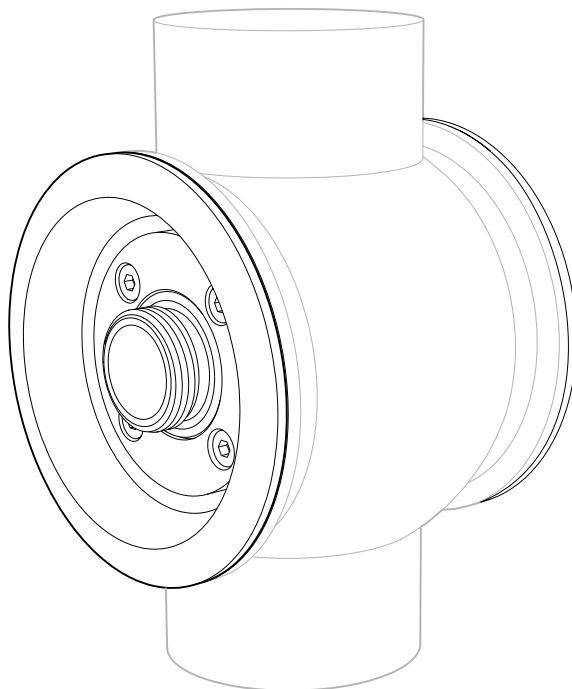


# Operating Instructions

## CUA261

Adapter for installing process photometers in  
VARIVENT process connections







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# 1 Document information

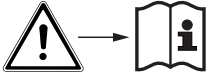
## 1.1 Warnings

Structure of information	Meaning
<p> <b>DANGER</b></p> <p><b>Causes (/consequences)</b> If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Corrective action</li> </ul>	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation <b>will</b> result in a fatal or serious injury.</p>
<p> <b>WARNING</b></p> <p><b>Causes (/consequences)</b> If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Corrective action</li> </ul>	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation <b>can</b> result in a fatal or serious injury.</p>
<p> <b>CAUTION</b></p> <p><b>Causes (/consequences)</b> If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Corrective action</li> </ul>	<p>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.</p>
<p> <b>NOTICE</b></p> <p><b>Cause/situation</b> If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Action/note</li> </ul>	<p>This symbol alerts you to situations which may result in damage to property.</p>

## 1.2 Symbols used

Symbol	Meaning
	Additional information, tips
	Permitted or recommended
	Not permitted or not recommended
	Reference to device documentation
	Reference to page
	Reference to graphic
	Result of a step

## 1.3 Symbols on the device

Symbol	Meaning
	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 Designated use

The CUA261 adapters are designed for the installation of optical sensors (OUSAF44, OUSAF12, OUSAF22, OUSAF46 and OUSTF10) in pipes with VARIVENT process connections (N 68 mm).

Their mechanical construction means that they can be operated in pressurized systems (see technical data).

Use of the device for any purpose other than that described, poses a threat to the safety of people and of the entire measuring system and is therefore not permitted.

The manufacturer is not liable for damage caused by improper or non-designated use.

## 2.3 Occupational safety

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

- Installation guidelines
- Local standards and regulations

## 2.4 Operational safety

1. Before commissioning the entire measuring point, verify that all connections are correct. Ensure that electrical cables and hose connections are undamaged.

2. Do not operate damaged products, and safeguard them to ensure that they are not operated inadvertently. Label the damaged product as defective.
3. If faults cannot be rectified:  
Take the products out of operation and safeguard them to ensure that they are not operated inadvertently.

## 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 European standards have been observed.

# 3 Incoming acceptance and product identification

## 3.1 Incoming acceptance

1. Verify that the packaging is undamaged.
  - ↳ Notify your supplier of any damage to the packaging.  
Keep the damaged packaging until the matter has been settled.
2. Verify that the contents are undamaged.
  - ↳ Notify your supplier of any damage to the delivery contents.  
Keep the damaged products until the matter has been settled.
3. Check the delivery for completeness.
  - ↳ Check it against the delivery papers and 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.  
The permitted ambient conditions must be observed (see "Technical data").

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

## 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 data on the nameplate with your order.

### 3.2.2 Product identification

#### Product page

[www.endress.com/cua261](http://www.endress.com/cua261)

#### 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 the product page for your product on the Internet.
2. At the bottom of the page, click the link **Online Tools** and then select **Access device specific information**.
  - ↳ An additional window opens.
3. Enter the order code from the nameplate into the search field and then select **Show details**.
  - ↳ You will receive information on each feature (selected option) of the order code.

#### Manufacturer's address

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

## 3.3 Scope of delivery

The delivery comprises:

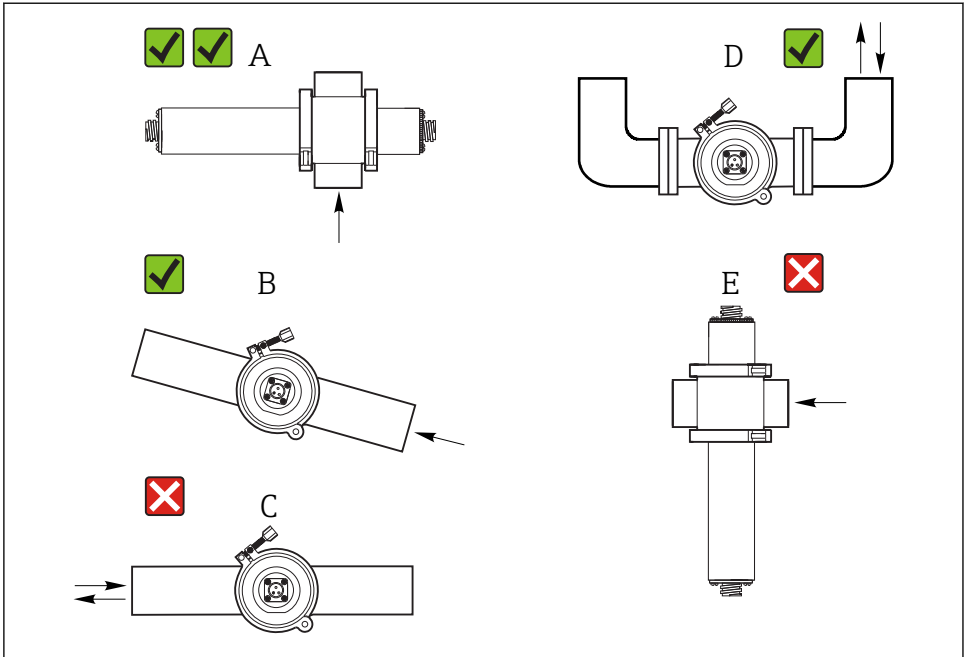
- Adapter in the version ordered, with or without VARIVENT flow assembly N 68 mm
- Clamp connector (only for version with VARIVENT flow assembly)
- Operating Instructions

## 4 Installation

### 4.1 Installation conditions

#### 4.1.1 Installation instructions

- Make sure that the optical windows of the flow assembly are vertically aligned. This prevents buildup on the window surfaces. The optical windows are vertical when the sensor and the detector housing are in a horizontal position.
- Install the flow assembly and sensor upstream from the pressure regulators.



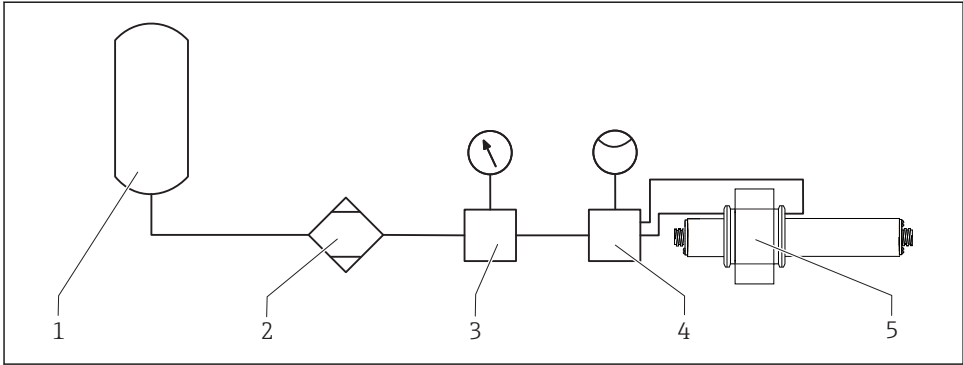
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### 1 Sensor installation

- A Optimum mounting angle, best installation position
- B Suitable mounting angle, better than D
- C Mounting angle to be avoided
- D Acceptable mounting angle
- E Forbidden mounting angle

### 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.



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#### 2 Purge gas supply via modified window rings of the VARIVENT adapter

- 1 Compressed air or nitrogen supply
- 2 Air drier (not required for nitrogen)
- 3 Pressure regulator
- 4 Flow controller
- 5 Sensor in VARIVENT flow assembly (version with air purge function)

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

Optimum purge gas pressure at:<sup>1)</sup>

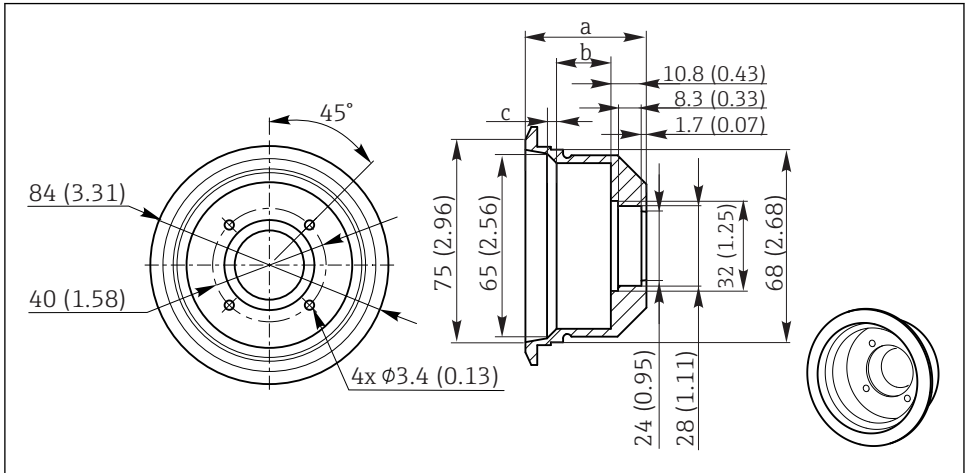
Modified window ring CUA261 with elbow connector	0.21 bar (2.5 psi) at room temperature
--	--

- 1) Indicated as overpressure

**i** The CUA261 version with the air purge function is supplied with hoses ready-connected on the window side (length 1 m (3.3 ft)). All you have to do is connect the hoses to the purge gas supply.



## 4.2 Dimensions

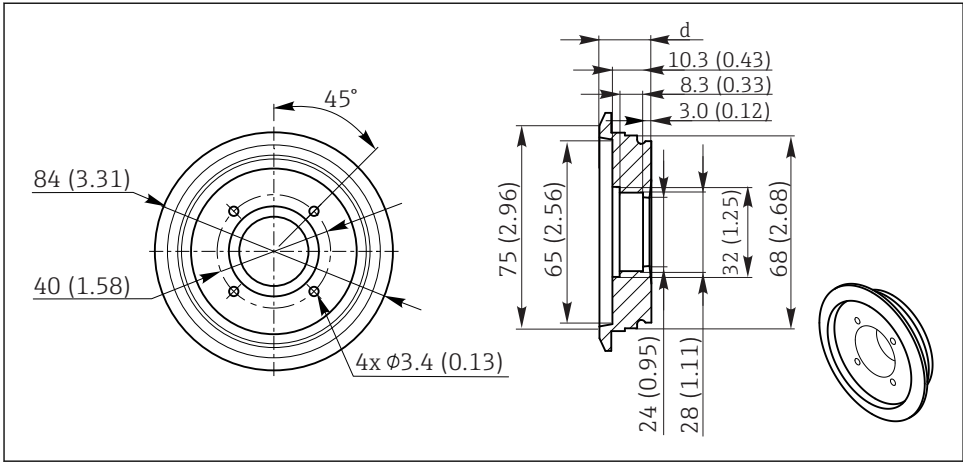


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3 Adapters for a wide variety of pipe diameters and path lengths, dimensions in mm (inch)

a-c See table

Pipe diameter, path length [mm]	a [mm (inch)]	b [mm (inch)]	c [mm (inch)]
DN50, 5/10/20	27.2 (1.07)	3.6 (0.14)	3.4 (0.13)
DN65, 5/10/20	35.2 (1.39)	11.6 (0.46)	3.4 (0.13)
DN65, 30/40	25.2 (0.99)	2.8 (0.11)	2.2 (0.09)
DN80, 5/10/20	42.7 (1.68)	19.1 (0.75)	3.4 (0.13)
DN80, 30/40	32.7 (1.29)	9.1 (0.36)	3.4 (0.13)
DN100, 5/10/20	52.2 (2.05)	28.6 (1.13)	3.4 (0.13)
DN100, 30/40	42.2 (1.66)	18.6 (0.73)	3.4 (0.13)
2", 5/10/20	26.0 (1.02)	2.4 (0.09)	3.4 (0.13)
2½", 5/10/20	26.0 (1.02)	2.4 (0.09)	3.4 (0.13)
2½", 30/40	22.2 (0.87)	2.5 (0.10)	2.0 (0.08)
3", 5/10/20	38.7 (1.52)	15.1 (0.59)	3.4 (0.13)
3", 30/40	28.7 (1.13)	5.1 (0.20)	3.4 (0.13)
4", 5/10/20	51.0 (2.00)	27.4 (1.08)	3.4 (0.13)
4", 30/40	41.2 (1.62)	17.7 (0.70)	3.4 (0.13)

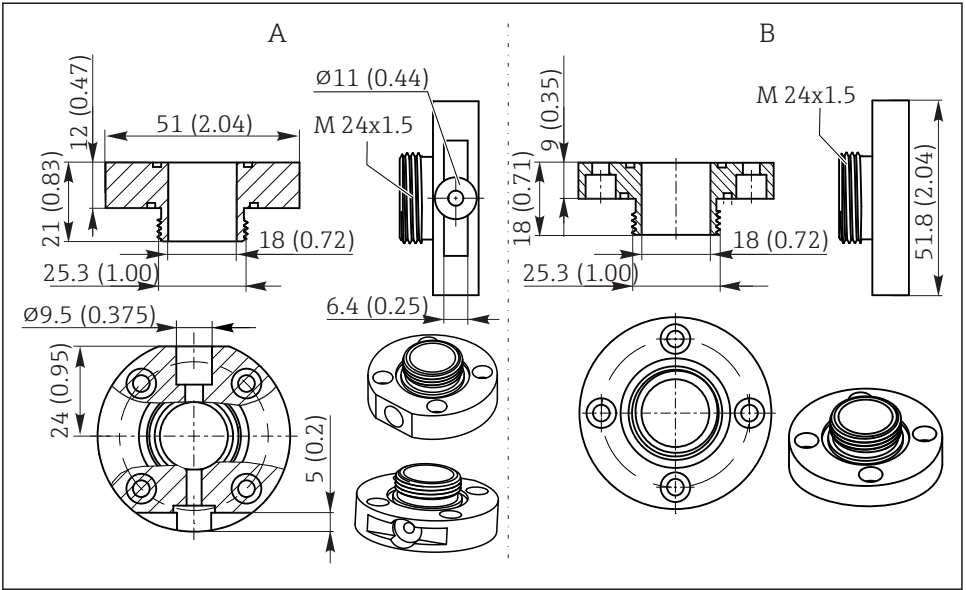


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4 Adapter for DN50/2" with 30 or 40mm path lengths, dimensions in mm (inch)

d See table

Pipe diameter, path length [mm]	d [mm (inch)]
DN50, 30/40	18.3 (0.72)
2", 30/40	17.1 (0.67)



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5 Window rings, dimensions in mm (inch)

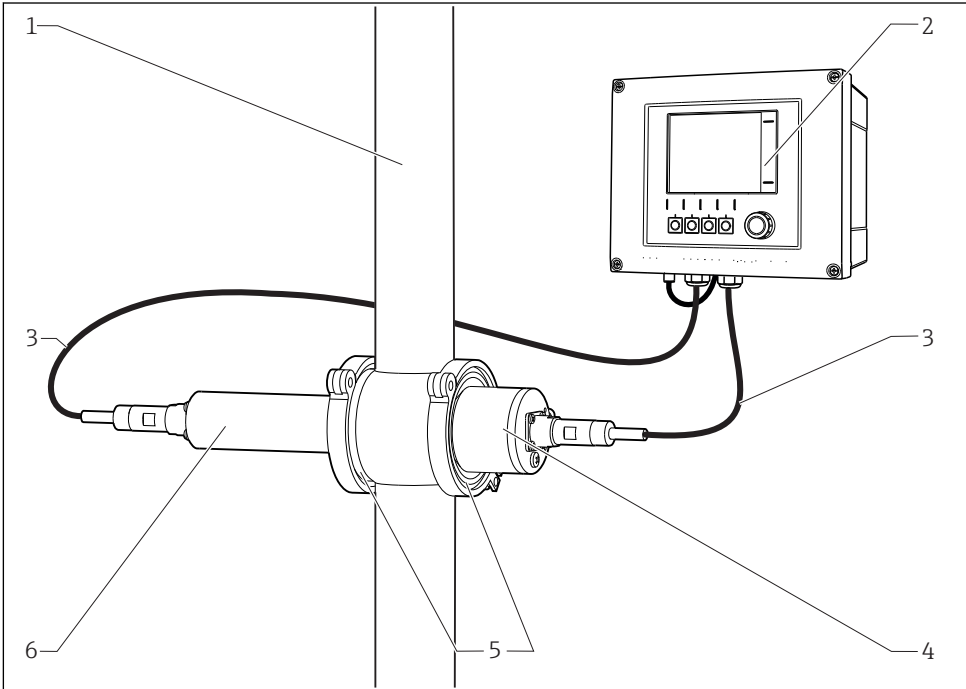
- A Window ring for air purge
- B Standard window ring

## 4.3 Installation

### 4.3.1 Measuring system

A complete measuring system comprises:

- Liquiline CM44P transmitter
- Photometer sensor, e.g. OUSAF44
- VARIVENT adapter CUA261
- VARIVENT flow assembly N 68 mm (provided at the place of installation or ordered as an optional extra)
- Cable set CUK80



- 1 Pipe
- 2 Transmitter CM44P
- 3 Cable set CUK80
- 4 Sensor: detector
- 5 VARIVENT adapter CUA261 (clamp connector only for version with flow assembly in the scope of supply)
- 6 Sensor: light source (lamp)

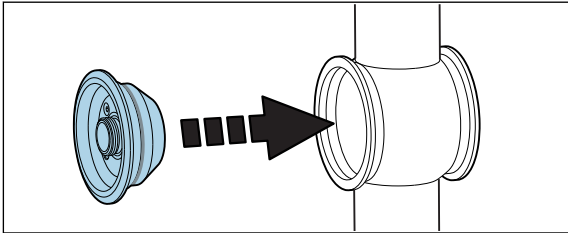
### 4.3.2 Installing the adapter in the process

#### **⚠ WARNING**

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

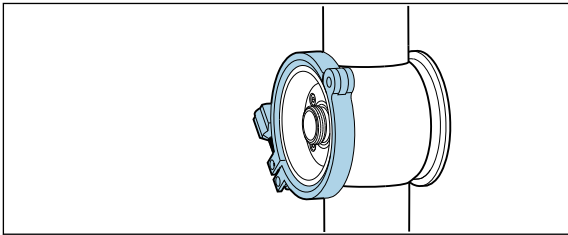
- ▶ Wear protective gloves, protective goggles and protective clothing.
- ▶ Only mount the adapter if the pipes are empty and unpressurized.
- ▶ Comply with national regulations concerning the grounding of metal assemblies.

1.



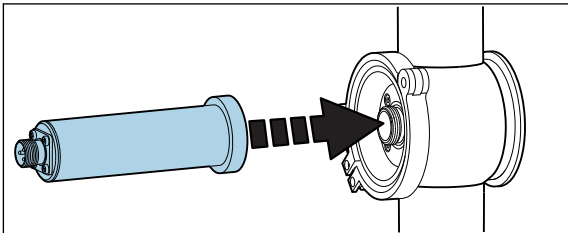
Open a VARIVENT process connection and insert the adapter (the graphics show the version without the "air purge" option).

2.



Secure the process connection with a suitable clamp connection.

3.



Screw the photometer sensor onto the window ring of the adapter. (Illustrated: photometer lamp installation.)

4.

Not illustrated:

Repeat the installation steps on the other side, i.e. on the detector side in our example.

## 4.4 Post-installation check

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

# 5 Maintenance

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, take into account possible repercussions for process control or 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.

## 5.1 Maintenance schedule

- Maintenance and servicing intervals are based on the individual application.
- Cleaning intervals depend on the medium.

#### Maintenance checklist

- Optical window and seal replacement  
The window only needs to be replaced if it is damaged.
- Replace O-rings in contact with the medium  
The replacement of O-rings in contact with the medium depends on the specific requirements of the process.  
Never re-use a used O-ring.

## 5.2 Replacing the sensor window and seals

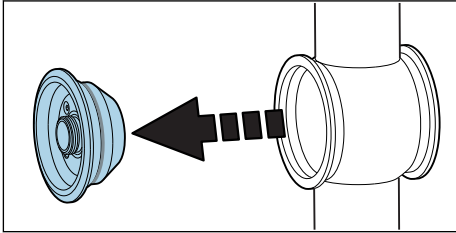
#### Removing optical windows and seals

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

1. Remove the lamp and detector housing .

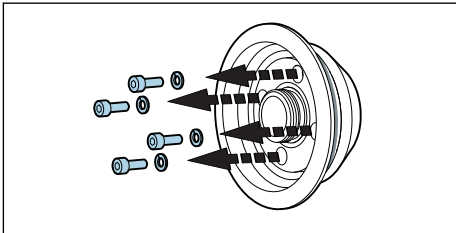
The following description applies for both sides, i.e. the detector side and the lamp side. Always change O-rings or optical windows<sup>1)</sup> on both sides.

2.



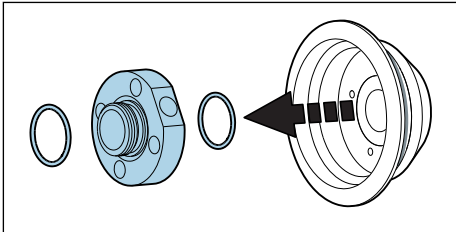
Stop the flow in the process pipe. If the pipe is dry, remove the clamp connector and remove the adapter from the VARIVENT flow assembly.

3.



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.

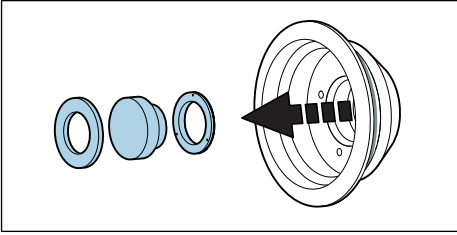
4.



Remove the window ring along with the O-rings.

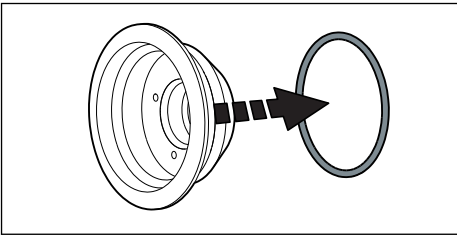
1) Optical windows only need to be replaced if they are damaged.

5.



Gently push the optical window along with the gasket and O-ring out of the adapter. 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!**

6.



Remove the O-ring on the process side of the adapter.

### Checking or replacing optical windows and seals

1. Check the window area of the adapter for residue or fouling. Clean it if necessary.
2. Check the optical windows for signs of chipping or abrasion.
  - ↳ Replace the windows if such signs are visible.
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, back on the adapter. 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.
5. Then mount the lamp and the detector on the VARIVENT adapter.



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.



## 6 Repairs

### 6.1 Spare parts

The path length is calculated from the combination of the optical windows in various wall thicknesses.

The window combination is identical for all the pipe diameters. It only depends on the desired path length.

Path length	Window types [mm]
5 mm	21.5 + 21.5
10 mm	19 + 19
20 mm	14 + 14
30 mm	19 + 19
40 mm	14 + 14

Description	Order number
Kit CUA261 quartz window 14 mm	71347354
Kit CUA261 quartz window 19 mm	71347355
Kit CUA261 quartz window 21.5 mm	71347356
Kit CUA261 sapphire window 14 mm	71347357
Kit CUA261 sapphire window 19 mm	71347358
Kit CUA261 sapphire window 21.5 mm	71347359
Kit CUA261 borosilicate window 14 mm	71347360
Kit CUA261 borosilicate window 19 mm	71347361
Kit CUA261 borosilicate window 21.5 mm	71347362
Kit CUA261 EPDM seals	71347363
Kit CUA261 FFKM seals	71347364
Kit CUA261 silicone seals	71347365
Kit CUA261 FKM seals	71347366
Kit CUA261 lamp and detector O-rings	71347367
Kit CUA261 air purge retrofit kit	71347368
Kit CUA261 relief valve	71347369

### 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.

To ensure swift, safe and professional device returns, please read the return procedures and conditions at [www.endress.com/support/return-material](http://www.endress.com/support/return-material).

## 7 Technical data

### 7.1 Process

#### 7.1.1 Process temperature

0 to 135 °C (32 to 275 °F)



Please comply with the maximum permitted process temperature of the sensor.

#### 7.1.2 Process pressure

Maximum 11 bar (15 psi), absolute, at 25 °C (77 °F)

## 7.2 Mechanical construction

### 7.2.1 Dimensions

→ 9

### 7.2.2 Weight

Adapter complete with flow assembly and OUSAF44	Approx. 4.4 kg (9.3 lbs)
Adapter complete with flow assembly, without photometer	Approx. 3.0 kg (6.6 lbs)
Individual adapter, depending on version	0.4 to 0.6 kg (0.9 to 1.3 lbs) depending on version

### 7.2.3 Materials

Adapter	Stainless steel 1.4404/1.4435 (AISI 316L)
Window ring	Stainless steel 1.4404/1.4435 (AISI 316L)
Screws and circlips	Stainless steel
Optical windows	Borosilicate, quartz, sapphire
Window snap ring	PTFE
Seals	FFKM FDA, silicone FDA, EPDM FDA, FKM FDA
Relief valve (optional)	PVDF, silicone O-rings

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