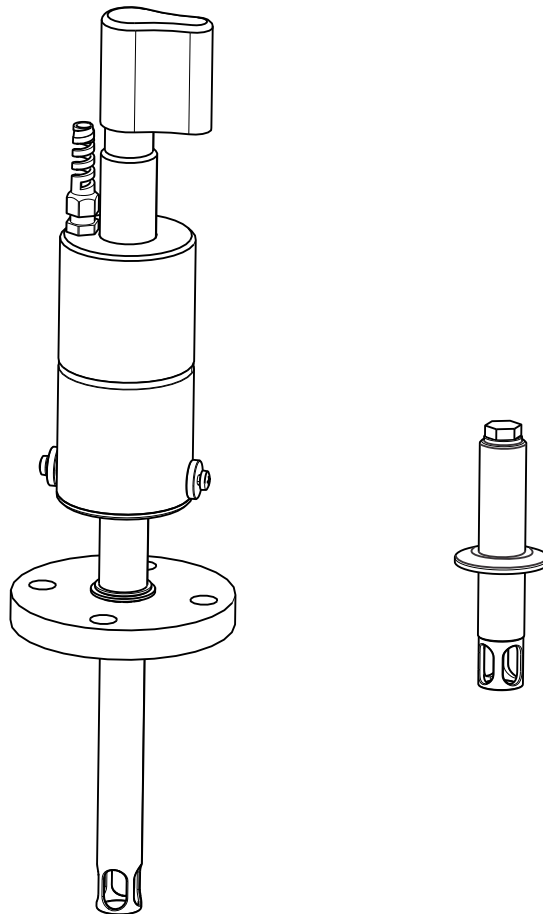


Operating Instructions

Unifit CPA442

Process assembly



Document information

Warning notices

The structure, signal words and safety colors of the warning notices comply with the specifications of ANSI Z535.6 ("Product safety information in product manuals, instructions and other collateral materials").

| Safety message structure | Meaning |
|--|--|
| ⚠ DANGER Causes (/consequences) Consequences of non-compliance (if applicable) ▶ Corrective action | This symbol alerts you to a dangerous situation. Failure to avoid the situation will result in a fatal or serious injury. |
| ⚠ WARNING Causes (/consequences) Consequences of non-compliance (if applicable) ▶ Corrective action | This symbol alerts you to a dangerous situation. Failure to avoid the situation can result in a fatal or serious injury. |
| ⚠ CAUTION Causes (/consequences) Consequences of non-compliance (if applicable) ▶ Corrective action | This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries. |
| NOTICE Cause/situation Consequences of non-compliance (if applicable) ▶ Action/note | This symbol alerts you to situations that can result in damage to property and equipment. |

Symbols used





-  Additional information, tips
-  Permitted or recommended
-  Forbidden or not recommended

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1 Basic safety instructions

1.1 Requirements for personnel

- ▶ Installation, commissioning, operation and maintenance of the measuring system must only be carried out by specially trained technical personnel.
 - ▶ The technical personnel must be authorized to perform such tasks by the owner-operator.
 - ▶ The electrical connection must only be performed by an electrical technician.
 - ▶ Technical personnel must have read and understood these Operating Instructions and must adhere to them.
 - ▶ Faults at the measuring point may only be rectified by authorized and specially trained personnel.
-  Repairs not described in the Operating Instructions supplied may only be carried out directly at the manufacturer's or by the service organization.

1.2 Designated use

The Unifit CPA442 process assembly is designed for the installation of 12 mm sensors in tanks, bio-reactors and pipelines.
Thanks to its mechanical construction, operation in pressurized systems is possible (see "Technical data").

Any use other than the one described here compromises the safety of persons and the entire measuring system and is not permitted.
The manufacturer is not liable for damage caused by improper or non-designated use.

1.3 Workplace safety

As the user, you are responsible for complying with the following safety conditions:

- Explosion protection guidelines (only devices approved for use in explosion hazardous areas)
- Installation specifications
- Local standards and regulations

1.4 Operational safety

- ▶ Before commissioning the entire measuring point, make sure all the connections are correct. Ensure that electrical cables and hose connections are not damaged.
- ▶ Do not operate damaged products, and secure them against unintentional commissioning. Mark the damaged product as defective.
- ▶ If faults cannot be rectified, the products must be taken out of service and secured against unintentional commissioning.

1.5 Product safety

The product is designed to meet state-of-the-art safety requirements, has been tested and left the factory in a condition in which it is safe to operate.
The applicable regulations and European standards have been considered.

2 Incoming acceptance and product identification

2.1 Incoming acceptance

- Make sure the packaging is undamaged!
- Inform the supplier about damage to the packaging. Keep the damaged packaging until the matter has been settled.
- Make sure the contents are undamaged!
- Inform the supplier about damage to the delivery contents. Keep the damaged products until the matter has been settled.
- Check the delivery to make sure nothing is missing. Compare it against the shipping documents and your order.
- Pack the product for storage and transportation in such a way that it is reliably protected against impact and moisture. The original packaging provides optimum protection. Furthermore, the permitted ambient conditions must also be observed (see "Technical data").
- If you have any questions, contact your supplier or your local sales center.

2.2 Product identification

2.2.1 Nameplate

The nameplate contains the following information:


- Manufacturer data
- Order code
- Extended order code
- Serial number
- Operating conditions
- Safety symbols

Compare the order code indicated on the nameplate with your order.

2.2.2 Identifying the product

The order code and serial number of your device can be found in the following locations:

- On the nameplate
- In the shipping documents

 To discover what product version you have, enter the order code on the nameplate into the search screen at the following address:
www.products.endress.com/order-ident

2.3 Scope of delivery

The scope of delivery comprises:

- Ordered assembly version
- Operating Instructions, English
- Process seal for process connections A, B, M and N

If you have any questions, contact your supplier or your local sales center.

3 Installation

3.1 Installation conditions

3.1.1 Installation angle

- | | | |
|---|------------------|--|
| A | Glass sensor: | Installation angle of at least 15° from the horizontal |
| B | ISFET pH sensor: | No restrictions, recommended 0 ... 180° |
| C | Oxygen sensor: | Installation angle of at least 10° from the horizontal |

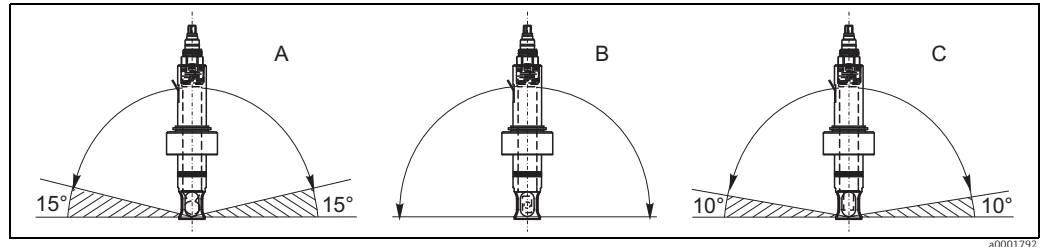


Fig. 1: Permitted installation angles depending on the sensor

- The assembly can only be installed when the tank is empty and the process is unpressurized.
- The assembly is designed for mounting on tanks and pipes. Suitable sockets must be available for this.
- The mounting seal that seals the adapter from the process socket must be provided by the customer (except for versions A, B, M and N, DN 25 Standard and DN 25 B.Braun Port).

3.1.2 Dimensions

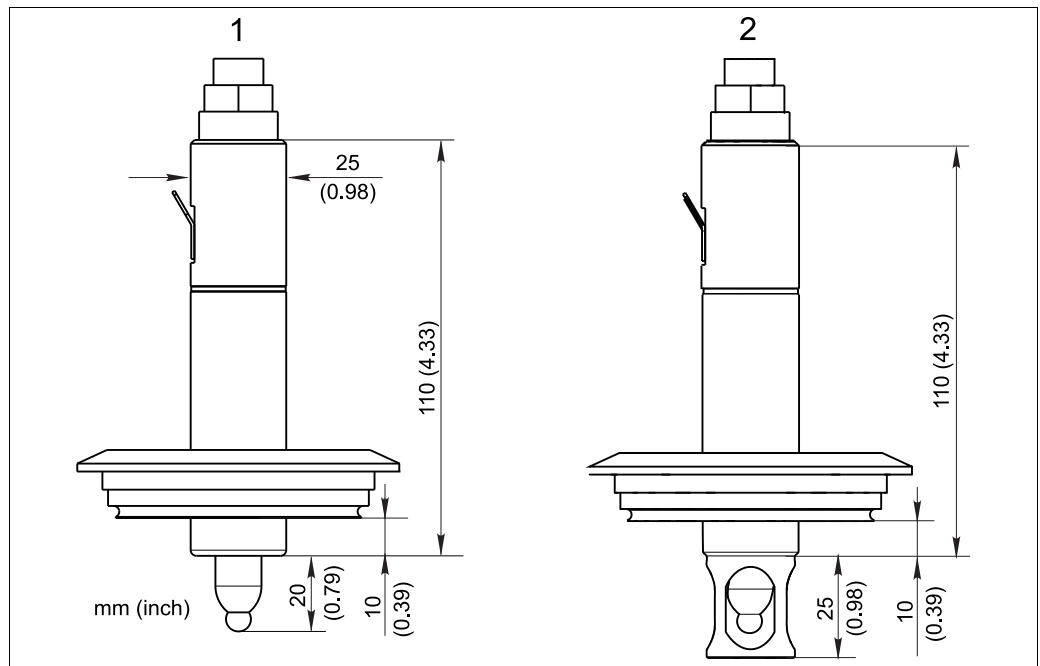


Fig. 2: Dimensions (1 = version G, 2 = Varivent)

- 1 Without sensor protection guard
- 2 With sensor protection guard

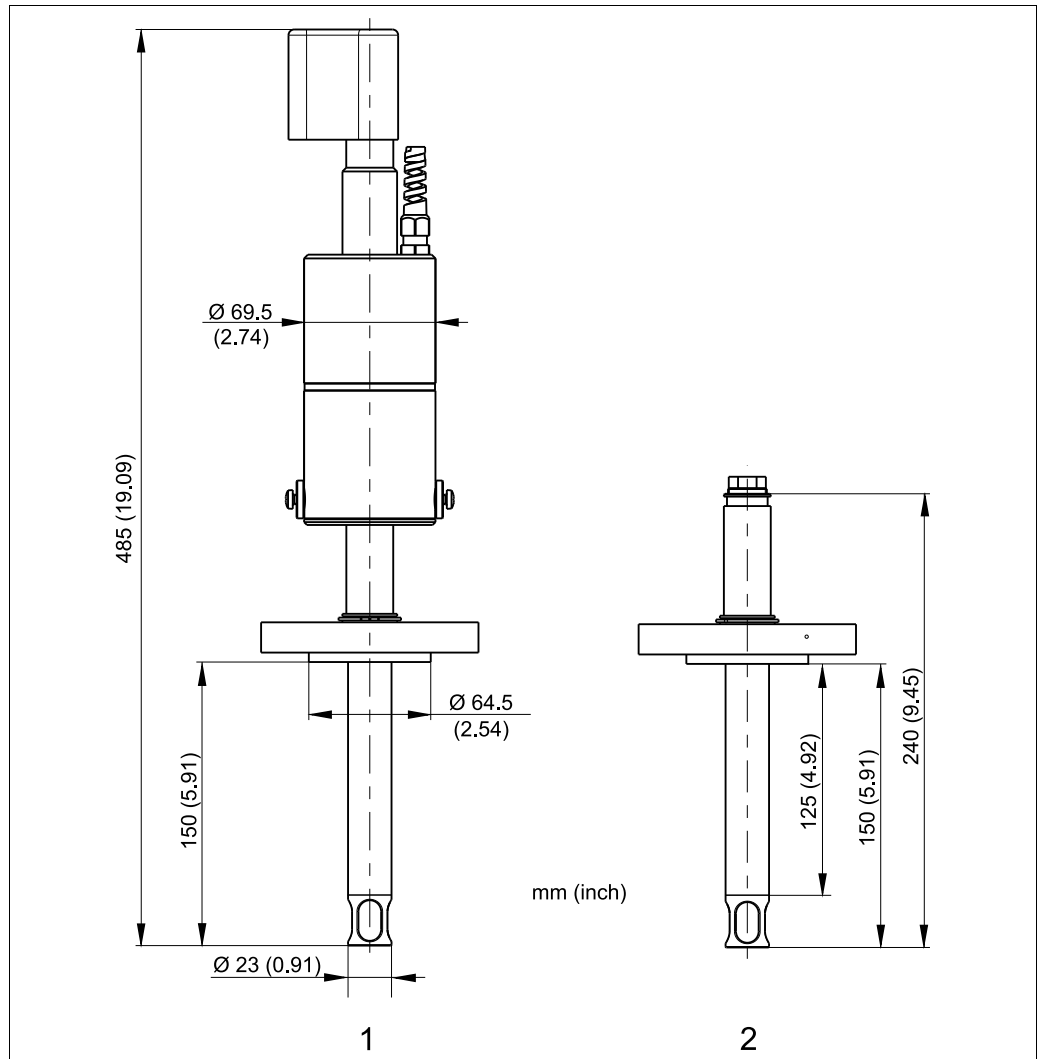


Fig. 3: Dimensions (version V, flange)

- 1 With sensor protection cover
- 2 Without sensor protection cover

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3.1.3 Process connections

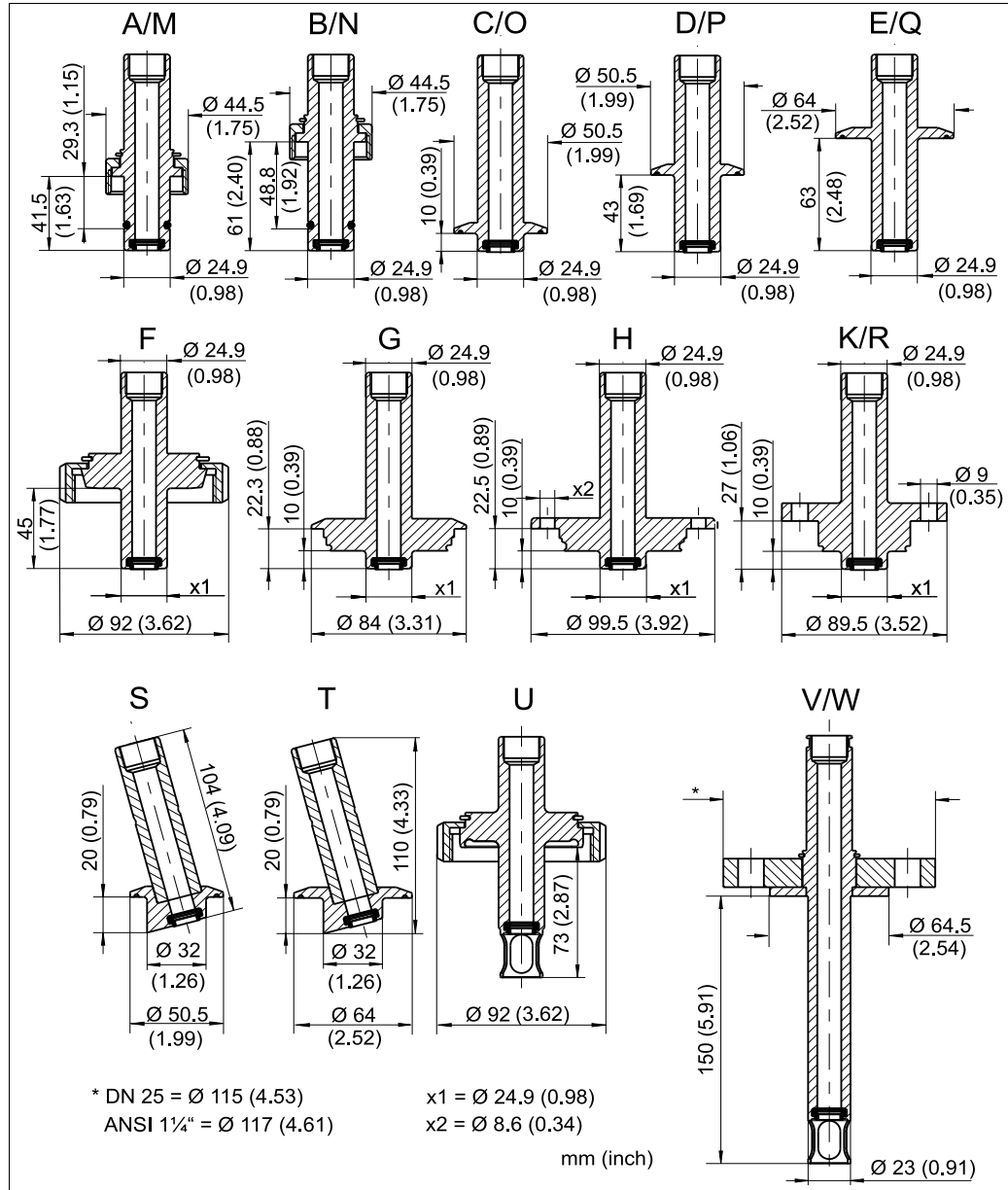


Fig. 4: Process connections

- | | | | |
|---|--|---|--|
| A | DN 25 standard / 41.5 mm (1.6") / with PM | M | DN 25 standard / 41.5 mm (1.6") / without PM |
| B | DN 25 B.Braun port / 61 mm (2.4") / with PM | N | DN 25 B.Braun port / 61 mm (2.4") / without PM |
| C | Clamp 1.5" / 10 mm (0.4") / with PM | O | Clamp 1.5" / 10 mm (0.4") / without PM |
| D | Clamp 1.5" / 43 mm (1.7") / with PM | P | Clamp 1.5" / 43 mm (1.7") / without PM |
| E | Clamp 2" / 63 mm (2.5") / with PM | Q | Clamp 2" / 63 mm (2.5") / without PM |
| F | Dairy fitting DN 50 DIN 11851 / 45 mm (1.8") / with PM | R | Neumo BioControl D 50 / 10 mm (0.4") / without PM |
| G | Varivent DN 40-125 / 10 mm (0.4") / with PM | S | PM |
| H | APV DN 40-100 / 10 mm (0.4") / with PM | T | Clamp 1.5" angular 15° / 20 mm (0.8") / without PM |
| K | Neumo BioControl D 50 / 10 mm (0.4") / with PM | U | Clamp 2" angular 15° / 20 mm (0.8") / without PM |
| | | V | DIN 11864-1-A / aseptic DN 50 / without PM |
| | | W | Flange DN 25 / 150 mm (5.9") / without PM |
| | | | Flange ANSI 150 lbs 1¼" / 150 mm (5.9") / without PM |

3.2 Installation instructions

3.2.1 Measuring system

A complete measuring system comprises:

- Unifit CPA442 assembly
- 120 mm sensor, e.g. Orbisint CPS11D or Oxymax COS22D, with or without Memosens technology, NIR sensors e.g. OUSBT66
- 225 mm sensor for version V and W
- Transmitter, e.g. Liquiline CM44x
- Measuring cable

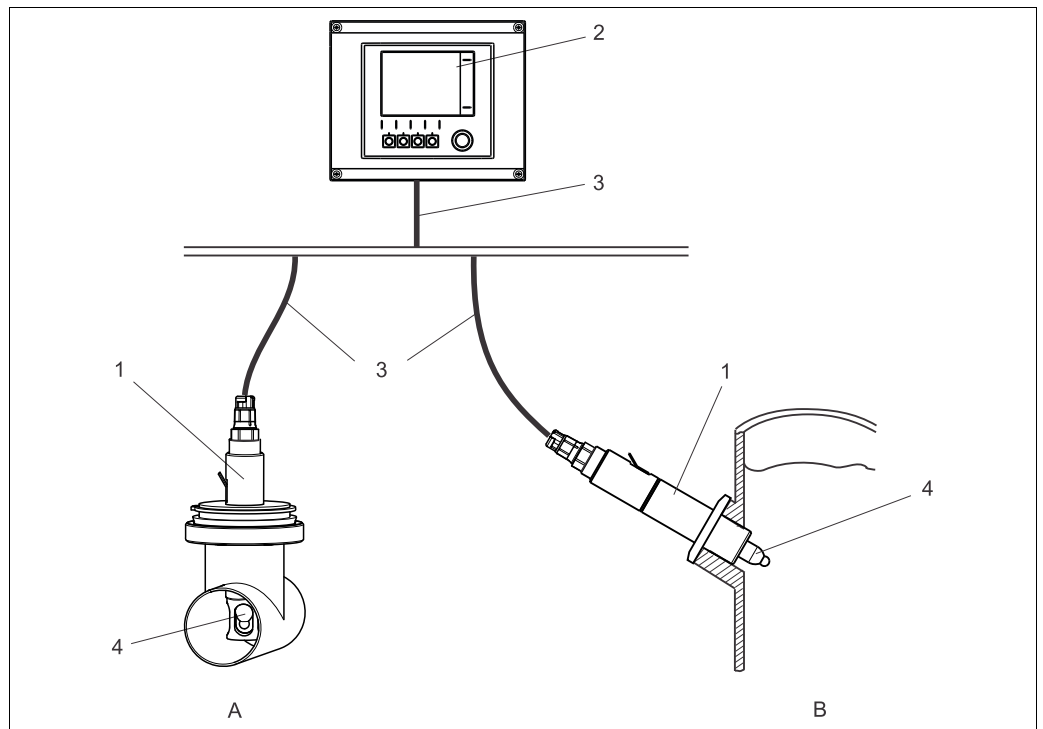


Fig. 5: Example of a measuring system

- 1 Unifit CPA442
- 2 Liquiline CM44x
- 3 Measuring cable
- 4 Orbisint CPS11D
- A Installation in pipe
- B Installation in reactor

3.2.2 Installing the assembly in the process

▲ WARNING

If medium escapes, this poses a risk of injury from high pressure, high temperature or contact with chemicals.

- ▶ Wear protective clothing, gloves and goggles.
 - ▶ Only mount the assembly on empty and unpressurized tanks or pipes.
1. Make sure the seal between the assembly and process adapter sealing surface is seated and positioned correctly.
 2. Secure the assembly to the tank or pipe with the process connection. In the case of versions A, B, M and N, only tighten the union nut finger-tight.
 3. If you are not installing a sensor immediately, install the dummy plug instead of the sensor.

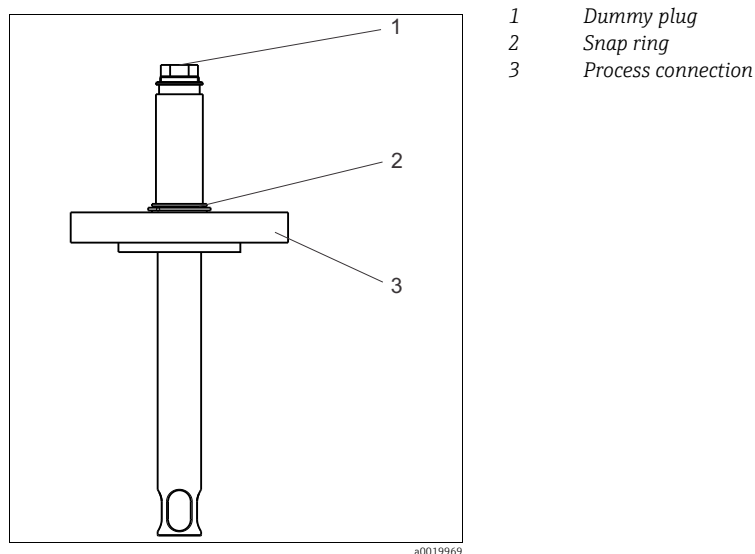



Fig. 6: Installation

3.2.3 Sensor installation

▲ WARNING

If medium escapes, this poses a risk of injury from high pressure, high temperature or contact with chemicals.

- ▶ Wear protective clothing, gloves and goggles.
- ▶ Only mount the sensor on empty and unpressurized tanks or pipes.

1. Remove the protection cap on the sensor. Make sure that the O-ring and thrust collar (→ , item 1) are present.
2. Immerse the sensor shaft in water. This makes installation easier.
3. Remove the dummy plug.
4. Screw in the sensor:
 - first screw it in finger-tight,
 - then tighten it by approx. ¼ rotation with a socket wrench (17 mm AF).
5. Connect the measuring cable to the sensor.
6. For KCl sensors: connect the KCl supply line.

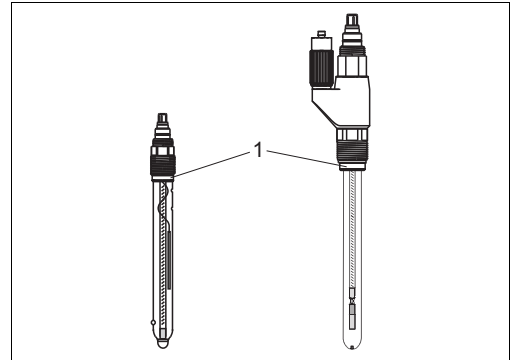


Fig. 7: Sensor installation

1 Thrust collar with O-ring

3.3 Post-installation check

- After installation, check all the connections to ensure they are secure and leak-tight.
- Ensure that the hoses can only be removed by force.
- Check all hoses for damage.

4 Maintenance

⚠ WARNING

Risk of injury if medium escapes!

- ▶ Before performing any maintenance task, make sure that the process pipe is unpressurized, empty and rinsed.

4.1 Cleaning the assembly

The assembly must be cleaned regularly to ensure stable and reliable sampling. The frequency and intensity of the cleaning process depend on the medium.

- Remove light dirt using suitable cleaning solutions (see the "Cleaning agent" section).
- Use a soft brush and a suitable cleaning agent for stubborn dirt.
- For very persistent dirt, soak the parts in a cleaning solution and then clean the parts with a brush.

i A typical cleaning interval for drinking water would be 6 months, for instance.

You can also clean the assembly in-line (CIP).

You can also sterilize the assembly in-line (SIP) if the sensor is SIP-enabled and the assembly is made from stainless steel or Alloy C22.

The assembly can also be autoclaved with the appropriate sensor.

4.2 Cleaning agent

The choice of cleaning agent depends on the degree and type of fouling. The most common fouling and the suitable cleaning agents are provided in the following table.

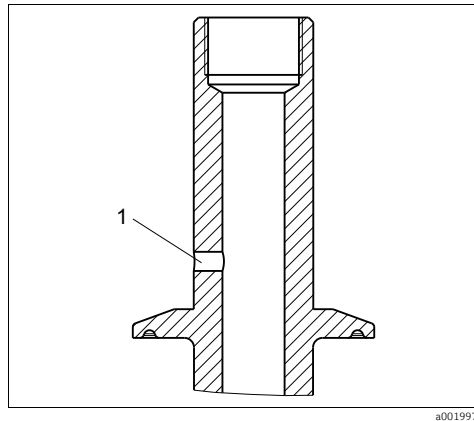
| Type of fouling | Cleaning agent |
|--|---|
| Greases and oils | Agents containing surfactants (alkaline) or water-soluble organic solvents (halogen-free, e.g. ethanol) |
| Lime deposits, metal hydroxide buildup, lyophobic biological buildup | Approx. 3% hydrochloric acid |
| Sulfide deposits | Mixture of 3% hydrochloric acid and thiocarbamide (commercially available) |
| Proteins deposits | Mixture of 3% hydrochloric acid and pepsin (commercially available) |
| Fibers, suspended substances | Pressurized water, possibly surface-active agent |
| Light biological deposits | Pressurized water |

⚠ CAUTION

Health risk due to solvents

- ▶ Do not use acetone or organic solvents containing halogen. These solvents can destroy plastic parts of the sensor and some are also suspected of being carcinogenic (e.g. chloroform).

4.3 Leak monitoring (optional)



Check for leaks (visual inspection) at regular intervals. If medium has escaped at the monitoring hole, the molded seal must be replaced.

Fig. 8: Leakage monitoring

1 Leak monitoring

4.4 Replacing the seals

To replace the seals in the assembly, you must interrupt the process and remove the entire assembly.

⚠ CAUTION

Residual medium and high temperatures can cause injury

- ▶ Protect yourself against residual medium and high temperatures when handling parts in contact with the medium. Wear protective goggles and safety gloves.

Clean the assembly before replacing the seals (see the "Cleaning the assembly" section).

Preparatory steps:

1. Interrupt the process. Watch out for residual medium, residual pressure and high temperatures.
2. Remove the sensor.
3. Detach the assembly completely from the process connection.
4. Clean the assembly (see the "Cleaning the assembly" section).

Replacing the seals:

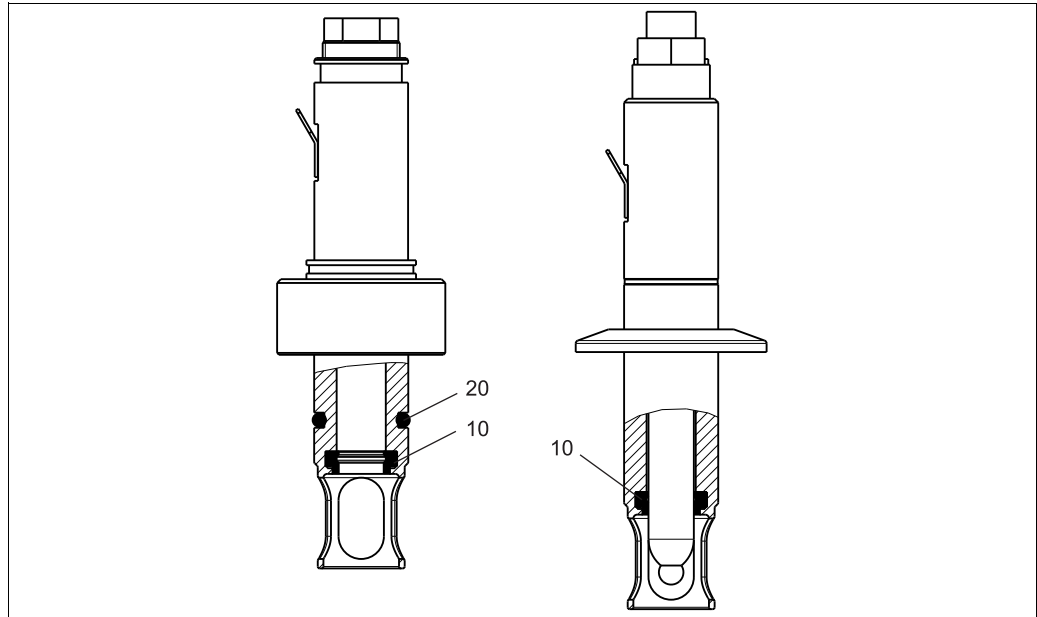


Fig. 9: Position of the seals
 10 Molded seal for all versions
 20 O-ring for process connection version A, B, M and N

1. Coat the new seals with a thin film of grease (e.g. Syntheso Glep1).
2. Replace the seals indicated.
3. Install the sensor into the assembly.
4. Install the assembly again.

| Kit No. | Kit Item No. (installation drawing) | Size | Comments/material |
|----------|-------------------------------------|-----------------|--------------------------------|
| 51507170 | Item 20 | ID 18.66 W 3.53 | EPDM, FDA, USP class VI |
| 51507170 | Item 10 | Molded seal | EPDM, FDA, USP class VI |
| 51507169 | Item 20 | ID 18.66 W 3.53 | FKM (Viton), FDA, USP class VI |
| 51507169 | Item 10 | Molded seal | FKM (Viton), FDA, USP class VI |
| 51507171 | Item 20 | ID 18.66 W 3.53 | Silicone, FDA, USP class VI |
| 51507171 | Item 10 | Molded seal | Silicone, FDA, USP class VI |

5 Repair

5.1 Replacing damaged parts

⚠ WARNING

Incorrect repair work can pose a hazard

- ▶ Damage to the assembly which impacts the pressure safety must **only** be repaired by authorized technical personnel.
- ▶ After every repair and maintenance activity, suitable measures must be taken to check the assembly and ensure it shows no signs of leaking. Afterwards, the assembly must again meet the specifications in the technical data.

Replace all other damaged components immediately.

5.2 Spare parts kits

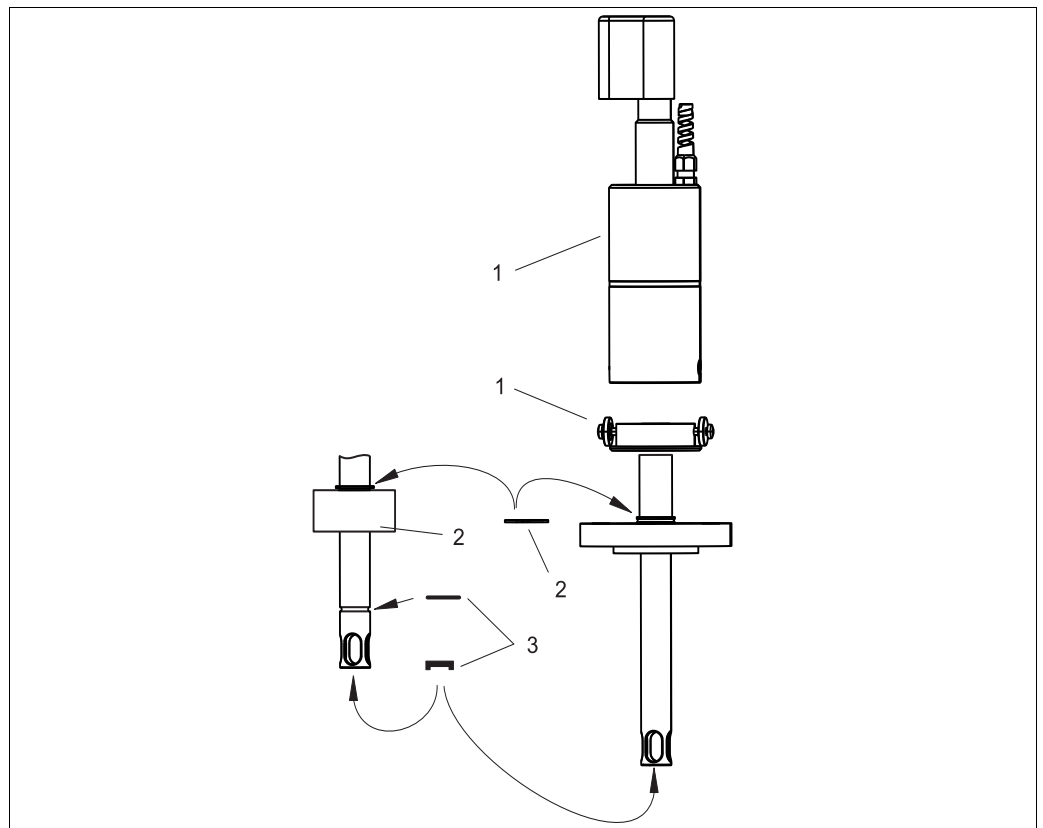




Fig. 10: Spare parts

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 Please refer to the following table for the order numbers of the spare parts kits based on the item numbers in →  10.

| Item No. | Kit name and content | Order number of spare parts kit |
|----------|---|---------------------------------|
| 1 | Protection cover with mounting plate | 71214966 |
| 2 | Union nut G1¼, brass, with circlip | 71214967 |
| | Union nut G1¼, stainless steel 1.4571 (AISI 316 Ti), with circlip | 71214968 |
| 3 | Seal set, EPDM, FDA USP class VI | 51507170 |
| | Seal set, FKM (Viton), FDA USP class VI | 51507169 |
| | Seal set, silicone, FDA USP class VI | 51507171 |

5.3 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product has been ordered or delivered. According to legal regulations Endress+Hauser, as an ISO-certified company, is required to follow certain procedures when handling returned products that are in contact with the medium.

To ensure swift, safe and professional device returns:

Check the website for information about the return procedure and basic conditions
www.services.endress.com/return-material

5.4 Disposal

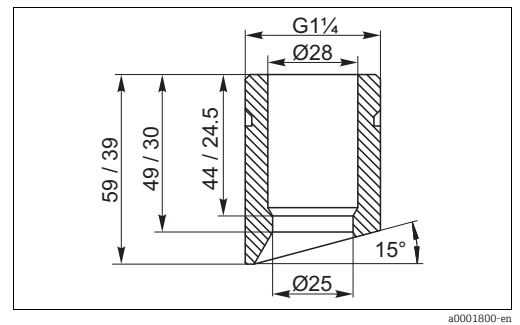
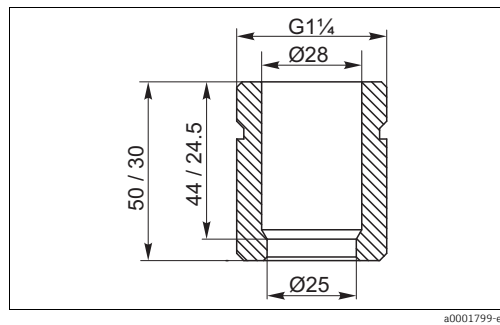
Please observe local regulations when disposing of the product.

6 Accessories

6.1 Seals

- EPDM seal set for CPA442; order no. 51507170
- FKM (Viton®) seal set for CPA442; order no. 51507169
- Silicone seal set for CPA442; order no. 51507171

6.2 Installation accessories



- DN25 safety welding socket, straight, stainless steel 1.4435, L=50; order no. 51508049
only for CPA442-B*****
only for CPA442-N*****
 - DN25 safety welding socket, angled, stainless steel 1.4435, L=50/60; order no. 51508050
only for CPA442-B*****
only for CPA442-N*****
 - DN25 safety welding socket, straight, stainless steel 1.4435, L=30; order no. 51508051
only for CPA442-A*****
only for CPA442-M*****
 - DN25 safety welding socket, angled, stainless steel 1.4435, L=30/40; order no. 51508052
only for CPA442-A*****
only for CPA442-M*****
- i** Already existing standard welding sockets (for CPA440 / CPA441 / CPA460), order no. 50005192 and 50028446, are also suitable for the CPA442 assembly.

Flow vessel DN 25,

- G 1¼ external thread, stainless steel 1.4404 (AISI 316 L);
- order no. 51502801

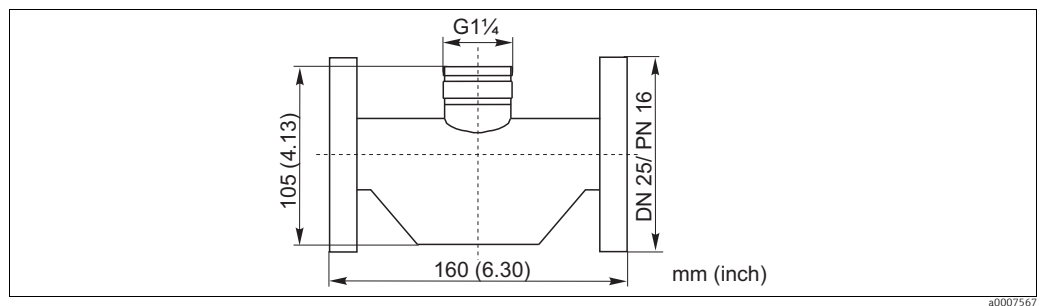


Fig. 11: Flow vessel

Dummy plug for welding socket,

- Stainless steel 1.4435 (AISI 316 L) with EPDM seal (USP Class VI), G 1¼
- Order no. for socket length 30 mm: 71213701
- Order no. for socket length 50 mm: 71213702

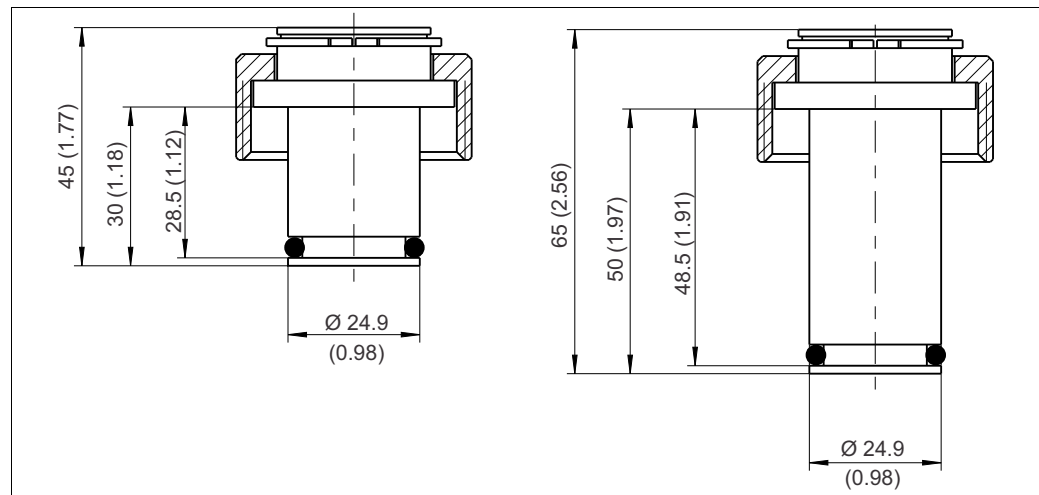


Fig. 12: Dummy plug

6.3 Sensors

Orbisint CPS11/CPS11D

- pH sensor for process applications
- Optional SIL version for connection to SIL approved transmitters
- With dirt-repellent PTFE diaphragm
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps11 or www.products.endress.com/cps11d)
- Technical Information TI028C/07/EN

Orbisint CPS12/CPS12D

- ORP electrode for process applications
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps12 or www.products.endress.com/cps12d)
- With dirt-repellent PTFE diaphragm
- Technical Information TI367C/07/EN

Ceraliquid CPS41/CPS41D

- pH sensor With ceramics diaphragm and liquid KCl electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps41 or www.products.endress.com/cps41d)
- Technical Information TI079C/07/EN

Ceraliquid CPS42/CPS42D

- ORP electrode With ceramics diaphragm and liquid KCl electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps42 or www.products.endress.com/cps42d)
- Technical Information TI373C/07/EN

Ceragel CPS71/CPS71D

- pH sensor With double chamber reference system and integrated bridge electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps71 or www.products.endress.com/cps71d)
- Technical Information TI245C/07/EN

Ceragel CPS72/CPS72D

- ORP electrode With double chamber reference system and integrated bridge electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps72 or www.products.endress.com/cps72d)
- Technical Information TI374C/07/EN

Orbipore CPS91/CPS91D

- pH sensor With open aperture for media with high dirt load
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps91 or www.products.endress.com/cps91d)
- Technical Information TI375C/07/EN

Orbipore CPS92/CPS92D

- ORP sensor With open aperture for media with high dirt load
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps92 or www.products.endress.com/cps92d)
- Technical Information TI435C/07/EN

Tophit CPS471/CPS471D

- Sterilizable and autoclavable ISFET sensor for food and pharmaceuticals, process technology,
- water treatment and biotechnology;
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps471 or www.products.endress.com/cps471d)
- Technical Information TI283C/07/EN

Tophit CPS441/CPS441D

- Sterilizable ISFET sensor for media with low conductivity, with
- liquid KCl electrolyte;
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps441 or www.products.endress.com/cps441d)
- Technical Information TI352C/07/EN

Tophit CPS491/CPS491D

- ISFET sensor with open aperture for media with high dirt load;
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps491 or www.products.endress.com/cps491d)
- Technical Information TI377C/07/EN

Oxymax COS22D

- Sterilizable sensor for dissolved oxygen
- Order as per product structure (--> Online configurator, www.products.endress.com/cos22d)
- Technical Information TI446C/07/EN

7 Technical data

7.1 Environment

Ambient temperature -15 to 80 °C (+5 to 176 °F)

Storage temperature -15 to 60 °C (+5 to 140 °F)

7.2 Process

| | | |
|----------------------------------|-------------------------------|-------------------------------|
| Process temperature range | Stainless steel and Alloy C22 | -15 to 140 °C (+5 to 284 °F) |
| | PEEK | -10 to 140 °C (+14 to 284 °F) |
| | PVDF | -10 to 120 °C (+14 to 248 °F) |

| | | |
|-------------------------|-------------------------------|--|
| Process pressure | Stainless steel and Alloy C22 | 12 bar (174 psi) up to 90 °C (194 °F) 6 bar (87 psi) up to 140 °C (284 °F) 5 bar (72.5 psi) at 150 °C (302 °F) max. 60 minutes |
| | PEEK | 8 bar (116 psi) up to 60 °C (140 °F) 2 bar (29 psi) up to 140 °C (284 °F) |
| | PVDF | 6 bar (87 psi) up to 60 °C (140 °F) 2 bar (29 psi) up to 120 °C (248 °F) |

7.2.1 Pressure / temperature diagram

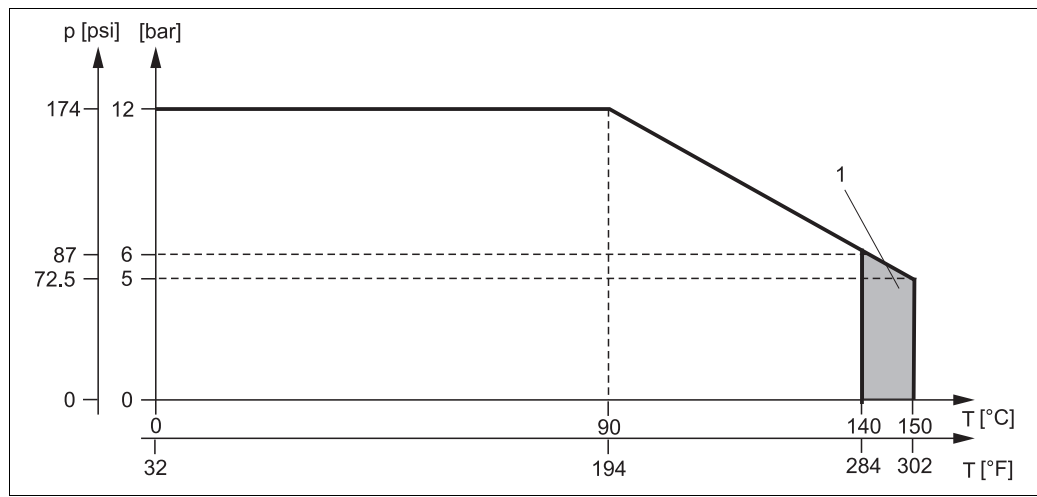


Fig. 13: Pressure temperature diagram for stainless steel 1.4435 (AISI 316 L) and Alloy C22

1 Short term for sterilization (max. 60 minutes)

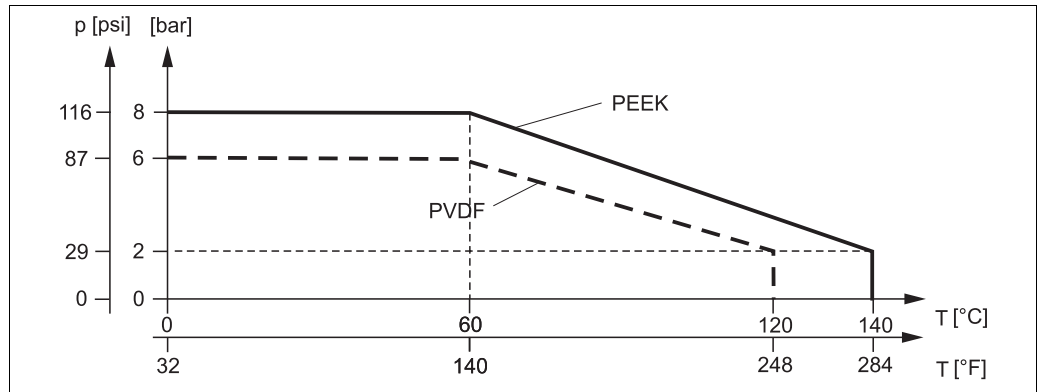


Fig. 14: Pressure temperature diagram for PEEK and PVDF

7.3 Mechanical construction

| | | |
|---------------------------|--|--|
| Dimensions | See the "Installation" section | |
| Weight | Assembly with process connections A to 0.5 to 1.4 kg (1.1 to 3.1 lbs) U Assembly with process connections V and W approx. 2.5 kg (5.5 lbs) Protection cover: approx. 1.0 kg (2.2 lbs) | |
| Materials | In contact with medium | |
| | Seals: | EPDM, FDA according to 21CFR 177.2600, USP Class VI FKM (Viton), FDA according to 21CFR 177.2600, USP Class VI Silicone, FDA according to 21CFR 177.2600, USP Class VI |
| | Assembly: | FFKM (Kalrez) on request Stainless steel 1.4435 (AISI 316 L) Alloy C22 PVDF PEEK |
| | Dummy plug (Pg 13.5): | PP |
| | Not in contact with medium | |
| | Union nut: | Stainless steel 1.4571 (AISI 316 Ti) optional nickel-plated brass |
| | Protection cover: | POM black |
| Process connection | See the "Installation" section | |

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