

Operating Instructions

OUA260

Flow assembly for sensors OUSAFxx and OUSTF10



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1 About this document

1.1 Safety information

Structure of information	Meaning
 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.
 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.
 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.
 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 used

-  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

1.3 Symbols on the device

-  Reference to device documentation

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

Flow assembly OUA260 has been developed for the installation of optical sensors (OUSAF44, OUSAF46, OUSAF12, OUSAF22 and OUSTF10) in pipes.

Thanks to its design, it can be used in pressurized systems (→  19).

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.

2.3 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

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 Incoming acceptance and product identification

3.1 Incoming acceptance

On receipt of the delivery:

1. Check the packaging for damage.
 - ↳ Report all damage immediately to the manufacturer.
Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.
4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.

 If one of the conditions is not satisfied, contact the manufacturer.

3.2 Product identification

3.2.1 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.

3.2.2 Identifying the product

Product page

www.endress.com/oua260

Interpreting the order code

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.
 - ↳ A new window opens. Here you will find information pertaining to your device, including the product documentation.

Manufacturer address

Endress+Hauser Conducta Inc.
4123 East La Palma Avenue, Suite 200
Anaheim, CA 92807 USA

3.3 Scope of delivery

The scope of delivery comprises:

- Assembly in the version ordered
- Operating Instructions
- Certificates of Life Science Package (optional)
 - Inspection certificate 3.1
 - Pharma CoC
 - Certificate of conformity with pharmaceutical requirements, conformity with biological reactivity test USP Class VI, FDA material conformity, TSE-/BSE-free
- Pressure test
- Certificate for surface roughness

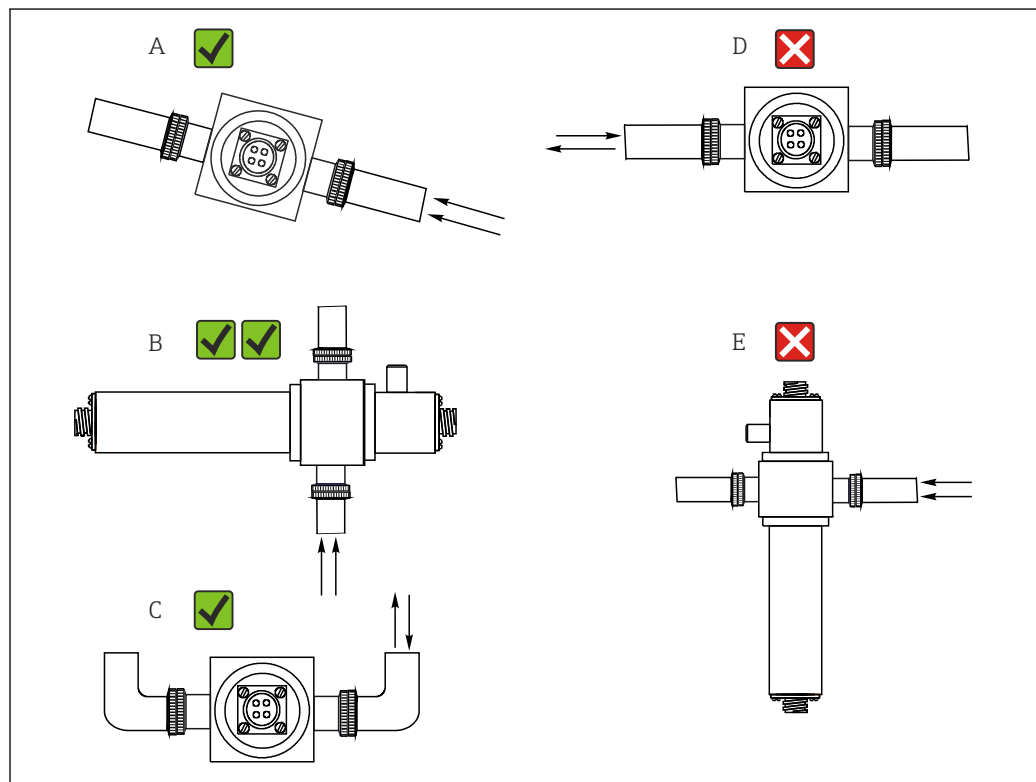
4 Installation

4.1 Installation requirements

4.1.1 Installation instructions

The assembly is available with a range of process connections. It can be installed either directly in a process line or in a bypass line.

- ▶ Make sure that the optical windows of the assembly are fully immersed in the medium.
- ▶ Avoid installation positions in which air bubbles can form.
- ▶ Install the flow assembly upstream from the pressure regulators.



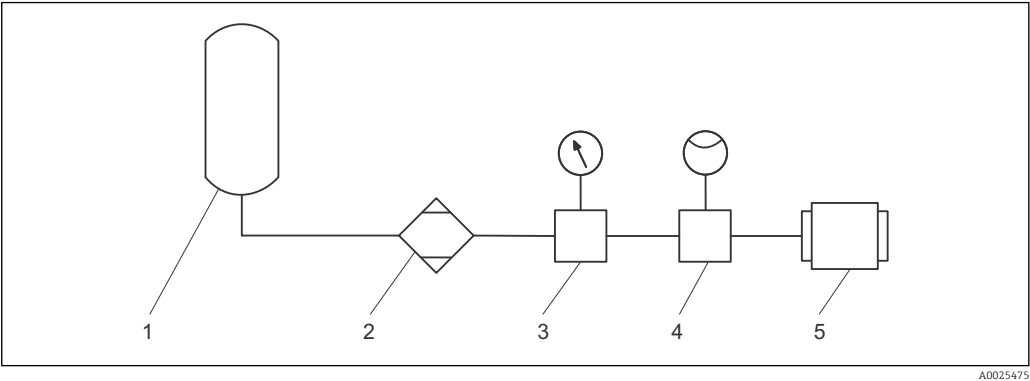
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 1 Mounting angles. The arrows indicate the direction of medium flow in the pipe.

- A Suitable installation position, better than C
- B Ideal, best installation position
- C Acceptable installation position
- D Installation position to be avoided
- E Unacceptable installation position

4.1.2 Air purge

The optical windows can be purged with dry air or nitrogen through pneumatic ports, preventing the formation of condensate on the optical windows.



 2 Example of purge air supply

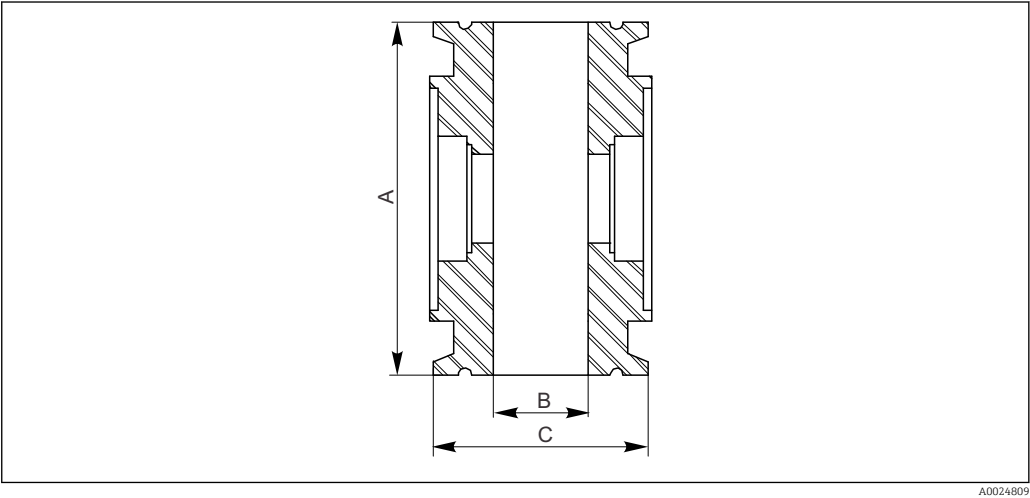
- 1 Compressed air or nitrogen supply
- 2 Air drier (not required for nitrogen)
- 3 Pressure regulator
- 4 Flow controller
- 5 Assembly OUA260

The purge gas must be clean and dry (ultra zero air).

Maximum pressure:	0.07 bar (1 psi)
Flow rate:	50 to 100 ml/min

-  The air purge function of the OUSTF10 is implemented in a different way compared to the other photometers.
-  For more details, see BA00500C.

4.2 Dimensions



 3 Dimensions of flow assembly OUA260

- A Flange spacing
- B Internal diameter
- C Flange diameter

Process connection	Pipe size	A	B	C
Tri-Clamp ¹⁾	¼"	82.5 mm (3.25 in)	4.6 mm (0.18 in)	25 mm (0.98 in)
Clamp ASME ²⁾	¼"	82.5 mm (3.25 in)	4.6 mm (0.18 in)	25 mm (0.98 in)
Tri-Clamp ¹⁾	½"	82.5 mm (3.25 in)	9.4 mm (0.37 in)	25 mm (0.98 in)
Clamp ASME ²⁾	½"	82.5 mm (3.25 in)	9.4 mm (0.37 in)	25 mm (0.98 in)
Tri-Clamp ¹⁾	¾"	82.5 mm (3.25 in)	15.2 mm (0.60 in)	25 mm (0.98 in)
Clamp ASME ²⁾	¾"	82.5 mm (3.25 in)	15.7 mm (0.62 in)	25 mm (0.98 in)
Tri-Clamp ¹⁾	1"	82.5 mm (3.25 in)	22.1 mm (0.87 in)	50.3 mm (1.98 in)
Clamp ASME ²⁾	1"	82.5 mm (3.25 in)	22.1 mm (0.87 in)	50.3 mm (1.98 in)
Tri-Clamp ¹⁾	1½"	82.5 mm (3.25 in)	36.1 mm (1.42 in)	50.3 mm (1.98 in)
Clamp ASME ²⁾	1½"	82.5 mm (3.25 in)	34.8 mm (1.37 in)	50.3 mm (1.98 in)
Tri-Clamp ¹⁾	2"	82.5 mm (3.25 in)	47.2 mm (1.86 in)	64 mm (2.52 in)
Clamp ASME ²⁾	2"	82.5 mm (3.25 in)	47.5 mm (1.87 in)	64 mm (2.52 in)
Tri-Clamp ¹⁾	2½"	88.9 mm (3.50 in)	59.9 mm (2.36 in)	77.5 mm (3.05 in)
Tri-Clamp ¹⁾	3"	114.3 mm (4.5 in)	72.6 mm (2.86 in)	90.9 mm (3.58 in)
Tri-Clamp ¹⁾	4"	124 mm (4.88 in)	96.8 mm (3.81 in)	118.9 mm (4.68 in)
RFF150 ³⁾	1"	174.7 mm (6.88 in)	25.4 mm (1.00 in)	107.9 mm (4.25 in)
RFF150 ³⁾	2"	190.5 mm (7.50 in)	47.5 mm (1.87 in)	152.4 mm (6.00 in)
RFF150 ³⁾	3"	203.2 mm (8.00 in)	69.8 mm (2.75 in)	190.5 mm (7.50 in)
RFF150 ³⁾	4"	228.6 mm (9.00 in)	95.2 mm (3.75 in)	228.6 mm (9.00 in)
RFF300 ³⁾	1"	174.7 mm (6.88 in)	25.4 mm (1.00 in)	124 mm (4.88 in)
RFF300 ³⁾	2"	190.5 mm (7.50 in)	47.5 mm (1.87 in)	165.1 mm (6.50 in)
RFF300 ³⁾	3"	203.2 mm (8.00 in)	69.8 mm (2.75 in)	209.6 mm (8.25 in)
RFF300 ³⁾	4"	228.6 mm (9.00 in)	95.2 mm (3.75 in)	254 mm (10.00 in)
Flange RF EN 1092-1 PN16	DN 25	174.7 mm (6.88 in)	26 mm (1.02 in)	115 mm (4.53 in)
Flange RF EN 1092-1 PN16	DN 50	190.5 mm (8.00 in)	50 mm (1.97 in)	165 mm (6.5 in)
NPT-SS ⁴⁾	½"	148.6 mm (5.85 in)	½" Standard NPT	N/A
NPT-SS ⁴⁾	1"	101.6 mm (4.00 in)	1" Standard NPT	N/A
NPT-SS ⁴⁾	2"	101.6 mm (4.00 in)	2" Standard NPT	N/A
NPT-PVDF ⁴⁾	½"	71.1 mm (2.80 in)	½" Standard NPT	N/A
NPT-PVDF ⁴⁾	1"	101.6 mm (4.00 in)	1" Standard NPT	N/A

1) Tri-Clamp process connection, flange diameter as per ASME BPE

2) Clamp ASME process connection as per ASME BPE

3) RFF150 and RFF300 process connections as per ASME B16.5

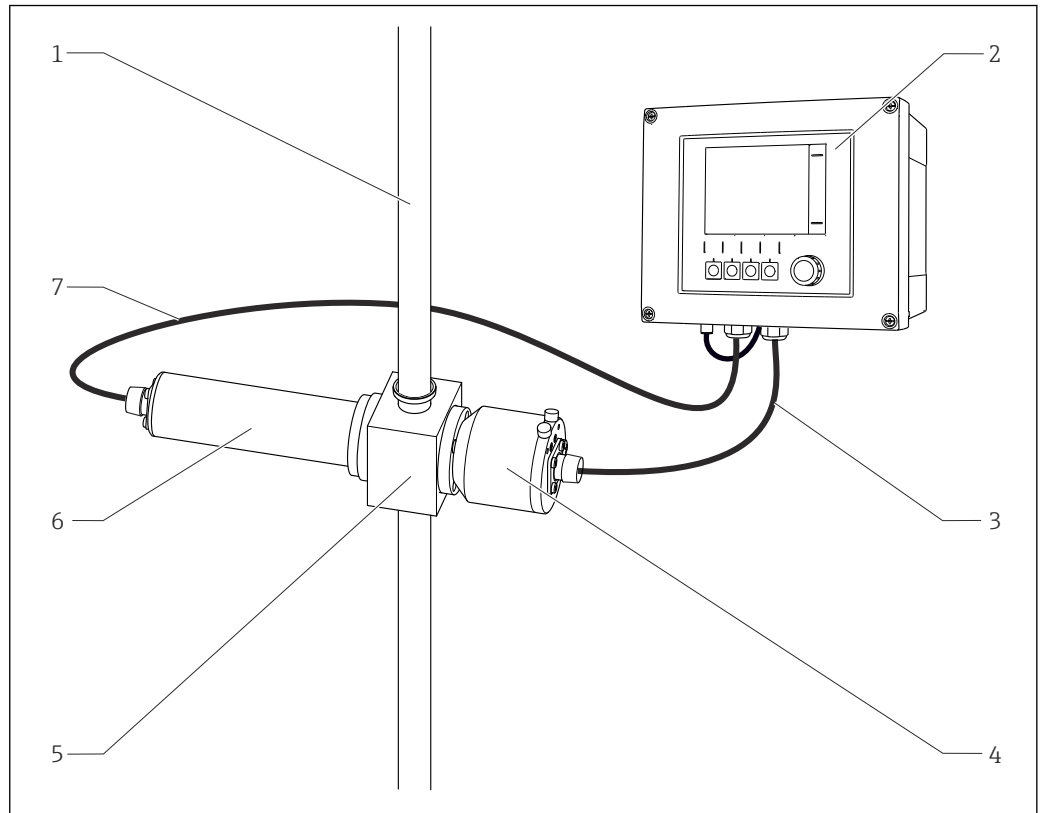
4) NPT-SS and NPT-PVDF process connections as per ASME B1.20.1

4.3 Installation conditions

4.3.1 Measuring system

A complete measuring system comprises:

- Liquiline CM44P transmitter
- Photometer sensor, e.g. OUSAF44
- Flow assembly OUA260
- Cable set CUK80



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4 Measuring system with OUA260

- 1 Pipe
- 2 Transmitter CM44P
- 3 Cable set CUK80
- 4 Sensor: detector
- 5 Flow assembly OUA260
- 6 Sensor: light source (lamp)
- 7 Cable set CUK80

4.3.2 Installing the assembly in 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.
- ▶ Only mount the assembly if the pipes are empty and unpressurized.
- ▶ Mount the assembly via the process connections.

4.4 Post-installation check

- ▶ After mounting, check all the connections to ensure they are secure and leak-tight.

5 Maintenance

5.1 Maintenance instructions

Take all the necessary precautions in time to ensure the operational safety and reliability of the entire measuring system.

NOTICE

Effects on process and process control!

- ▶ When carrying out any work on the system, bear in mind any potential impact this could have on the process control system and the process itself.
- ▶ For your own safety, only use genuine accessories. With genuine parts, the function, accuracy and reliability are also ensured after maintenance work.

NOTICE

Sensitive optical components

If you do not proceed with care, you can damage or severely dirty the optical components.

- ▶ Maintenance work may only be carried out by appropriately qualified staff.
- ▶ Use ethanol and a lint-free cloth which is suitable for cleaning lenses to clean all the optical components.

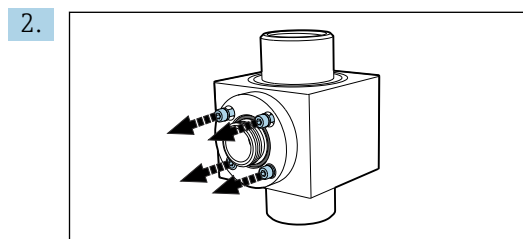
5.2 Replacing the sensor window and seals

Removing optical windows and seals

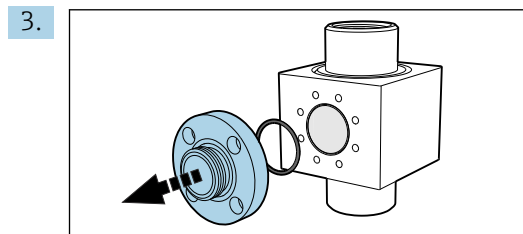
Always replace windows with windows of the same type in order to maintain the path length.

1. Remove the lamp and detector housing.

The following description applies for both sides, i.e. the detector side and the lamp side. Always change O-rings or optical windows ¹⁾ on both sides.



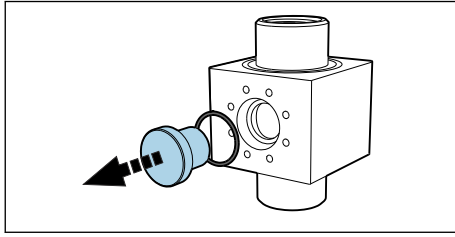
Remove the 4 Allen screws (1/8" or 3 mm) from the window ring. Make sure to loosen the screws evenly and alternately around the window ring.



Remove the window ring .

1) Optical windows only need to be replaced if they are damaged.

4.



If the window jams, apply some acetone around the window seal (O-ring) and wait a few minutes for it to take effect. This should help release the window. **The seal cannot be reused afterwards!**

Checking or replacing optical windows and seals

1. Check the window area for residue or fouling. Clean if necessary.
2. Check the optical windows for signs of chipping or abrasion.
 - ↳ Replace the windows if signs of chipping/abrasion are found.
3. Dispose of all the O-rings and replace them with new O-rings from the relevant maintenance kit.
4. Mount the optical window and then the window ring, along with the new seals, . Make sure to tighten the screws of the window ring uniformly in a diagonally opposite sequence. In this way, you ensure that the ring is seated correctly.



If you have changed the path length by installing other optical windows, you then have to configure the measuring system appropriately.

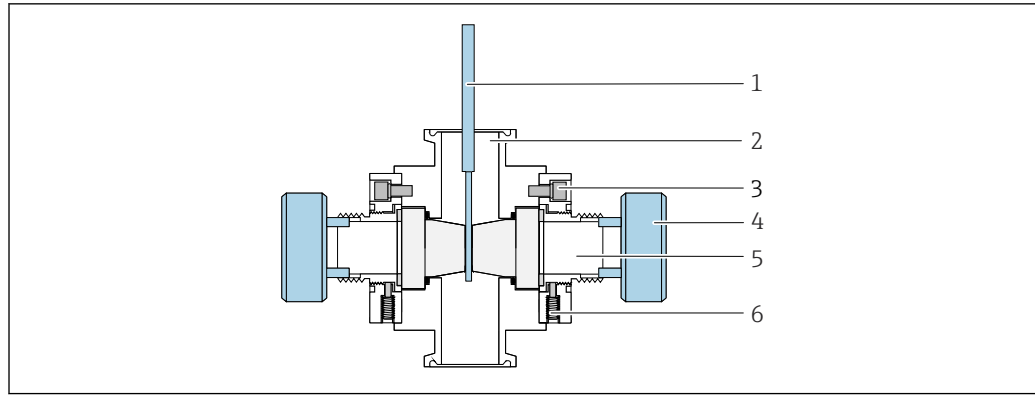
In any case, you must always perform an adjustment with liquids after disassembling and assembling the windows.

Assemblies with an adjuster for the precision optical path length (POPL) ²⁾

The precision optical path length (POPL) adjuster makes it possible to adjust the optical path length to the exact distance necessary for the measurement.

POPL is only required for measuring systems with Easycal and optical path lengths < 5 mm (0.2 in).

2) POPL, precision optical path length adjuster



 5 Assembly with POPL function, sectional view

- 1 Measuring gage
- 2 Assembly OUA260
- 3 Screws of the window ring
- 4 Path length adjuster
- 5 Actuators with gaskets
- 6 Securing screws

 The following description applies for assemblies with POPL already fitted. If you are retrofitting POPL, please refer to the instructions supplied with the spare parts kit.

1. Replace O-rings and damaged windows in the same way as for assemblies without POPL. Follow the steps until you have re-installed the window rings on either side of the assembly.
2. Release the 2 securing screws (item 6) on each window ring.
3. Clean the measuring gage (item 1) and insert it into the assembly until it is positioned between the windows.
4. Now use the path length adjuster (item 4). Reduce the path length by gradually screwing in the actuator (item 5) on both sides until the measuring gage just touches both windows (→ diagram). Do not secure too tightly.
5. Carefully remove the measuring gage from the assembly again.
6. Then tighten the securing screws to secure the actuator in place.
 - ↳ Remove the path length adjuster.

If possible: perform a pressure test with double the process pressure on the mounted flow assembly. Perform another check with the measuring gage and adjust the path length if necessary. Pressure tests guarantee the compression of the O-ring window seals and the adjustment thread during mounting. This compensates for any initial changes to the path length.

 Some window surfaces might not be parallel to one another. This is normal, particularly in the case of windows made of fire-polished quartz. Make absolutely sure that the measuring gage does not scratch the window surfaces.

6 Repair

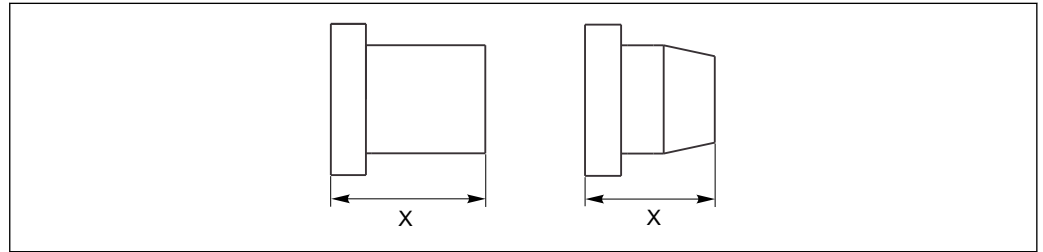
6.1 Spare parts

Device spare parts that are currently available for delivery can be found on the website:

<https://portal.endress.com/webapp/SparePartFinder>

- Quote the serial number of the device when ordering spare parts.

For both window types, the length is measured over the entire length.



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6 Length measurement of both window types

Example:

To obtain a path length of 10 mm (0.39 in) with the Tri-Clamp 3.5 mm (2.5 ") process connection, take one window with a length of 34 mm (1.34 in) and one with a length of 36.8 mm (1.45 in).

Window types and path lengths for the various pipe sizes with the Tri-Clamp process connection (dimensions in mm)

Path length	0.25" 0.50" 0.75"	1.0 " LV 1.5" LV	2.0"	2.5"	3.0"	4.0"
0.5 mm POPL	19 + 18.5	24 + 23.5	33.5 + 34			
1 mm	18 + 19	23 + 24	33.5 + 33.5			
1 mm POPL	18 + 19	23 + 24	33.5 + 33.5			
2 mm	18 + 18	23 + 23				
2 mm POPL	18 + 18	23 + 23				
5 mm	16.5 + 16.5	21.5 + 21.5	31.5 + 31.5			
5 mm POPL	16.5 + 16.5	21.5 + 21.5	31.5 + 31.5			
10 mm	14 + 14	19 + 19	29 + 29	34 + 36.8		
20 mm	9 + 9	14 + 14	24 + 24	29 + 31.5	34 + 34	
30 mm		9 + 9	19 + 19	21.5 + 29	29 + 29	
40 mm			14 + 14	19 + 21.5	24 + 24	36.8 + 36.8
50 mm			9 + 9	14 + 16.5	19 + 19	31.5 + 31.5
60 mm				9 + 9	14 + 14	24 + 29
70 mm					9 + 9	21.5 + 21.5
80 mm						16.5 + 16.5
90 mm						9 + 14

Dimensions of the window types given in mm (e.g. 19 mm + 18.5 mm)

Window types and path lengths for the various pipe sizes with the Tri-Clamp process connection (dimensions in inch)

Path length	0.25" 0.50" 0.75"	1.0" LV 1.5" LV	2.0"	2.5"	3.0"	4.0"
0.02 in POPL	0.75 + 0.73	0.94 + 0.93	1.32 + 1.34			
0.04 in	0.71 + 0.75	0.91 + 0.94	1.32 + 1.32			
0.04 in POPL	0.71 + 0.75	0.91 + 0.94	1.32 + 1.32			
0.08 in	0.71 + 0.71	0.91 + 0.91				
0.08 in POPL	0.71 + 0.71	0.91 + 0.91				
0.2 in	0.65 + 0.65	0.85 + 0.85	1.24 + 1.24			
0.2 in POPL	0.65 + 0.65	0.85 + 0.85	1.24 + 1.24			
0.39 in	0.55 + 0.55	0.75 + 0.75	1.14 + 1.14	1.34 + 1.45		
0.79 in	0.35 + 0.35	0.55 + 0.55	0.94 + 0.94	1.14 + 1.24	1.34 + 1.34	
1.18 in		0.35 + 0.35	0.75 + 0.75	0.85 + 1.14	1.14 + 1.14	
1.57 in			0.55 + 0.55	0.75 + 0.85	0.94 + 0.94	1.45 + 1.45
1.97 in			0.35 + 0.35	0.55 + 0.65	0.75 + 0.75	1.24 + 1.24
2.36 in				0.35 + 0.35	0.55 + 0.55	0.94 + 1.14
2.76 in					0.35 + 0.35	0.85 + 0.85
3.15 in						0.65 + 0.65
3.54 in						0.35 + 0.55

Dimensions of the window types given in inch (e.g. 0.75 in + 0.73 in)

Window types and path lengths for the various pipe sizes with NPT SS and RFF 150/300/EN 1092-1 process connections (dimensions in mm)

Path length	NPT SS 0.5" / 1.0" / 2.0"	RFF 150/300 1.0" / 2.0"	RFF 150/300 3.0"	RFF 150/300 4.0"
0.5 mm POPL	33.5 + 34	33.5 + 34		
1 mm POPL	33.5 + 33.5	33.5 + 33.5		
2 mm				
2 mm POPL				
5 mm	31.5 + 31.5	31.5 + 31.5		
5 mm POPL	31.5 + 31.5	31.5 + 31.5		
10 mm	29 + 29	29 + 29		
20 mm	24 + 24	24 + 24	34 + 34	
30 mm	19 + 19	19 + 19	29 + 29	
40 mm	14 + 14	14 + 14	24 + 24	36.8 + 36.8
50 mm	9 + 9	9 + 9	14 + 24	31.5 + 31.5
60 mm			14 + 14	24 + 29
70 mm			9 + 9	21.5 + 21.5
80 mm				16.5 + 16.5
90 mm				9 + 14

Dimensions of the window types given in mm (e.g. 19 mm 18.5 mm)

Window types and path lengths for the various pipe sizes with NPT SS and RFF 150/300/EN 1092-1 process connections (dimensions in inch)

Path length	NPT SS 0.5" / 1.0" / 2.0"	RFF 150/300 1.0" / 2.0"	RFF 150/300 3.0"	RFF 150/300 4.0"
0.02 in POPL	1.32 + 1.34	1.32 + 1.34		
0.04 in POPL	1.32 + 1.32	1.32 + 1.32		
0.08 in				
0.08 in POPL				
0.2 in	1.24 + 1.24	1.24 + 1.24		
0.2 in POPL	1.24 + 1.24	1.24 + 1.24		
0.39 in	1.14 + 1.14	1.14 + 1.14		
0.79 in	0.94 + 0.94	0.94 + 0.94	1.34 + 1.34	
1.18 in	0.75 + 0.75	0.75 + 0.75	1.14 + 1.14	
1.57 in	0.55 + 0.55	0.55 + 0.55	0.94 + 0.94	1.45 + 1.45
1.97 in	0.35 + 0.35	0.35 + 0.35	0.55 + 0.94	1.24 + 1.24
2.36 in			0.55 + 0.55	0.94 + 1.14
2.76 in			0.35 + 0.35	0.85 + 0.85
3.15 in				0.65 + 0.65
3.54 in				0.35 + 0.55

Dimensions of the window types given in inch (e.g. 0.75 in + 0.73 in)

6.2 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium.

www.endress.com/support/return-material

6.3 Disposal

- Observe the local regulations.

7 Accessories

The following are the most important accessories available at the time this documentation was issued.

Listed accessories are technically compatible with the product in the instructions.

1. Application-specific restrictions of the product combination are possible.
Ensure conformity of the measuring point to the application. This is the responsibility of the operator of the measuring point.
2. Pay attention to the information in the instructions for all products, particularly the technical data.
3. For accessories not listed here, please contact your Service or Sales Center.

OUSAF44

- Optical sensor for measuring UV absorption
- Variety of materials and process connections available
- Hygienic design
- Product Configurator on the product page: www.endress.com/ousaf44



Technical Information TI00416C

OUSAF12

- Optical sensor for the measurement of absorbance
- Variety of materials and process connections available
- Product Configurator on the product page: www.endress.com/ousaf12



Technical Information TI00497C

OUSAF22

- Optical sensor for measuring color concentrations
- Variety of materials and process connections available
- Product Configurator on the product page: www.endress.com/ousaf22



Technical Information TI00472C

OUSTF10

- Optical sensor for measuring turbidity and undissolved solids
- Variety of materials and process connections available
- Product Configurator on the product page: www.endress.com/oustf10



Technical Information TI00500C

OUSAF46

- Optical sensor for measuring UV absorption
- Two individually configurable measuring channels
- Product Configurator on the product page: www.endress.com/ousaf46



Technical Information TI01190C

8 Technical data

8.1 Process

Process temperature range and pressure range

The process temperature range and pressure range depend on the process connection, material and pipe size.

Process connection	Line size	Nominal pressure	Temperature
Tri-Clamp 1.4435/316L	0.25 to 2"	16 bar (232 psi)	0 to 130 °C (32 to 266 °F)
Tri-Clamp 1.4435/316L	2.5 to 4"	10 bar (145 psi)	0 to 130 °C (32 to 266 °F)
Tri-Clamp PVDF	0.25", 0.5", 0.75"	4 bar (58 psi)	0 to 130 °C (32 to 266 °F)
Flange ASME RF Class 150, 316SS	All	10 bar (145 psi)	0 to 130 °C (32 to 266 °F)
Flange ASME RF Class 300, 316SS	All	20 bar (290 psi)	0 to 130 °C (32 to 266 °F)
Flange RF EN 1092-1 PN16	DN 25	16 bar (232 psi)	0 to 38 °C (32 to 100 °F)
		13.7 bar (198 psi)	38 to 130 °C (100 to 266 °F)
Flange RF EN 1092-1 PN16	DN 50	16 bar (232 psi)	0 to 38 °C (32 to 100 °F)
		13.7 bar (198 psi)	38 to 130 °C (100 to 266 °F)
NPT 316SS	All	20 bar (290 psi)	0 to 130 °C (32 to 266 °F)
NPT PVDF, plastic fittings	All	4 bar (58 psi)	0 to 130 °C (32 to 266 °F)
NPT PVDF, metal fittings	All	2 bar (29 psi)	0 to 35 °C (32 to 95 °F)

- Comply with the maximum permitted process temperature of the sensor!

8.2 Mechanical construction

Dimensions

→ Section "Installation"

Weight	¼" Tri-Clamp	stainless steel 316L/1.4435:	1.14 kg (2.51 lbs)
	1" Tri-Clamp	stainless steel 316L/1.4435:	1.39 kg (3.07 lbs)
	2" Tri-Clamp	stainless steel 316L/1.4435:	1.88 kg (4.15 lbs)
	4" Tri-Clamp	stainless steel 316L/1.4435:	3.38 kg (7.45 lbs)

Materials

Flow assembly: Stainless steel AISI 316L, 1.4435, PVDF, other materials available on request

Window: Borosilicate, quartz, sapphire

O-rings: VITON-FDA, silicone FDA, EPDM-FDA, KALREZ-FDA



PVDF is not suitable for all hazardous areas.

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