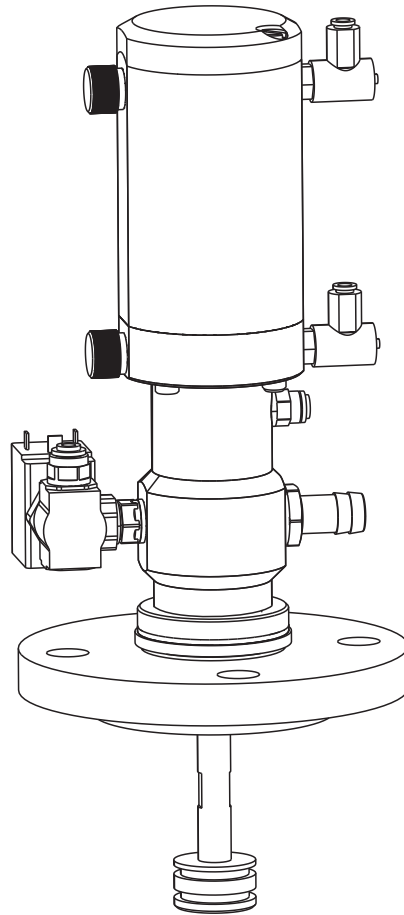


# Operating Instructions

## Samplefit CSA420





Sampling assembly






# About this document

## Warnings

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

Safety message structure	Meaning
 <b>DANGER</b> <b>Cause (/consequences)</b> Consequences if safety message is not heeded ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the situation <b>will</b> result in a fatal or serious injury.
 <b>WARNING</b> <b>Cause (/consequences)</b> Consequences if safety message is not heeded ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the situation <b>can</b> result in a fatal or serious injury.
 <b>CAUTION</b> <b>Cause (/consequences)</b> Consequences if safety message is not heeded ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
 <b>NOTICE</b> <b>Cause/situation</b> Consequences if safety message is not heeded ▶ Action/note	This symbol alerts you to situations that can result in damage to property and equipment.

## Symbols

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

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# 1 Basic safety instructions

## 1.1 Requirements for the personnel

- ▶ Installation, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel.
  - ▶ The technical personnel must be authorized by the plant operator to carry out the specified activities.
  - ▶ The electrical connection may only be performed by an electrical technician.
  - ▶ The technical personnel must have read and understood these Operating Instructions and must follow the instructions they contain.
  - ▶ Measuring point faults may only be rectified by authorized and specially trained personnel.
- i** Repairs not described in the enclosed Operating Instructions may only be carried out directly at the manufacturer's or by the service organization.

## 1.2 Designated use

The pneumatically controlled Samplefit CSA420 sampling assembly is designed for automatic sampling in tanks and pipes. Thanks to its special design, it is possible to operate the assembly in pressurized systems (see "Technical data").

Any other use 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:

- Regulations for explosion protection
- Installation instructions
- 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 safeguard them to ensure that they are not operated inadvertently. 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. Relevant regulations and European standards have been observed.

## 2 Incoming acceptance and product identification

### 2.1 Incoming acceptance

- ▶ Make sure the packaging is undamaged!
- ▶ Inform the supplier about any 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 contents. Keep the damaged products until the matter has been settled.
- ▶ Check that the order is complete and agrees with your shipping documents.
- ▶ The packaging material used to store or to transport the product must provide shock protection and humidity protection. The original packaging offers the best protection. Also, keep to the approved ambient conditions (see "Technical data").
- ▶ If you have any questions, please contact your supplier or your local sales center.

### 2.2 Nameplate

The nameplate contains the following information:


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

Compare the order code on the nameplate with your order.

### 2.3 Scope of delivery

The scope of delivery comprises:

- Sampling assembly in the version ordered
- Operating Instructions

 The scope of delivery of the sampler CSF48 comprises 5 m (16.4 ft) compressed-air supply hose ID = 4 mm (0.16") and 5 m (16.4 ft) sampling hose ID = 13 mm (0.51").

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

## 2.4 Order code and device version

Enter the following address in your browser to access the product page:  
[www.products.endress.com/csa420](http://www.products.endress.com/csa420)

1. You can choose from the following options on the product page located on the right:

Product page function
:: Add to product list
:: Price & order information
:: Compare this product
:: Configure this product

2. Click "Configure this product".
3. The configurator opens in a separate window. You can now configure your device and receive the complete order code that applies for the device.
4. Afterwards, export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the page.

### 3 Installation

#### 3.1 Installation conditions

##### 3.1.1 Dimensions

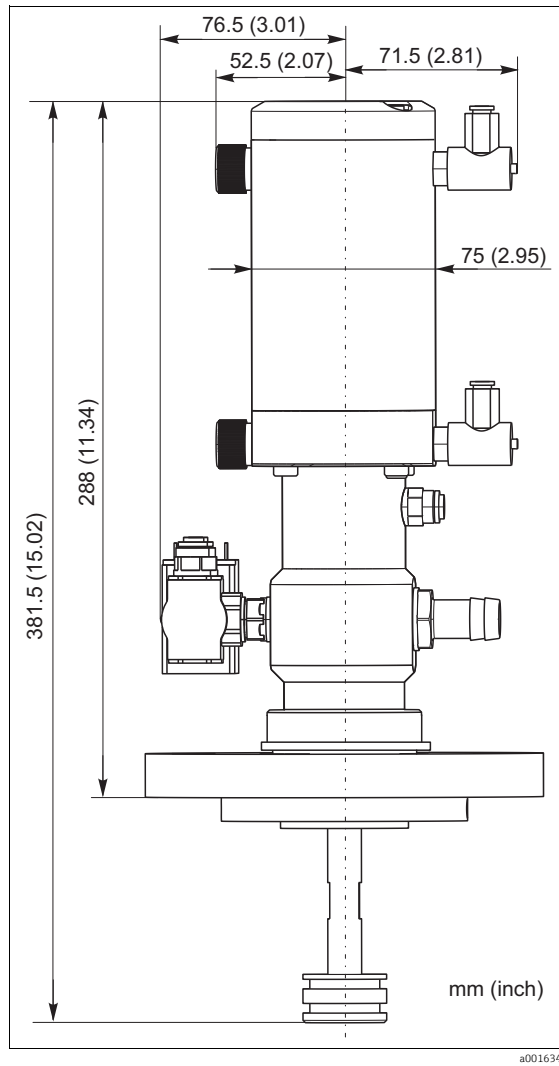


Fig. 1: Version with flange connection and optional purge valve

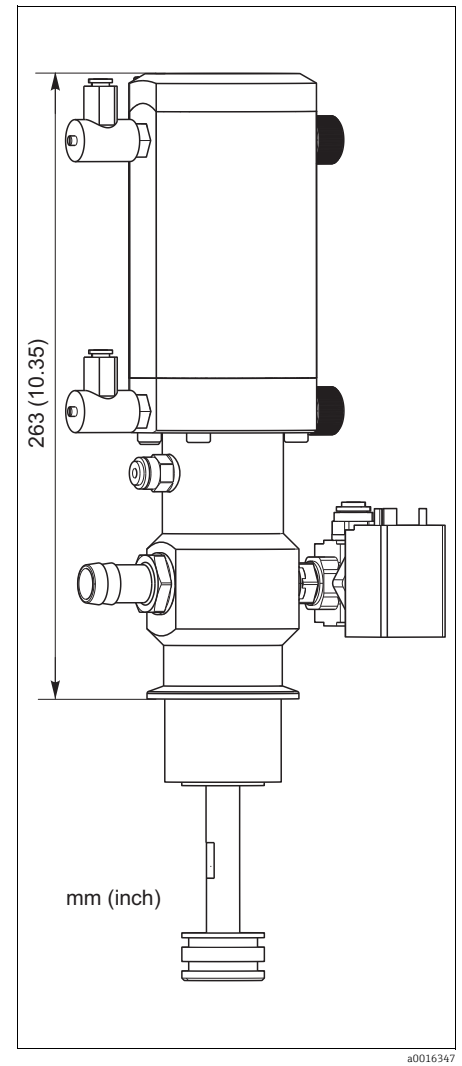
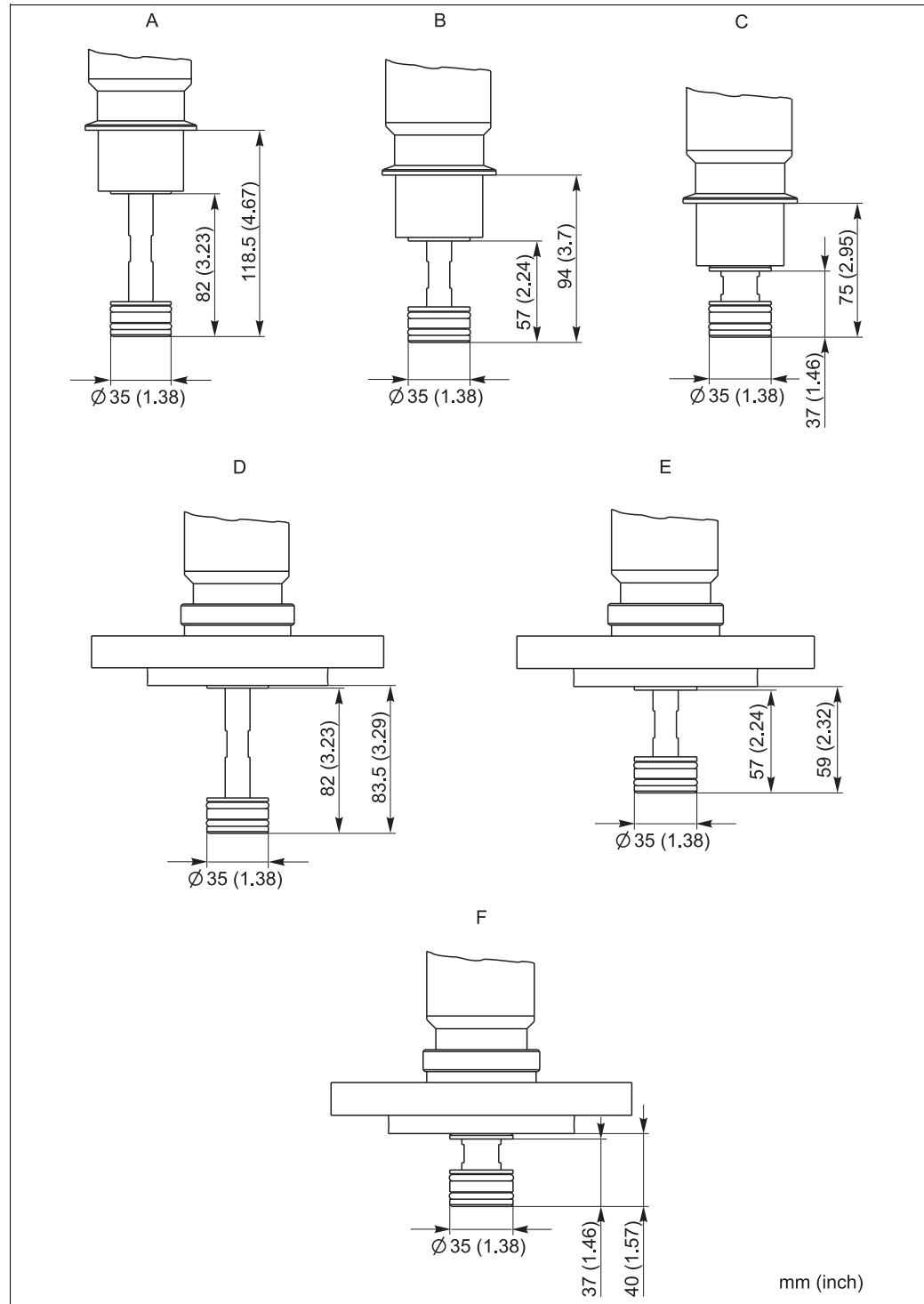


Fig. 2: Version with Triclamp connection and optional purge valve

### 3.1.2 Process connections



a0016245

Fig. 3: Process connections

- A Triclamp DN 50, 50 ml
- B Triclamp DN 50, 30 ml
- C Triclamp DN 50, 10 ml
- D Flange DN 50, 50 ml
- E Flange DN 50, 30 ml
- F Flange DN 50, 10 ml



### 3.1.3 Installation instructions

The assembly is designed for installation on tanks and pipes. Suitable nozzles must be available for this.

The assembly is available with the following process connections:

- Flange connection DN 50, PP
- Triclamp connection DN 50, DIN 32676

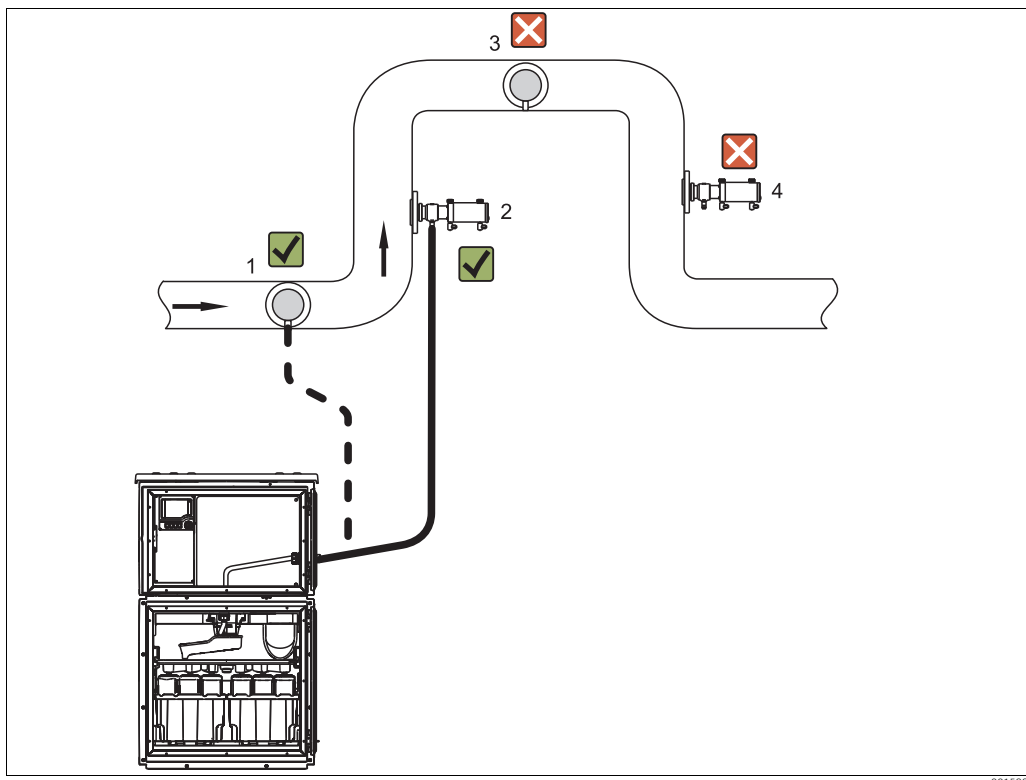


Fig. 4: Installation conditions for Samplefit CSA420 sampling assembly

Note the following when installing the assembly in pipelines:

- The best installation location is in the ascending pipe (position 2). Installation is also possible in the horizontal pipe (position 1).
- Avoid installation in the down pipe (position 4).
- Avoid siphoning effects in the suction line.
- The vertical distance between the assembly and sampler inlet should be at least 0.5 m (1.65 ft).

## 3.2 Installation instructions

### 3.2.1 Measuring system

A complete sampling unit for pressure pipes comprises:

Liquistation CSF48 and Samplefit CSA420 sampling assembly with:

- Controller with display, soft keys and navigator
- Samplefit CSA420 sampling assembly for 10 ml, 30 ml or 50 ml sample volume depending on the version ordered
- Plastic (PE) or glass sample bottles for sample preservation
- Sample compartment temperature regulator (optional) for safe sample storage

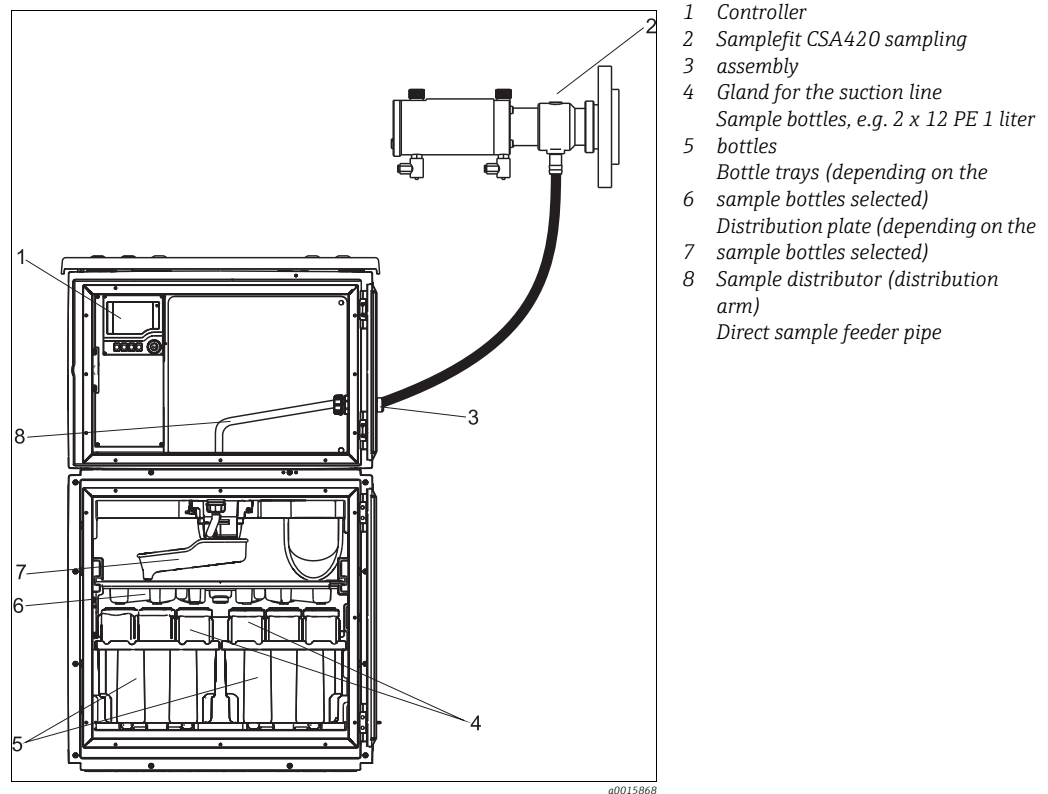


Fig. 5: Liquistation CSF48 with CSA420 sampling assembly

### 3.2.2 Installing the assembly in the process

#### NOTICE

Pay attention to the orientation of the assembly.

- ▶ The medium outlet must point downwards to ensure that the medium can reach the sampler easily.

Take the following precautions depending on the process connection used:

- Check the flange seal between the flanges before installing the assembly.
- Check the seal between the weld-in adapter and Triclamp adapter.

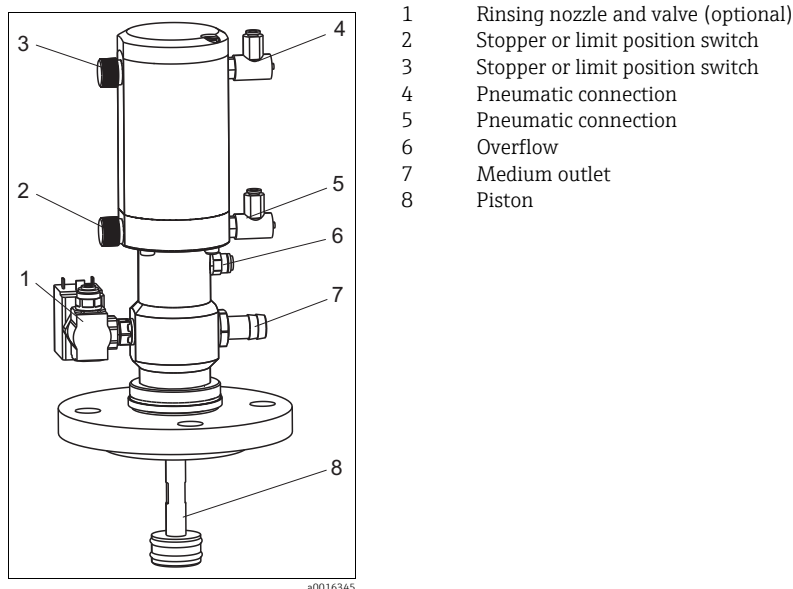


Fig. 6: Elements

1. Secure the assembly on the tank or pipe via the process connection.
2. Follow the instructions in the following sections to connect compressed air and rinsing water lines (depending on the assembly version).

### 3.2.3 Information for external compressed air connection

Prerequisites:

- Air pressure from 4 to 6 bar (58 to 87 psi)
- The air must be filtered (40 µm), and free of oil and water
- No continuous air consumption
- Minimum nominal diameter of air ducts: 4 mm (0.16 ")

Connection thread: 2 x G 1/8

#### ⚠ CAUTION

**If the air pressure can exceed 6 bar or 87 psi (even transient pressure surges), the assembly can leak, putting the user at risk of injury.**

- ▶ Install a pressure-reducing valve upstream of the assembly.
- ▶ We recommend you also use a pneumatic throttle for lower pressures. This results in smoother assembly operation. Such a throttle is available as an accessory (see "Accessories" section).

### 3.2.4 Compressed air connection

Compressed air connection on CSF48 sampler:

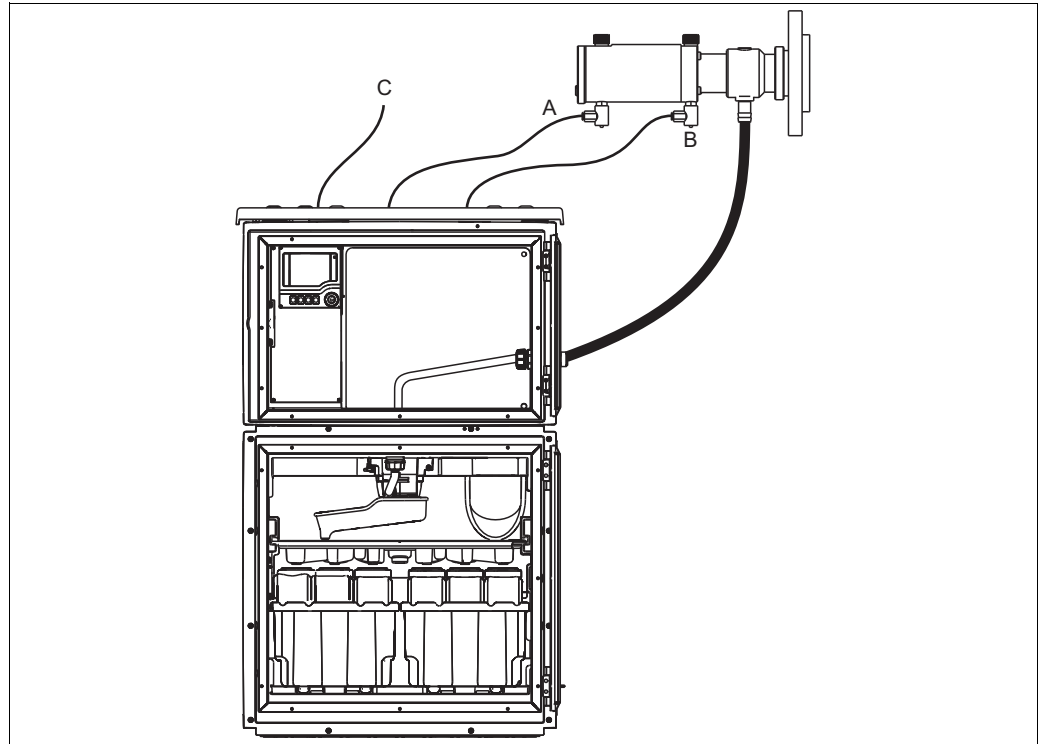


Fig. 7: Compressed air connection

- A Piston "injection"
- B Piston "retraction"
- C Optional connection for an external compressed air source

The compressed air is driven in the CSF48 sampler. In the case of samplers that do not have an internal compressor, the external compressed air supply is connected to hose "C".

### 3.2.5 Limit position switches (optional)

- Pneumatic: 3/2 way valve; thread M 12 x 1; connection for hoses with OD = 6 mm (0.24")
- Electric: inductive (NAMUR type); cable length: 10 m (32.8 ft); housing material: stainless steel; thread M 12 x 1; nominal voltage: 8 V DC in hazardous areas  
 ⓈII 1G EEx ia IIC T6  
 nominal voltage: 24 V DC in non hazardous areas  
 switching distance: 2 mm, flush

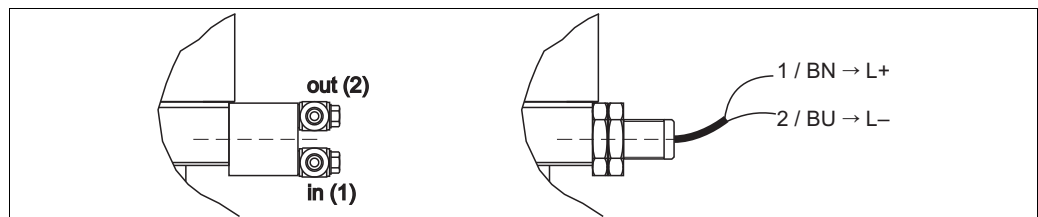


Fig. 8: Limit position switches, left: pneumatic (1 = compressed air inlet, 2 = compressed air outlet) right: electric (NAMUR)

**i** The position of the input resp. the output may be different from the figure. Please, refer to the marks at the limit position switch: "1" is the input (in), "2" is the output (out).

### 3.2.6 Connection of the pneumatic limit position switches

Following, you find the connection of the compressed air lines to the assembly.

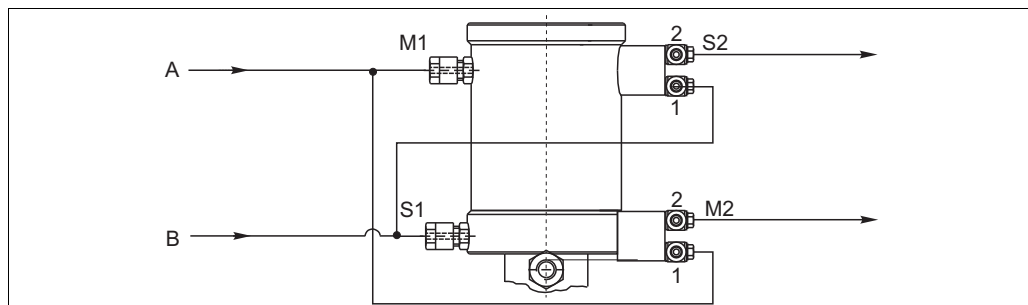



Fig. 9: Pneumatic connections and pneumatic limit position switches (1=inlet, 2=outlet)

M1	Pneumatics "Assembly sampling"
M2	Position feedback signal "Assembly sampling"
S1	Pneumatics "Assembly dosing"
S2	Position feedback signal "Assembly dosing"
A	CSF48: hose A
B	CSF48: hose B

The pneumatic limit position switches serve as control elements and determine the sequence of the individual steps.

1. Connect the compressed air supply line for "Assembly sampling" (CSF48: hose A) to the upper G 1/8 pneumatics connection (→  9).
2. Also, connect the compressed air supply hose A to the inlet (1) of the lower limit position switch (M2, via tee connector). This limit position switch supplies the position feedback signal "Assembly sampling".
3. When the "sampling" position is reached, the air applied to the inlet M2 (1) is switched through and can be tapped at the outlet M2 (2).
4. Connect the compressed air supply line for "Assembly pause" (CSF48: hose B) to the lower G 1/8 pneumatics connection.
5. Also, connect the compressed air supply hose B to the inlet (1) of the upper limit position switch (S2, via tee connector). This limit position switch supplies the position feedback signal "Assembly pause".
6. When the position "pause" is reached, the air applied to the inlet S2 (1) is switched through and can be tapped at the outlet S2 (2).

### 3.2.7 Connection of the electric limit position switches

Like the pneumatic limit position switches, the electric limit position switches also serve as control elements and determine the sequence of the individual steps.

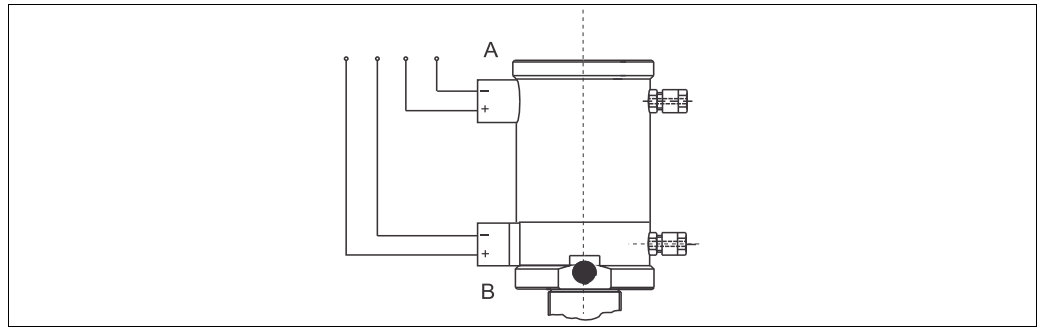


Fig. 10: Electric limit position switches

- A Limit position switch "Assembly dosing"
- B Limit position switch "Assembly sampling"

#### PLC connection

Connect the limit position switches to the corresponding terminals at the PLC.

#### Liquistation CSF48 connection

**i** According to NAMUR in hazardous areas (ATEX 1G) you have to operate the inductive limit position switches with a nominal voltage of 8 V DC.

In non hazardous areas the nominal voltage is 24 V DC. Therefore the Liquistation provides a power supply (see chapter "Power supply terminal assignment" of BA00443C).

The sampler CSF48 is equipped with two binary inputs (terminals 191/192 and 291/292).

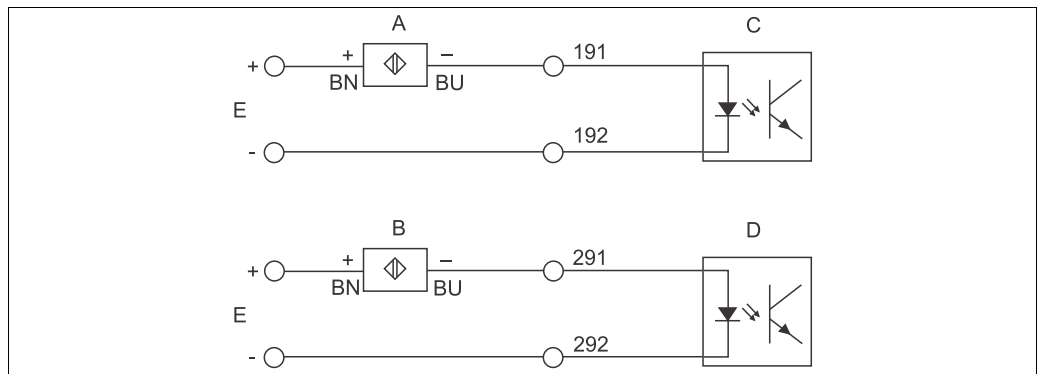


Fig. 11: Connection of the limit position switches to the binary inputs

- A Power supply
- B Electric limit position switches
- C Binary input 1
- D Binary input 2

Use "Menu/Setup/Inputs" to configure the binary inputs for "Armature end position detection".

**i** A positioning failure produces an error message F926. You can assign this message to an output.

## 3.3 Cleaning

### 3.3.1 Cleaning with air (optional)

1. Connect the compressed-air supply line to the designated rinse nozzle on the valve.
2. Operate the compressed-air supply for the rinse nozzle with an air pressure of 2 to 4 bar (29 to 58 psi).
3. Connect the valve to the terminal block rear (terminals 145/146) of the Liquistation.
4. Use "Menu/Setup/General settings/Sampling" to configure the function "Dosing with pressure" and / or "Assembly cleaning with air".

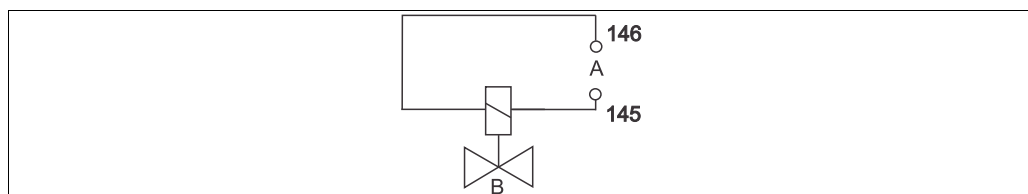


Fig. 12: Rinse-valve connection to terminal block

- A Terminal block  
B Rinse valve

### 3.3.2 Cleaning with water (optional)

1. Connect the rinse water pipe to the designated rinse nozzle on the valve.
2. Operate the rinse water connection of the assembly with a water pressure of 2 to 4 bar (29 to 58 psi).
3. In addition, install a check valve and a dirt trap (100 µm) in the water supply line (at the inlet to the rinse valve).
4. Connect the valve to the terminal block rear (terminals 245/246) of the Liquistation.
5. Use "Menu/Setup/General settings/Sampling" to configure the function "Assembly cleaning with water".

#### NOTICE

##### Water pressure too high

The assembly could be damaged.

- If it is possible for the water pressure to rise above 4 bar (58 psi) install a pressure-reducing valve upstream.

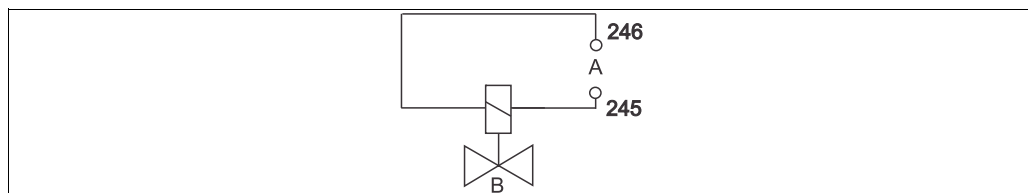


Fig. 13: Rinse-valve connection to binary output 2

- A Terminal block  
B Rinse valve

## 3.4 Post-installation check

- After installation, check that all connections are firmly in position and leak-tight.
- Ensure that the hoses cannot be removed without force.
- Check all hoses for damage.

## 4 Commissioning

Prior to initial commissioning, make sure that:

- All the seals are seated correctly (on the assembly and the process connection)
- The sensor is correctly installed and connected

### **⚠ WARNING**

#### **Medium incorrectly connected to the assembly**

Danger of medium leaking

- ▶ Before applying pressure to an assembly, make sure the medium is connected correctly. Otherwise do **not** introduce the assembly into the process!

### **Operation**

The operation of the assembly is described in the Operating Instructions of the connected control unit.

- i** For periodical replacment of the process sealing you can start a sample counter for warning and alarm (Menu/Setup/General settings/Sampling/Diagnostics setting/Process sealing).
- i** You can perform a function control of the assembly (Menu/Setup/General settings/Sampling/Diagnostics settings/Armature lock position). The piston moves to the position "sampling" and with "ESC" return to the position "dosing".



## 5 Maintenance

### **▲ WARNING**

#### **Risk of injury if medium escapes!**

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

### 5.1 Cleaning the assembly

The assembly must be cleaned at regular intervals to ensure stable and reliable sampling. The frequency and intensity of the cleaning operation depend on the medium.

- Use suitable cleaning solutions to remove light dirt and fouling (see "Cleaning agent" section).
- Heavy dirt can be removed with a soft brush and a suitable cleaning agent.
- To remove stubborn dirt, soak the parts in a cleaning solution. Then clean the parts with a brush.

 Six months is a typical cleaning interval for drinking water, for example.

### 5.2 Cleaning agents

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

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

### **▲ CAUTION**

#### **Solvents can cause a health hazard**

- ▶ Never use acetone or any organic solvents containing halogens. Such solvents can damage plastic parts of the sensor and some are suspected of causing cancer (e.g. chloroform).

### 5.3 Replacing the seals

You must interrupt the process and remove the entire assembly to replace the seals in the assembly.

**⚠ CAUTION**

**Residual medium can be caustic or cause burns**

- ▶ Wear protective goggles and safety gloves.

Preparatory steps:

1. Interrupt the process. Be careful of residual medium, residual pressure and high temperatures.
2. Completely dismantle the assembly from the process connection.
3. Clean the assembly (see the "Cleaning the assembly" section).

**Dismantling the assembly:**

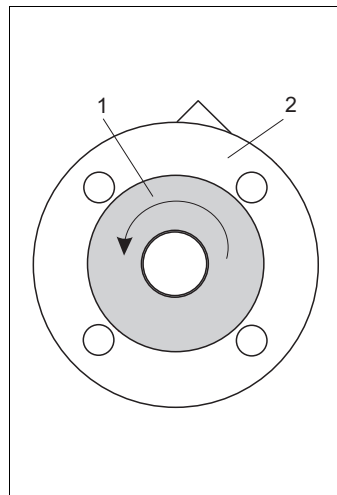


Fig. 14: Dismantling, Part 1

- 1 Raised face
- 2 Flange

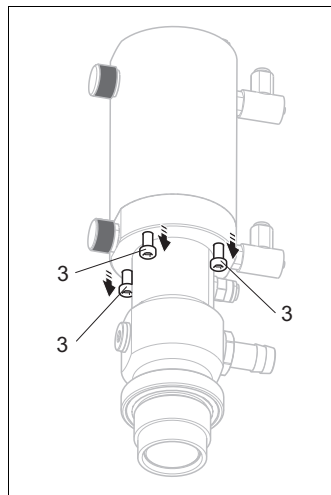


Fig. 15: Dismantling, Part 2

- 3 Connecting screws (x 4)

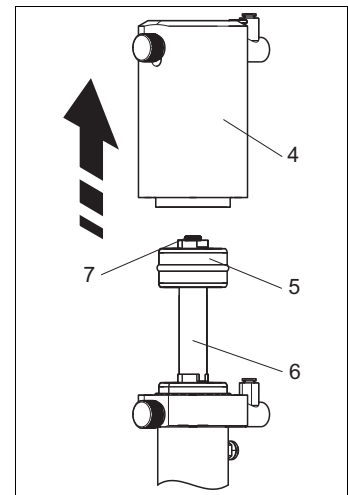


Fig. 16: Dismantling, Part 3

- 4 Pressure cylinder
- 5 Reciprocating piston
- 6 Piston
- 7 Retaining ring

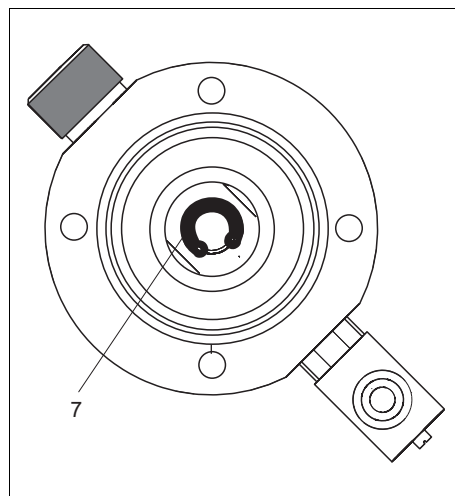


Fig. 17: Dismantling, Part 4

- 7 Retaining ring

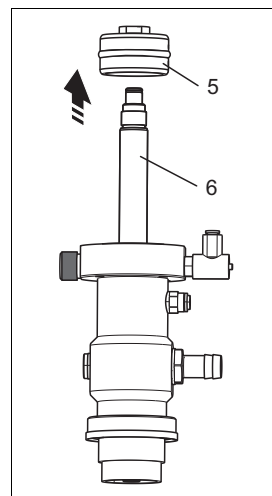


Fig. 18: Dismantling, Part 5

- 5 Reciprocating piston
- 6 Piston

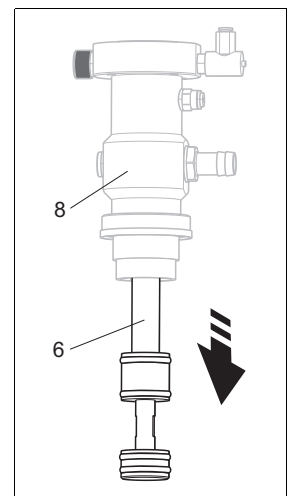


Fig. 19: Dismantling, Part 6

- 6 Piston
- 8 Sample housing


For flange version only:

1. Unscrew the raised face (item 1).
2. Remove the flange and raised face.

For all versions:

3. Release the four connecting screws (item 3) on the bottom of the sample housing.
4. Remove the pressure cylinder (item 4) from the top.
5. Remove the retaining ring (item 7).
6. Remove the reciprocating piston (item 5) from the piston (item 6). If necessary, use the wrench flats on the piston (12 mm AF) and on the reciprocating piston (19 mm AF).
7. Remove the piston from the sample housing (item 8).

**Replacing the seals**

1. Apply a thin layer of lubricant (e.g. Syntheso Glep1) to the new seals.
2. Now replace the O-rings indicated in (→  20).
3. Reassemble the assembly.

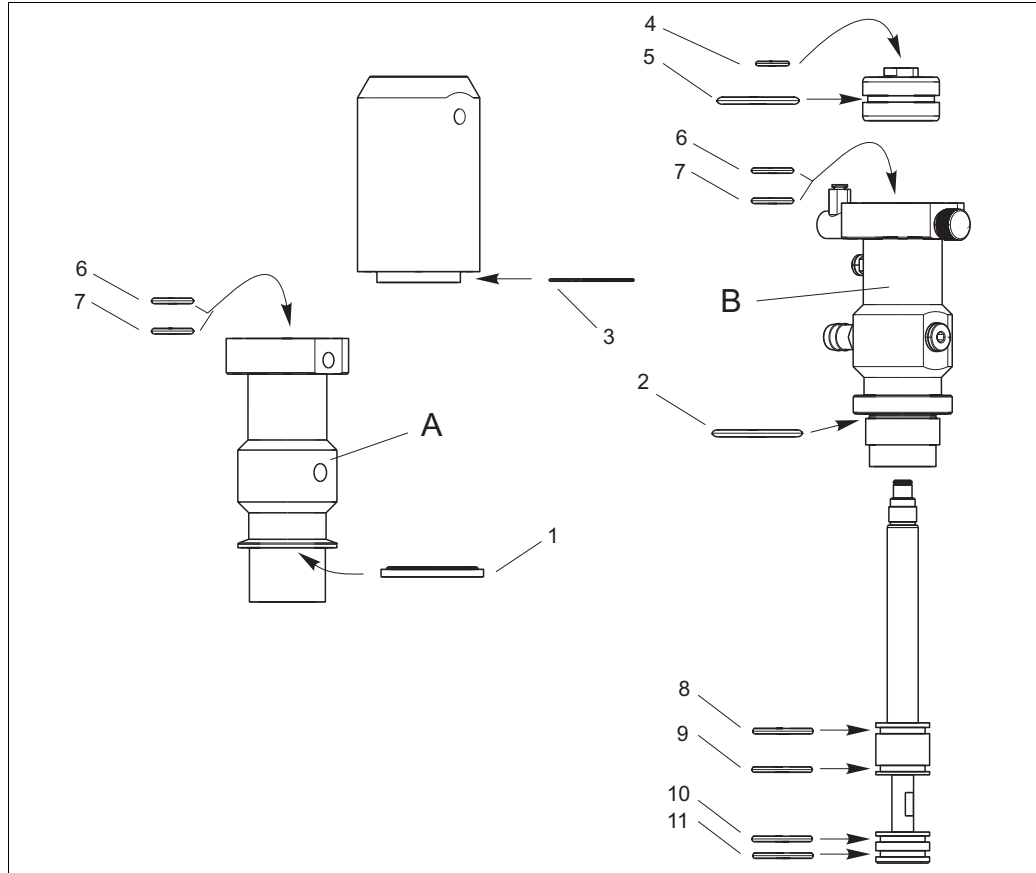



Fig. 20: Position of the O-rings

- A Triclamp sample housing
- B Flange sample housing

No	Size	Comments/material
1	Clamp-on seal DN50	Triclamp version
2	ID 50.39 W3.53	Flange version
3	ID 52.00 W1.50	EPDM
4	ID 16.00 W3.00	EPDM
5	ID 42.00 W4.00	VITON
6	ID 20.22 W3.53	EPDM
7	ID 20.22 W3.53	EPDM
8-11	ID 26.57 W3.53	EPDM
8-11	ID 26.57 W3.53	KALREZ
8-11	ID 26.57 W3.53	VITON

 For spare parts see chapter "Spare parts kits"

## 6 Repair

### 6.1 Replacing damaged parts

**⚠ WARNING**

**Incorrectly repaired devices can cause hazard**

- ▶ Assembly damage which affects the pressure safety may **only** be repaired by authorized technical personnel.
- ▶ Following every repair and maintenance task, suitable measures must be taken to ensure that the assembly is leak-tight. The assembly must again meet the technical data specifications when it has been repaired.

Replace all other damaged parts immediately.

### 6.2 Spare parts kits

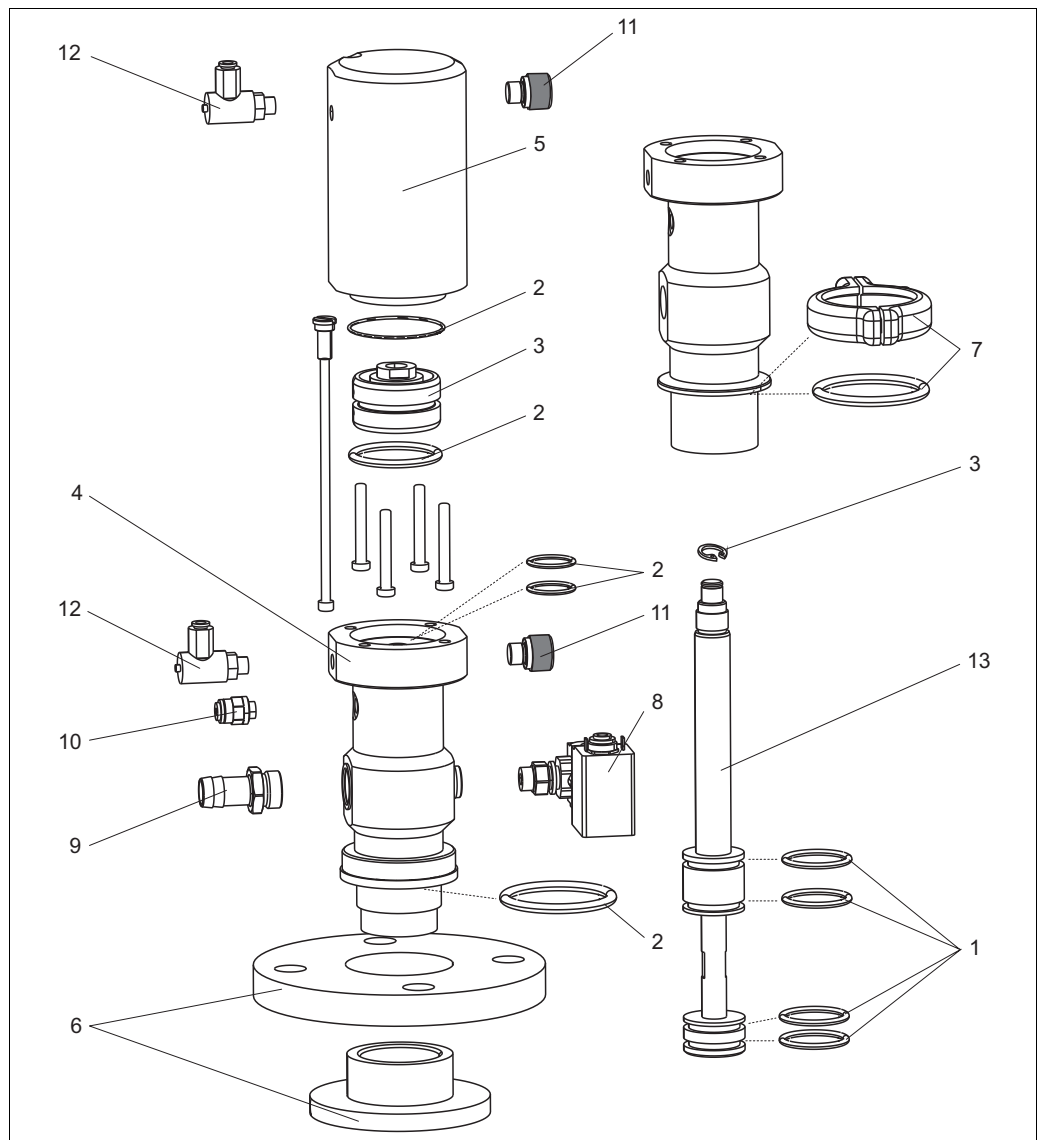


Fig. 21: Spare parts

**i** Refer to the table on the next page for the order numbers of the spare part kits based on the item numbers in → 21.

Item No.	Kit name and content	Order number for spare part kit
1	Seal set, in contact with medium, EPDM	71157754
	Seal set, in contact with medium, KALREZ	71157613
	Seal set, in contact with medium, VITON	71157615
2	Seal set, not in contact with medium	71157616
3	Reciprocating piston with O-ring and retaining ring with O-ring ID 42.00 W 4.00 OD 50.00 VITON and retaining ring D12x1.00 DIN 471 A2	71157619
4	Housing, PP	71157620
	Housing, stainless steel V4A	71157758
5	Pressure cylinder, PA	71157761
	Pressure cylinder, stainless steel V4A	71157762
6	Flange, DN 50, PP with raised face and O-ring ID 50.39 W 3.53 OD 57.45 EPDM	71157763
7	Triclamp DN 50 clamp DN 50, DIN 32676 and clamp-on seal DN 50, DIN 32676	71157764
8	Solenoid valve, 3/2-way, 24 V, G $\frac{1}{4}$ with double nipple G $\frac{1}{4}$ , PVDF	71157767
9	Threaded nozzle G $\frac{1}{2}$ with sealing ring G $\frac{1}{2}$ , PVC	71157768
10	Stopper of sampling chamber, G $\frac{1}{4}$ with sealing ring G $\frac{1}{4}$ ,	71157769
11	Stopper of pressure cylinder, M12x1, 2 pcs with O-ring ID 12.00 W 2.00 OD 16.00, EPDM, 2 pcs	71157771
12	Pneumatic throttle check valve, 2 pcs	71157772
13	Piston 10 ml, stainless steel	71157774
	Piston 30 ml, stainless steel	71157775
	Piston 50 ml, stainless steel	71157776
	Piston 10 ml, PP	71157777
	Piston 30 ml, PP	71157778
	Piston 50 ml, PP	71157779

### 6.3 Return

The device must be returned if repairs or a factory calibration are required, or if the wrong device 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 medium.

To ensure swift, safe and professional device returns, please read the return procedures and conditions on the internet site:

[www.services.endress.com/return-material](http://www.services.endress.com/return-material)

### 6.4 Disposal

Please dispose of the device in accordance with the local regulations.

## **7 Accessories**

### **7.1 Installation accessories**

Pressure reducer kit

- complete, incl. manometer and angle bracket;
- order no. 51505755

Pneumatic throttle for the reduction of the assembly moving speed,

- G1/8 threaded connection
- order no. 50036864

### **7.2 Limit position switch**

Set of pneumatic limit position switches (2 pieces);

- order no. 51502874

Set of electric limit position switches, Ex and non-Ex (2 pieces);

- order no. 51502873

## 8 Technical Data

### 8.1 Environment

**Ambient temperature range** 0 to +50 °C (32 to 122 °F)

#### 8.1.1 Storage temperature

-20 to +60 °C (-4 to 140 °F)

### 8.2 Process

**Process temperature** 0 to +50 °C (32 to 122 °F)

**Process pressure** max. 6 bar (87 psi)

### 8.3 Mechanical construction

**Dimensions** See the "Installation" section

**Weight** Depends on material: 1.55 to 6.1 kg (3.42 to 13.5 lbs)

<b>Materials</b>	In contact with medium:	
	Piston	Polypropylene (PP), stainless steel 1.4404 (316L)
	Sampling chamber	Polypropylene (PP), stainless steel 1.4404 (316L)
	Seals	EPDM/FPM (Viton)/FFKM (Kalrez®)
	Not in contact with medium:	
	Pressure cylinder	Polyamide (PA), stainless steel 1.4404 (316L)

**Process connection** Triclamp DN 50, flange DN50





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