width: 20%;">Length</th> <th style="width: 20%;">Volume</th> <th style="width: 20%;">Volume</th> <th style="width: 20%;">Percent</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> kg</td> <td><input type="checkbox"/> m</td> <td><input type="checkbox"/> l</td> <td><input type="checkbox"/> gal</td> <td><input type="checkbox"/> %</td> </tr> <tr> <td><input type="checkbox"/> t</td> <td><input type="checkbox"/> dm</td> <td><input type="checkbox"/> hl</td> <td><input type="checkbox"/> lgal</td> <td></td> </tr> <tr> <td><input type="checkbox"/> lb</td> <td><input type="checkbox"/> cm</td> <td><input type="checkbox"/> m³</td> <td></td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> mm</td> <td><input type="checkbox"/> ft³</td> <td></td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> ft</td> <td><input type="checkbox"/> in³</td> <td></td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> inch</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Mass | Length | 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 ³ | | | | <input type="checkbox"/> mm | <input type="checkbox"/> ft ³ | | | | <input type="checkbox"/> ft | <input type="checkbox"/> in ³ | | | | <input type="checkbox"/> inch | | | |
| Mass | Length | 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 ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <input type="checkbox"/> mm | <input type="checkbox"/> ft ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <input type="checkbox"/> ft | <input type="checkbox"/> in ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <input type="checkbox"/> inch | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Empty pressure [a]: Low pressure value (empty) _____ [pressure engineering unit]</p> <p>Full pressure [b]: High pressure value (full) _____ [pressure engineering unit]</p> | <p>Empty calibration [a]: Low level value (empty) _____ [Scaled Unit]</p> <p>Full calibration [b]: High level value (full) _____ [Scaled Unit]</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Example</p>  <p style="text-align: right; margin-right: 50px;">A</p> <p style="text-align: right; margin-right: 50px;">B</p> <p style="text-align: right; margin-right: 50px;">A0024007</p> <p>A 0 mbar / 0m B 300 mbar (4.5psi) / 3 m (9.8 ft).</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Display | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>1st Value Display ¹⁾</p> <input type="checkbox"/> Main Value | <p>2nd Value Display ¹⁾</p> <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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>¹⁾ Depending on sensor and communication variant</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Damping | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Damping: _____ sec (Default 2 sec)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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

The following configuration data sheet has to be filled in and included with the order if the option "J" has been selected in the Product Configurator, "Calibration; Unit" ordering feature.

| Pressure Engineering Unit | |
|---|---|
| <input type="checkbox"/> mbar | <input type="checkbox"/> mmH ₂ O |
| <input type="checkbox"/> bar | <input type="checkbox"/> mH ₂ O |
| <input type="checkbox"/> psi | <input type="checkbox"/> inH ₂ O |
| <input type="checkbox"/> mmHg | <input type="checkbox"/> Pa |
| <input type="checkbox"/> kPa | <input type="checkbox"/> MPa |
| <input type="checkbox"/> kgf/cm ² | |
| Calibration Range / Output | |
| Low range value (LRV): _____ | [pressure engineering unit] |
| Upper range value (URV): _____ | [pressure engineering unit] |
| Display | |
| 1st Value Display ¹⁾ | 2nd Value Display ¹⁾ |
| <input type="checkbox"/> Main Value | <input type="checkbox"/> none (Default) |
| ¹⁾ Depending on sensor and communication variant | |
| Damping | |
| Damping: _____ | sec (Default 2 sec) |

Smallest calibratable span (preset at the factory) → 11 ff.

Documentation

Technical Information

- EMC test procedures TI00241F/00/EN
- Deltabar M: TI00434P/00/EN
- Deltapilot M: TI00437P/00/EN

Operating Instructions

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

Brief Operating Instructions

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

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

Safety Instructions

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

1) Product Configurator, "Approval" ordering feature

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

1) Product Configurator, "Approval" ordering feature

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

1) Product Configurator, "Approval" ordering feature

| Directive | Approval | Electronics | Documentation | Option ¹⁾ |
|-----------|--------------|-------------------|---------------|----------------------|
| TIIS | Ex ia IIC T4 | - 4 to 20 mA HART | - | TA |

1) Product Configurator, "Approval" ordering feature

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

1) Product Configurator, "Approval" ordering feature

Installation/Control Drawings

| Directive | Approval | Type | Housing | | Electronics | Documentation | Option ¹⁾ |
|-----------|---|------------------------|---------|-----|---|--------------------------------|----------------------|
| | | | F31 | F15 | | | |
| FM | FM IS Cl.I,II,III Div.1 Gr.A-G, AEx ia FM NI Cl.I Div.2 Gr.A-D FM IS: Zone 0,1,2,20,21,22/FM NI: Zone 2 | PMC51, PMP51, PMP55 | ✓ | ✓ | - 4 to 20 mA HART - PROFIBUS PA, FOUNDATION Fieldbus | - XA00563P/00 - XA00564P/00 | FA |
| | FM XP Cl.I, II Div.1 Gr.A-D, AEx d (Factory sealed) Zone 1,2 | PMP51, PMP55 | ✓ | - | - 4 to 20 mA HART - PROFIBUS PA - FOUNDATION Fieldbus | - XA01163P/00 | FB |
| | FM DIP Cl.II, III Div.1 Gr.A-D Zone 21,22 | PMP51, PMP55 | ✓ | ✓ | - 4 to 20 mA HART | - In preparation | FC |
| | FM NI Cl.I Div.2 Gr.A-D, Zone 2 | PMC51, PMP51, PMP55 | ✓ | ✓ | - 4 to 20 mA HART | - FM3035394 | FD |
| | FM IS/XP Cl.I, II Div.1 Gr.A-G, Zone 1,2 | PMP51, PMP55 | ✓ | - | - 4 to 20 mA HART - PROFIBUS PA, FOUNDATION Fieldbus | - XA01160P/00 - XA00567P/00 | F1 |
| CSA | C/US IS Cl.I,II,III Div.1 Gr.A-G, C/US IS Cl.I Div.2 Gr.A-D, Ex ia | PMC51, PMP51, PMP55 | ✓ | ✓ | - 4 to 20 mA HART - PROFIBUS PA, FOUNDATION Fieldbus | - XA00556P/00 - XA00558P/00 | CA |
| | CSA C/US CP Cl.I, II Div.1 Gr.B-G, Ex d (factory sealed) Zone 1,2 | PMP51, PMP55 | ✓ | - | - 4 to 20 mA HART | - XA00577P/00 | CB |
| | CSA C/US Cl.II, III Div.1 Gr.E-G, Zone 21,22 | PMP51, PMP55 | ✓ | ✓ | - 4 to 20 mA HART | - In preparation | CC |
| | CSA C/US IS/XP Cl.I, II Div.1 Gr.A-G/B-G, Zone 1,2 | PMP51, PMP55 | ✓ | - | - 4 to 20 mA HART - PROFIBUS PA, FOUNDATION Fieldbus | - XA00577P/00 - XA00561P/00 | C1 |
| FM CSA | FM/CSA IS + XP Cl.I, II Div.1 Gr.A-D/B-G FM IS/FM XP Cl.I, II Div.1 Gr.A-G+ 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, "Approval" ordering feature

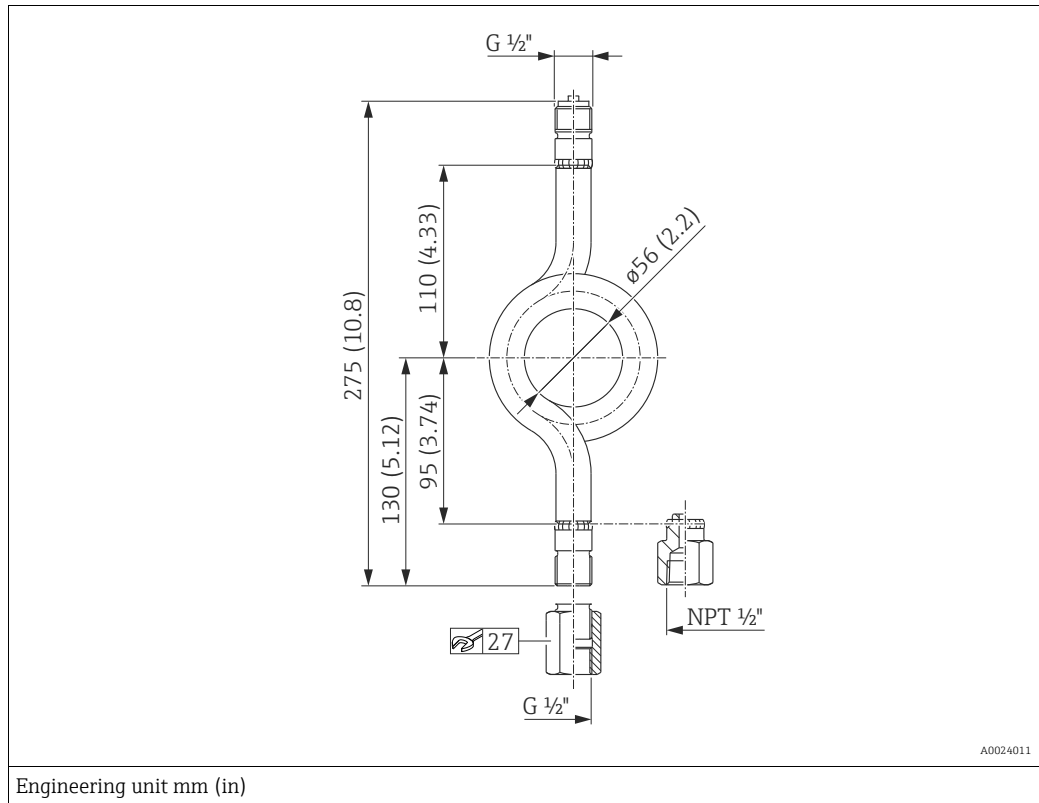
Combination certificate

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

1) Product Configurator, "Approval" ordering feature

Accessories

Siphon - O-shape

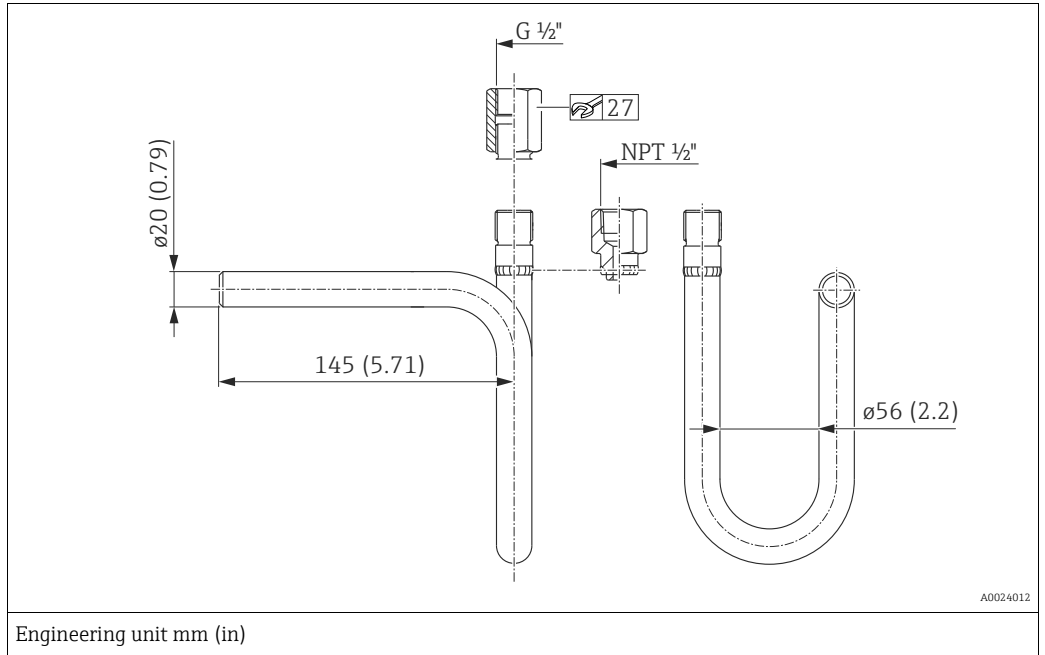


| Max. operating pressure [bar (psi)] | | Max. operating temperature upstream from siphon (on process side) [°C (°F)] |
|-------------------------------------|---|---|
| 104 (1508) | = | 400 (752) |
| 120 (1740) | = | 300 (572) |
| 160 (2320) | = | 120 (248) |

| Connection thread [d] | Material | Option ¹⁾ | |
|-----------------------|----------------|----------------------|--------------------|
| G 1/2" | 1.0345 | | - |
| | 316Ti (1.4571) | RA22 | BA22 ²⁾ |
| NPT 1/2" | 316Ti (1.4571) | - | BB22 ²⁾ |

- 1) Product Configurator, "Accessory enclosed" ordering feature, option "P4".
- 2) with 3.1 inspection certificate

Siphon - U-shape

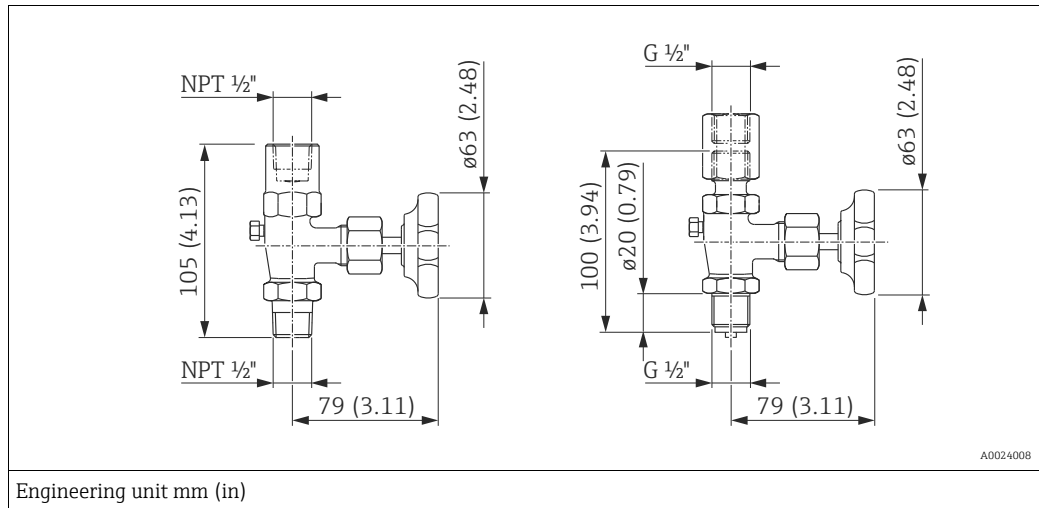


| Max. operating pressure [bar (psi)] | | Max. operating temperature upstream from siphon (on process side) [°C (°F)] | |
|-------------------------------------|---|---|--|
| 104 (1508) | = | 400 (752) | |
| 120 (1740) | = | 300 (572) | |
| 160 (2320) | = | 120 (248) | |

| Connection thread [d] | Material | Option ¹⁾ |
|-----------------------|----------|----------------------|
| G 1/2" | 1.0345 | RC11 |
| NPT 1/2" | 1.0345 | RD11 |

1) Product Configurator, "Accessory enclosed" ordering feature, option "P4".

Shutoff valve



| Max. working pressure [bar (psi)] | Connection thread [d] | Material | Option ¹⁾ |
|-----------------------------------|-----------------------|----------------|----------------------|
| 400 (5800) | G 1/2" | C22.8 (1.0460) | R1A1 |
| | | 316Ti (1.4571) | R1A2, B1A2 |
| | NPT 1/2" | C22.8 (1.0460) | R1D1 |
| | | 316Ti (1.4571) | R1D2, B1D2 |


1) Product Configurator, "Accessory enclosed" ordering feature, option "P2".

Welding necks and Weld-in tool flanges

| Designation | PMC51 | PMP51 | PMP55 | Option ¹⁾ |
|---|-------|-------|-------|----------------------|
| 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 G1-1/2, 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 |

1) Product Configurator, "Accessories" ordering feature

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

**Mounting bracket for wall
and pipe mounting** →  34 ff

M12 connector →  23 ff

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