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2026-10-15

Brief Operating Instructions
Cleanfit CPA871

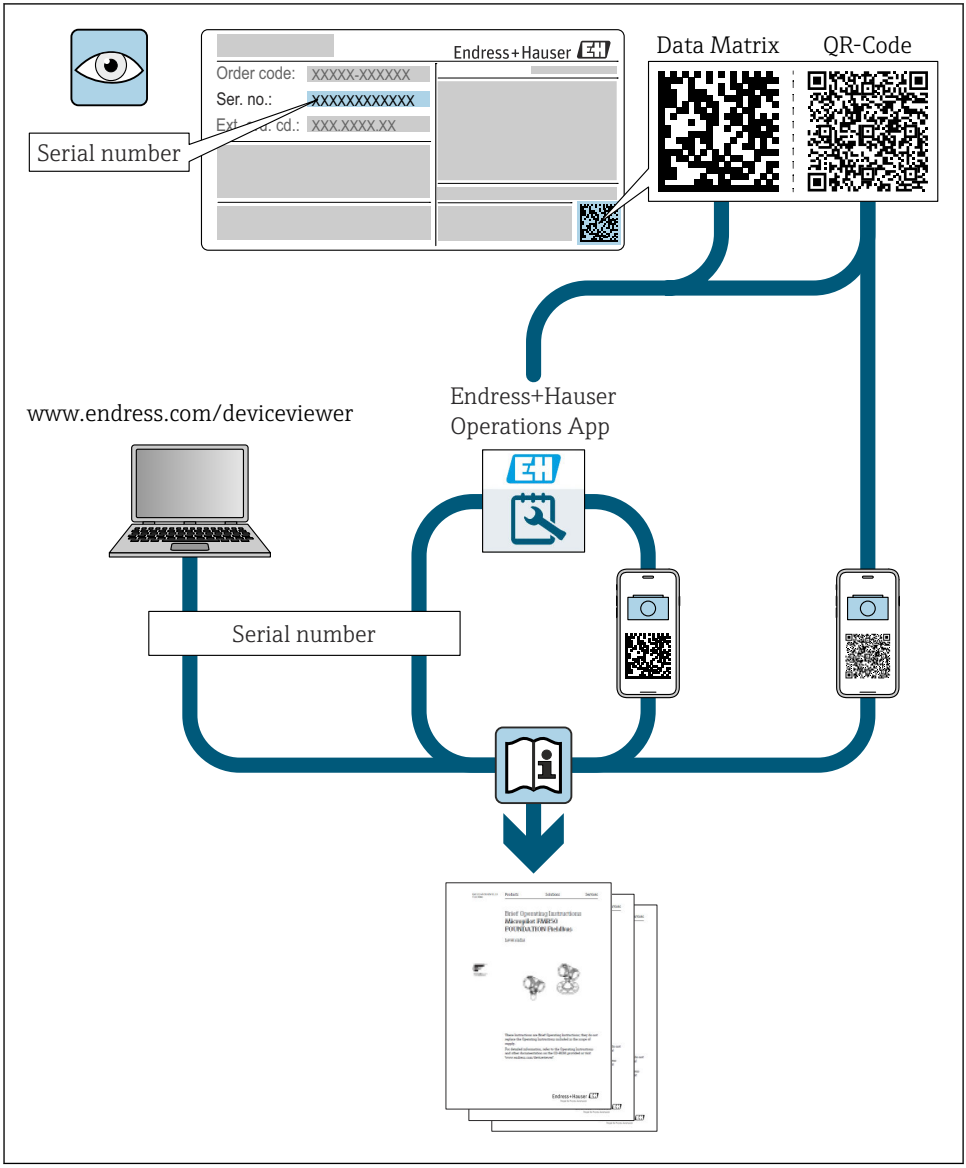
Flexible retractable process assembly for water, wastewater, chemical industry and heavy industry

These instructions are Brief Operating Instructions; they are not a substitute for the Operating Instructions pertaining to the device.

Detailed information on the device can be found in the Operating Instructions and in the other documentation available at:

- www.endress.com/device-viewer
- Smart phone/tablet: Endress+Hauser Operations App

Endress+Hauser
People for Process Automation


Serial number
Endress+Hauser
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Ser. no.: XXXXXXXXXXXX
Ext. ord. cd.: XXX.XXXX.XX
Data Matrix
QR-Code
www.endress.com/deviceviewer
Endress+Hauser
Operations App
Serial number

A0023555

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1 About this document

1.1 Safety information

Structure of information	Meaning
DANGER **Causes (/consequences)** If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation **will** result in a fatal or serious injury.
WARNING **Causes (/consequences)** If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation **can** result in a fatal or serious injury.
CAUTION **Causes (/consequences)** If necessary, 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** If necessary, Consequences of non-compliance (if applicable) ▶ Action/note	This symbol alerts you to situations which may result in damage to property.

1.2 Symbols

- Additional information, tips
- Permitted
- Recommended
- Not permitted or not recommended
- Reference to device documentation
- Reference to page
- Reference to graphic
- Result of an individual step

1.2.1 Symbols on the device

- Reference to device documentation
- Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

2 Basic safety instructions

2.1 Requirements for the personnel

- Installation, commissioning, operation and maintenance of the measuring system may be carried out only by specially trained technical personnel.
- The technical personnel must be authorized by the plant operator to carry out the specified activities.
- The electrical connection may be performed only by an electrical technician.
- The technical personnel must have read and understood these Operating Instructions and must follow the instructions contained therein.
- Faults at the measuring point may only be rectified by authorized and specially trained personnel.

Repairs not described in the Operating Instructions provided must be carried out only directly at the manufacturer's site or by the service organization.

2.2 Intended use

The Cleanfit CPA871 retractable assembly, which can be manually or pneumatically operated, is designed for the installation of sensors in vessels and pipes.

Thanks to its design, it can be operated in pressurized systems ().

Any use other than that intended puts the safety of people and the measuring system at risk. Therefore, any other use is not permitted.

The manufacturer is not liable for harm caused by improper or unintended use.

2.2.1 Use in explosion-proof areas

As a manufacturer of products used for analysis, we declare that the product supplied has undergone an ignition risk assessment and may be used in hazardous atmospheres once the following conditions for safe usage have been met:

- The protective ring is labeled as follows: "CAUTION, DANGER DUE TO ELECTROSTATIC CHARGES, CLEAN USING ONLY AN ANTISTATIC CLOTH". This instruction must be observed.
- Assemblies comprising wetted parts made of non-conductive material, must not be used in potentially explosive atmospheres.
- The compressed air supply, sensors and limit position switches must comply with the applicable guidelines and standards for use in hazardous atmospheres, be labeled with the degree of protection and meet the requirements of the relevant range of application. The ambient temperatures must be observed. The limit position switch used in the product complies with this requirement.
- Ensure that the compressed air does not contain a potentially explosive atmosphere.
- Please ensure that movements associated with the retraction and insertion of the sensor do not damage the connection.
- The product must be incorporated into the local potential equalization system.
- The Operating Instructions for the product and in particular the conditions for safe usage must be read, understood and implemented.

The product does not need to be labeled with the degree of protection.

2.3 Workplace safety

The operator is responsible for ensuring compliance with the following safety regulations:
- Installation guidelines
- Local standards and regulations

2.4 Operational safety

Before commissioning the entire measuring point:

1. Verify that all connections are correct.
2. Ensure that electrical cables and hose connections are undamaged.

Procedure for damaged products:

1. Do not operate damaged products, and protect them against unintentional operation.
2. Label damaged products as defective.

During operation:

- ▶ If errors cannot be rectified,
  take products out of service and protect them against unintentional operation.

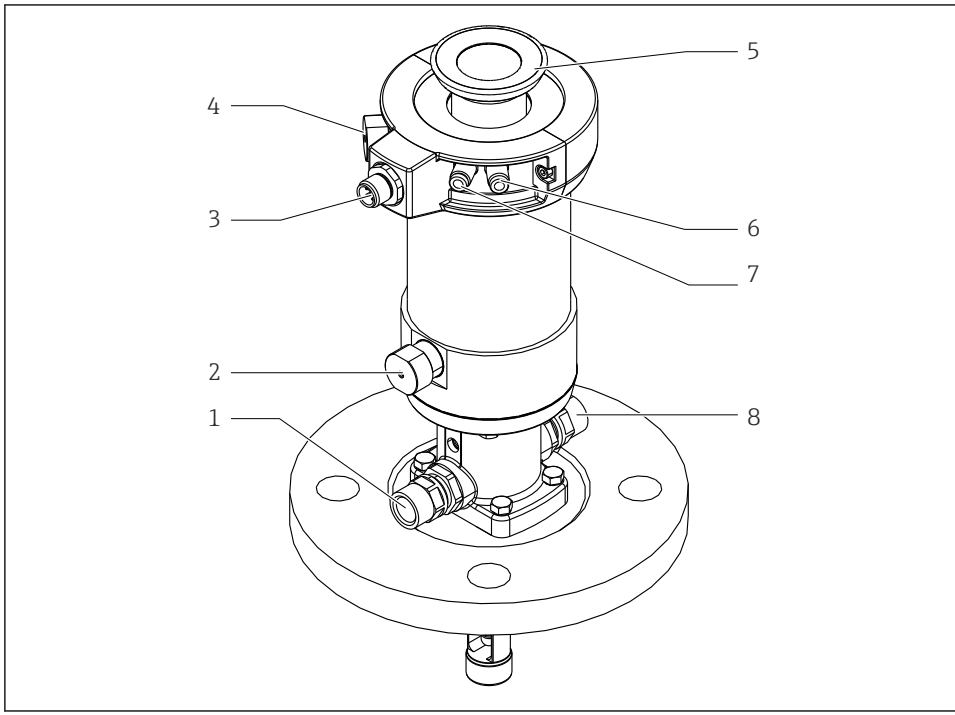
2.5 Product safety

2.5.1 State-of-the-art technology

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 relevant regulations and international standards have been observed.

3 Product description

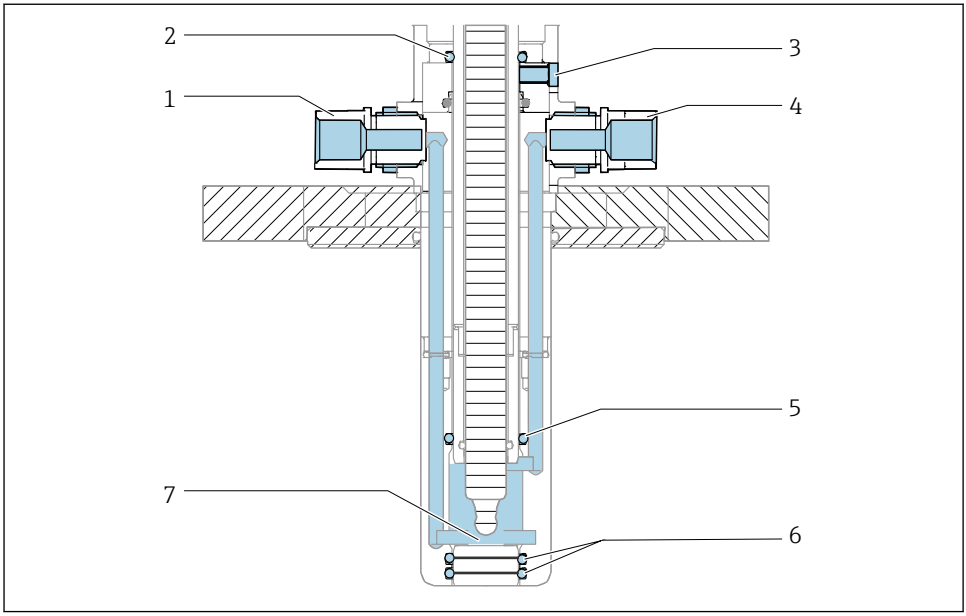
3.1 Product design



1 Assembly with pneumatic drive (without protective cover)

1 Rinse connection (outlet)
2 Automatic limit position lock, process
3 Connection for limit position switch
4 Automatic limit position lock, service
5 Fastening ring for protective cover
6 Pneumatic connection (move to measuring position)
7 Pneumatic connection (move to service position)
8 Rinse connection (inlet)

3.1.1 Operating principle



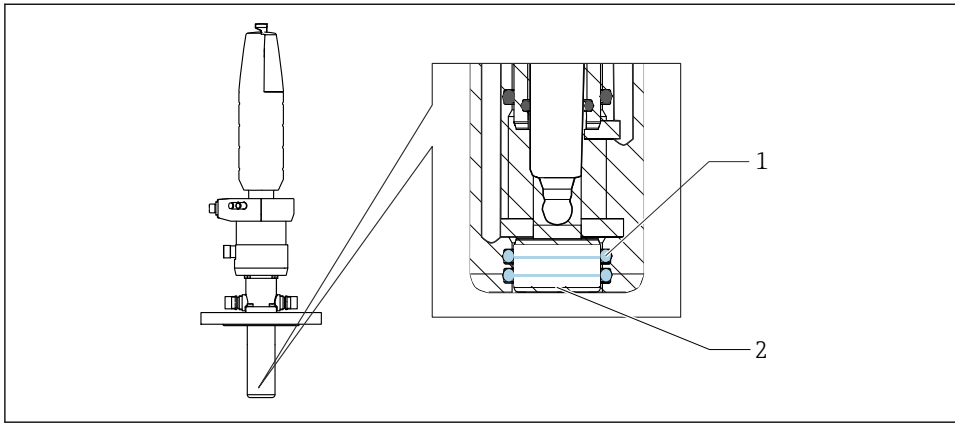
2 *Sealing system, assembly in service position*

1 *Rinse chamber, inlet*
2 *Seal drive (1 x O-ring)*
3 *Leakage hole*
4 *Rinse chamber, outlet*
5 *Seal, rinse chamber (1 x O-ring)*
6 *Process seal (2 x O-ring)*
7 *Rinse chamber*

The assembly is open to the process during insertion/retraction; the rinse connections must either be pipe-fitted or sealed.

The assembly has a pin seal. This seals the assembly from the process in the relevant limit position.

Process seal



3 Process seal, assembly in service position

1 Process seal (2 x O-ring)
2 Pin

4 Incoming acceptance and product identification

4.1 Incoming acceptance

1. Verify that the packaging is undamaged.
   ↳ Notify the supplier of any damage to the packaging.
   Keep the damaged packaging until the issue has been resolved.
2. Verify that the contents are undamaged.
   ↳ Notify the supplier of any damage to the delivery contents.
   Keep the damaged goods until the issue has been resolved.
3. Check that the delivery is complete and nothing is missing.
   ↳ Compare the shipping documents with your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
   ↳ The original packaging offers the best protection.
   Make sure to comply with the permitted ambient conditions.

If you have any questions, please contact your supplier or your local Sales Center.

4.2 Scope of delivery

The scope of delivery comprises:
- Assembly in the version ordered
- Operating Instructions
- Adapter for plug-in connector, 6 mm (0.24 in) to 4 mm (0.16 in) (outer diameter)
- Optional accessories ordered

4.3 Product identification

4.3.1 Nameplate

The nameplate provides you with the following information on your device:
- Manufacturer identification
- Order code
- Extended order code
- Serial number
- Ambient and process conditions
- Safety information and warnings

▶ Compare the information on the nameplate with the order.

4.3.2 Identifying the product

The order code and serial number of your product can be found in the following locations:
- On the nameplate
- In the delivery papers

Obtaining information on the product

1. Go to www.endress.com.
2. Page search (magnifying glass symbol): Enter valid serial number.
3. Search (magnifying glass).
   ↳ The product structure is displayed in a popup window.
4. Click the product overview.
   ↳ Here you will find information pertaining to your device, including the product documentation.

Product page

www.endress.com/CPA871

Manufacturer address

Endress+Hauser Conducta GmbH+Co. KG
Dieselstraße 24
70839 Gerlingen
Germany

5 Installation

5.1 Installation requirements

5.1.1 Orientation

NOTICE

Frost damage to the assembly

► If used outdoors, ensure that water cannot penetrate the drive.

The assembly is designed to be mounted on vessels and pipes. Suitable process connections must be available for this.

The assembly is designed in such a way that there are no restrictions with regard to the orientation.

The sensor that is used can restrict the orientation.

Ensure compliance with the Operating Instructions of the sensor installed.

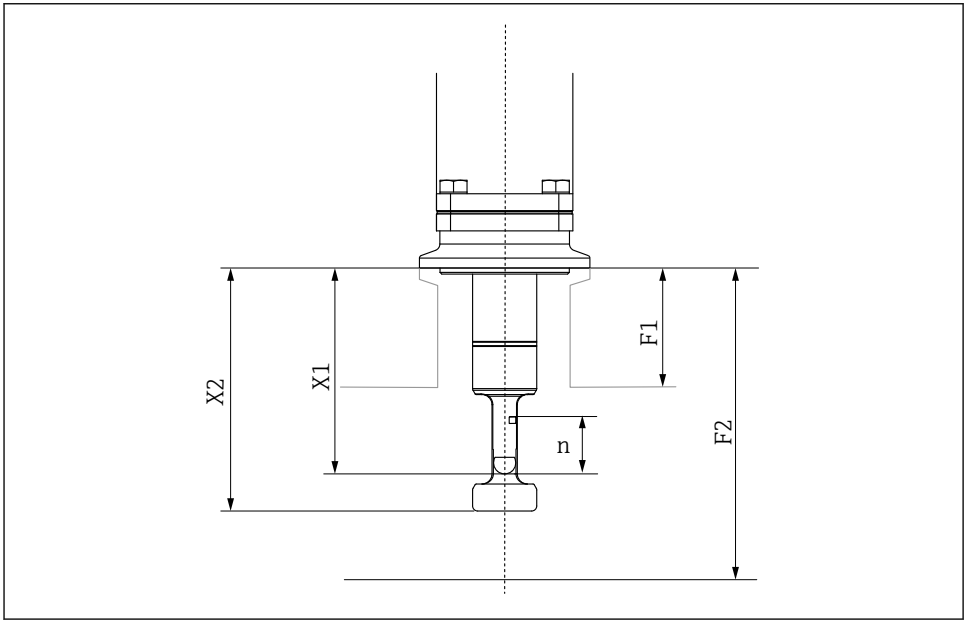
Installation free of dead space

A measurement in the dead space is inaccurate due to the low exchange of medium.

► Install the assembly in such a way that measurement is not possible in the dead space.

Configure the installation in such a way that dimension X1, reduced by the distance between the measuring elements n (in the case of pH sensors 20 mm (0.8 in)), exceeds dimension F1 (distance between the process connection support and the inside of the pipe).

When installing inside a pipe, make sure the sensor guide does not hit the opposite wall. To do this, ensure that dimension X2 is smaller than dimension F2 (distance between process connection and inside of pipe).



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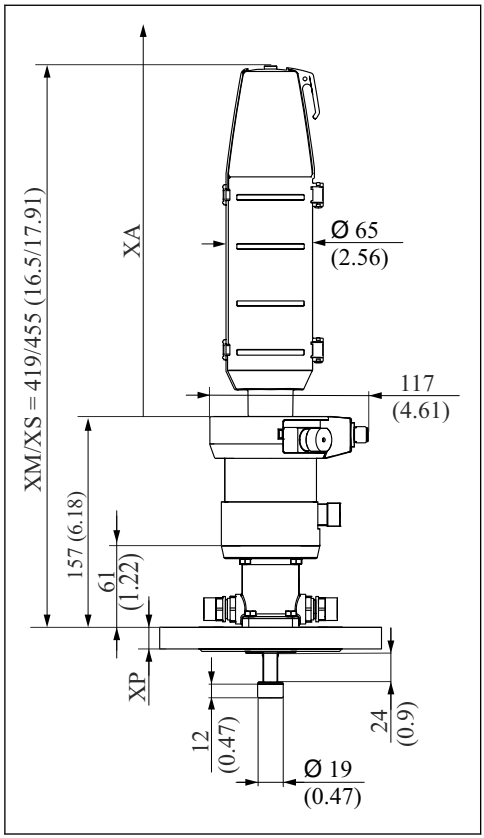
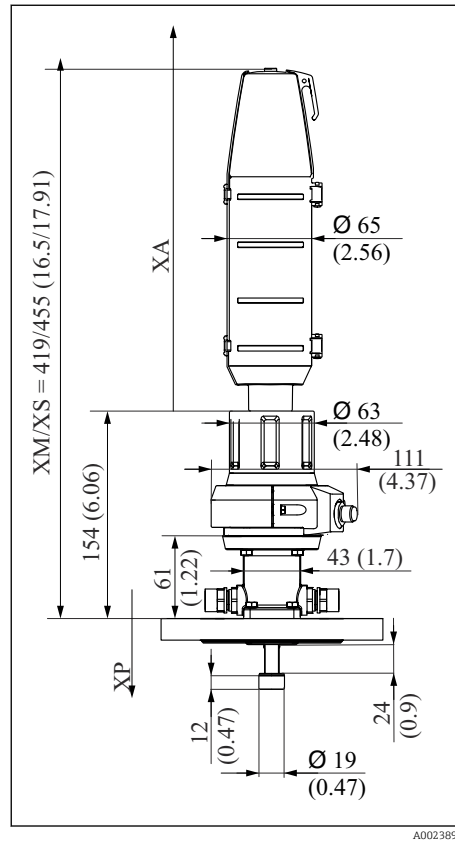
n 20 mm (0.8 in)
F1 Refers to the system; customer's specific situation
F2 Refers to the system; customer's specific situation
X1 Dimensions of process assemblies CPA87x
X2 Dimensions of process assemblies CPA87x

5.1.2 Dimensions

Short version



4 *Pneumatic drive, short version, dimensions in mm (in)*



5 *Manual drive, short version, dimensions in mm (in)*

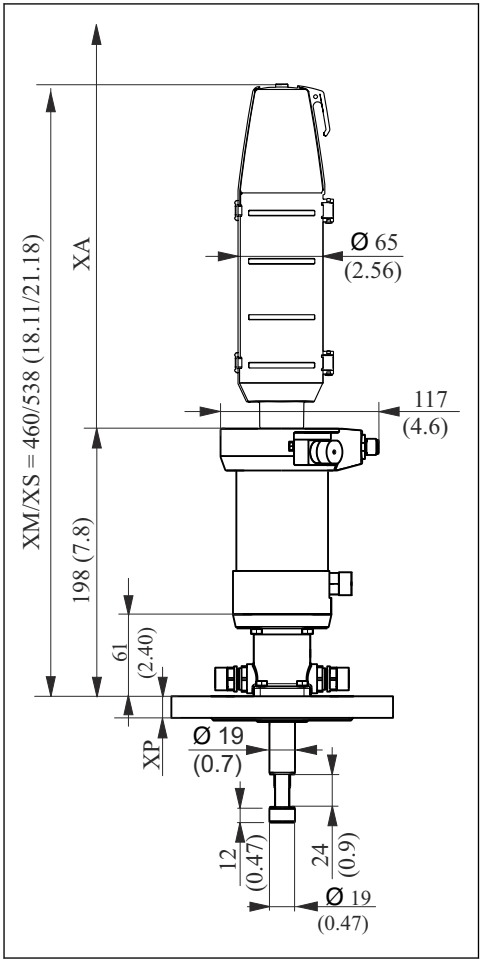
XM Assembly in measuring position
XS Assembly in service position
XP Height of particular process connection (see table below)
XA Necessary mounting distance for sensor replacement

A free path length XA above the drive is required to replace the sensors:

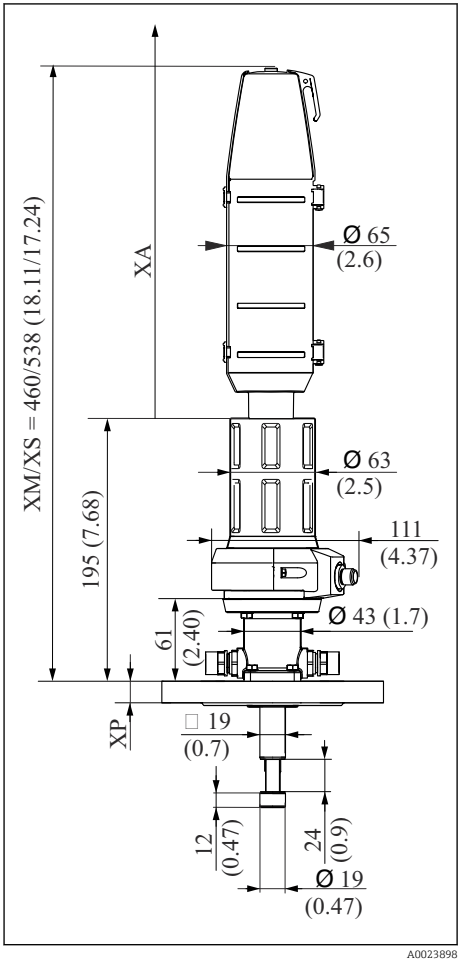
XA is 280 mm (11.02 in) for 120 mm sensors

XA is 408 mm (15.94 in) for 225 mm sensors

Long version



6 *Pneumatic drive, long version, dimensions in mm (in)*



7 *Manual drive, long version, dimensions in mm (in)*

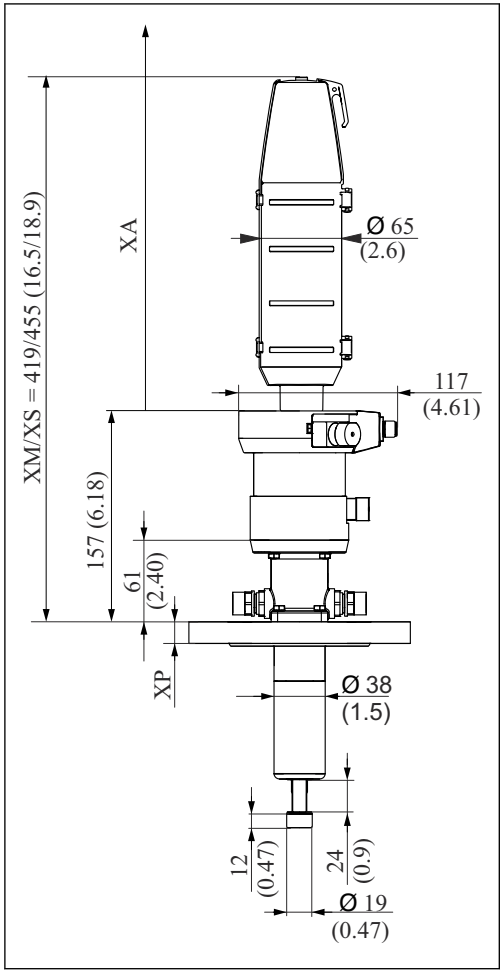
XM Assembly in measuring position
XS Assembly in service position
XP Height of particular process connection (see table below)
XA Necessary mounting distance for sensor replacement

A free path length XA above the drive is required to replace the sensors:

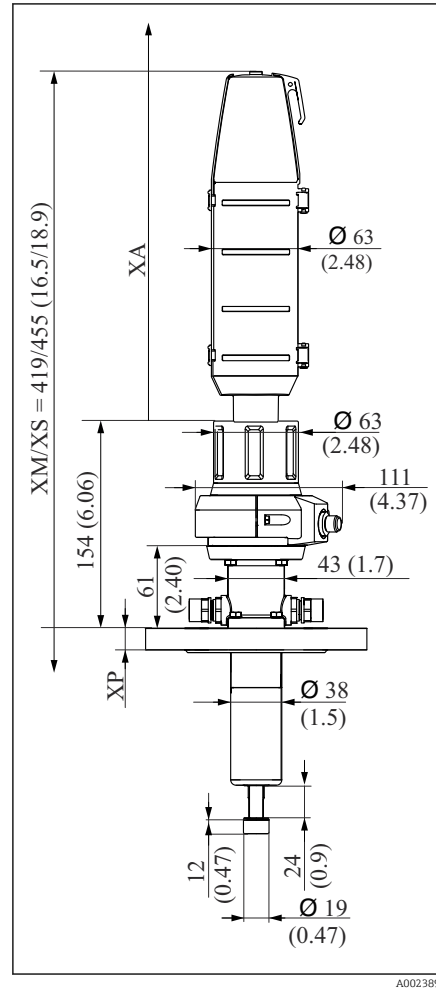
XA is 360 mm (14.17 in) for 225 mm sensors

XA is 582 mm (22.91 in) for 360 mm sensors including KCl

Immersion chamber version



8 *Immersion chamber version with pneumatic drive, dimensions in mm (in)*



9 *Immersion chamber version with manual drive, dimensions in mm (in)*

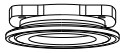
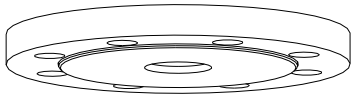
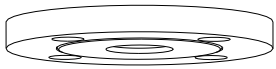
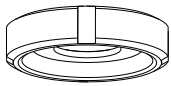
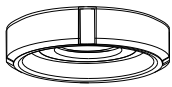
XM Assembly in measuring position
XS Assembly in service position
XP Height of particular process connection (see table below)
XA Necessary mounting distance for sensor replacement

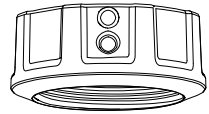
A free path length XA above the drive is required to replace the sensors:

XA is 280 mm (11.02 in) for 225 mm sensors

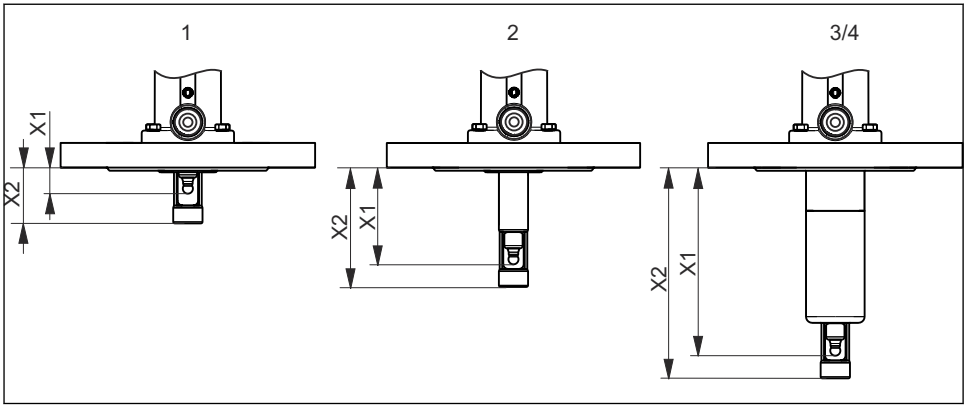
XA is 570 mm (22.44 in) for 360 mm sensors

Process connection height

Process connection		Height XP in mm (in)
CB Clamp 2" ISO 2852, ASME BPE-2012	 A0024100	16 (0.63)
FA Flange DN 40 PN16, EN 1092-1	 A0024102	18 (0.71)
FB Flange DN 50 PN16, EN 1092-1	 A0024103	18 (0.71)
FC Flange DN 80 PN10, EN 1092-1	 A0024104	20 (0.79)
FD Flange 2" 150 lbs, ASME B16.5	 A0024105	19.1 (0.75)
FE Flange 3" 150 lbs, ASME B16.5	 A0024106	23.8 (0.94)
FF 10K50, JIS B2220	 A0024107	16 (0.63)
MA Dairy fitting DN 50 DIN 11851	 A0024109	15.5 (0.61)
MB Dairy fitting DN 65 DIN 11851	 A0024110	15.5 (0.61)

Process connection		Height XP in mm (in)
HB Thread NPT 1½"	A0024111	40.5 (1.57)
NA DN 25 G1¼" female thread ▪ Thread ISO 228 G1¼ ▪ Compatible with hook wrench, DIN 1810 flat face NOTICE **Mounting with pipe wrench causes damage.** ▶ Use a hook wrench for mounting and removal.	 A0054908	31.1 (1.22) (Union nut 22.5 (0.89))

5.1.3 Immersion depths



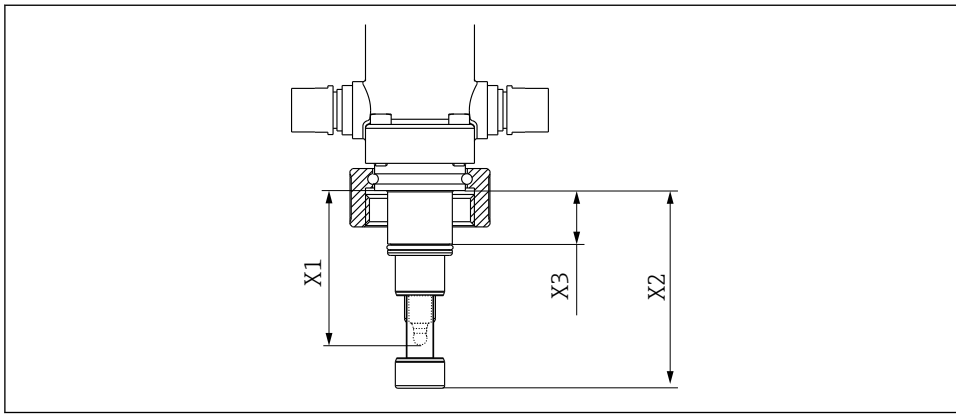
10 Immersion depths in mm (in)

1 Short stroke, 36 mm (1.42 in)
2 Long stroke, 78 mm (3.07 in)
3 Immersion chamber version, 99 mm (3.89 in) / 36 mm (1.42 in)
4 Long immersion chamber version, 151 mm (5.94 in) / 36 mm (1.42 in)

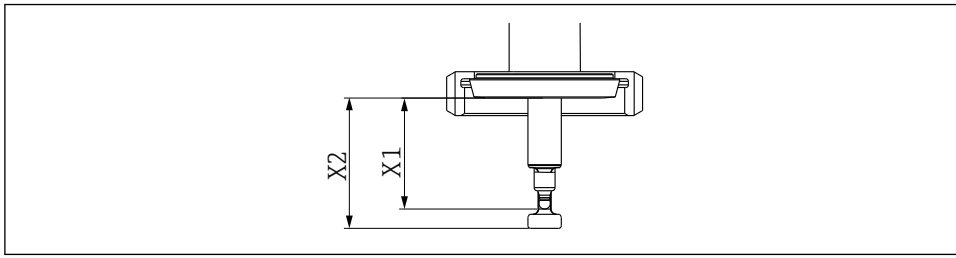
Versions

Process connection		1	2	3	4
CB Clamp ISO 2852 ASME BPE-2012 2"	X1 X2	14.9 (0.59) 34.2(1.35)	61.0 (2.40) 75.7 (2.98)	119.9 (4.72) 134.6 (5.30)	171.9 (6,76) 186.6 (7.35)
FA Flange DN 40 EN 1092-1	X1 X2	14.9 (0.59) 34.2(1.35)	61.0 (2.40) 75.7 (2.98)	119.9 (4.72) 134.6 (5.30)	171.9 (6,76) 186.6 (7.35)
FB Flange DN 50 EN 1092-1	X1 X2	14.9 (0.59) 34.2(1.35)	61.0 (2.40) 75.7 (2.98)	119.9 (4.72) 134.6 (5.30)	171.9 (6,76) 186.6 (7.35)
FC Flange DN 80 EN 1092-1	X1 X2	12.9 (0.51) 32.2(1.27)	59.0 (2.32) 73.7 (2.90)	117.9 (4.64) 132.6 (5.22)	169.9 (6.69) 184.6 (7.27)
FD Flange 2" 150 lbs ASME B16.5	X1 X2	13.8 (0.54) 33.1 (1.30)	59.9 (2.36) 74.6 (2.94)	118.9 (4.68) 133.6 (5.26)	170.9 (6.73) 185.6 (7.30)
FE Flange 3" 150 lbs ASME B16.5	X1 X2	- -	- -	114.1 (4.49) 128.8 (5.07)	166.1 (6.54) 180.8 (7.11)
FF Flange 10K50 JIS B2220	X1 X2	14.4 (0.57) 33.7 (1.33)	61.3 (2.41) 76.0 (2.99)	120.2 (4.73) 134.9 (5.31)	172.2 (6.78) 186.9 (7.36)
HB Thread NPT 1½"	X1 X2	- -	63.0 (2.48) 77.7 (3.06)	121.9 (4.80) 136.6 (5.38)	173.9 (6.85) 188.6 (7.40)
MA Dairy fitting DN 50 DIN 11851	X1 X2	15.4 (0.61) 34.7 (1.37)	61.5 (2.42) 76.2 (3.00)	120.4 (4.74) 135.1 (5.32)	172.4 (6.79) 187.1 (6.37)

Process connection		1	2	3	4
MB Dairy fitting DN 65 DIN 11851	X1 X2	15.4 (0.61) 34.7 (1.37)	61.5 (2.42) 76.2 (3.00)	120.4 (4.74) 135.1 (5.32)	172.4 (6.79) 187.1 (6.37)
NA thread ISO 228 G 1¼	X1 X2 X3	- -	61.5 (2.42) 76.2 (3.00) 20.6 (0.81)	- -	- -



11 Immersion depth in mm (in) for process connection NA thread ISO 228 G1¼

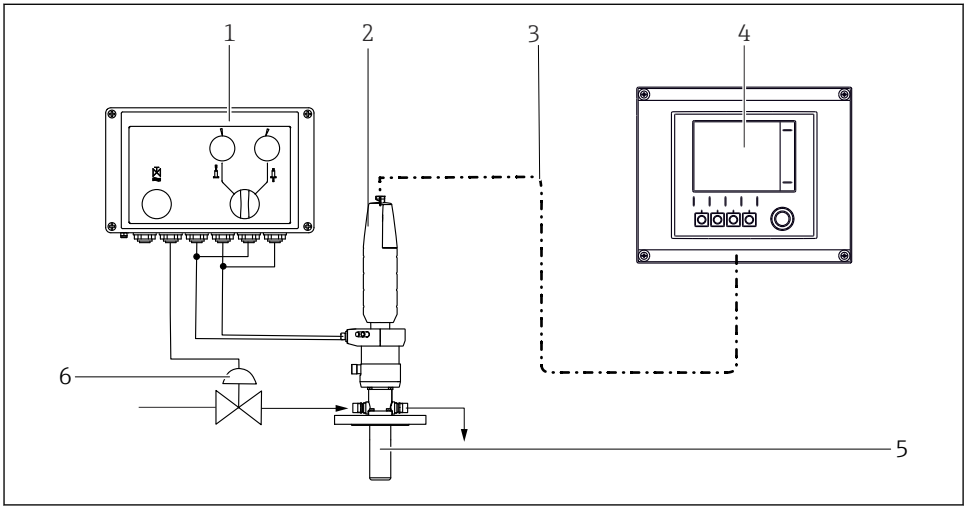


12 Immersion depth in mm (in) for process connection MA and MB thread

5.2 Installing the assembly

5.2.1 Installation procedure

Measuring system



13 *Example of a measuring system*

1 *Air-Trol CYC10 switching unit*
2 *Cleanfit CPA871 assembly*
3 *Measuring cable CYK10*
4 *Liquiline CM44x transmitter*
5 *Sensor (in assembly)*
6 *Valve (example)*

Installation recommendation

CAUTION

There is a direct connection between the process and the service chamber when the assembly is inserted/retracted. Medium can escape through the service chamber connections.

Risk of injury from escaping process medium.

- ▶ Connect the service chamber connections.
- ▶ Check all connections for leaks prior to commissioning.

NOTICE

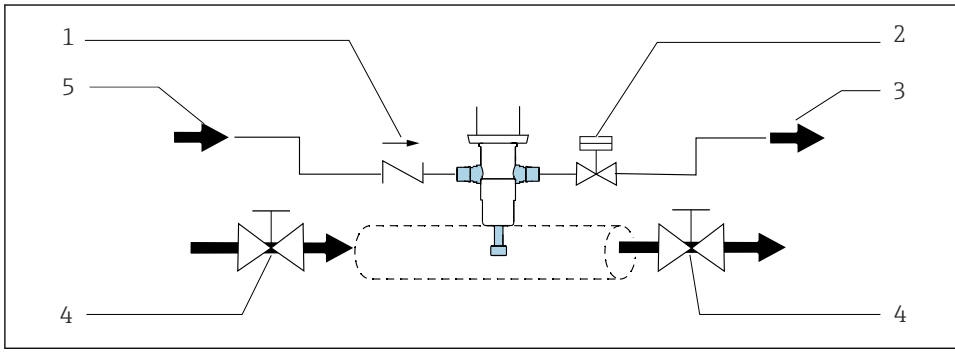
There is a connection between the process and the service chamber during insertion/ retraction.

Contamination of the assembly.

- ▶ Include the assembly in the cleaning concept.
- ▶ Ensure regular cleaning.

The process seals seal the process in the relevant end position. The assembly is open to the process during insertion/retraction; the rinse connections must either be pipe-fitted or sealed.

The connection between the service chamber and the process is open during movement; the sealing water function can be used as a result. The rinse chamber outlet must be blocked (e.g., with a shutoff valve) to implement the sealing water function.



14 *Installation suggestion for seal system using a bypass*

1 Check valve
2 Valve open/closed, sealing water function
3 Wastewater
4 Shutoff valve open/closed (optional)
5 Water/cleaning agent

The seals must be checked and serviced regularly. Therefore measures must be taken to separate the assembly from the process, e.g., by installing in a bypass.

Installing/removing the assembly from the process

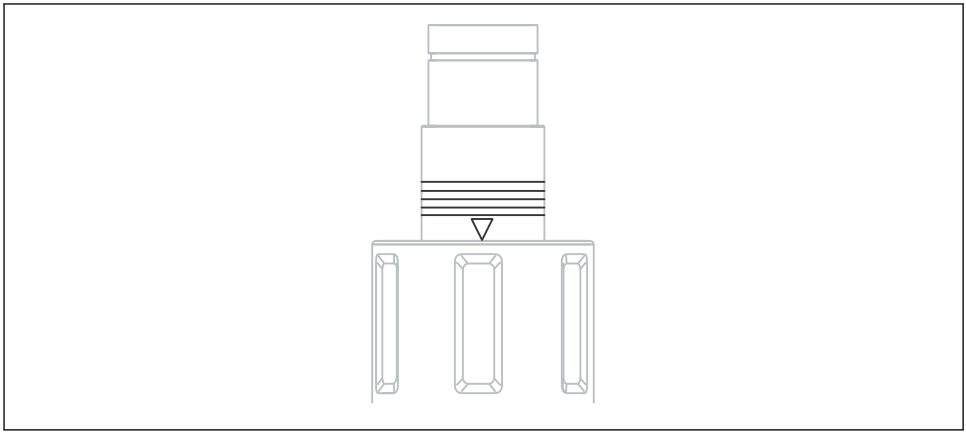
WARNING

Risk of injury from high pressure, high temperature or chemical hazards if process medium escapes.

- Wear protective gloves, protective goggles and protective clothing.
- Mount the assembly only if vessels or pipes are empty and unpressurized.

Prior to installation, check the flange seal between the flanges.

1. Move the assembly to the service position.
   ↳ (The triangle position marking is visible (→ 15).
2. Secure the assembly on the tank or piping via the process connection.
3. Follow the instructions in the next section to connect pipes for compressed air and rinse water (for the relevant assembly version).



A0023307

15 *Position markings (service position)*

Pneumatic connection for automatic operation

Prerequisites:
- Air pressure 5 to 8 bar (72 to 116 psi) (absolute) or
  air pressure 4 to 7 bar (58 to 102 psi)(relative)
- Compressed air quality in accordance with ISO 8573-1:2001
  Quality class 3.3.3 or 3.4.3
- Solids class 3 (max. 5 µm, max. 5 mg/m^3, contamination with particles)
- Water content for temperatures ≥ 15 °C (59 °F): Class 4 pressure dew point 3 °C (37 °F) or lower
- Water content for temperatures 5 to 15 °C (41 to 59 °F): Class 3 pressure dew point −20 °C (−4 °F) or lower
- Oil content: Class 3 (max. 1 mg/m^3)
- Air temperature: 5 °C (41 °F) or higher
- Minimum nominal diameter of the air lines: 2 mm (0.08 in)

A dual-operating cylinder is used to operate the pneumatic drive.

An automatic limit position lock both in service and measuring position secures the assembly to prevent it from moving inadvertently in the event of a failure in the control air. The assembly remains in the relevant position.

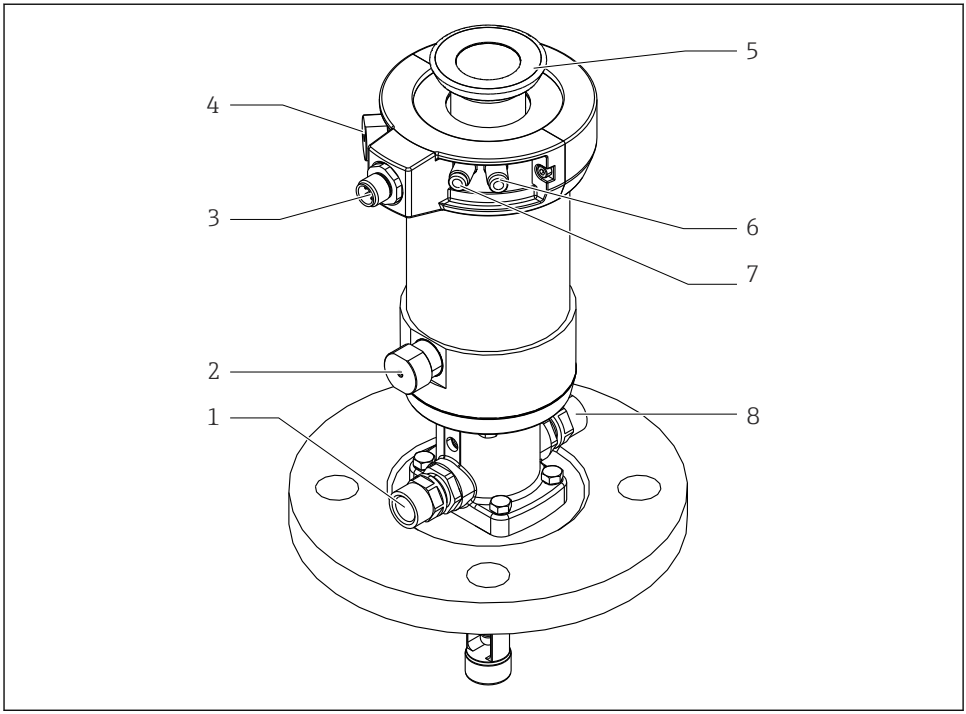
Connection: Plug-in connector M5, hose 4/2 mm OD/ID (adapter for 6/4 mm OD/ID enclosed)

NOTICE

Air pressure too high

Damage to seals.

▶ Install a pressure-reducing valve upstream if the air pressure is likely to increase to more than 7 bar (102 psi) (absolute) (even short pressure surges).

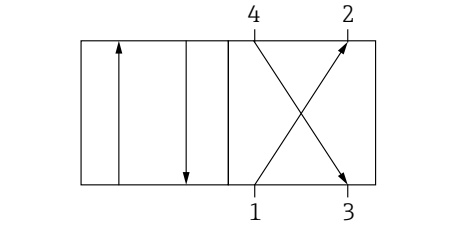


A0029614

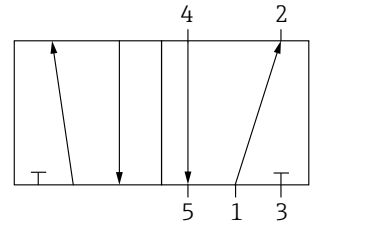
16 *Assembly with pneumatic drive (without protective cover)*

1 *Rinse connection*
2 *Automatic limit position lock, process*
3 *Connection for limit position switch, optional*
4 *Automatic limit position lock, service*
5 *Fastening ring for protective cover*
6 *Pneumatic connection (move to measuring position)*
7 *Pneumatic connection (move to service position)*
8 *Rinse connection*

Use a pneumatic pilot valve (4/2-way or 5/2-way) to insert/retract the assembly. Connect the two inputs of the assembly.



17 4/2-way valve



18 5/2-way valve

Connection 1 is attached to the compressed air supply.

Connections 2 and 4 are used to attach to the pneumatic drive.

Connection 3 and, if present, connection 5 are not attached; they are used to vent the drive.

Rinse connections

The service chamber connections make it possible to rinse the chamber (including the sensor) with water or cleaning solution. The pressure difference between the sealing water and process must not exceed 6 bar (87 psi).

The sealing water pressure must not exceed 8 bar (116 psi) in manual mode and 16 bar (232 psi) in pneumatic mode.

Install a pressure-reducing valve upstream if there is the possibility that water pressures can exceed the specified sealing water pressure (8 bar (116 psi) or 16 bar (232 psi)).

NOTICE

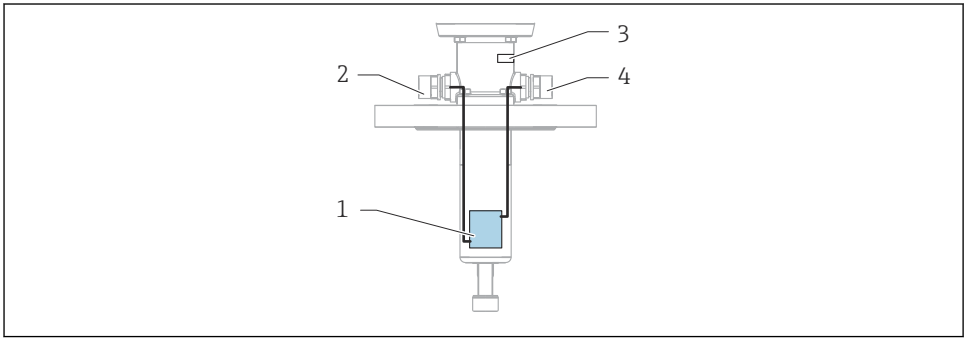
Pressure difference too high between process and wastewater system or if rinse connections are not properly connected.

Damage to seals

- Close rinse connections.
- Pipe-fit rinse connections.
- Use sealing water function.

Assignment of rinse connections

In the standard and immersion chamber version, the inlet and outlet of the service chamber are fixed. The outlet of the service chamber is located under the leakage hole. The leakage hole is sealed with an M5 screw.



19 *Connection of service chamber in the immersion chamber version*

1 Service chamber
2 Service chamber inlet, IN
3 Leakage hole
4 Service chamber outlet, OUT

Leakage hole, M5 thread, optional connection must be supplied by customer

Used for visual inspection.

If medium leaks out:

1. Switch off the process
2. Replace the seals

Assembly connection

NOTICE

There is a connection between the process and the rinse chamber during insertion/ retraction.

This can result in contamination or deposit buildup.

► Rinse/clean the assembly regularly.

NOTICE

Solids, deposits and/or sedimentation in the process medium can result in increased wear

Increased wear of the seal

► Rinse/clean the assembly regularly
► Check the sealing system regularly and perform maintenance when necessary.
► Use an automatic cleaning system

NOTICE

Connection between the process and service chamber during insertion/retraction

Medium escaping during insertion/retraction. Service chamber is pressurized.

- ▶ To ensure controlled draining, connect the outlet of the rinse chamber to the drain.
- ▶ Release the pressure before performing maintenance tasks.
- ▶ Check the sealing system to ensure it is intact.

Assembly connection up to PN8

Delivery

Rinse connections vary depending on the connection selected (G¼", NPT¼" or Swagelok; Alloy C22 or stainless steel VA).

NOTICE

If the pressure compensation between the process pressure and the environment occurs too quickly, it can cause damage to the process seals when the assembly is inserted/ retracted.

- ▶ Use versions that are suitable for process pressures up to 16 bar. These are fitted with a pressure retarder.

Connections	Thread	Delivery
Rinse connection outlet	G¼", female thread	Mounted
Rinse connection inlet	G¼", female thread	Mounted

Assembly connection PN16

Delivery

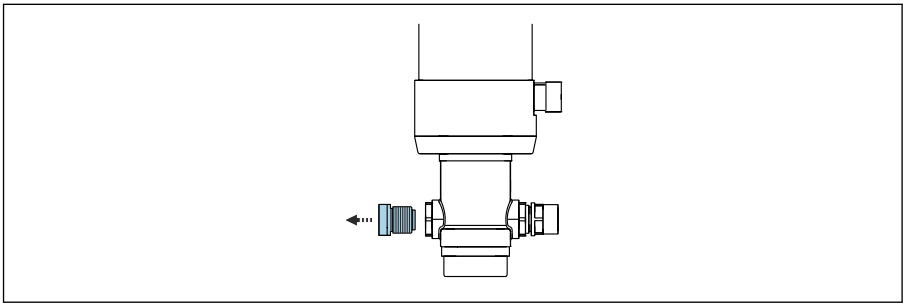
Rinse connections vary depending on the connection selected (G¼", NPT¼" or Swagelok)

Connections	Thread	Delivery
Dummy plug	M16, male thread	Mounted
Pressure retarder	M16, male thread to M16 female thread	Mounted
Rinse connection outlet	G¼" or NPT 1/4", female thread, or pipe connection	Mounted on pressure retarder
Rinse connection inlet	G¼" or NPT 1/4", female thread, or pipe connection	Included

Changing the dummy plug/rinse connection inlet

If an (automatic) cleaning or calibration system is used, the dummy plug must be replaced with the accompanying rinse connection inlet. The inlet and outlet must be fully connected.

1.

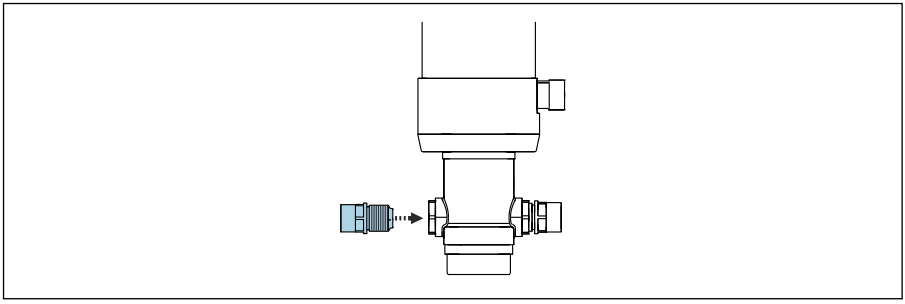


A0043258

Remove the dummy plug.

2. Replace the flat seal with the O-ring.

3.



A0047539

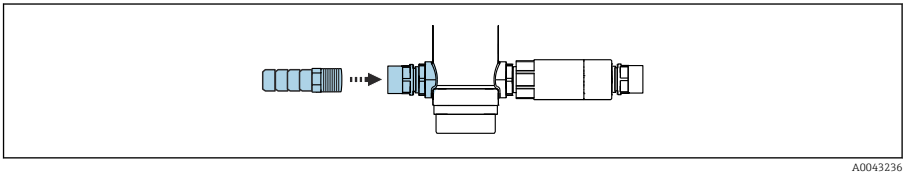
Screw in the rinse connection inlet.

Connecting the cleaning unit

Assembly as-delivered state, PN16 with dummy plug and pressure retarder.

1. Replace the dummy plug with the rinse connection inlet.→ 28

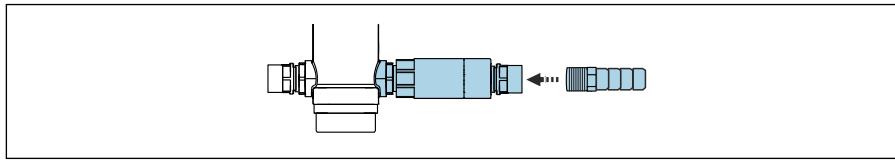
2.



A0043236

Mount the connection for the rinse medium supply line (available to order as an accessory) on the rinse connection inlet.

3.



A0043237

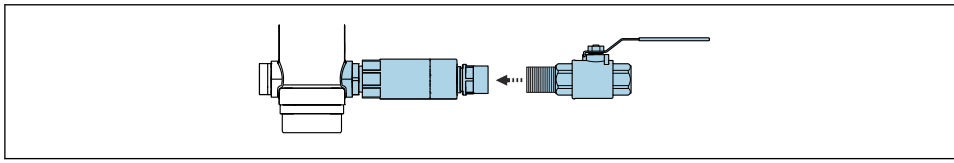
Connect the rinse connection outlet (available to order as an accessory) to a drain line.

Complete seal PN8 and PN16

Complete seal with pressure retarder and ball valve

The complete seal with the pressure retarder and ball valve is only provided in the PN16 version. The pressure retarder must be mounted for this purpose. The ball valve can be ordered as an accessory (sealing kit).

The sealing kit only provided in connection with the rinse connection inlet G1/4". Version only available in stainless steel.



A0043406

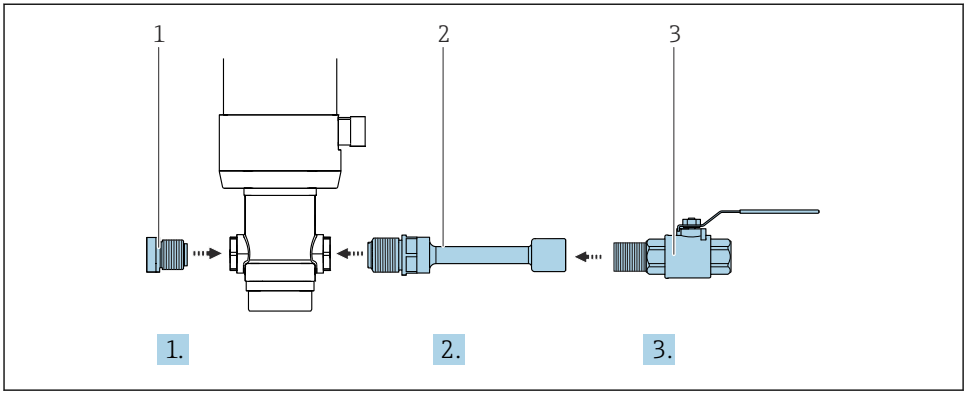
Not suitable for media that tend to cake, form deposits or sediment, or contain solids.

► Screw the ball valve onto the rinse connection outlet of the pressure retarder.

Complete seal with extension and ball valve

The complete seal with the extension and ball valve is only provided in the PN8 version. The extension and ball valve can be ordered as an accessory. The extension is only necessary for the flange process connection. The ball valve and extension can be ordered as an accessory (sealing kit).

Not suitable for media that tend to cake, form deposits or sediment, or contain solids.



A0043341

1. Seal the rinse connection inlet with the dummy plug (1).
2. In the case of flange versions, screw the extension (2) into the rinse connection outlet.
3. Screw the ball valve (3) onto the rinse connection outlet or the extension.

Connecting the limit position switches

With limit position detection, you can notify a system located downstream (transmitter, switching amplifier, output interface terminal) whether the assembly is in the measuring or service position (in the case of manual drive, only the measuring position is queried).

The limit position switches must be connected to output interface terminals (can be ordered as accessories for the non-hazardous area) to enable power supply.

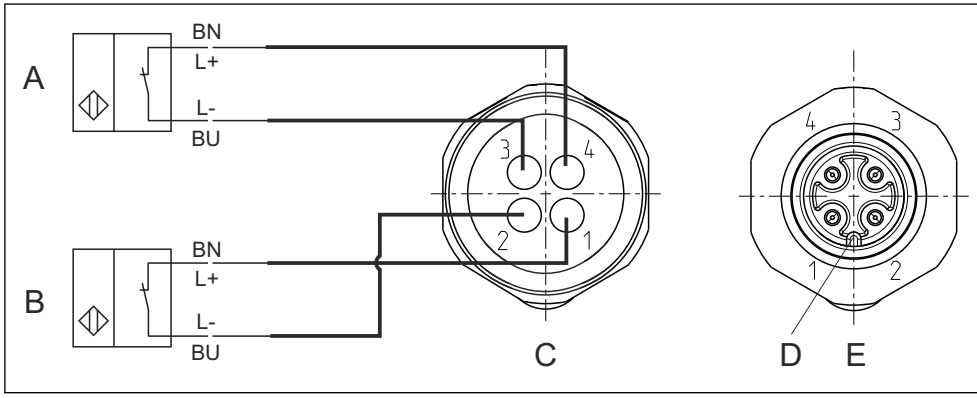
The assembly can be ordered directly with limit position detection, or it can be retrofitted at a later stage. The cable for the limit position switches must be ordered as an accessory.

Feedback devices

The feedback devices are intrinsically safe. The approval for the feedback devices is no longer valid if they are not installed or connected correctly.

1. Ensure full compliance with manufacturer documentation.
2. Connect the feedback devices in accordance with the relevant instructions.

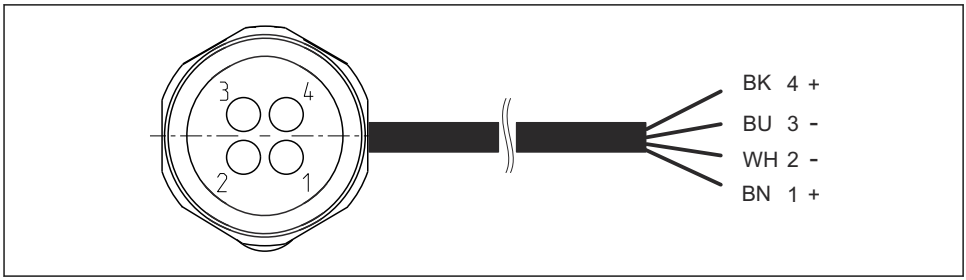
Switching element function:	NAMUR NC contact (inductive)
Switching distance:	1.5 mm (0.06 in)
Nominal voltage:	8 V DC
Switching frequency:	0 to 5000 Hz
Housing material:	Stainless steel



A0017831

20 Inductive limit position switches, internal cabling in the blue protective ring

A Limit position switch, service position
B Limit position switch, measuring position
C Connector, M12, solder side (inside of assembly)
D Coding
E Connector, pin side (outside of assembly)



21 Connecting cable for limit position switch on transmitter, switching amplifier, output interface terminal etc.

1 Measuring position
2 Measuring position
3 Service position
4 Service position

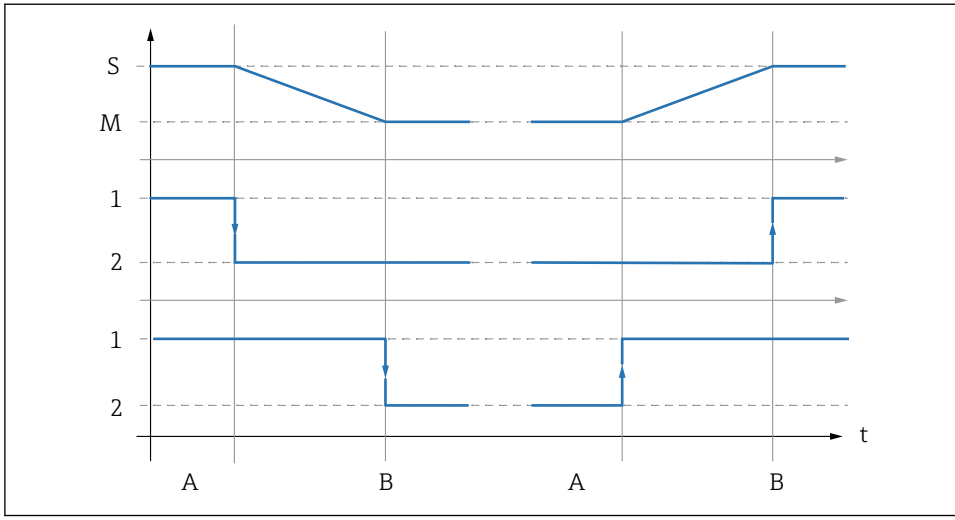
Only pins 1 and 2 are assigned for manually activated assemblies with one switch (measuring position).

If the feedback devices are operated with a 24 V DC power supply, e.g. at Liquiline CM442/CM444/CM448, NAMUR terminals must be used. NAMUR terminal (8 V DC) for the non-hazardous area available as an accessory. The NAMUR terminal must have its own power supply and cannot be powered by a current output of the CM44.

For versions CPA87x-AB* for use in hazardous areas, the enclosed manufacturer's declaration and the operating instructions for the installed Pepperl+Fuchs NJ1.5-6.5-15-N-Y180094 feedback devices must be observed.

Signal table for limit position switches

Position of assembly	Limit position switch, measuring position	Limit position switch, service position
Measuring	Active LOW (≥ 3 mA)	Active LOW (≥ 3 mA)
Service	Active HIGH (≤ 1 mA)	Active HIGH (≤ 1 mA)



22 *Description of switching function*

S *Service*
M *Measuring*
1 *High*
2 *Low*
A *Movement starts*
B *Limit position reached*

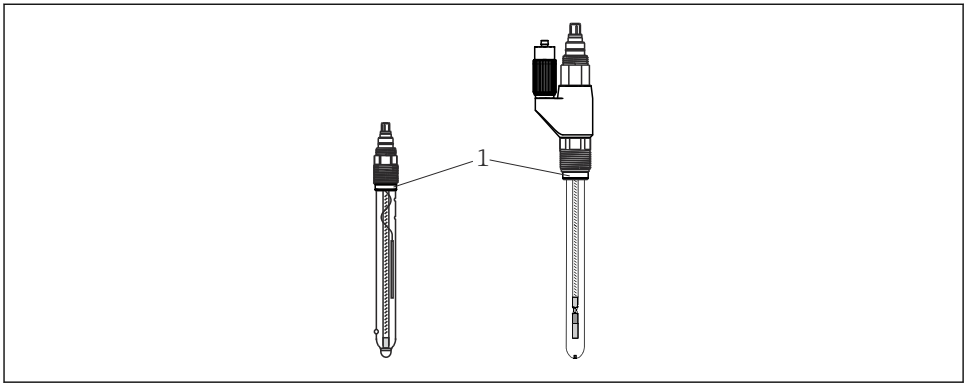
5.2.2 Sensor installation

Preparing the sensor and assembly

NOTICE

Danger of medium penetrating if a defective sensor is installed.

- Inspect the sensor and use a new, intact sensor if necessary.



23 Sensor installation

1 Thrust collar with O-ring

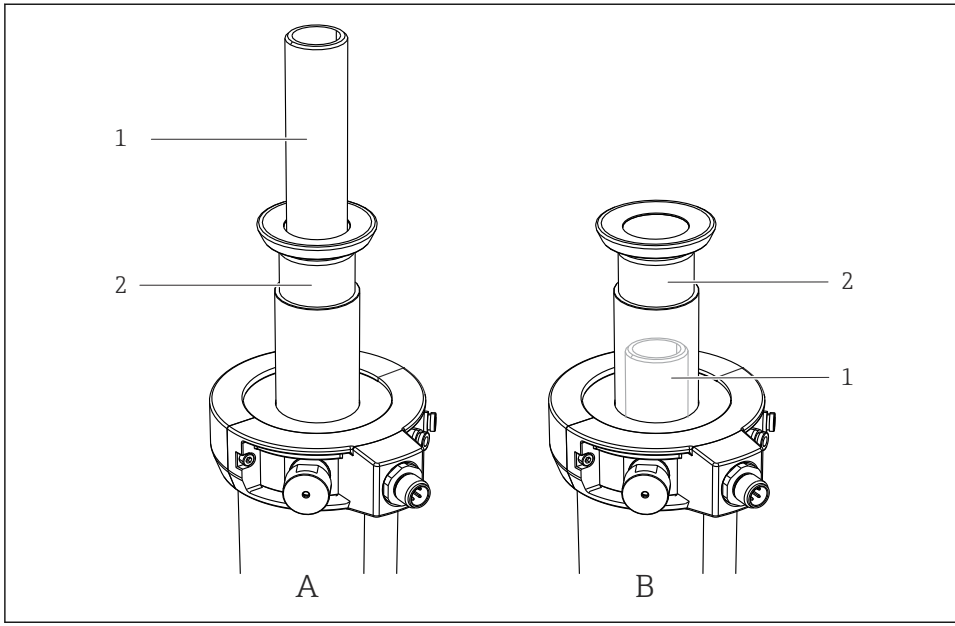
1. Remove the protective cap from the sensor. Make sure that the O-ring and thrust collar (→ 23, item 1) are provided.
2. To aid installation, immerse the sensor shaft in water.
3. Move the assembly to the service position.

Installing and removing sensors

WARNING

Risk resulting from temperature, pressure and chemical composition!

- Establish pressure compensation in the service chamber.
- Before removing, clean and rinse the sensor adequately in the rinse chamber.
- Check process seals. (There can be no leakage of medium from the rinse chamber in limit position when rinsing is disabled)

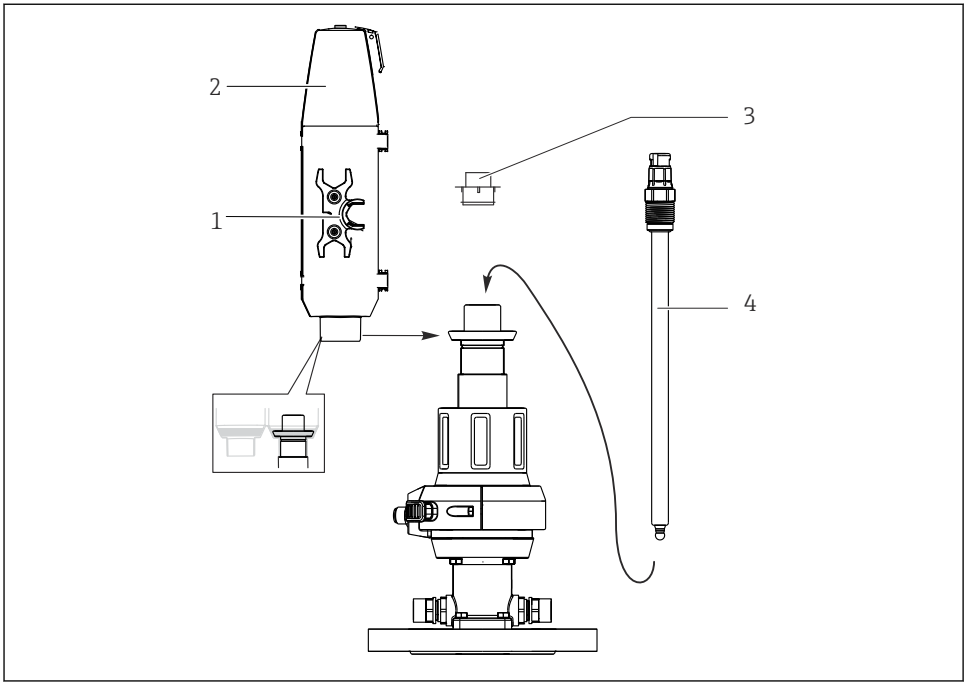


24 Sensor installation options

1 Sensor adapter
2 Retraction tube
A Sensor adapter is on top of the retraction tube
B Sensor adapter is below the retraction tube (not visible)

Depending on the assembly version, the sensor adapter is visible (, item A) or is positioned within the retraction tube and is not visible (item B). As a result, the procedures for installing and removing the sensors differ as follows:

Installing and removing sensors if the sensor adapter is visible (item A)



25 *Sensor installation*

1 *Open-ended wrench (AF 17/19 mm)*
2 *Protective cover*
3 *Dummy plug*
4 *Sensor*

Gel and KCl sensors can be installed in this version.

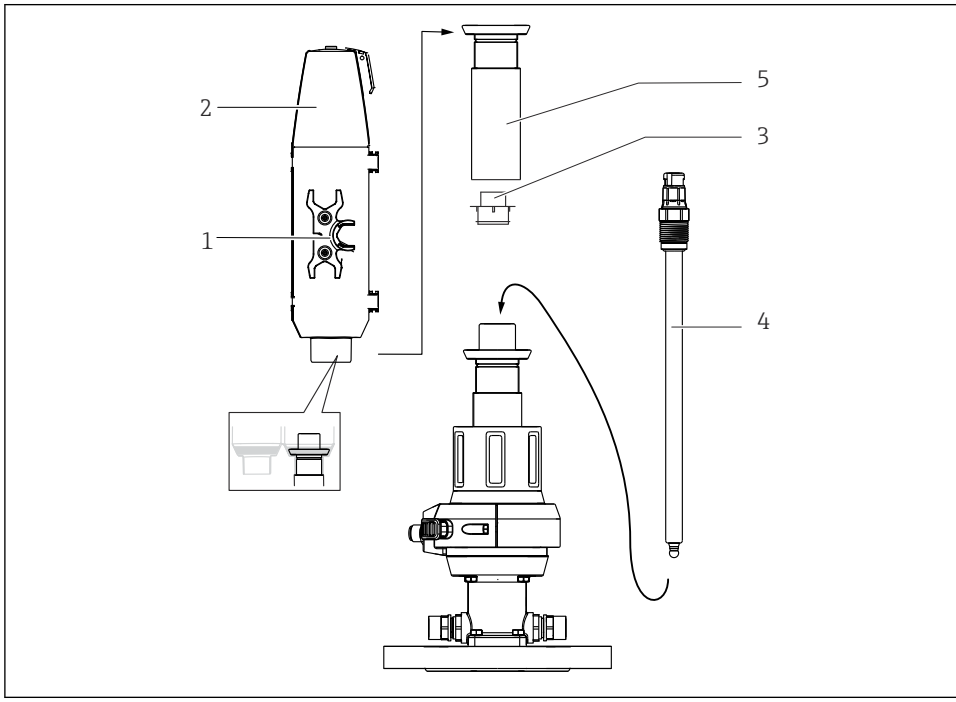
Install the sensor as follows:

1. Remove the protective cover (→ 25, item 2) (this is only possible if the assembly is in service position).
2. Remove the yellow dummy plug (item 3).
3. Use the open-ended wrench (item 1) to screw in the sensor (item 4) in place of the dummy plug and hand-tighten (3 Nm (2.2 lbf ft)).
4. Attach the open-ended wrench back into the protective cover.

5. Mount the protective cover on the assembly. When doing so, guide the measuring cable through the cable run (top of protective cover).

Always install the protective cover before moving the assembly to measuring position. The protective cover cannot be removed in measuring position. This prevents the sensor from being removed.

Installing and removing sensors if the sensor adapter is not visible (item B)



26 *Sensor installation*

1 *Socket wrench (AF 17/19 mm)*
2 *Protective cover*
3 *Dummy plug (protective cap)*
4 *Sensor*
5 *Retraction tube*

Gel sensors can be installed in this version. To install KCl sensors, you will need a "Gel - KCl adapter".

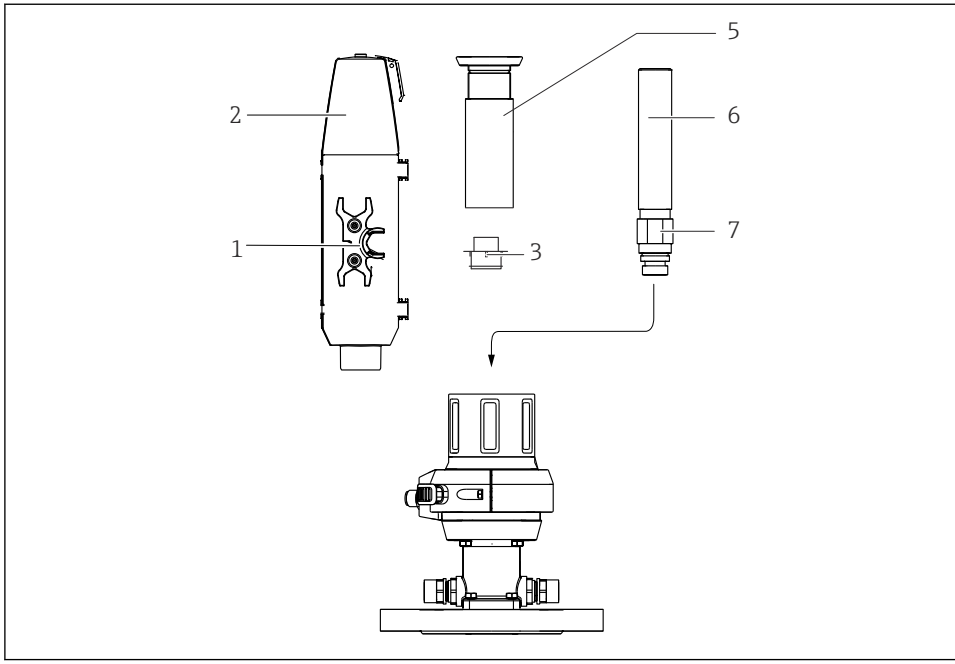
Install the sensor as follows:

1. Remove the protective cover (→ 26, item 2) (this is only possible if the assembly is in service position).

2. Unscrew the retraction tube (item 5) in a counterclockwise direction.
3. Remove the yellow dummy plug (item 3).
4. Use the open-ended wrench (item 1) to screw in the sensor (item 4) in place of the dummy plug and hand-tighten (3 Nm (2.2 lbf ft)).
5. Screw in the retraction tube again.
6. Attach the open-ended wrench back into the protective cover.
7. Mount the protective cover on the assembly. When doing so, guide the measuring cable through the cable run (top of protective cover).

Always install the protective cover before moving the assembly to measuring position. The protective cover cannot be removed in measuring position. This prevents the sensor from being removed.

Installation of 360 mm gel and KCL sensors with the "Gel - KCl adapter"



27 *Sensor installation, Part 1*

1 Open-ended wrench (AF 17/19 mm)
2 Protective cover
3 Dummy plug (protective cap)
5 Retraction tube
6 Gel - KCl adapter
7 Lock nut

Gel and KCl sensors can be installed in this version.

NOTICE

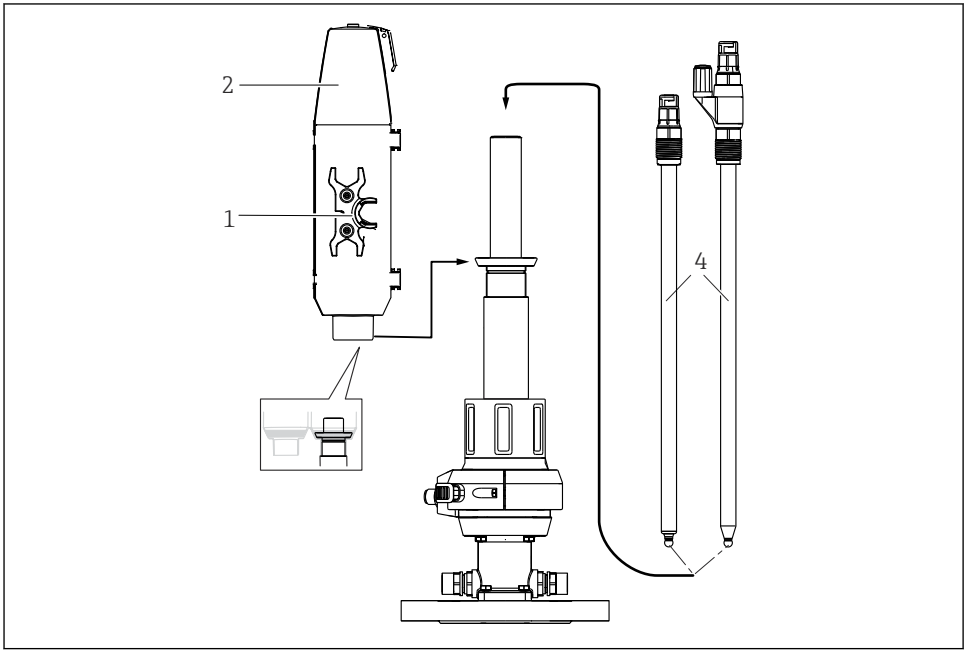
The protective cover cannot be removed in measuring position. This prevents the sensor from being removed.

- Always install the protective cover before moving the assembly to measuring position.
- There is an opening prepared at the top of the cover which can be broken out if necessary to feed the hose through

Install the sensor as follows:

1. Remove the protective cover (→ 27, item 2) (this is only possible if the assembly is in service position).

2. Unscrew the retraction tube (item 5) (in a counterclockwise direction).
3. Turn the lock nut (item 7) on the "Gel - KCl adapter" (item 6) as far as it will go in an upward direction.
4. Remove the yellow dummy plug (item 3).
5. Screw in the "Gel - KCl adapter" (item 6) in place of the dummy plug and hand-tighten (3 Nm (2.2 lbf ft)).
6. Hand-tighten the lock nut in a clockwise direction, and then use an open-ended wrench (AF 24 mm) to tighten it by ¼ turn.
7. Screw in the retraction tube again.
8. Use the open-ended wrench (item 1) to screw in the sensor (→ 28, item 4) and hand-tighten (3 Nm (2.2 lbf ft)).
9. Attach the open-ended wrench back into the protective cover.
10. Mount the protective cover on the assembly. When doing so, guide the measuring cable through the cable run (top of protective cover).



28 *Sensor installation, Part 2*

1 Open-ended wrench
2 Protective cover
4 360 mm gel or KCl sensor

5.3 Post-installation check

Put the sensor into operation only if you can answer "yes" to the following questions:
- Are the sensor and cable undamaged?
- Is the orientation correct?
- Is the sensor installed in an assembly and not suspended from the cable?

5.3.1 Checking that the sealing system is intact

Check the seals after mounting or removing the sensor, and when maintenance work is carried out at regular intervals.

1. Move the assembly to the service position
2. If provided, open the ball valve of the service chamber outlet
   ↳ It is normal for a slight amount of medium to escape (connection between the service chamber and process during insertion/retraction).
3. If provided, rinse the service chamber/sensor.
4. Observe the outlet. No more medium should escape after a short period of time.
5. If medium continues to escape, the sealing system is damaged; take the measuring point out of service and perform maintenance on the assembly.

6 Commissioning

6.1 Preliminaries

Before commissioning, ensure that:
- all seals are correctly seated (on the assembly and on the process connection).
- the sensor is correctly installed and connected.
- the water connection at the rinse connections is correct (if present) or the rinse connections are sealed.

⚠ WARNING

Risk of injury from high pressure, high temperature or chemical hazards if process medium escapes.
- ▶ Check the connections to ensure they are sealed tightly.

⚠ WARNING

Process medium may escape during insertion/retraction of the assembly.
- ▶ Check that the process seal is intact.
- ▶ Pipe-fit the rinse chamber outlet accordingly.
- ▶ Seal the rinse connections with dummy plugs.

Note that when the assembly is inserted/retracted, an open connection exists for a short period between the process and service chamber.

7 Operation

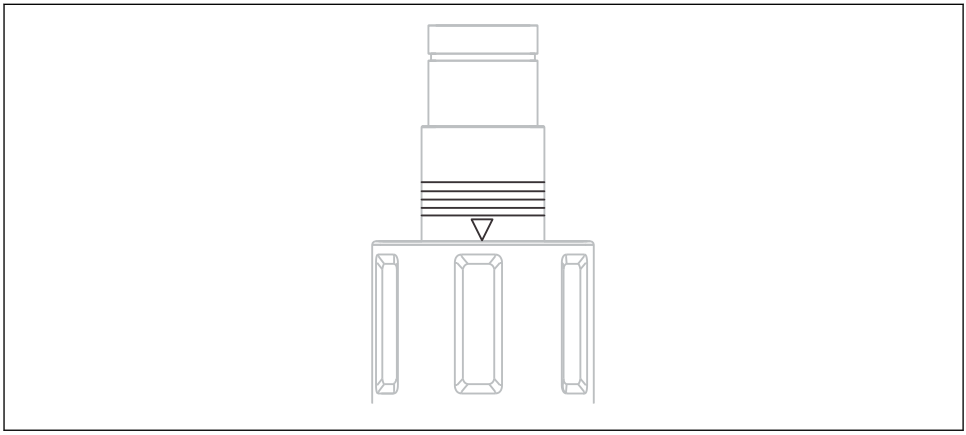
7.1 Adapting the assembly to the process conditions

⚠ CAUTION

Due to the operating principle, there is a connection between the process and the service chamber. The service chamber can be pressurized as a result.

Process medium may escape during insertion/retraction.

- ▶ Check that the process seal is intact.
- ▶ Pipe-fit the rinse chamber outlet accordingly.
- ▶ Seal the rinse connections with dummy plugs.



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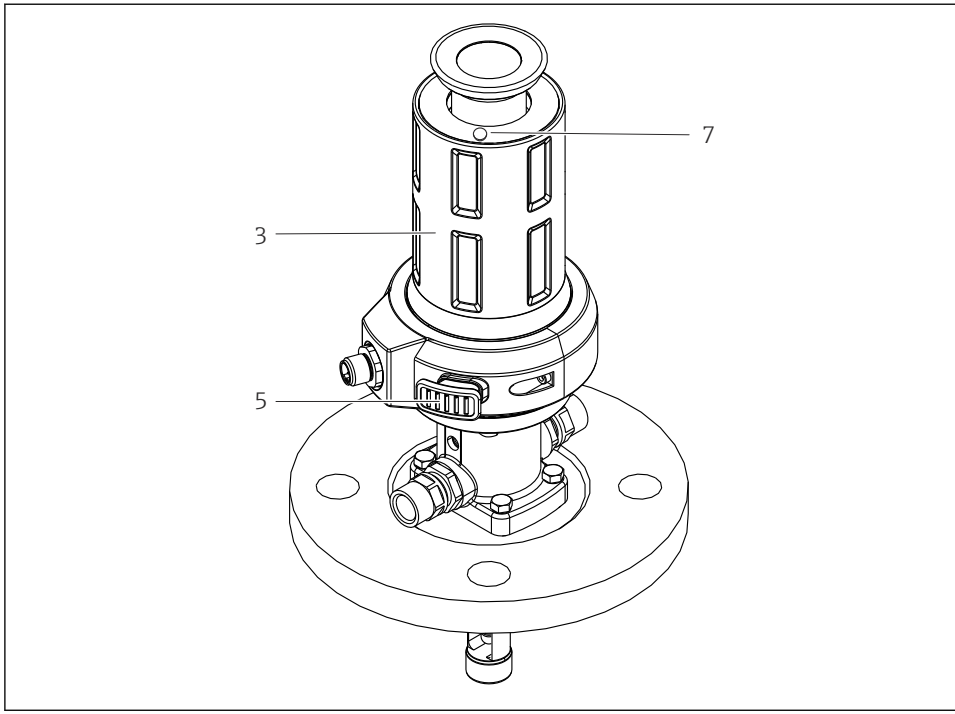
29 Position markings (service position)

The assembly with pneumatic drive does not have any operating elements.



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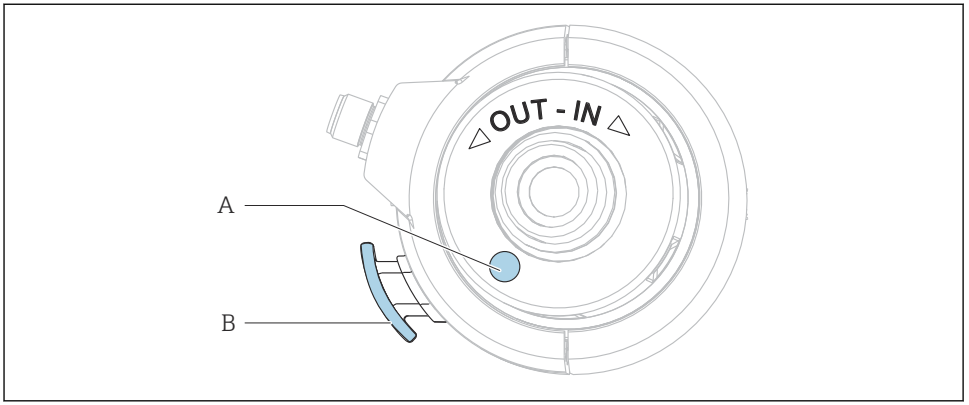
30 Assembly with manual operation, operating elements

3 Manual drive
5 Unlocking button (measuring position)
7 Unlocking button (service position)

7.1.1 Manual operation



31 Direction of rotation

A Unlocking button (service position)
B Unlocking button (measuring position)

Moving the assembly from the service position to the measuring position

The assembly can only be inserted/retracted if a sensor is installed.

1. Press the unlocking button (A).
2. With the unlocking button (A) pressed during the first quarter turn, rotate the drive in a clockwise direction so that the sensor holder enters the process (this is possible only if a sensor is installed). You can release the button for any continued movement.
3. Rotate the drive until the lock engages.

Moving the assembly from the measuring position to the service position

1. Press the unlocking button (B).
2. With the unlocking button (B) pressed during the first quarter turn, rotate the drive in a counterclockwise direction until the stop (service position).
3. Perform the necessary service work.

7.1.2 Pneumatic operation

The assembly can only be inserted/retracted if a sensor is installed.

Operation of the pneumatic version depends on the controller in question. Consult the controller manual for instructions.

Use a pneumatic pilot valve (4/2-way or 5/2-way) to insert/retract the assembly.

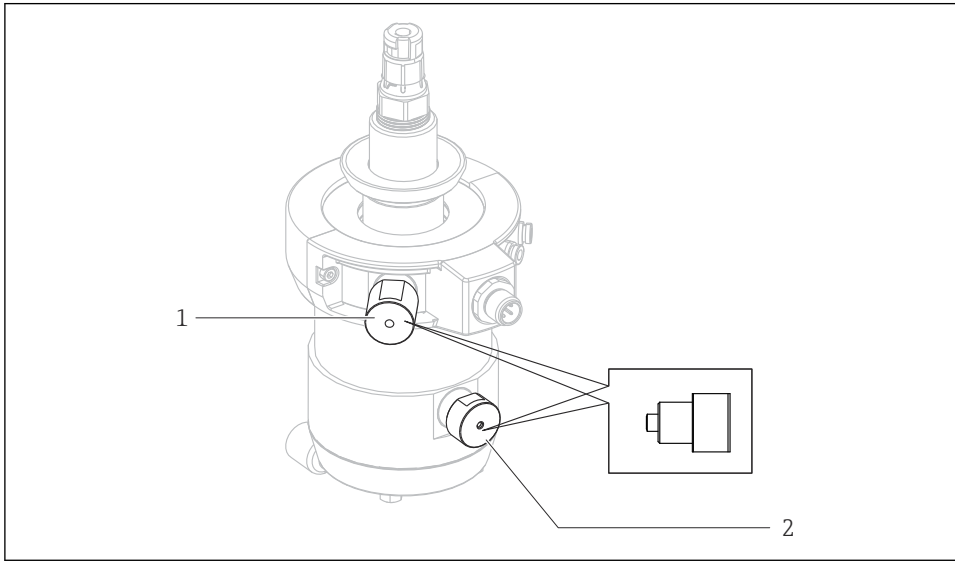
- ▶ Connect the two inputs.
  - ↳ If only one input is connected, the piston is blocked as the sensor guide moves before the limit position lock is disabled.

Inserting/retracting the assembly if the compressed air supply fails

⚠ CAUTION

Risk of injury due to high medium pressure

- ▶ Depressurize the system.



32 *Failure of compressed air supply*

1 Limit position lock for service position
2 Limit position lock for measuring position

If the compressed air supply fails, you can still move the assembly manually. Proceed as follows here:

1. Use an open-ended wrench (AF 17 mm (0.67 in)) to unscrew both limit position locks (items 1 and 2).
2. Move the assembly to the desired position manually (only possible with sensor installed).
3. Screw the limit position lock back in.

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