

Operating Instructions

CUA261

Adapter for installing process photometers in
VARIVENT process connections







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1 About this document



1.1 Safety information

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

1.2 Symbols used

	Additional information, tips
	Permitted
	Recommended
	Forbidden or not recommended
	Reference to device documentation
	Reference to page
	Reference to graphic
	Result of a step

1.3 Symbols on the device

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

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).

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

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

- 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.
3. Do not operate damaged products, and protect them against unintentional operation.
4. Label damaged products as defective.

During operation:

- ▶ If faults 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

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.

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/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 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 fill information pertaining to your device, including the product documentation.

Manufacturer's address

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

3.3 Scope of delivery

The scope of delivery comprises:

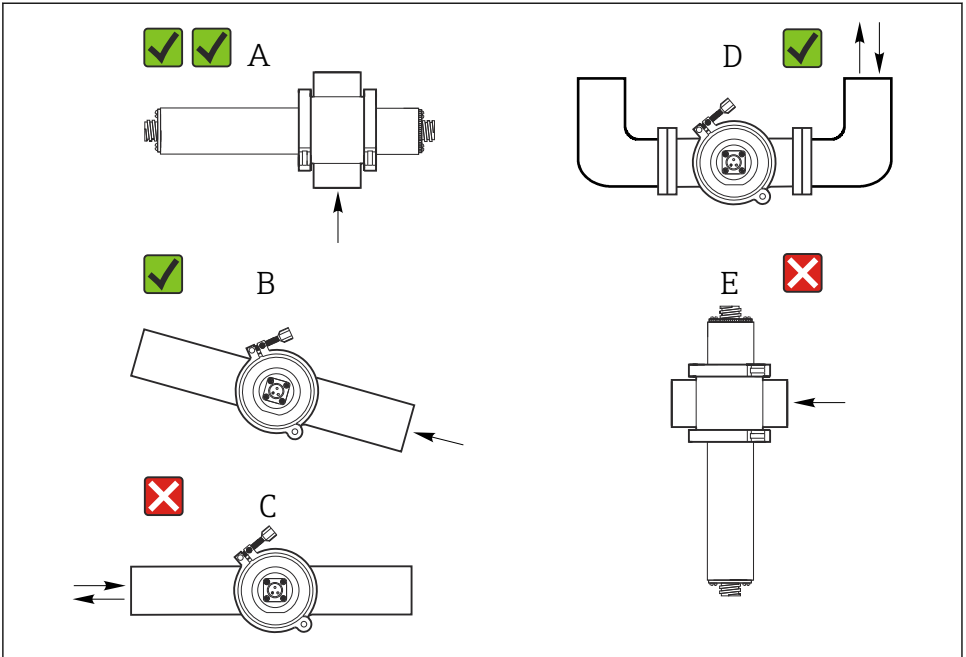
- Adapter in the version ordered,
with or without VARIVENT flow assembly N 68 mm
- Clamp connector (only for version with VARIVENT flow assembly)
- Operating Instructions

4 Mounting

4.1 Mounting requirements

4.1.1 Mounting instructions

- ▶ 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.



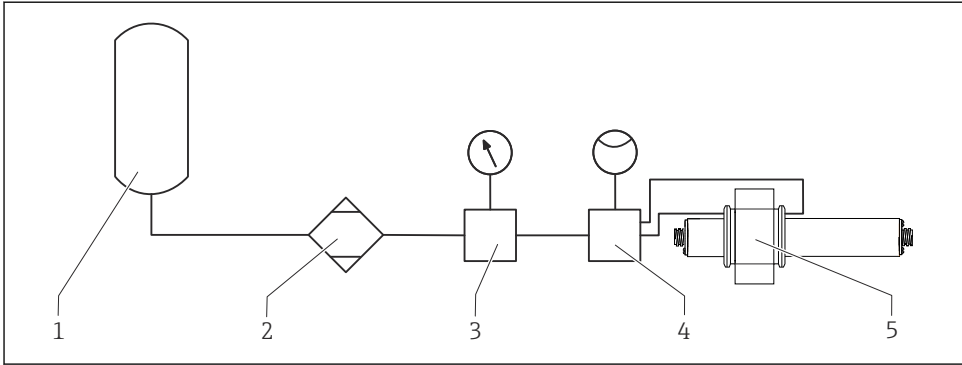
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1 Sensor installation

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



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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 pressure of the purge gas at:¹⁾

Modified window ring CUA261 with elbowed sleeve	0.21 bar (2.5 psi) at room temperature
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- 1) Indicated as overpressure

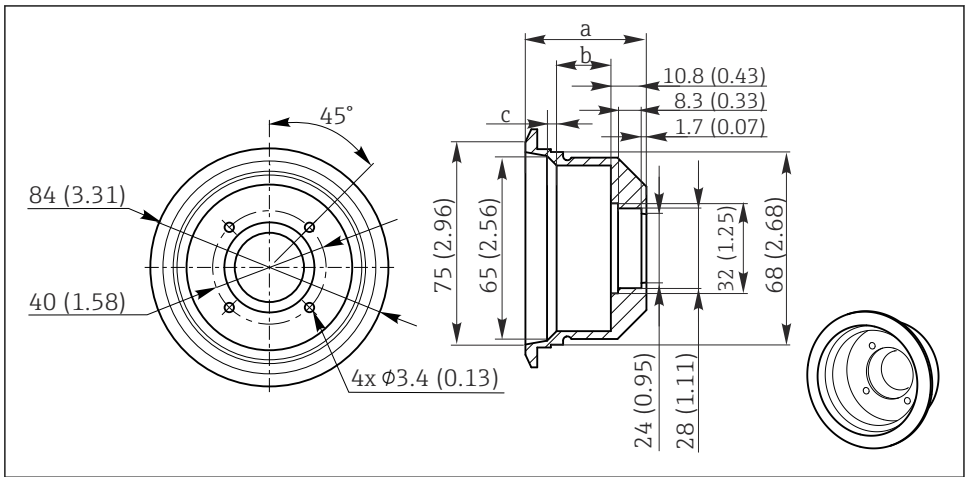
i The CUA261 version with the air purge function is supplied with hoses ready-connected on the window side (length 1 m (3.3 ft)). All you have to do is connect the hoses to the purge gas supply.

i The air purge function of the OUSTF10 is implemented in a different way compared to the other photometers.

b For more details, see BA00500C.

4.2 Dimensions

4.2.1 Adapter for OUSAF4x and OUSAFx2 sensors

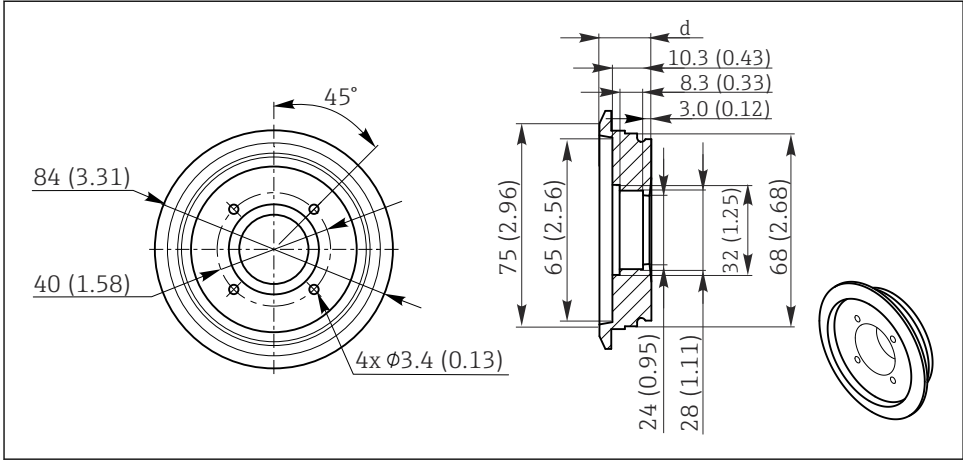


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3 Adapter for various pipe diameters and path lengths. Unit of measurement mm (in)

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, 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, 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, 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", 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", 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)



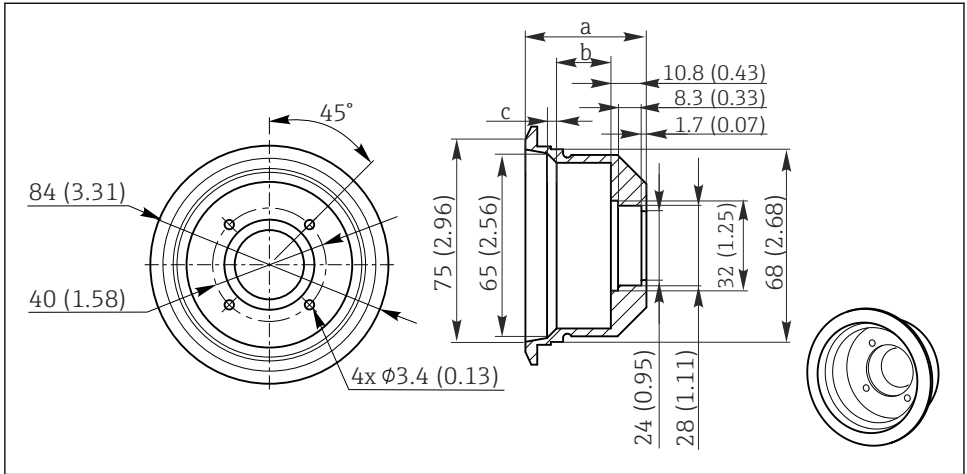
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4 Adapter for DN50/2" with path lengths 30 or 40 mm. Unit of measurement mm (in)

d See table

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

4.2.2 Adapter for OUSTF10

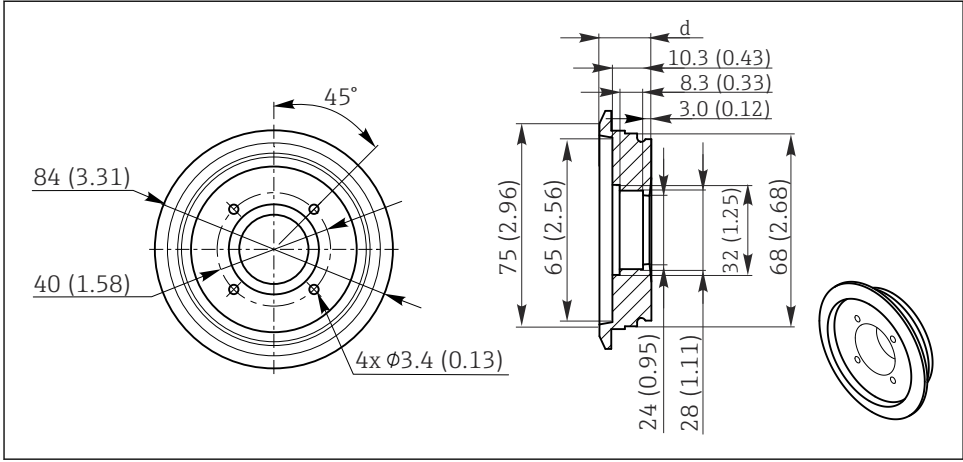


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5 Adapter for various pipe diameters and path lengths. Unit of measurement mm (in)

a-c See table

Pipe diameter	a [mm (inch)]	b [mm (inch)]	c [mm (inch)]	Window length (mm)
TF10 2-1/2" lamp side	28.68 (1.12)	5.13 (0.20)	3.38 (0.13)	14 (0.55)
TF10 3" lamp side	41.22 (1.62)	17.68 (0.70)	3.38 (0.13)	14 (0.55)
TF10 4" lamp side	25.17 (0.99)	2.84 (0.11)	2.16 (0.09)	34 (1.34)



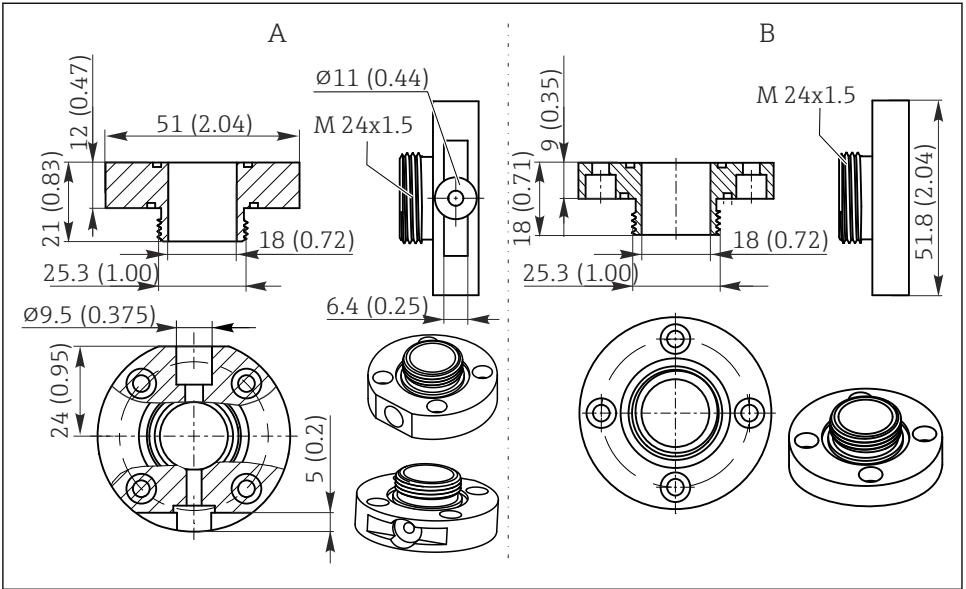
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6 Adapter for DN50/2" with path lengths 30 or 40 mm. Unit of measurement mm (in)

d See table

Pipe diameter	d [mm (inch)]	Window length [mm (inch)]
TF10 DN50 lamp/detector side	17.1 (0.67)	14(0.55)/16.5 (0.65)
TF10 DN65 lamp/detector side	17.1 (0.67)	14(0.55)/16.5 (0.65)
TF10 DN80 lamp/detector side	17.1 (0.67)	14(0.55)/16.5 (0.65)
TF10 DN100 lamp/detector side	17.1 (0.67)	14(0.55)/16.5 (0.65)
TF10 2" lamp/detector side	17.1 (0.67)	14(0.55)/16.5 (0.65)
TF10 2-1/2" detector side	17.1 (0.67)	14 (0.55)
TF10 3" detector side	17.1 (0.67)	14 (0.55)
TF10 4" detector side	17.1 (0.67)	34 (1.34)

4.2.3 Window rings



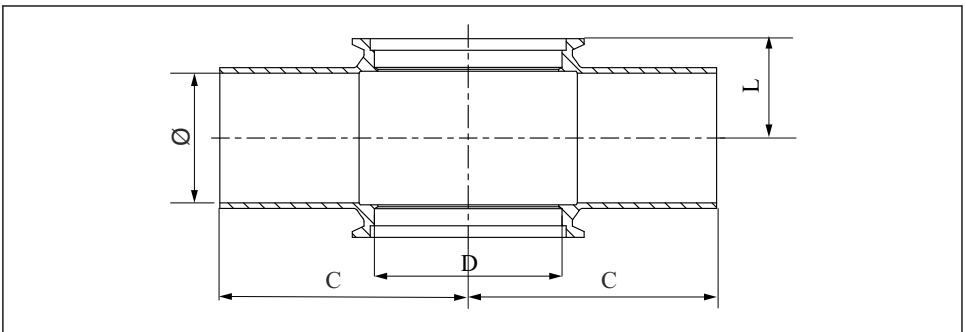
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7 Window rings. Unit of measurement mm (in)

A Window ring for air purge

B Standard window ring

4.2.4 Varivent housing



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8 Varivent housing. Unit of measurement mm (in)

L L-form housing

C, D See list

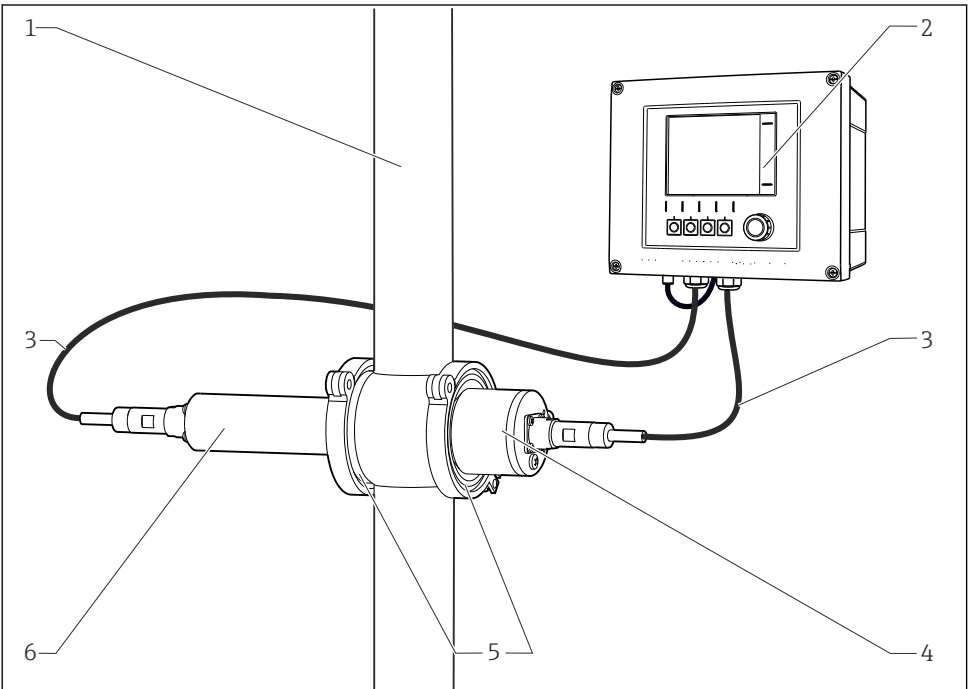
Nominal diameter	Pipe Ø [mm]	C [mm]	D [mm]	L [mm]
DN50	53.00 × 1.50	90.0	68	43.5
DN65	70.00 × 2.00	125.0	68	51.5
DN80	85.00 × 2.00	125.0	68	59.0
DN100	104.00 × 2.00	125.0	68*, 123	68.5; 73.5*
OD 2"	50.80 × 1.65	90.0	68	42.3
OD 2 ½"	63.50 × 1.65	125.0	68	48.5
OD 3"	76.20 × 1.65	125.0	68	55.0
OD 4"	101.60 × 2.11	125.0	68*, 123	67.3; 72.3*

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)

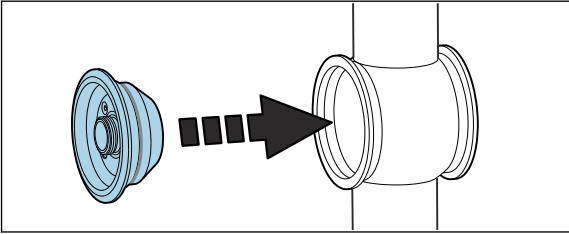
4.3.2 Installing the adapter in the process

⚠ WARNING

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

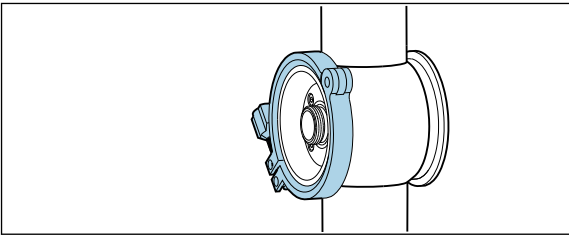
- ▶ Wear protective gloves, protective goggles and protective clothing.
- ▶ Only mount the adapter if the pipes are empty and unpressurized.
- ▶ Comply with national regulations concerning the grounding of metal assemblies.

1.



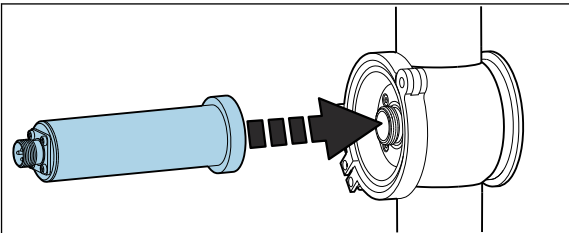
Open a VARIVENT process connection and insert the adapter (the graphics show the version without the "air purge" option).

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-mounting 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, 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.

5.1 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

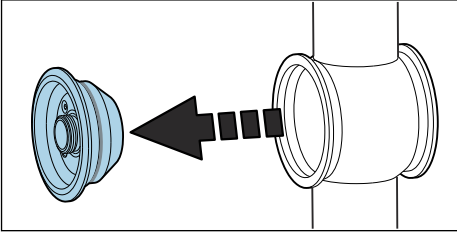
Removing optical windows and seals

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

1. Remove the lamp and detector housing.

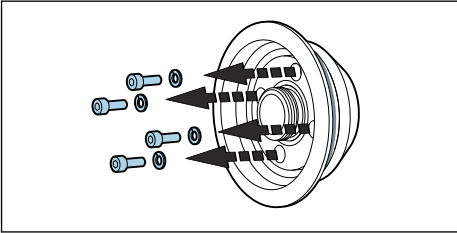
The following description applies for both sides, i.e. the detector side and the lamp side.
Always change O-rings or optical windows ¹⁾ on both sides.

2.



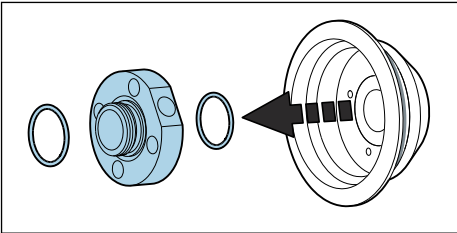
Stop the flow in the process pipe. If the pipe is dry, remove the clamp connector and remove the adapter from the VARIVENT flow assembly.

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.

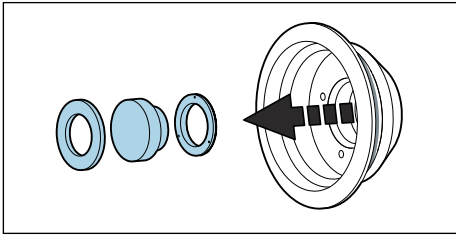
4.



Remove the window ring along with the O-rings.

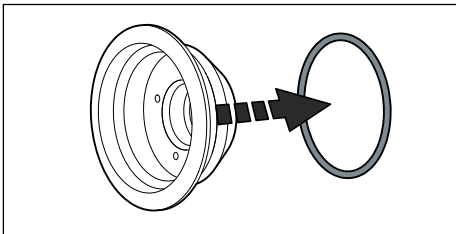
1) Optical windows only need to be replaced if they are damaged.

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 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, 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 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 Repair

The repair and conversion concept provides for the following:

- The product has a modular design
- Only use original spare parts from the manufacturer
- Repairs are carried out by the manufacturer's Service Department or by trained users
- Observe applicable standards, national regulations and certificates

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.

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 the swift, safe and professional return of the device:

- ▶ Check the website www.endress.com/support/return-material for information on the procedure and general conditions.

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

Path length

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

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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