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Operating Instructions
CYR51

Mechanical cleaning unit

Endress+Hauser
People for Process Automation

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1 About this document

1.1 Safety information

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

1.2 Symbols

1.2.1 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

1.2.2 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

1.3 Documentation

The following manuals, which complement these Operating Instructions, can be found on the product pages on the Internet:

Operating Instructions Turbimax CUS51D, BA00461C

Operating Instructions Turbimax CUS52D, BA01275C

Operating Instructions for Viomax CAS51D, BA00459C

Operating Instructions for Memosens Wave CAS80E, BA02005C

For more information on installing the assembly with the holder, see Operating Instructions BA00430C and BA00432C

In addition to the Operating Instructions and depending on the relevant approval, XA "Safety instructions" are supplied with products for the hazardous area.

- Please follow the XA instructions when using the device in the hazardous area.

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

CYR51 is a mechanical cleaning unit for turbidity and UV/Vis absorption sensors. Sensors immersed in liquid can be cleaned directly in the basin or vessel. The CYA112 wastewater assembly and corresponding CYH112 holder are required for this.

Possible liquids are:
- Wastewater
- Drinking water
- Untreated water
- Surface water
- Process water (e.g. cooling water)

Use is not permitted in salt water or water with highly corrosive substances.

CYR51 is compatible with:
- Turbimax CUS51D turbidity sensor
- Turbimax CUS52D turbidity sensor (stainless steel version)
- Viomax CAS51D photometric sensor
- Memosens Wave CAS80E spectrometer

Use sapphire windows for highly abrasive media.

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 Safety at the workplace

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

Electromagnetic compatibility
- The product has been tested for electromagnetic compatibility in accordance with the applicable international standards for industrial applications.
- The electromagnetic compatibility indicated applies only to a product that has been connected in accordance with these Operating Instructions.

2.4 Operational safety

Before commissioning the entire measuring point:

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

Procedure for damaged products:

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

During operation:

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

2.5 Product safety

2.5.1 State of the art

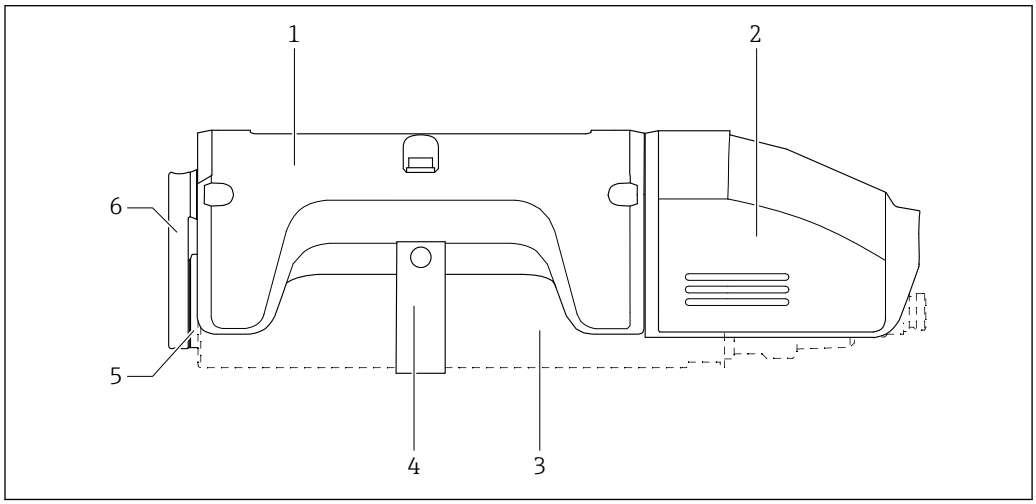
The product is designed to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. The relevant regulations and international standards have been observed.

3 Product description

3.1 Product design

CYR51 is a mechanical cleaning unit that facilitates easy and proper cleaning of optical windows. The mechanical cleaning unit is clipped onto the sensor and secured. During each cleaning cycle, the wiper arm moves over the optical windows and cleans them. Replaceable brushes or wiper blades are used depending on the order option.

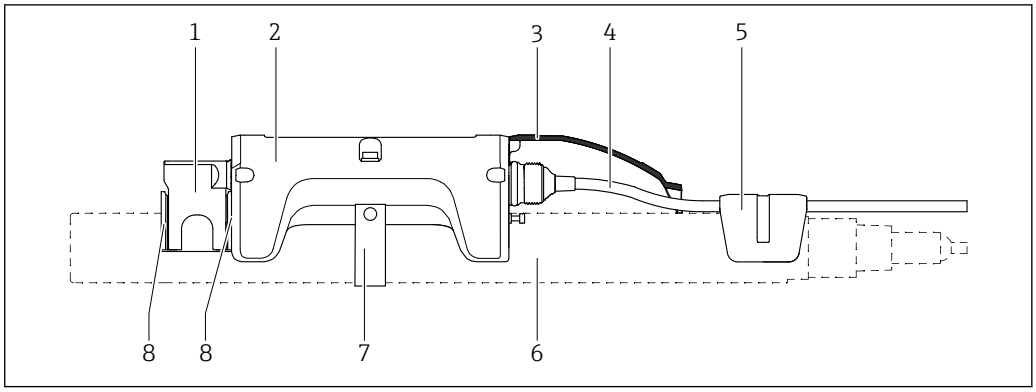
3.1.1 Turbimax CUS51D as an example



1 CYR52 using CUS51D as an example

1 *Wiper unit*
2 *Tressing protection (optional for "Wastewater" order version)*
3 *CUS51D sensor*
4 *Mounting bracket with 2x O-ring + 2x screw*
5 *Wiper blade or brush*
6 *Wiper arm*

3.1.2 Viomax CAS51D as an example



2 *CYR51 using CAS51D as an example*

1 Wiper arm
2 Wiper unit
3 Tressing protection (optional for "Wastewater" order version)
4 Cable for wiper
5 Cable clip
6 Sensor
7 Mounting bracket with 2x O-ring + 2x screw
8 Wiper blade or brush

4 Incoming acceptance and product identification

4.1 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.

4.2 Product identification

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.

4.2.1 Nameplate

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

▶ Compare the information on the nameplate with the order.

4.2.2 Identifying the product

Product page

www.endress.com/cyr51

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.

4.2.3 Manufacturer address

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

4.3 Scope of delivery

The scope of delivery comprises:
- Mechanical cleaning unit in the version ordered
- Operating Instructions
- "Wastewater" option: with additional tressing protection
- "Drinking water with hose set" option:
  - Cable protection hose
  - Hose adapter
  - Hose clamp
  - Hose clips to secure the protective hose
- Cable clips to secure the cable to the sensor (optional)

▶ If you have any queries:
Please contact your supplier or local sales center.

4.4 Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

5 Installation

5.1 Installation requirements

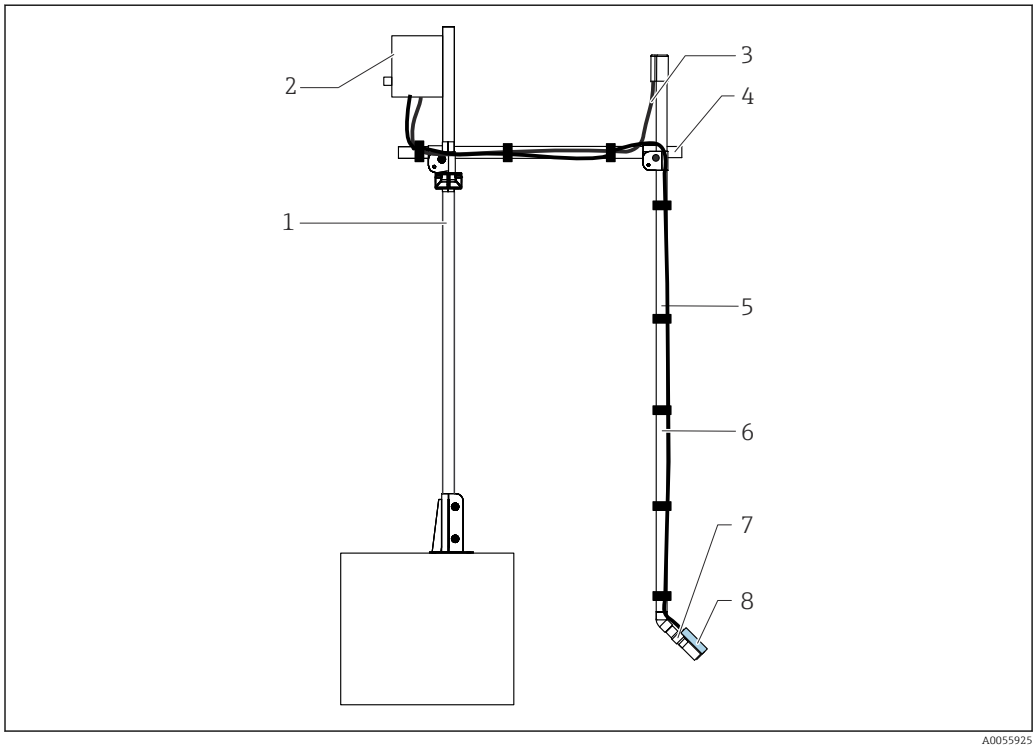
5.1.1 Measuring system

CYR51 is a mechanical cleaning unit for turbidity and UV/Vis absorption sensors. Sensors immersed in liquid can be cleaned directly in the basin or vessel. The CYA112 wastewater assembly and corresponding CYH112 holder are required for this.

Possible liquids are:
- Wastewater
- Drinking water
- Untreated water
- Surface water
- Process water (e.g. cooling water)

Use is not permitted in salt water or water with highly corrosive substances.

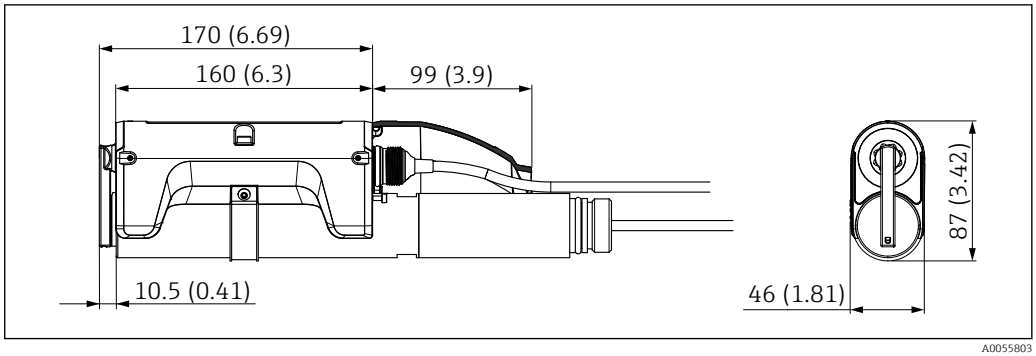
The complete measuring system comprises at least:
- Sensor
- CYR51 mechanical cleaning unit
- Liquiline CM44x transmitter
- Flexdip CYA112 and Flexdip CYH112 assemblies



3 Example of a measuring system

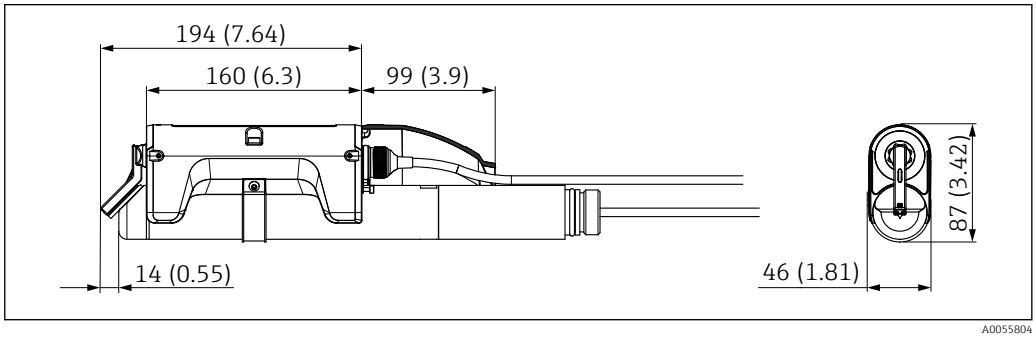
1 Main pipe, Flexdip CYH112 holder
2 Liquiline CM44x transmitter
3 Sensor cable
4 Transverse pipe, Flexdip CYH112 holder
5 Flexdip CYA112 wastewater assembly
6 Cable of mechanical cleaning unit
7 Sensor
8 Mechanical cleaning unit

5.1.2 Dimensions of CYR51 with Turbimax CUS51D



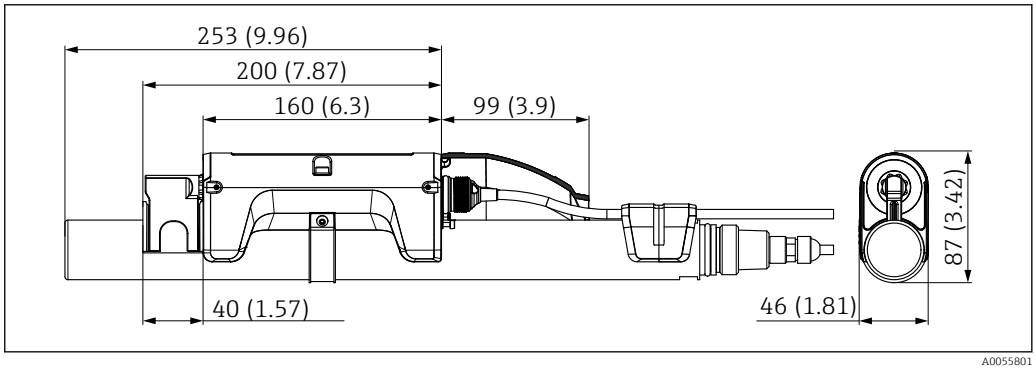
4 *Dimensions. Unit: mm (in)*

5.1.3 Dimensions of CYR51 with Turbimax CUS52D



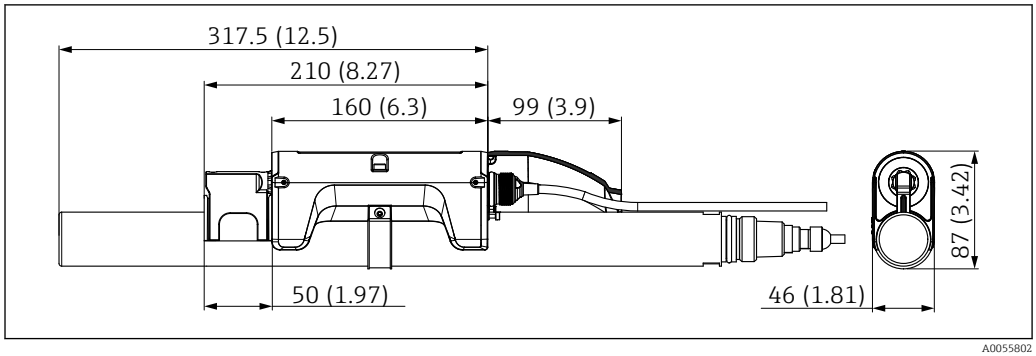
5 *Dimensions. Unit: mm (in)*

5.1.4 Dimensions of CYR51 with Viomax CAS51D



6 *Dimensions with optical path length 40 mm (1.57 in). Unit: mm (in)*

5.1.5 Dimensions of CYR51 with Memosens Wave CAS80E



7 *Dimensions with optical path length 50 mm (1.97 in). Unit: mm (in)*

5.2 Installing the mechanical cleaning unit on Turbimax CUS51D

⚠ CAUTION

Careless installation!

Fingers can become squashed between the wiper unit and the sensor.

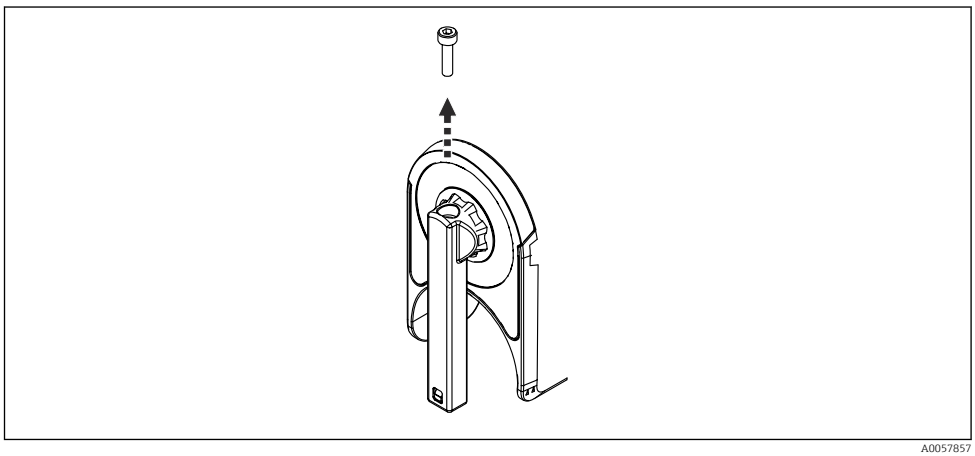
- ▶ Pay attention to your fingers when clipping on the wiper unit.

NOTICE

Damage to the wiper arm and the drive!

- ▶ Never rotate the wiper arm manually when mounted.
- ▶ Unscrew the wiper arm before installation.
- ▶ Do not lay the sensor down during installation so that the swivel range of the wiper arm remains free.

1.



Remove the screw from the wiper arm.

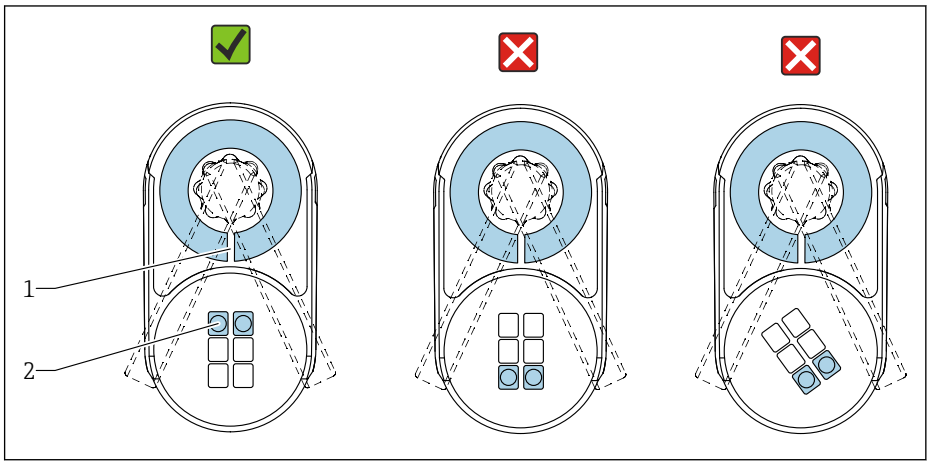
2. Remove the wiper arm with scraper and sliding disk.
3. Clip the mechanical cleaning unit onto the sensor.

Secure the mounting bracket with rubber protection:

4. Grease the screws of the mounting bracket using the grease supplied.
5. Fit the mounting bracket and tighten by hand initially.
   ↳ The cleaning unit can still be moved on the sensor.

5.2.1 Aligning the mechanical cleaning unit

1. Move the wiper unit onto the sensor until the sensor head and the front end of the wiper unit are flush.
2. Turn the mechanical cleaning unit on the sensor until the optical windows are in line with the installation marking (item 1).
   ↳ The LEDs (item 2) are located on the side of the mechanical cleaning unit.

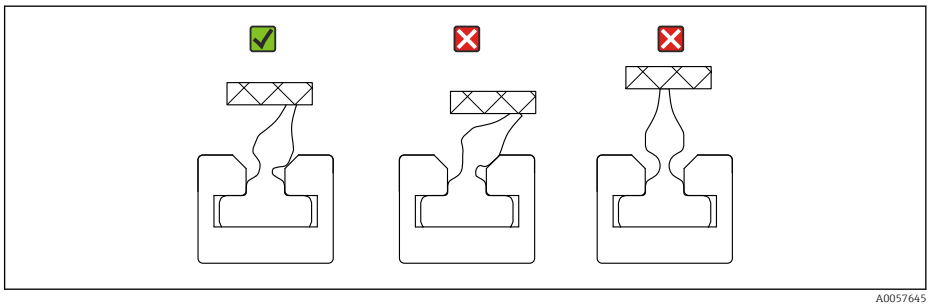


8 Align the mechanical cleaning unit on the sensor

1 Installation marking
2 LED

Check and adjust the contact pressure:

1. Place the sliding disk, scraper and wiper arm back on the drive shaft (do not tighten).
2. Use the wiper arm to perform manual wiping movements over the optical windows.
   ↳

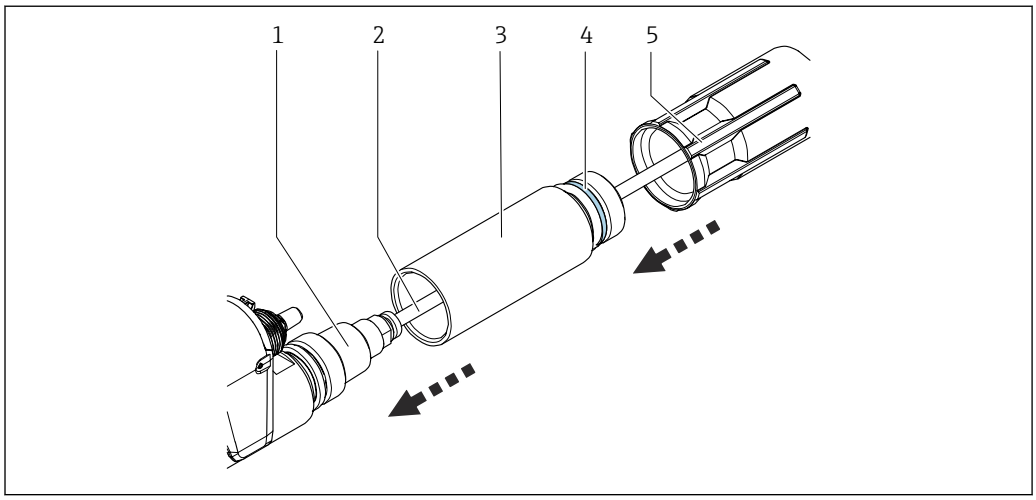


The cleaning unit is correctly aligned if the wiper blade or brush is lightly pressed on.

Lock position:

1. Tighten the screws of the mounting bracket evenly, torque of 1.5 + 0.5 Nm.
2. Fit the screw(s) back on the wiper arm. The wiper arm must now no longer be rotated manually.

5.2.2 Installing the extension adapter (for use in wastewater with tressing protection)



9 *Installing the O-ring and extension adapter*

1 *Sensor*
2 *Sensor cable*
3 *Extension adapter*
4 *O-ring*
5 *Quick fastener*

If tressing protection is used, the enclosed extension adapter must first be fitted. The extension adapter prevents a gap from forming where balls of hair or other fibers can build up.

1. Fit the enclosed O-ring (item 4) on the extension adapter (item 3).
2. Guide the sensor cable (item 2) through the extension adapter (item 3).
3. Screw the extension adapter (item 3) onto the sensor (item 1).
   ↳ The connection must be tight.
4. Guide the sensor cable (item 2) through the quick fastener (item 5).
5. Screw the quick fastener (item 5) onto the extension adapter (item 3).
   ↳ The connection must be tight.

Follow Operating Instructions BA00432C for the assembly.

5.3 Installing the mechanical cleaning unit on Turbimax CUS52D

⚠ CAUTION

Careless installation!

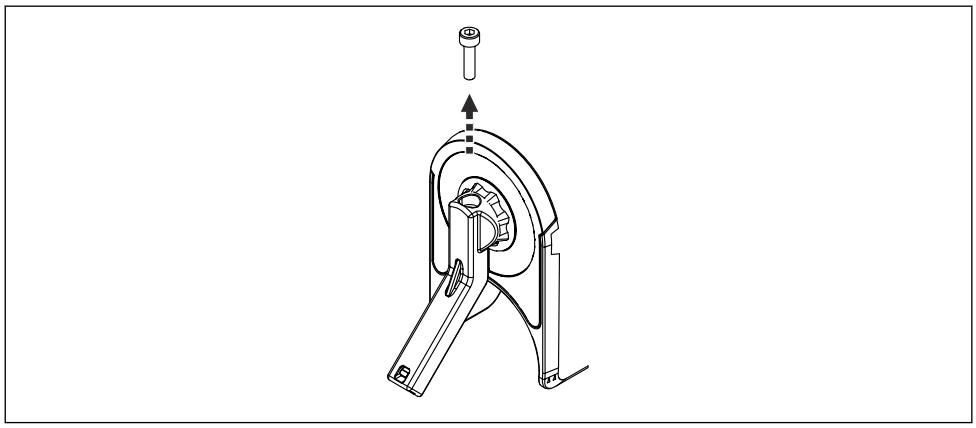
Fingers can become squashed between the wiper unit and the sensor.

- Pay attention to your fingers when clipping on the wiper unit.

NOTICE

Damage to the wiper arm and the drive!

- Never rotate the wiper arm manually when mounted.
- Unscrew the wiper arm before installation.
- Do not lay the sensor down during installation so that the swivel range of the wiper arm remains free.

1. 

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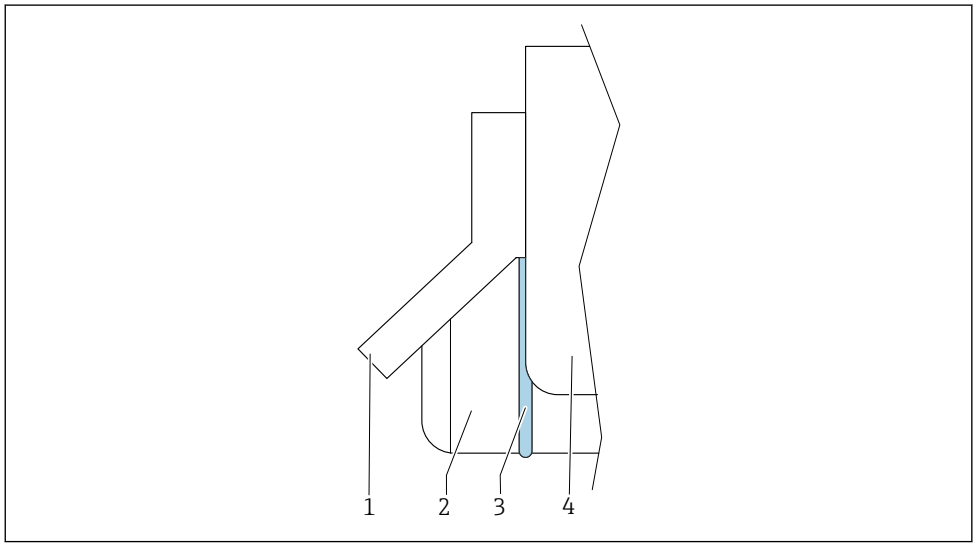
Remove the screw from the wiper arm.

2. Remove the wiper arm with scraper and sliding disk.
3. Clip the mechanical cleaning unit onto the sensor.

Secure the mounting bracket with rubber protection:

4. Grease the screws of the mounting bracket using the grease supplied.
5. Fit the mounting bracket and tighten by hand initially.
   ↳ The cleaning unit can still be moved on the sensor.

5.3.1 Aligning the mechanical cleaning unit

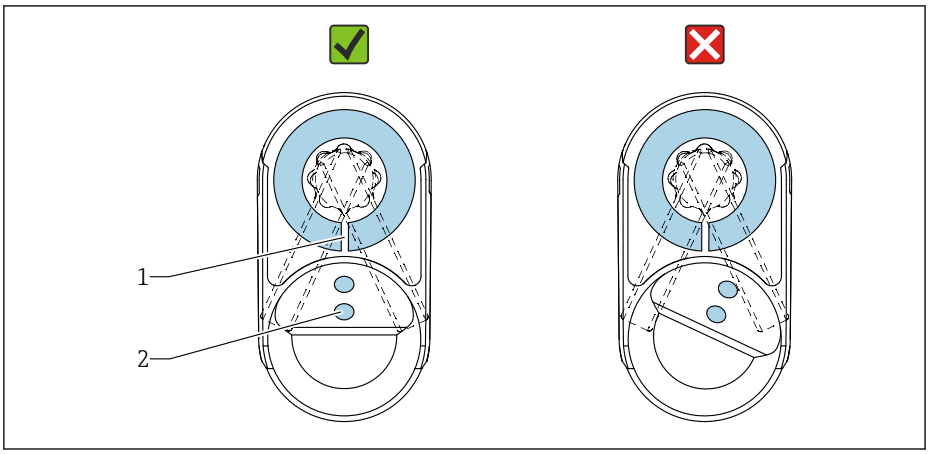
1. 

A0056832

1 Wiper arm
2 Sensor
3 O-ring
4 Mechanical cleaning unit

Move the wiper unit on the sensor until the mechanical cleaning unit is **centered** with the O-ring of the sensor.

2. Turn the mechanical cleaning unit on the sensor until the optical windows are in line with the installation marking (item 1).
   ↳ The LEDs (item 2) are located on the side of the mechanical cleaning unit.

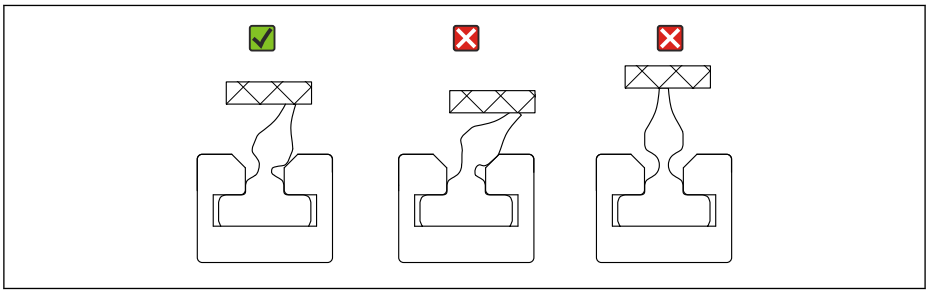


10 Align the mechanical cleaning unit on the sensor

1 Installation marking
2 LED

Check and adjust the contact pressure:

1. Place the sliding disk, scraper and wiper arm back on the drive shaft (do not tighten).
2. Use the wiper arm to perform manual wiping movements over the optical windows.
   ↳

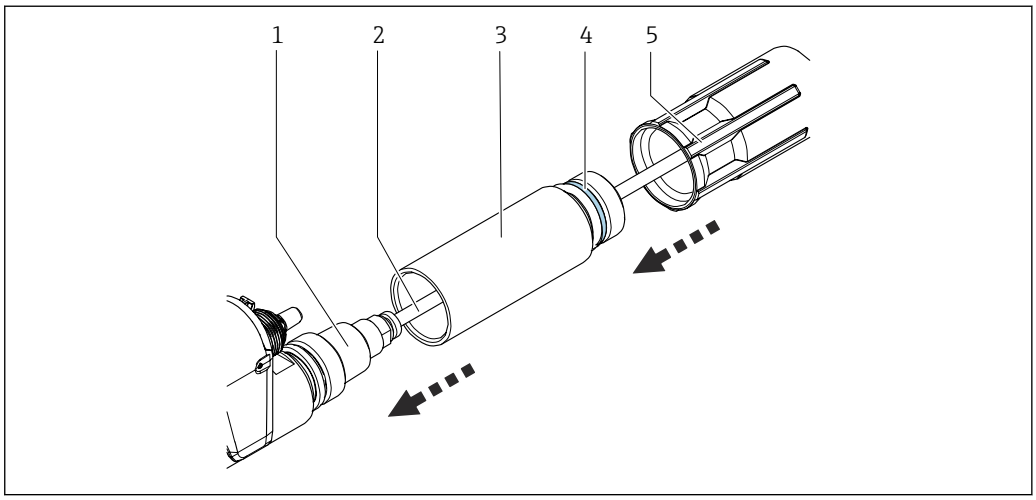


The cleaning unit is correctly aligned if the wiper blade or brush is lightly pressed on.

Lock position:

1. Tighten the screws of the mounting bracket evenly, torque of 1.5 + 0.5 Nm.
2. Fit the screw(s) back on the wiper arm. The wiper arm must now no longer be rotated manually.

5.3.2 Installing the extension adapter (for use in wastewater with tressing protection)



11 *Installing the O-ring and extension adapter*

1 *Sensor*
2 *Sensor cable*
3 *Extension adapter*
4 *O-ring*
5 *Quick fastener*

If tressing protection is used, the enclosed extension adapter must first be fitted. The extension adapter prevents a gap from forming where balls of hair or other fibers can build up.

1. Fit the enclosed O-ring (item 4) on the extension adapter (item 3).
2. Guide the sensor cable (item 2) through the extension adapter (item 3).
3. Screw the extension adapter (item 3) onto the sensor (item 1).
   ↳ The connection must be tight.
4. Guide the sensor cable (item 2) through the quick fastener (item 5).
5. Screw the quick fastener (item 5) onto the extension adapter (item 3).
   ↳ The connection must be tight.

Follow Operating Instructions BA00432C for the assembly.

5.4 Installing the mechanical cleaning unit on CAS51D or CAS80E

⚠ CAUTION

Careless installation!

Fingers can become squashed between the wiper unit and the sensor.

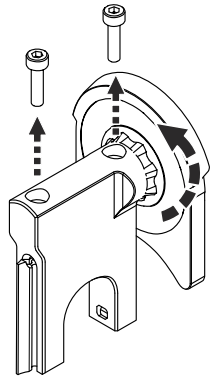
- Pay attention to your fingers when clipping on the wiper unit.

NOTICE

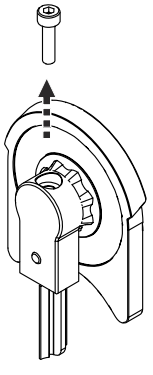
Damage to the wiper arm and the drive!

- Never rotate the wiper arm manually when mounted.
- Unscrew the wiper arm before installation.
- Do not lay the sensor down during installation so that the swivel range of the wiper arm remains free.

Align the mechanical cleaning unit:



12 *Optical path length 40 to 50 mm (1.57 to 1.97 in)*



13 *Optical path length 2 to 10 mm (0.08 to 0.39 in)*

1. Remove the screw(s) from the wiper arm.
2. Clip the mechanical cleaning unit onto the sensor.

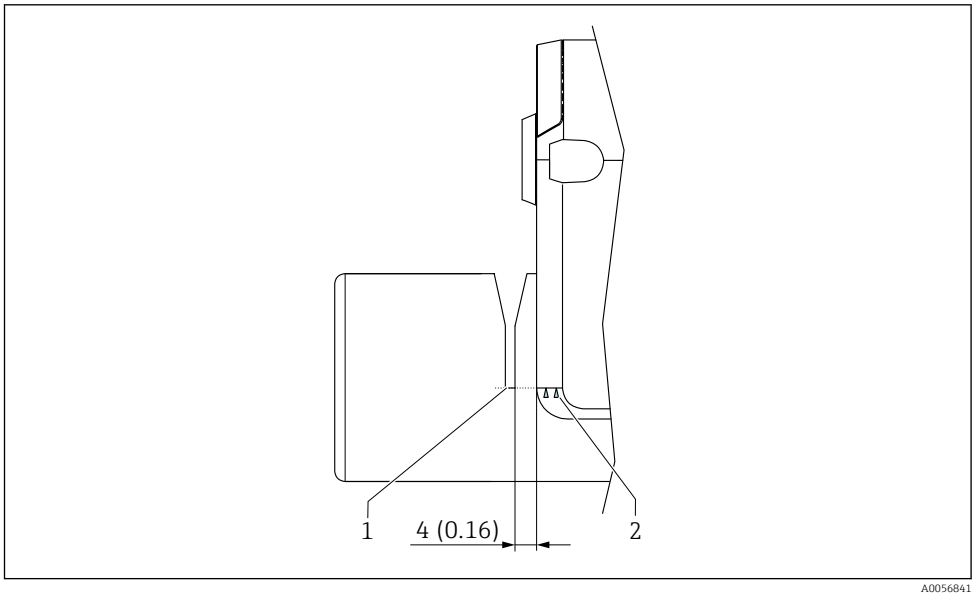
Secure the mounting bracket with rubber protection:

3. Grease the screws of the mounting bracket using the grease supplied.
4. Fit the mounting bracket and tighten by hand initially.
   ↳ The cleaning unit can still be moved on the sensor.

5.4.1 Aligning the mechanical cleaning unit

Optical path length 2 mm (0.08 in)

1.



14 *Unit: mm (in)*

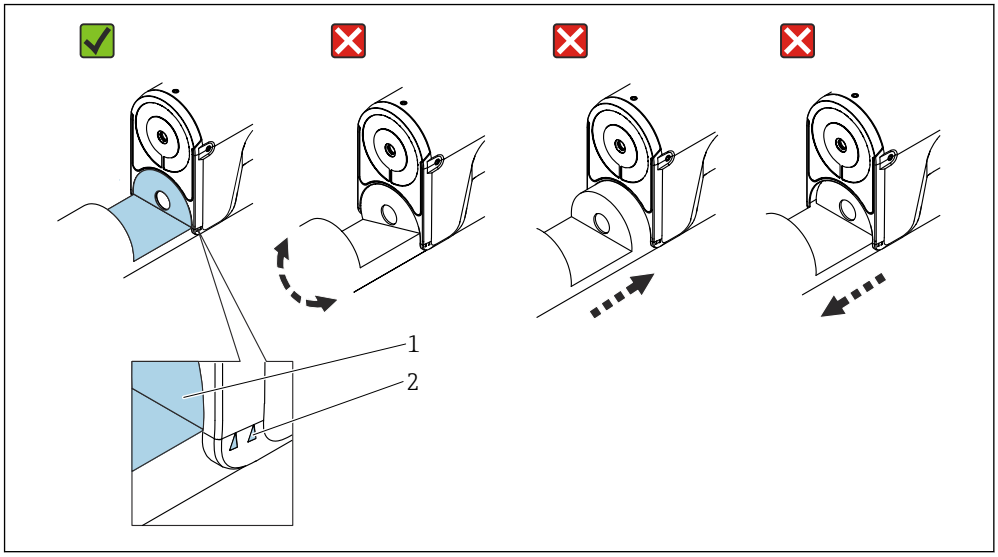
1 Measurement gap
2 Installation marking

Turn the mechanical cleaning unit on the sensor until the installation marking is in line with the measurement gap.

2. Move the mechanical cleaning unit on the sensor until there is a distance of 4 mm (0.16 in) between the measurement gap and the housing of the cleaning unit.

Optical path length 8 to 50 mm (0.31 to 1.97 in)

▶



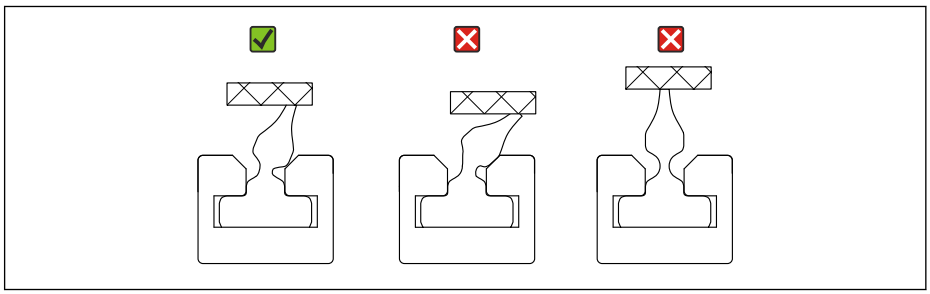
1 Measurement gap
2 Installation marking

Move the mechanical cleaning unit on the sensor and turn it until the installation marking (item 2) is flush with the measurement gap (item 1).

Check and adjust the contact pressure:

1. Place the sliding disk, scraper and wiper arm back on the drive shaft (do not tighten).
2. Use the wiper arm to perform manual wiping movements over the optical windows.

↳

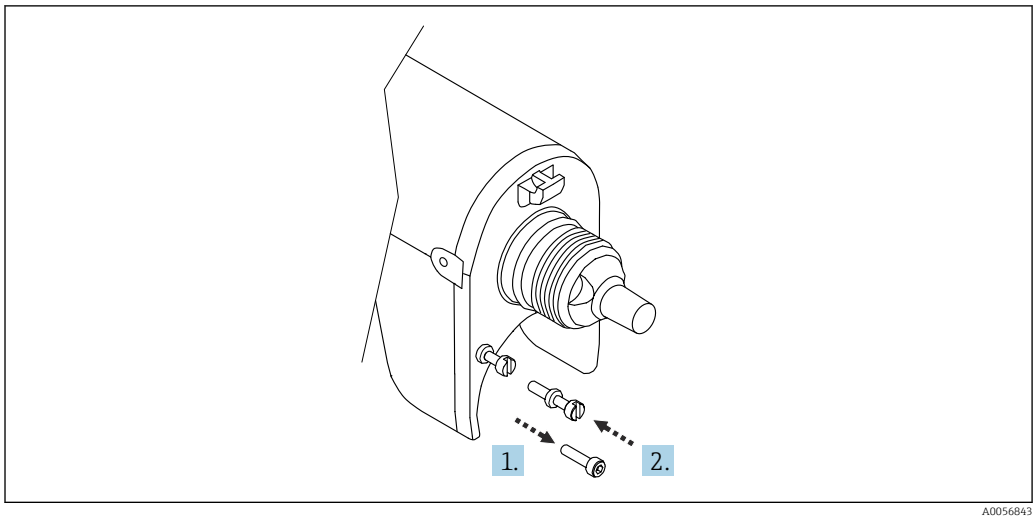


The cleaning unit is correctly aligned if the wiper blade or brush is lightly pressed on.

Lock position:

1. Tighten the screws of the mounting bracket evenly, torque of 1.5 + 0.5 Nm.
2. Fit the screw(s) back on the wiper arm. The wiper arm must now no longer be rotated manually.

5.5 Installing the tressing protection

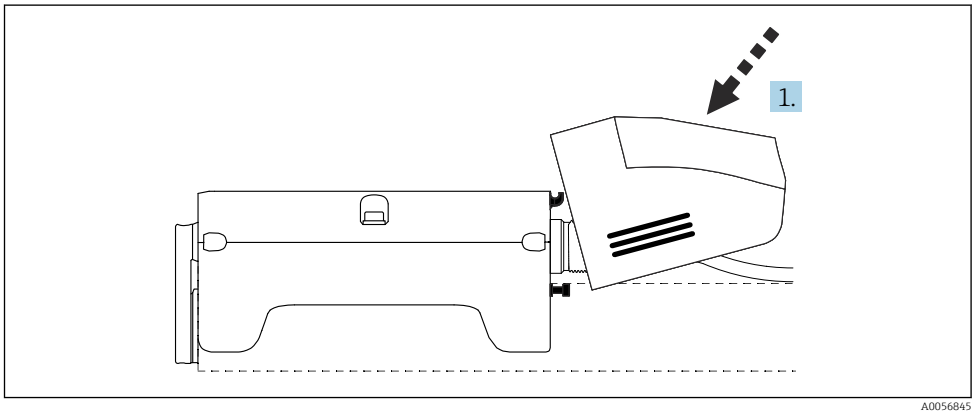


15 *Replacing the screws on the anti-clogging device*

1. Remove the screws on the housing.
2. Insert the screws for the tressing protection into the housing and tighten to a torque of 0.5 Nm).

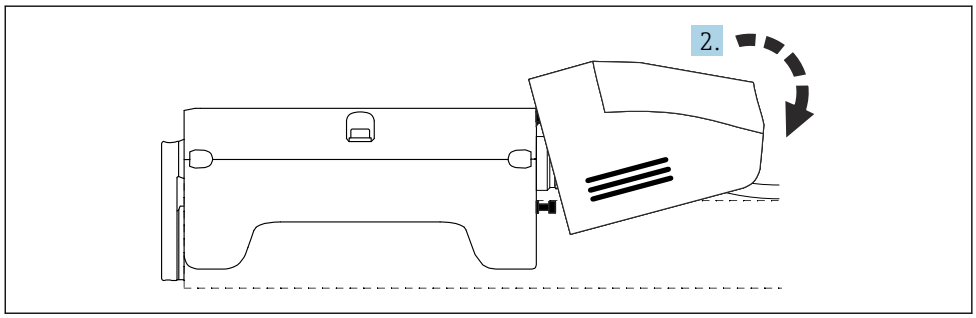
The tressing protection locks into place on the sensor and is additionally secured with two screws. The tressing protection is stretched over the sensor shaft for installation:

1.



Place the tressing protection at an angle on the sensor and press it down towards the wiper unit.

2.



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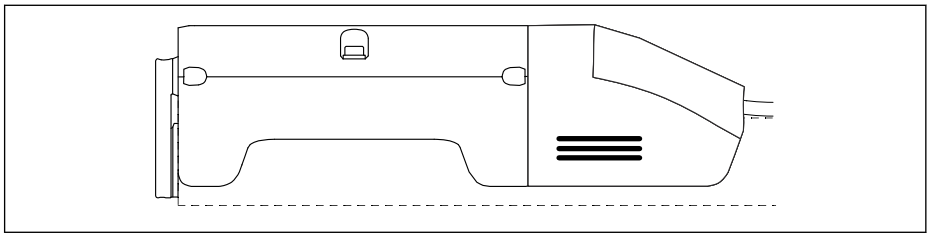
Tilt the tressing protection downwards.

↳ The tressing protection locks into place in the holder, the sensor and the two screws.



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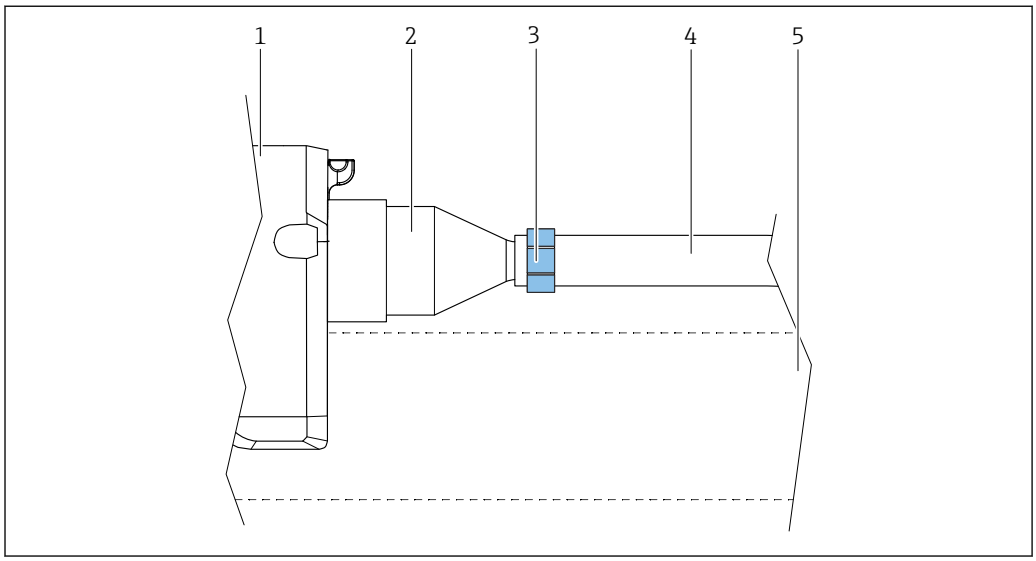
5.6 Securing the cable

The cable of the mechanical cleaning unit must be secured to the assembly at approx. 50 cm (19.7 in) intervals. This ensures that the cable is closely fitted to the assembly and balls of hair and other fibers are minimized.

There are two options for this:
- Attach cable clips (optionally available) along the assembly
- Secure the cables with cable ties

Select cable ties that are bigger than 4 mm (0.16 in).

5.7 Installing the cable protection hose (drinking water application/accessories)



16 *Installing the cable protection hose*

1 *Wiper unit*
2 *Hose adapter*
3 *Hose clamp*
4 *Cable protection hose*
5 *Sensor*

Installing the cable protection hose

A cable protection hose made of drinking water-compliant material is supplied if the drinking water application option is ordered. It separates the cable of the mechanical cleaning unit from the medium.

The cable protection hose must be adapted to the individual length:
- The cable protection hose must end at least 50 cm (19.7 in) above the surface of the water
- The cable protection hose may extend up to the cable entry of the transmitter (an entry into the transmitter is not provided)

1. Adjust the length of the cable protection hose.
2. Slide the hose adapter (item 2) over the cable of the mechanical cleaning unit and secure it to the wiper unit (item 1).
3. Slide the cable of the mechanical cleaning unit through the cable protection hose (item 4) with the wire end ferrules first. Make sure that the connecting wires do not bend.
4. Using the hose clamp (item 3), secure the cable protection hose on the hose adapter.

The connection must be tight.

5.8 Post-mounting check

Put the cleaning unit into operation only if you can answer **yes** to **all** the following questions.
- Are the cleaning unit and cable undamaged?
- Is the orientation correct and the wiper arm firmly screwed in place?
- Are the cleaning unit, tressing protection and cable or hose secure?
- Are all the connections leak-tight?

6 Electrical connection

⚠ WARNING

Device is live!

Incorrect connection may result in injury or death!

- ▶ The electrical connection may be performed only by an electrical technician.
- ▶ The electrical technician must have read and understood these Operating Instructions and must follow the instructions contained therein.
- ▶ **Prior** to commencing connection work, ensure that no voltage is present on any cable.

6.1 Connecting requirements

The mechanical cleaning unit is mounted on the sensor and aligned.

6.2 Connecting the mechanical cleaning unit

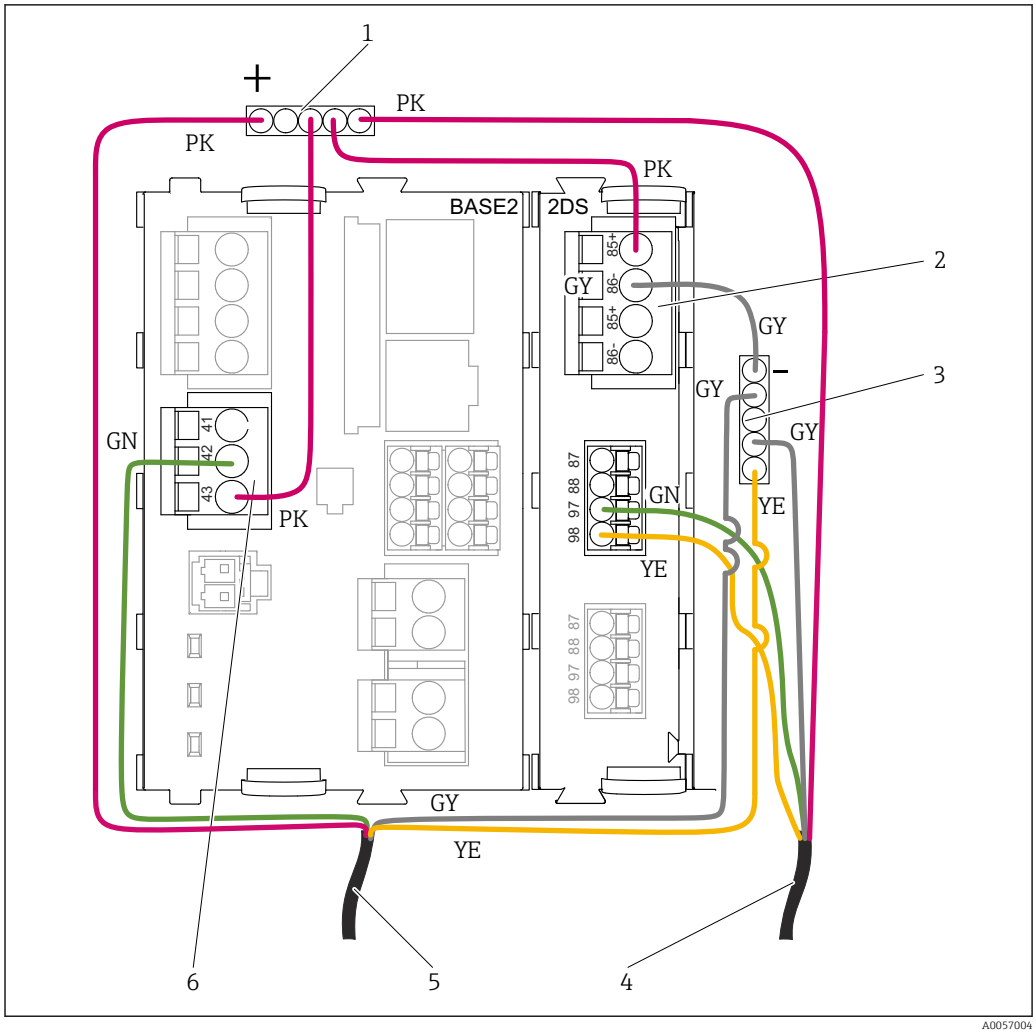
The mechanical cleaning unit may only be powered by the power supply in the Liquiline transmitter.

This supply point distributes the current (+ and -) to two separate, enclosed installation terminals. The mechanical cleaning unit, sensor and relay/DIO card are supplied with current via these installation terminals.

Connection

- Shorten the cable and cable protection hose as required.
- Wire the components in accordance with the following requirements:
  - Mechanical cleaning unit without diagnostics → 26
  - Mechanical cleaning unit with diagnostics → 28

6.2.1 Connection in the transmitter without diagnostics



17 *Connection diagram without diagnostics*

1 *Installation terminal +*
2 *24 V DC power supply*
3 *Installation terminal -*
4 *Sensor cable*
5 *Cable of the mechanical cleaning unit*
6 *Relay for control signal*

CAUTION

As soon as voltage is applied, initialization of the mechanical cleaning unit is carried out automatically.

Trapped fingers

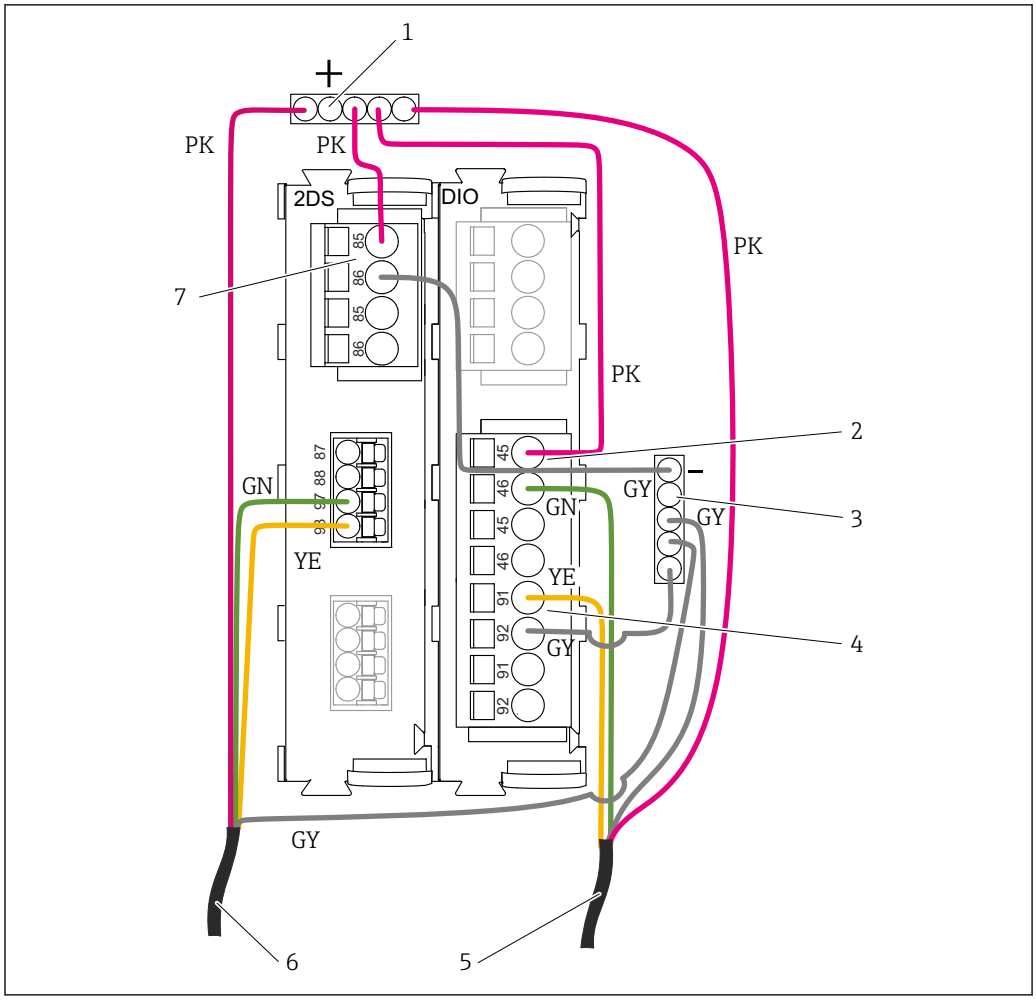
► Make sure that the wiper arm can move before the cables are connected so that the wiper arm can reach its end position.

Connect the mechanical cleaning unit in this order:

1. Connect the green sensor cable (item 4) to terminal 97.
2. Connect the yellow sensor cable (item 4) to terminal 98.
3. Connect the pink sensor cable (item 4) to the"+" installation terminal (item 1).
4. Connect the gray sensor cable (item 4) to the"-" installation terminal (item 3).
   ↳ The sensor is connected.

5. Connect the green cable of the cleaning unit (item 5) to terminal 42 of the relay (item 6).
6. Connect the pink cable of the cleaning unit (item 5) to the"+" installation terminal (item 1).
7. Connect the yellow cable of the cleaning unit (item 5) to the"-" installation terminal (item 3).
8. Connect the gray cable of the cleaning unit (item 5) to the"-" installation terminal (item 3).
   ↳ The mechanical cleaning unit is connected.
9. Connect an additional pink cable from the"+" installation terminal (item 1) to terminal 43 on the relay (item 6).
10. Connect an additional pink cable from the "-" installation terminal (item 1) to terminal 85 on the power supply (item 2).
11. Connect an additional gray cable from the "-" installation terminal (item 3) to terminal 86 on the power supply (item 2).
    ↳ Initialization of the mechanical cleaning unit is performed automatically.

6.2.2 Connection in the transmitter with diagnostics



18 *Connection diagram with diagnostics*

1 *Installation terminal +*
2 *Digital output for control signal*
3 *Installation terminal -*
4 *Digital input for diagnostic feedback*
5 *Cable of the mechanical cleaning unit*
6 *Sensor cable*
7 *24 V DC power supply*

⚠ CAUTION

As soon as voltage is applied, initialization of the mechanical cleaning unit is carried out automatically.

Trapped fingers

► Make sure that the wiper arm can move before the cables are connected so that the wiper arm can reach its end position.

Connect the mechanical cleaning unit in this order:

1. Connect the green sensor cable (item 6) to terminal 97.
2. Connect the yellow sensor cable (item 6) to terminal 98.
3. Connect the pink sensor cable (item 6) to the"+" installation terminal (item 1).
4. Connect the gray sensor cable (item 6) to the"-" installation terminal (item 3).
   ↳ The sensor is connected.
5. Connect the green cable of the cleaning unit (item 5) to terminal 46.

6. Connect the pink cable of the cleaning unit (item 5) to the"+" installation terminal (item 1).
7. Connect the yellow cable of the cleaning unit (item 5) to terminal 91.
8. Connect the gray cable of the cleaning unit (item 5) to the"-" installation terminal (item 3).
   ↳ The mechanical cleaning unit is connected.
9. Connect an additional pink cable from the"+" installation terminal (item 1) to terminal 45.
10. Connect an additional pink cable from the "+" installation terminal (item 1) to terminal 85 on the power supply (item 7).
11. Connect an additional gray cable from the "-" installation terminal (item 3) to terminal 86 on the power supply (item 7).
12. Connect an additional gray cable from the"-" installation terminal (item 3) to terminal 92.
    ↳ Initialization of the mechanical cleaning unit is performed automatically.

6.3 Post-connection check

⚠ WARNING

Connection errors

The safety of people and of the measuring point is at risk! The manufacturer does not accept any responsibility for errors that result from failure to comply with the instructions in this manual.

▶ Put the device into operation only if you can answer **yes** to **all** the following questions.

Device condition and specifications

▶ Are the device and all the cables free from damage on the outside?

▶ Do the mains voltage and nameplate specifications match?

Electrical connection

▶ Are the mounted cables strain relieved?
▶ Are the cables routed without loops and cross-overs?
▶ Are the cables correctly connected as per the wiring diagram?
▶ Are all the screw terminals connected as per the wiring diagram?

7 Commissioning

7.1 Function check

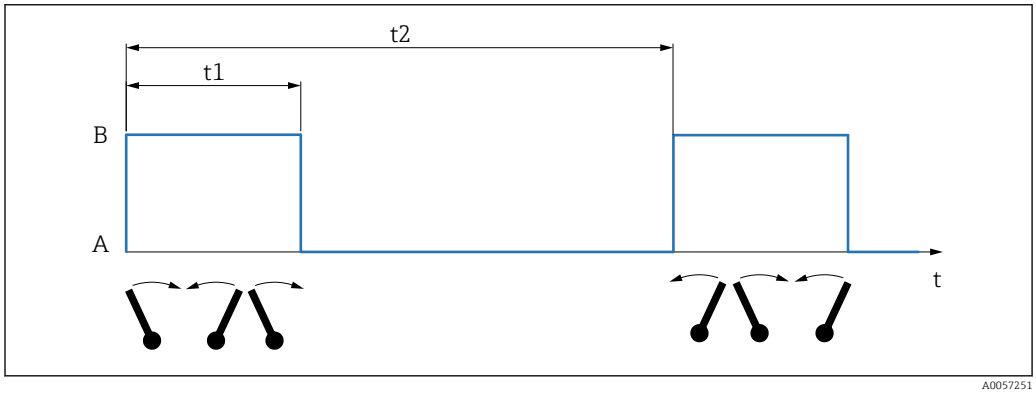
Incorrect connection, incorrect supply voltage

Safety risks for staff and device malfunctions!

- ▶ Check that all connections have been established correctly in accordance with the wiring diagram.
- ▶ Ensure that the supply voltage matches the voltage indicated on the nameplate.

7.2 Configuring the product

Mechanical cleaning is switched on cyclically for a few seconds via the transmitter. Once the transmitter activates the cleaning interval, cleaning starts automatically. The wiper arm moves three times per cleaning interval.



19 *Cleaning interval*

A Wiper arm with no movement
B Wiper arm moving
t1 Cleaning time
t2 Cleaning interval

The cleaning time (t1) is preset and lasts for a maximum of 10 seconds.

The cleaning interval (t2) can be shortened if necessary. A DIO card must be used in the transmitter for cleaning intervals that are shorter than 5 minutes.

Recommendation for good cleaning power and maximum service life:

Application	Cleaning interval (t2)
Wastewater	5 minutes
Process water	10 minutes
Drinking water	20 minutes

The cleaning cycle is configured in the transmitter in the **Menu/Setup/Additional functions/Cleaning** menu.

Follow the Operating Instructions for the transmitter.

8 Diagnostics and troubleshooting

8.1 General troubleshooting

Problem	Possible cause	Tests and/or remedial action
No cleaning power, wiper arm is stationary	Drive shaft defective.	▶ Check for noise. ▶ The entire device must be replaced.
	Wiper arm is blocked by foreign objects or twisting of the unit.	▶ Remove blockage.
	Wiper blade or brush defective.	▶ Check for visible damage. ▶ If necessary, replace the wiper blade or brush.
	Water has penetrated the device.	▶ Check for sound of liquid in the housing. ▶ The entire device must be replaced.
	Diagnostic signal reports fault.	▶ Disconnect the voltage and reconnect for re-initialization.
Wiper arm wipes more than three times	The device is in the initialization process.	
Cleaning effect diminishes	Wiper blade or brush is worn.	▶ Replace the wiper blade or brush.
	The position of the wiper arm has shifted.	▶ Correct the position of the wiper arm. ▶ Check contact pressure of the wiper blade or brush.
	Quick and severe fluctuation of contamination in the process.	Automatic: Motor drive is adjusted continuously
	Contamination cannot be removed by automatic cleaning.	▶ Manual cleaning of the cleaning unit and the optical windows on the sensor.

Please contact Endress+Hauser Support if the problem cannot be rectified or if other faults occur.

9 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.

9.1 Maintenance schedule

The specified intervals serve as a guide. For harsh process or ambient conditions, it is recommended that the interval be shortened accordingly. Cleaning intervals depend on the medium.

Interval	Maintenance measures
During initial commissioning / when putting back into service after maintenance	▶ Check that all connections are sealed tightly
Monthly	Visual inspection ▶ Correct position of the wiper blade or brush on the sensor ▶ Wear on wiper blade or brush ▶ Product installed securely on sensor ▶ Cable/protective hose secured in place Cleaning ▶ Remove balls of hair or other fibers/residual medium ▶ Clean surfaces
6 months (Cleaning interval ≤ 5 minutes)	▶ Replace the wiper blade or brush.
Annually (Cleaning interval > 5 minutes)	▶ Replace the wiper blade or brush.

9.2 Maintenance tasks

9.2.1 Cleaning

Cleaning agents not permitted

Possible damage to the housing surface or housing seal!

- ▶ Never use concentrated mineral acids or alkaline solutions for cleaning.
- ▶ Never use organic cleaners such as acetone, benzyl alcohol, methanol, methylene chloride, xylene or concentrated glycerol cleaner.
- ▶ Never use high-pressure steam for cleaning.
- ▶ Clean the product using commercially available cleaning agents only.

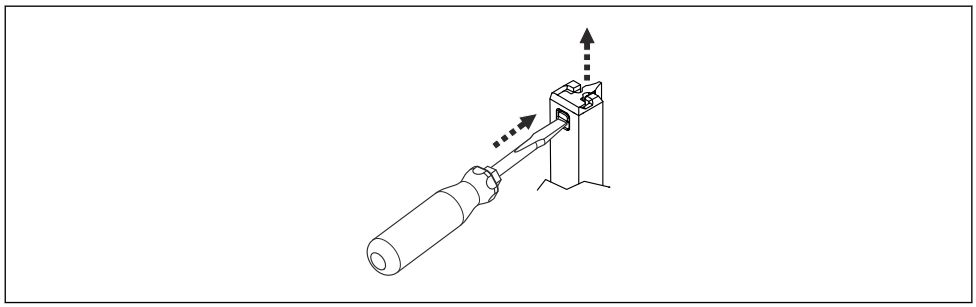
The product is resistant to:

- Ethanol (for a short time)
- Diluted bases (max. 3% NaOH)
- Soap-based household cleaning agents

9.2.2 Replacing the wiper blade or brush on CUS51D or CUS52D sensors

1. Clean the product.

2.



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Use a screwdriver to press into the recess on the wiper arm.

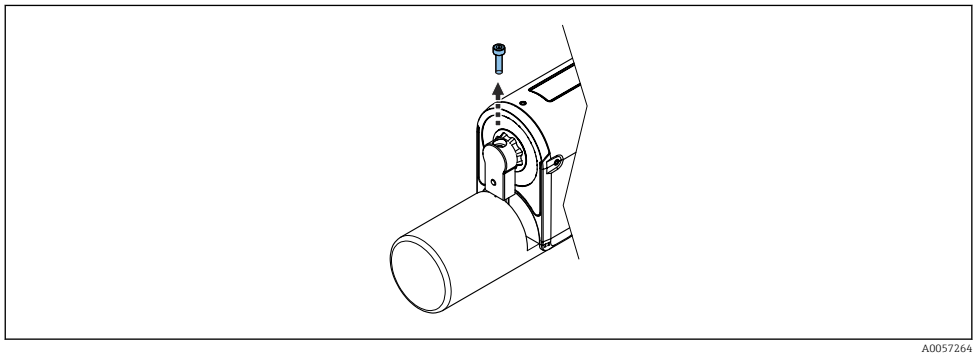
3. Use the other hand to pull out the wiper blade or brush.
4. Insert the new wiper blade or brush and check the contact pressure.
   ↳ The wiper blade or brush locks into place in the recess of the wiper arm.

9.2.3 Replacing the wiper blade or brush on CAS51D or CAS80E sensors

Optical path length 2 to 10 mm (0.08 to 0.39 in)

The wiper blade cannot be replaced directly when installed. Release the wiper arm first.

1. Clean the product.
2.



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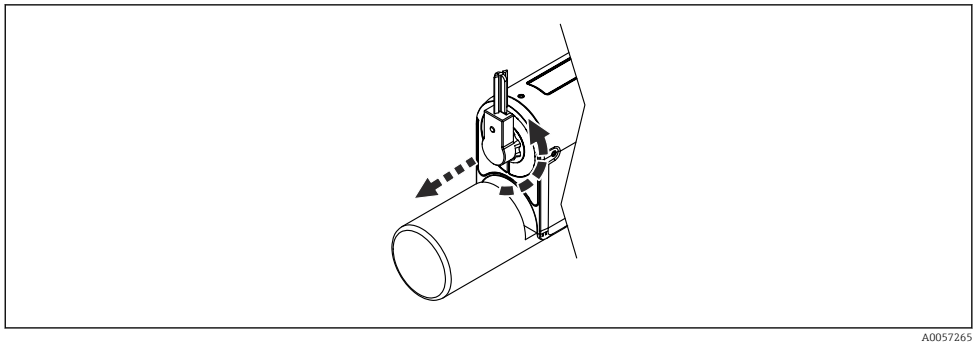
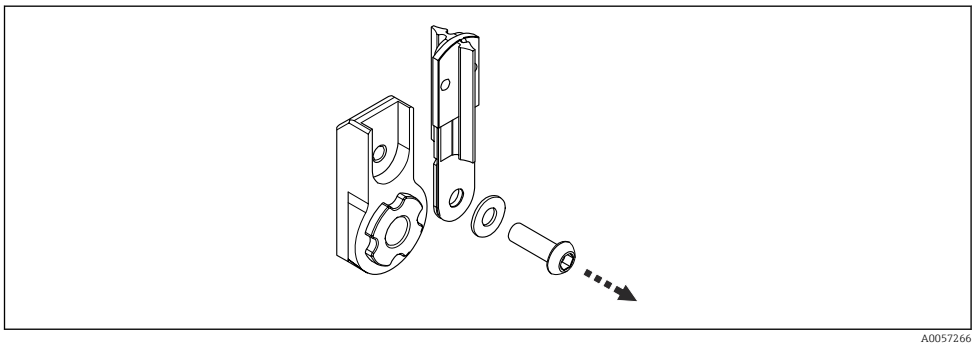
Remove the screw from the wiper arm.

3.



A0057265

Turn the wiper arm by 180° on the axis out of the gap and pull it forward.
↳ The wiper arm, scraper and sliding disk can then be easily accessed.

4. 

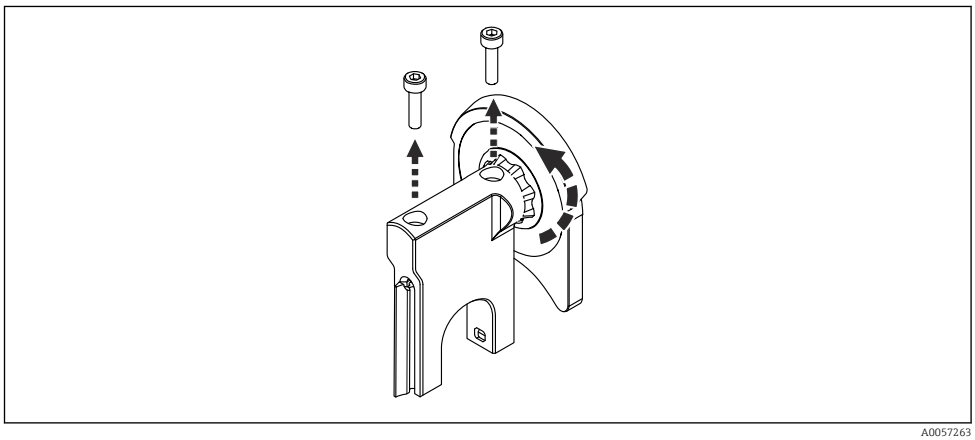
A0057266

Remove the screw on the wiper arm, remove the sliding disk and wiper blade.

5. Insert the new wiper blade.
6. Use the screw to secure the wiper blade and sliding disk on the wiper arm.
7. Turn the wiper arm with scraper and sliding disk by 180° on the axis again.
   ↳ The wiper arm is now positioned in the measurement gap again.
8. Use the screw to lock the position of the wiper arm.
   ↳ The wiper arm is firmly seated again.

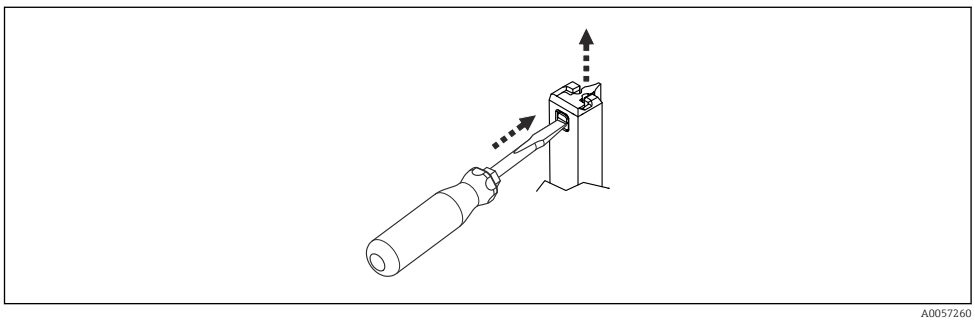
Optical path length 40 to 50 mm (1.57 to 1.97 in)

The wiper blade or brush cannot be replaced directly when mounted. Release the wiper arm first.

1. Clean the product.
2. 

A0057263

Remove the two screws from the wiper arm.

3. Turn the wiper arm by 180° on the axis out of the gap.
   ↳ The wiper arm or brush with scraper and sliding disk can now be easily accessed.
4. 

A0057260

Use a screwdriver to press into the recess on the wiper arm.

5. Use the other hand to pull out the wiper blade or brush.

6. Insert the new wiper blade or brush.
   ↳ The wiper blade or brush locks into place in the recess of the wiper arm.
7. Turn the wiper arm with scraper and sliding disk by 180° on the axis again.
   ↳ The wiper arm with scraper and sliding disk are once again positioned in the measurement gap.
8. Lock the position of the wiper arm with the screws.
   ↳ The wiper arm is firmly seated again.

10 Repair

10.1 General information

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

10.2 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.

10.3 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

10.4 Disposal

The device contains electronic components. The product must be disposed of as electronic waste.

▶ Observe the local regulations.

If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

11 Accessories

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

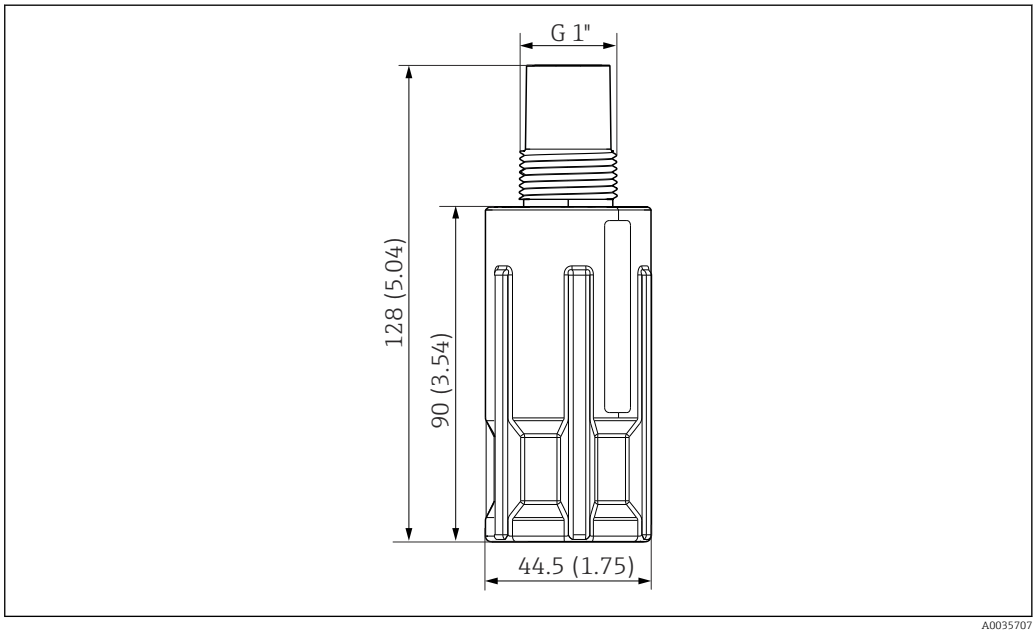
Listed accessories are technically compatible with the product in the instructions.

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.

11.1 Device-specific accessories

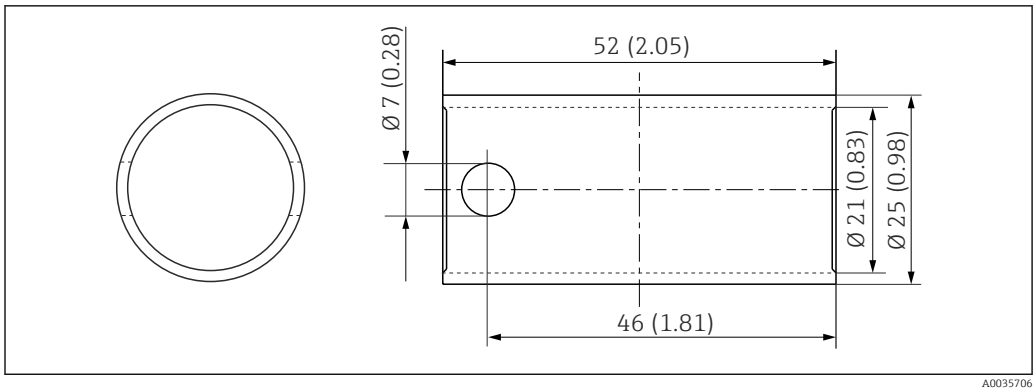
11.1.1 Complete quick fastener

Quick fastener
- For quick and easy installation and replacement of sensors
- Material: POM - GF
- Including mounting tool 71093438
- Order code: 71093377



20 *Quick fastener. Unit: mm (in)*

Mounting tool
- Tool to remove the quick fastener
- Material: stainless steel V4A
- Order code: 71093438



21 Mounting tool. Unit: mm (in)

11.1.2 Brush and wiper blade

Material:
- Brush: PA, nylon
- Wiper blade: Silicone

The product-specific accessory can be ordered via the order structure for spare parts "XPC0031".

11.1.3 Cable attachment

Cable clips can be ordered to secure cables on the assembly
- Material: PPS GF40
- Quantity: 5 pcs

The product-specific accessory can be ordered via the order structure for spare parts "XPC0031".

11.1.4 Cable protection hose set

The cable protection hose separates the cable of the mechanical cleaning unit from the medium in drinking water applications.

- Cable protection hose 7 m (23 ft) or 15 m (49.2 ft): PE
- Hose clamp: stainless steel
- Hose adapter: stainless steel
- O-ring: EPDM
- 5 hose clips: PPS GF40

The product-specific accessory can be ordered via the order structure for spare parts "XPC0031".

12 Technical data

12.1 Power supply

Supply voltage	24 V DC (- 30 % / + 25 %)
Power consumption	2.6 VA
Overvoltage protection	I

12.2 Environment

Ambient temperature range	–20 to 60 °C (–4 to 140 °F)
Storage temperature	–20 to 70 °C (–4 to 158 °F)
Relative humidity	10 to 95 %, non-condensing
Degree of protection	▪ IP 68 (1.83 m (6 ft) water column over 24 hours) ▪ IP 66 ▪ Type 6P
Operating height	3 000 m (9 842.5 ft) maximum
Fouling	Degree of fouling 2 (micro environment) Pollution degree 4 (macro environment)

12.3 Process

Process temperature range	–5 to 55 °C (23 to 131 °F)
Process pressure range	0.5 to 3 bar (7.3 to 43.5 psi) (absolute)

12.4 Mechanical construction

Dimensions	→ Section "Installation"
Weight	Approx. 1 kg (2.2 lb) with a 7m (22.9ft) cable. The weight varies depending on the order option.

Materials

Mechanical cleaning unit	
Housing:	PPS GF40
Tressing protection:	PPS GF40
Wiper shaft:	Stainless steel
Wiper blade:	Silicone
Brush	PA, nylon
Cable:	TPU, black
Cable attachment:	PBT

Hose set	
Hose:	PE
Hose adapter:	Stainless steel
Hose attachment:	PPS GF40
O-ring:	EPDM

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