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Operating Instructions
Memosens CUS71E

Ultrasonic interface sensor

Endress+Hauser
People for Process Automation

Table of contents

1 About this document

1.1 Warnings

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

- 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

1.2.1 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

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

Memosens CUS71E measures the interface layer between water and sediments for the automation of sedimentation processes in the following applications:
- Wastewater treatment plants
- Drinking water plants
- Mining
- Hydroelectric power stations

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

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

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.

2.6 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions . The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

3 Product description

3.1 Product design

The sensor determines the distance to the interface.

The sensor includes all necessary modules:
- Power supply
- Ultrasound source: transmits sequential measuring signals and receives measuring signals
- Sensor protector: protects against mechanical shock in hazardous areas or when surface skimmers are used
- Wiper (optional) for removing air bubbles and deposits

For salt concentrations > 35 g/l NaCl, use a sensor without a wiper.

3.1.1 Measuring principle

A piezoceramic element is excited at a frequency of approx. 670 kHz and generates ultrasonic waves at a beam angle of 6 °. The signal is reflected at the interface and generates an echo. The distance to the interface zone is determined based on the required transit time and the speed of sound.

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

4.2.1 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.

4.2.2 Identifying the product

Product page

www.endress.com/CUS71E

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 pop-up window.
4. Click the product overview.
   ↳ A new window opens. Here you will find information relating to your device, including the product documentation.

Manufacturer address

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

4.3 Scope of delivery

The scope of delivery comprises:
- Sensor, version as ordered
- Sensor protector (optional)
- Operating instructions

▶ 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.

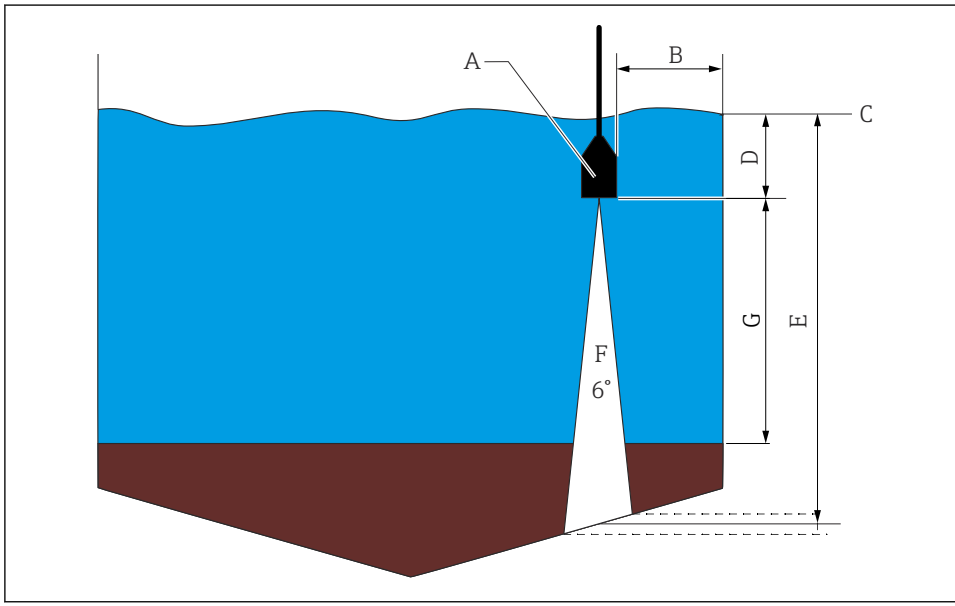
2. Open the product page.
3. Select **Downloads**.

5 Installation

5.1 Installation requirements

5.1.1 Installation instructions

Installation instructions



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1 *Tank configuration*

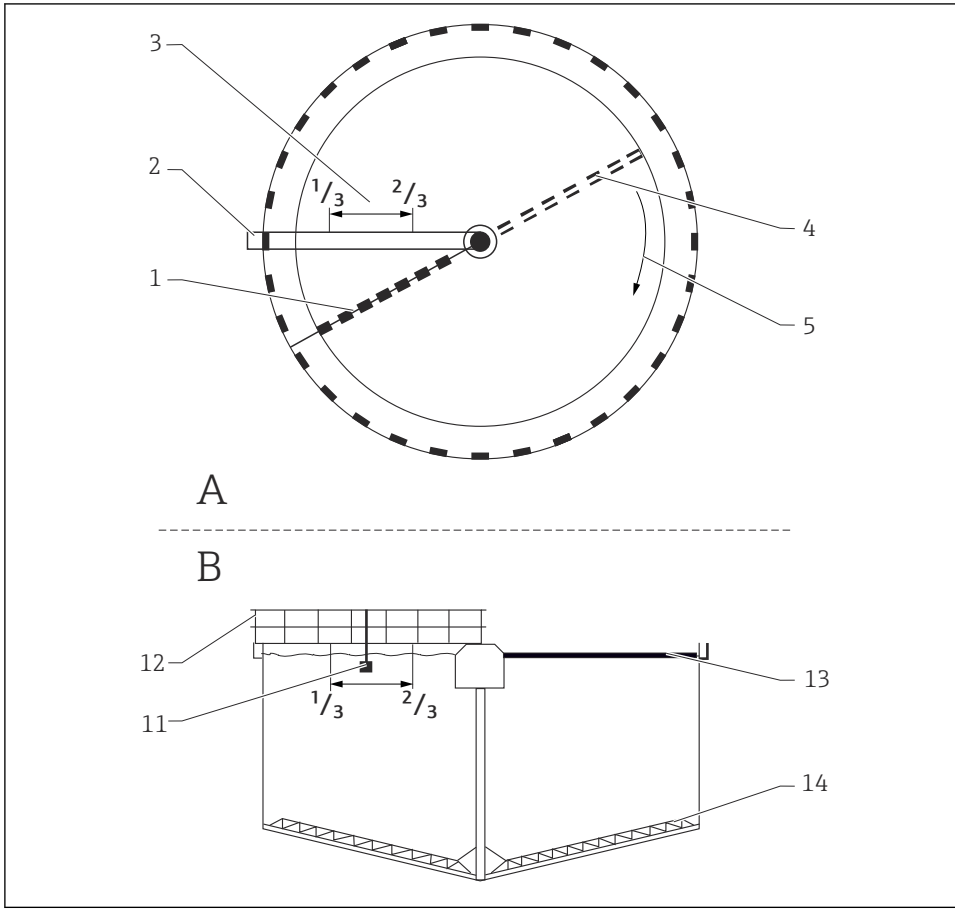
A Sensor
B Minimum distance between the sensor and the tank edge
C Fixed reference point (preferably water surface, alternatively basin edge, bridge etc.)
D Sensor immersion depth
E Basin depth
F Ultrasonic cone opening angle 6 °
G Minimum distance to the upper interface

Find a suitable installation position for the sensor in the basin. Take the following points into consideration when selecting the installation position:

1. Define a common fixed reference point (C) for the sensor immersion depth (D) and basin depth (E). Preferably the water surface, alternatively basin edge, bridge, etc.

2. Maintain a minimum distance (B) from the basin edge of 50 cm (1.64 ft) (sensor beam angle tapers conically).
3. Do not allow pipes or wall projections within the measuring range below the sensor.
4. Skimmer equipment may only temporarily enter the measuring range.
5. Align the sensor vertically and install it parallel to the basin wall.
6. Using an immersion tube, install the sensor at least 20 cm (0.66 ft) beneath the water surface.
7. Install the sensor at a distance of at least 30 cm (0.98 ft) to the upper interface (G).
8. Do not immerse the sensor deeper than 10 m (32.8 ft) under water.
9. Do not install the sensor under the following conditions:
   Air bubbles, turbulence, high concentrations of suspended and floating solids, foam formation (e.g. at inlet)

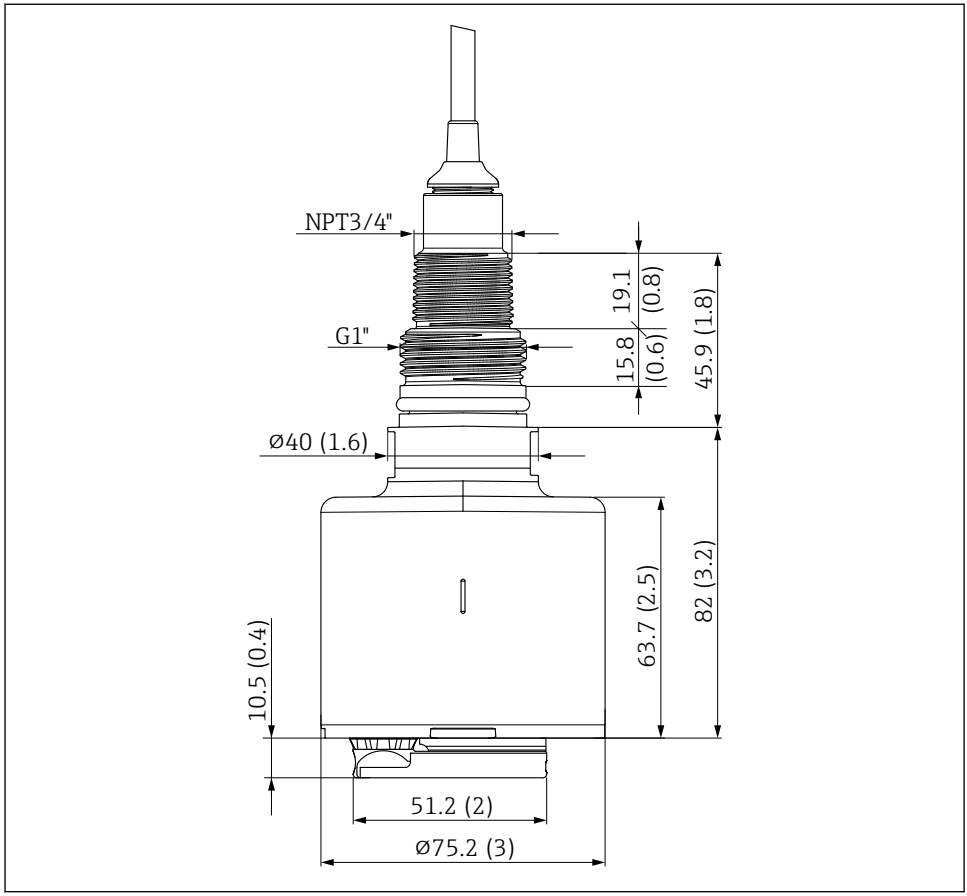
Installation in circular clarifiers



2 *Basin configuration in circular clarifiers*

A	View from above	B	Cross-section
1	Surface skimmer	11	Sensor
2	Bridge/walkway	12	Guard rail for mounting assembly
3	Sensor position range	13	Surface skimmer
4	Floor rake	14	Floor rake
5	Direction of rake movement		

5.1.2 Dimensions



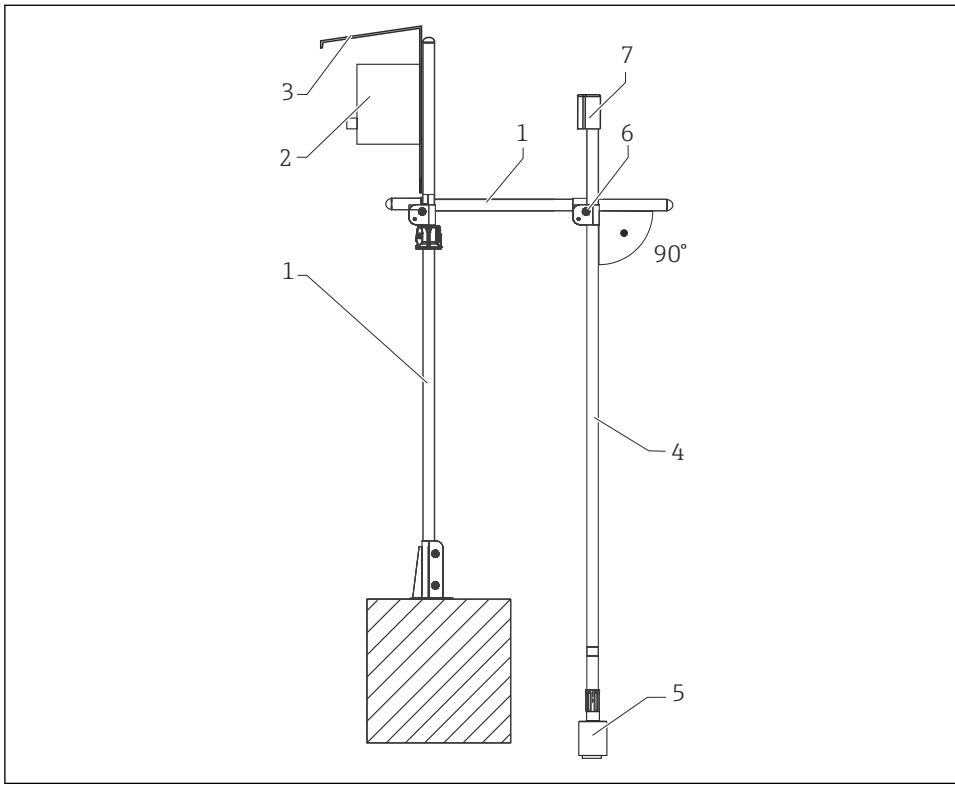
3 Dimensions. Unit: mm (in)

5.2 Installing the sensor

5.2.1 Measuring system

A complete measuring system comprises:
- Ultrasonic interface sensor
- Multichannel transmitter Liquiline CM44x or CM44xR
- Fixed or pivotable immersion tube Flexdip CYA112

and is optionally delivered with the following accessories:
- Weather protection cover CYY101
- Flexdip CYH112 holder

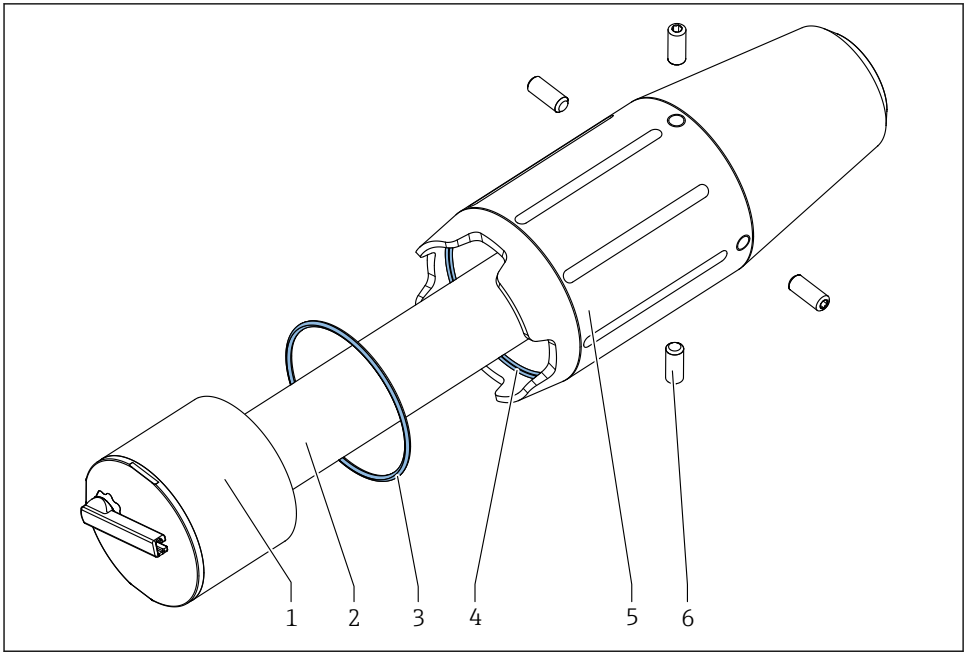


4 Ultrasonic interface sensor with basin holder and multichannel transmitter

1 Flexdip CYH112 holder
2 Multichannel transmitter Liquiline CM44x or CM44xR
3 Weather protection cover
4 Flexdip CYA112 assembly
5 Ultrasonic interface sensor
6 Vertical from all sides
7 Splash protection cap

5.2.2 Installing the sensor protector (pendulum holder, hazardous zones)

The sensor protector protects the ultrasonic sensor from being damaged by the surface skimmer.In hazardous zones, operate sensors only with the sensor protector installed.

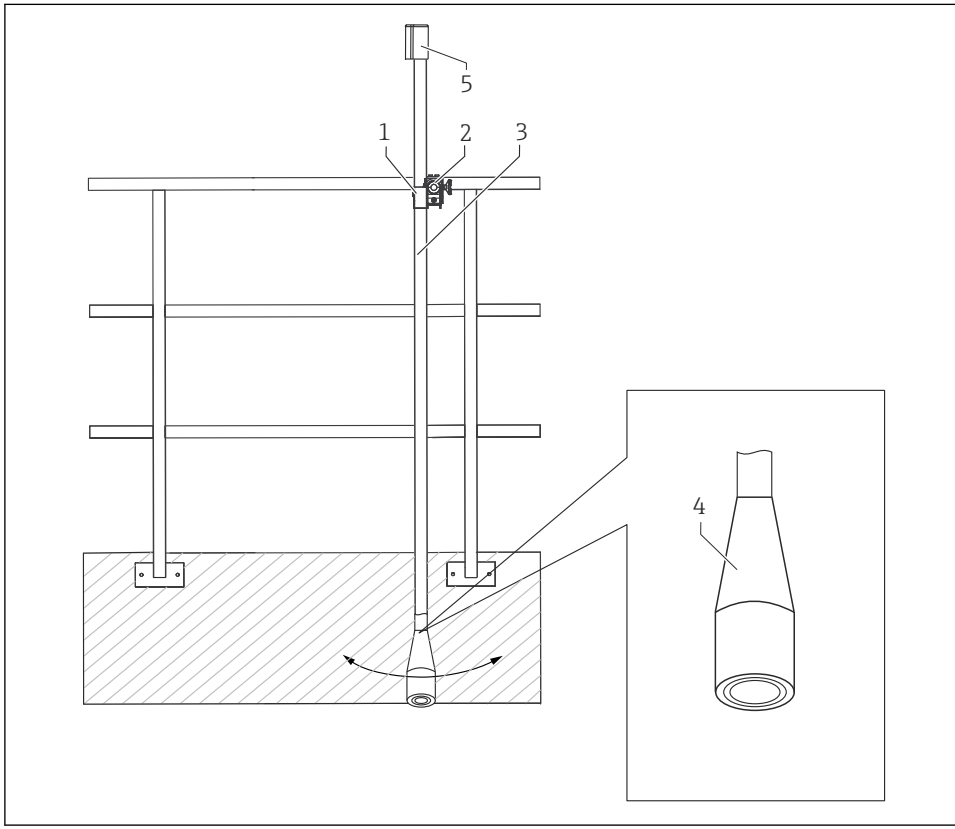


5 Mounting the sensor protector

1 Sensor
2 Assembly
3 Seal
4 Groove
5 Sensor protector
6 Setscrew (4x)

1. Insert the seal (pos. 3) into the groove (pos. 4) of the sensor protector (pos. 5).
2. Slide the sensor protector (pos. 5) onto the tube of the assembly (pos. 2).
3. Screw the sensor (pos. 1) onto the assembly.
4. Slide the sensor protector over the sensor as far as it will go.
5. Secure the sensor protector in place with 4 setscrews (pos. 6).

Measuring system with pendulum holder



6 Measuring system with pendulum holder

1 *Flexdip CYH112 holder (cross clamp)*
2 *Flexdip CYH112 holder (pendulum holder)*
3 *Flexdip CYA112 assembly with CUS71Esensor*
4 *Sensor protector*
5 *Splash protection cap*

5.3 Post-installation check

Check the following:
- Are the sensor and cable undamaged?
- Are the wiper arm and the wiper lip undamaged?
- Is the sensor protector (optional) undamaged and correctly installed?

- Have the installation instructions been observed?
- Is the sensor installed in an assembly and not freely suspended from the cable?
- Are the assembly and the sensor aligned vertically at a right angle to the interface?

Avoid the penetration of moisture by fitting the protective cap on the assembly.

6 Electrical connection

WARNING

Device is live!

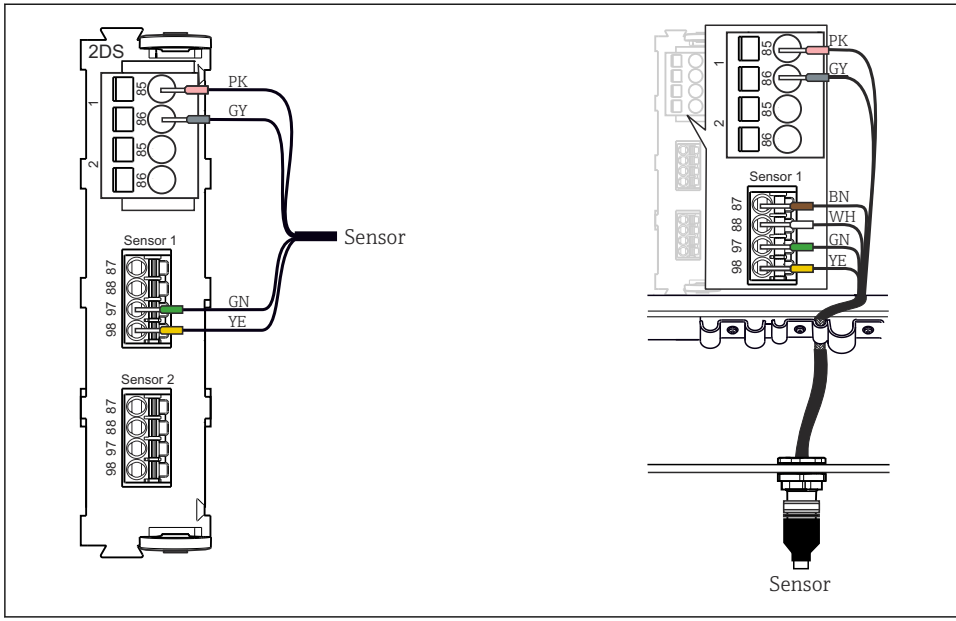
Incorrect connection may result in injury or death!

- 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 the sensor

The following connection options are available:

- Via M12 plug (version: fixed cable, M12 plug)
- Via sensor cable to the plug-in terminals of a sensor input on the transmitter (version: fixed cable, end sleeves)



7 *Sensor connection to sensor input (left) or via M12 plug (right)*

The maximum cable length is 100 m (328.1 ft).

Use the following accessories to extend the sensor cable if necessary:
- CYK11 measuring cable with ferrules (accessories)
- Cable/cable junction box (accessory)

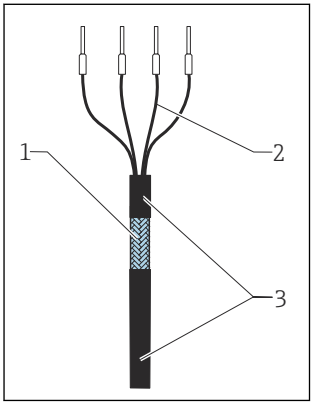
6.1.1 Connecting the cable shield

The device cable must be shielded cables.

Only use terminated original cables where possible.

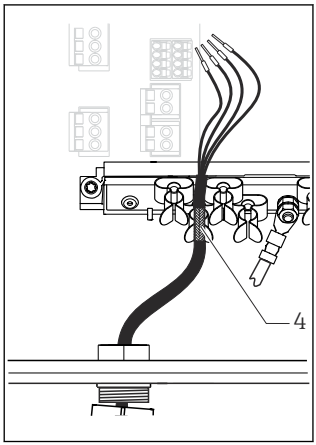
Clamping range of cable clamps: 4 to 11 mm (0.16 to 0.43 in)

Sample cable (does not necessarily correspond to the original cable supplied)



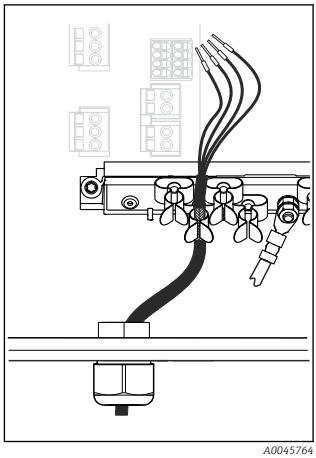
8 Terminated cable

1 Outer shield (exposed)
2 Cable cores with ferrules
3 Cable sheath (insulation)



9 Connect the cable to the grounding clamp

4 Grounding clamp



10 Press the cable into the grounding clamp

The cable shield is grounded using the grounding clamp [1)]

1) Observe the instructions in the "Ensuring the degree of protection" section

1. Loosen a suitable cable gland at the bottom of the housing.
2. Remove the dummy plug.
3. Attach the gland to the cable end, making sure the gland is facing the right direction.
4. Pull the cable through the gland and into the housing.
5. Route the cable in the housing in such a way that the **exposed** cable shield fits into one of the cable clamps and the cable cores can be easily routed as far as the connection plug on the electronics module.
6. Connect the cable to the cable clamp.
7. Clamp the cable.
8. Connect cable cores as per the wiring diagram.
9. Tighten the cable gland from outside.

6.2 Post-connection check

Device health and specifications	Action
Is the outside of the sensor, assembly or cable free from damage?	▶ Perform a visual inspection.
Electrical connection	**Action**
Are the mounted cables strain-relieved and not twisted?	▶ Perform a visual inspection. ▶ Untwist the cables.
Is a sufficient length of the cable cores stripped, and are the cores positioned in the terminal correctly?	▶ Perform a visual inspection. ▶ Pull gently to check they are seated correctly.
Are the power supply and signal lines correctly connected?	▶ Refer to the wiring diagram for the transmitter.
Are all screw terminals tightened?	▶ Tighten the screw terminals.
Are all the cable entries installed, tightened and leak-tight?	▶ Perform a visual inspection. In the case of lateral cable entries:
Are all cable entries mounted on the side or pointing downwards?	▶ Point cable loops downward so that water can drip off.

7 Commissioning

⚠ CAUTION

Mechanical cleaning not switched off during calibration or maintenance activities

Risk of injury from automatic cleaning mechanism!

- ▶ Switch off the cleaning system before removing the sensor from the medium.
- ▶ Disconnect the sensor from the power supply of the measuring transmitter: terminal 85 (pink wire) and terminal 86 (gray wire).
- ▶ When checking the cleaning system during operation, wear suitable personal protective equipment or take other protective measures.

7.1 Function check

Before commissioning, check the following conditions:

1. The sensor is correctly installed.
2. The electrical connection has been correctly established.
3. Chemical material compatibility is ensured.
4. The permitted temperature and pressure range is observed.

7.2 Guided commissioning

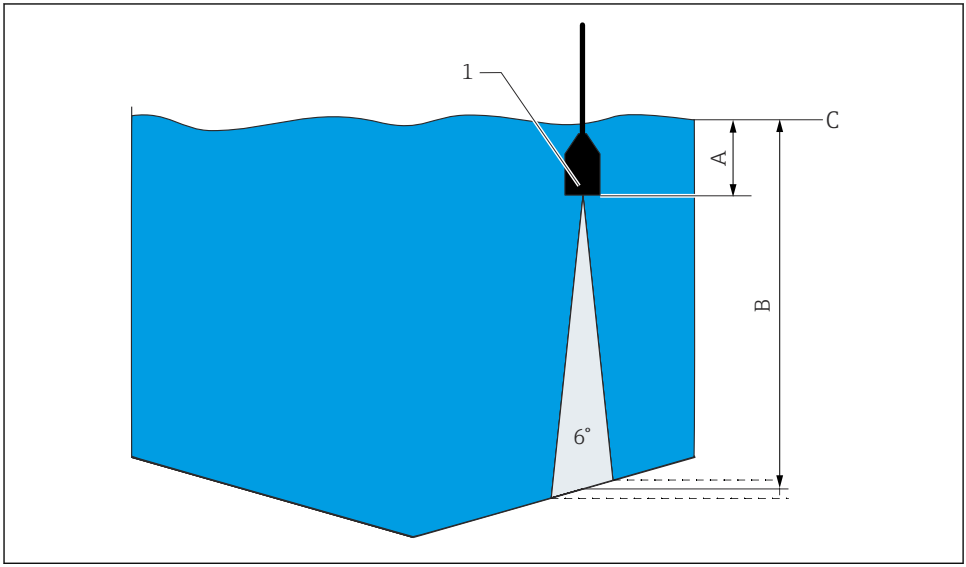
Guided commissioning using the Commissioning Wizard is the recommended procedure.

The Commissioning Wizard provides guided configuration of the following:
- Measurement settings
- Interference zones
- Sensor immersion depth and basin depth

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Commissioning wizard**
2. Follow the instructions.

7.3 Manual commissioning

7.3.1 Specify the sensor immersion depth and basin depth



11 Sensor immersion depth and basin depth

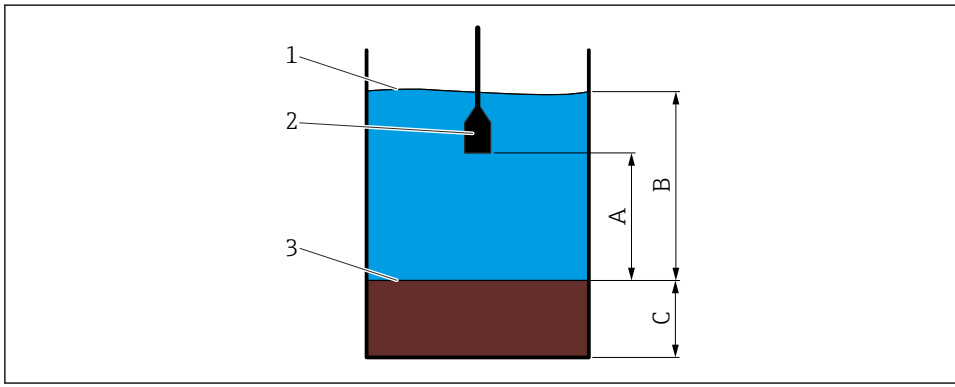
1 Sensor
A Sensor immersion depth
B Basin depth
C Fixed reference point (preferably water surface, alternatively basin edge, bridge etc.)

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration**
2. Specify **Sensor immersion depth** (A).
3. Specify **Tank depth** (B).

The **Sensor immersion depth** (A) and the **Tank depth** (B) must refer to the same reference point (C). The system will only display the correct relative distance if the reference point is identical.

7.3.2 Selecting the measurement method

The system offers the following measurement methods:
- **Distance measurement** (default)
- **Interface level**
- **Interface depth**



12 *Selecting the measurement method*

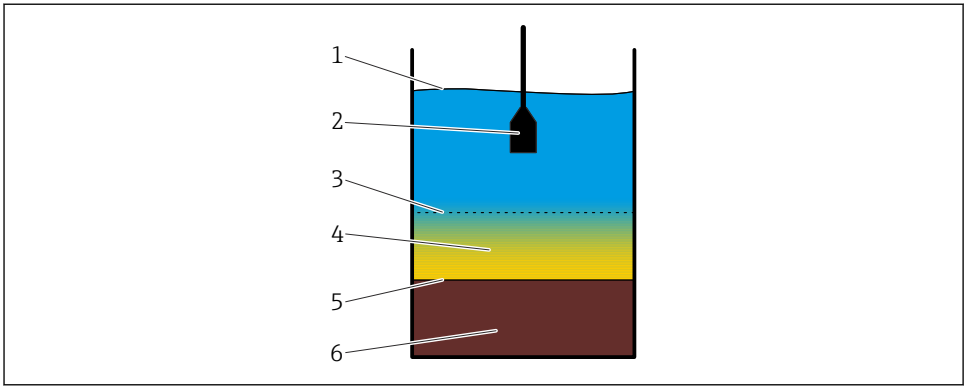
1 Water surface (reference point)
2 Sensor
3 Interface
A Distance measurement
B Interface depth
C Interface level

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Measuring mode**
2. Select the desired measurement method.

Changing the measuring method changes the measured value, but not the configuration of the output signals (e.g. 0 m remains 4 mA and 10 m remains 20 mA). Adjust the output configuration if necessary.

7.3.3 Interface layer selection

The interface layer selection differentiates between **Lower interface** or **Top layer**:
- **Lower interface** (pos. 5), default and recommended: The system determines the interface layer closest to the bottom of the tank.The layer above it consisting of non-sedimented particles (pos. 4) is ignored.
- **Top layer** (pos. 3): If a large area of incompletely sedimented particles (pos. 4) is present above the lower interface layer (pos. 5) at the bottom of the tank (pos. 4), the transmitter outputs the upper limit (pos. 3) of this layer.Fluctuations may result in less accurate results.



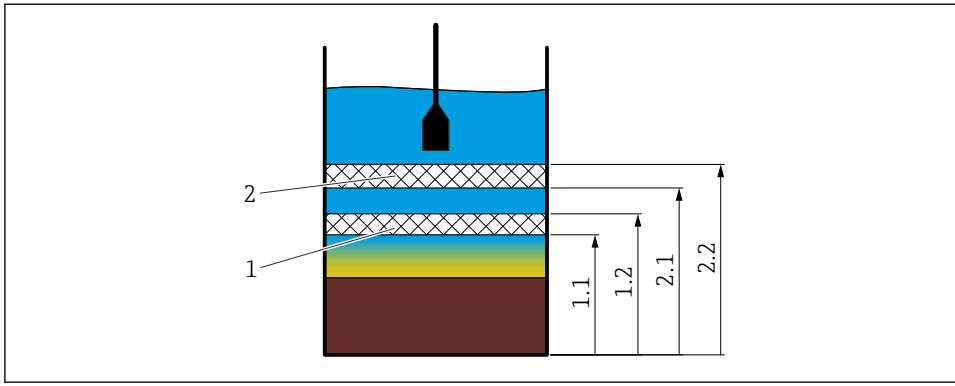
13 Selecting the interface layer

1 Water surface (reference point)
2 Sensor
3 Top layer
4 Layer consisting of non-sedimented particles
5 Lower interface
6 Layer consisting of completely sedimented particles

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Interface selection**
2. Select the desired interface layer.

7.3.4 Interference zones

If objects such as pipes or agitators are located between the sensor and interface layer, incorrect measured values may occur because the sensor detects these objects. These areas (interference zones) must be masked to ensure that the sensor does not identify them as possible interface layers. Up to two interference zones can be masked for measurement in the area below the sensor:



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1 Interference area 1
2 Interference area 2
1.1 Boundary 1.1
1.2 Boundary 1.2
2.1 Boundary 2.1
2.2 Boundary 2.2

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Interference area**
2. Activate **Interference area 1** and/or **Interference area 2**.
3. Specify limits (distance to tank bottom below the sensor).

7.3.5 Selecting the operating condition (water/saltwater)

Water

The speed of sound depends on the liquid and the temperature in which the sensor is located. Temperature compensation and the resulting adjustment of the speed of sound are activated by default in the transmitter for use in water. The sensor measures the temperature of the liquid and compensates for the speed of sound.

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Signal tracking/Speed of sound/Profile**
2. Select **Water**.

Saltwater

When using the sensor in saltwater, the profile must be changed and the salt concentration specified.

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Signal tracking/Speed of sound**
2. Activate **Temperature compensation**.
3. Select the **Profile** and switch to **Salt water (NaCl)**.

4. Enter the **Salt concentration** of the liquid.

7.3.6 Manually changing the speed of sound

Temperature compensation and the resulting adjustment of the speed of sound are activated by default in the transmitter. It may be necessary to change the speed of sound manually (oils, greases, solvents, etc. in the medium).

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Signal tracking/Speed of sound/Temperature compensation**
2. Deactivate **Temperature compensation**.
3. Specify **Comp. speed of sound** in m/s.

7.3.7 Calibration

1. Follow this path in the transmitter: **Menu/CAL/Ultrasonic interface/Interface/Offset**
2. Enter the sensor offset.

8 Operation

8.1 Wiper

Cyclic cleaning is available for ultrasonic sensors with an integrated wiper. The wiper interval is set to 240 minutes at the factory.

Menu/Setup/Inputs/Ultrasonic interface/Wiper configuration/Cleaning interval

Type of application	Cleaning interval
Wastewater	240 minutes
Drinking water	240 minutes
Drinking water with high air content	10 minutes
Process water	30 minutes

8.2 Detection: echo loss

If the sensor does not receive a signal for 30 minutes, for example because it is not immersed in water, the sensor triggers the diagnostic message **Alarm delay echo loss** (F979).

The delay before the diagnostic message is triggered can be configured.

1. Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/ Extended setup/Diagnostic settings/Alarm delay echo loss**
2. Set the desired time.

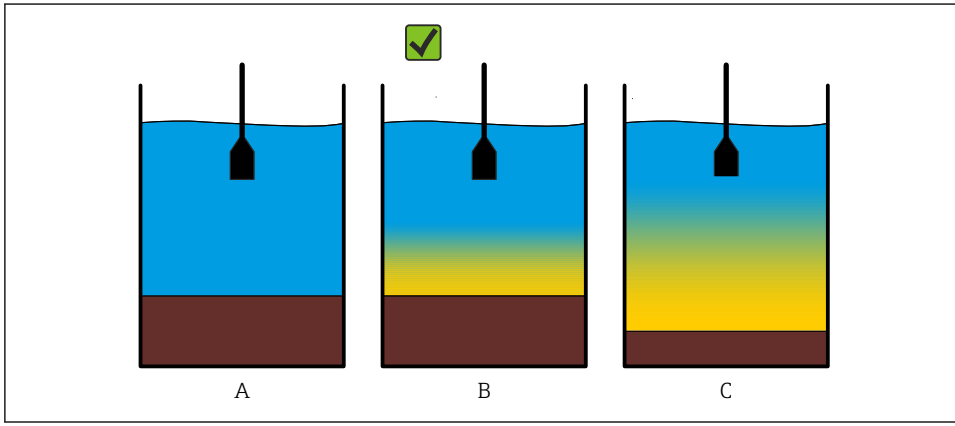
8.3 Dosing flocculants

The transmitter displays a "sedimentation factor".

The sedimentation factor describes how effectively sedimentation is taking place in the tank.It represents the ratio between:

- Non-sedimented particles (particles above the interface that do not settle and remain in the water)
- Sediment (particles that have settled below the interface at the bottom)

A flocculant improves sedimentation: it binds fine particles into larger flocs that settle more quickly.However, excessive use of flocculants places a burden on the environment.



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Dose the flocculant according to the table:

Sedimentation:	Strong sedimentation (A)	Optimum sedimentation (B)	Poor sedimentation (C)
Sedimentation factor:	0.5 to 1	0.1 to 0.8	0.01 to 0.5
Description:	Clear interface, hardly any particles above the sludge layer.	Visible particle cloud above the sludge layer, but water largely clear.	Diffuse interface, many particles in water, solids carryover possible.
Flocculant:	Reduce flocculant dosage.	Flocculant correctly dosed, no solids carryover.	Increase flocculant dosage.

This function is optional.It can be selected when ordering or retrofitted using an activation code.

8.4 Saving the signal envelope

The transmitter allows the signal envelope to be saved to an SD card.The signal envelope is recorded cyclically (sampling interval 8 to 600 s).The saved data are stored on the SD card and can be read out for later analysis.

Menu/Setup/Inputs/Ultrasonic interface/Extended setup/Envelope curve logging

9 Diagnostics and troubleshooting

9.1 General troubleshooting

When troubleshooting, the entire measuring point must be taken into account:
- Transmitter
- Electrical connections and cables
- Assembly
- Sensor

The possible causes of faults in the following table refer primarily to the sensor.

Problem	Test	Remedy
Blank display, no sensor reaction	▪ Mains voltage connected to the transmitter ▪ Sensor connected correctly ▪ Deposit buildup on sensor membrane ▪ Check sensor/channel configuration	▪ Apply mains voltage. ▪ Connect sensor correctly. ▪ Clean sensor. ▪ Assign sensor.
Sensor in air	Check sensor immersion depth.	Observe installation instructions.
Faulty wiper function	▪ Check wiper setting. ▪ Check wiper for tressing or blockage.	▪ Remove tressing/blockages. ▪ Perform one wiping cycle. **Menu/Setup/Inputs/Ultrasonic interface/ Clean sensor**
No echo signal found	▪ Check sensor settings. ▪ Check sensor installation.	Observe installation instructions.
	Check whether the interface is in an interference zone.	Change the interference zone setting. **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Interference area**
	Check whether the sensor is immersed in sediment.	Observe installation instructions.
	Check whether the interface is displayed (signal envelope on the transmitter display).	Adjust sensor settings.
Buildup on sensor	Check the sensor and wiper.	▪ Clean sensor. ▪ Adjust cleaning interval. **Menu/Setup/Inputs/Ultrasonic interface/ Wiper configuration/Cleaning interval** ▪ If necessary: replace the wiper.
Display value too high or too low	Check sensor installation.	Observe installation instructions.
	Check operating conditions.	Change interface layer selection. **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Interface selection**
	Check minimum distance between sensor and tank bottom.	Increase the distance.

Problem	Test	Remedy
	Check interference zone setting.	Change the interference zone setting. **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Interference area**
	Check medium compensation.	Adjust medium compensation (temperature, salt content). **Menu/Setup/Inputs/Ultrasonic interface/ Measuring point configuration/Signal tracking/ Speed of sound/Profile**
Display value fluctuates greatly	Check mounting location	▪ Observe installation instructions. ▪ Clean sensor.
	Deposit buildup on sensor membrane	Clean sensor.
	Check the **Measuring point configuration**.	**Menu/Setup/Inputs/Ultrasonic interface**Increase /**Damping interface**.

Pay attention to the troubleshooting information in the Operating Instructions for the transmitter. Check the transmitter if necessary.

10 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.

10.1 Maintenance work

CAUTION

Mechanical cleaning not switched off during calibration or maintenance activities

Risk of injury from automatic cleaning mechanism!

- ▶ Switch off the cleaning system before removing the sensor from the medium.
- ▶ Disconnect the sensor from the power supply of the measuring transmitter: terminal 85 (pink wire) and terminal 86 (gray wire).
- ▶ When checking the cleaning system during operation, wear suitable personal protective equipment or take other protective measures.

Non-permitted cleaning agents

Possible damage to the housing surface or housing seal!
- ▶ Never use concentrated acids or alkalis 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

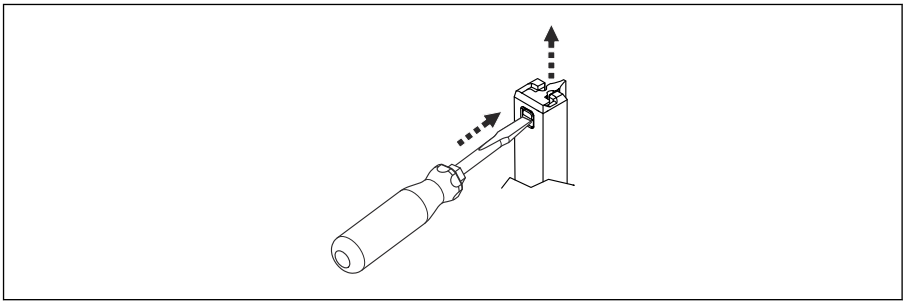
10.1.1 Cleaning the sensor and wiper

Contamination of the sensor can impair measurement and may lead to a malfunction.

1. Clean the sensor, and the underside of the sensor in particular, at regular intervals to ensure reliable measurement.
   ↳ The frequency and intensity of the cleaning process depend on the medium.
2. Clean the sensor before returning it for repair.
3. After cleaning, rinse the sensor with copious amounts of water.

10.1.2 Replacing the wiper blade

We recommend you replace the wiper blade every 6 to 12 months.

1. Clean the product.
2. 
   A0057260

   Use a screwdriver to press into the recess on the wiper arm.
3. Using the other hand, pull out the wiper blade .
4. Insert the new wiper blade or brush and check the contact pressure.
   ↳ The wiper blade engages in the recess of the wiper arm.

After replacing the wiper blade, run the wizard for wiper blade replacement in the transmitter. During this process, the sensor checks the internal settings of the cleaning system and resets the maintenance counter.

- Follow this path in the transmitter: **Menu/Setup/Inputs/Ultrasonic interface/Wiper configuration/Wiper blade/Exchange wiper blade**

11 Repair

11.1 General information

The repair and conversion concept provides for the following:
- The product has a modular design
- Spare parts are grouped into kits which include the associated kit instructions
- Only use original spare parts from the manufacturer
- Repairs are carried out by the manufacturer's Service Department or by trained users
- Certified devices can only be converted to other certified device versions by the manufacturer's Service Department or at the factory
- Observe applicable standards, national regulations, Ex documentation (XA) and certificates

1. Carry out the repair according to the kit instructions.
2. Document the repair and conversion and enter, or have entered, in the Life Cycle Management tool (W@M).

11.2 Spare parts

Spare parts currently available for the device can be found at: www.endress.com/onlinetools

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

11.3 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

11.4 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.

12 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 for 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.

12.1 Device-specific accessories

12.1.1 Assemblies

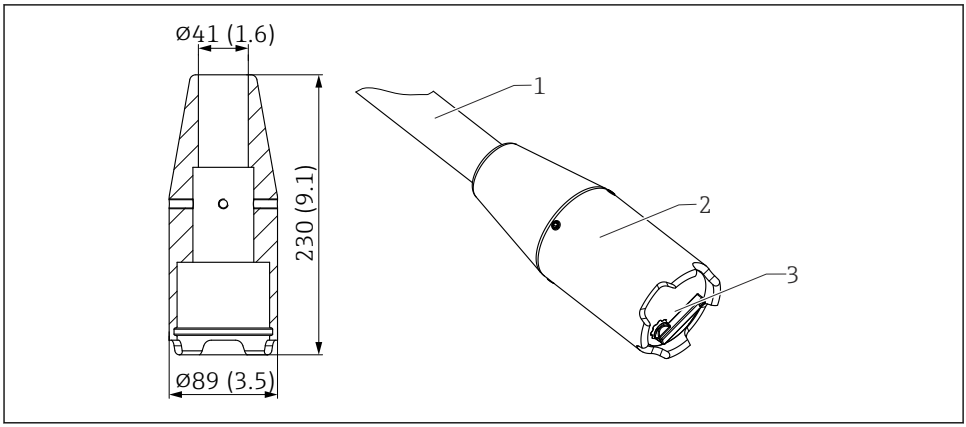
Flexdip CYA112

- Immersion assembly for water and wastewater
- Modular assembly system for sensors in open basins, channels and tanks
- Material: PVC or stainless steel
- Product Configurator on the product page: www.endress.com/cya112

Technical Information TI00432C

Sensor protector for pendulum holder or for use in hazardous zones

- The sensor protector protects the ultrasonic sensor from being mechanically damaged by the surface skimmer.
- Can be ordered via the spare parts order structure "XPC0032"
- Material: PE



14 Sensor protectorUnit: mm (in)

1 Assembly
2 Sensor protector
3 Sensor

12.1.2 Holder

Flexdip CYH112
- Modular holder system for sensors and assemblies in open basins, channels and tanks
- For Flexdip CYA112 water and wastewater assemblies
- Can be affixed anywhere: on the ground, on the coping stone, on the wall or directly onto railings.
- Stainless steel version
- Product Configurator on the product page: www.endress.com/cyh112

Technical Information TI00430C

Dipfit CLA140
- Immersion assembly with flange connection for very demanding processes
- Product Configurator on the product page: www.endress.com/cla140

Technical Information TI00196C

12.1.3 Cable extension

Memosens data cable CYK11
- Extension cable for digital sensors with Memosens protocol
- Product Configurator on the product page: www.endress.com/cyk11

Technical Information TI00118C

Junction box, cable/cable
- Material: aluminum, painted
- Cable extension: Memosens sensors, Liquiline
- Order number: 71145499

13 Technical data

13.1 Input

13.1.1 Measured variables

- Interface
- Basin depth
- Temperature
- Sedimentation factor

13.1.2 Measuring ranges

- Specified measuring range: 0.3 to 10 m (1 to 32 ft)
- Extended measuring range: 0.3 to 30 m (1 to 98 ft)

13.2 Energy supply

13.2.1 Power consumption

24 V_{DC} (−15 % / 20 %), 3 W

13.2.2 Overvoltage protection

Overvoltage category 1

13.3 Performance characteristics

13.3.1 Reference conditions

20 °C (68 °F), 1013 hPa

13.3.2 Measurement error

± 0.1 m (0.33 ft) or ± 2 % for a measuring range of 0.3 to 10 m (1 to 32 ft)

13.3.3 Measured value resolution

15 mm (0.05 ft) for a measuring range of 0.3 to 10 m (1 to 32 ft)

13.3.4 Calibration

The sensor is factory-configured when delivered.

13.4 Environment

13.4.1 Storage temperature

-25 to +70 °C (-13 to +158 °F)

13.4.2 Relative humidity

10 to 100 %

13.4.3 Degree of protection

- IP 68 (1.83 m (6 ft) water column over 24 hours)
- IP 66
- Type 6P

13.4.4 Operating height

3 000 m (9 842.5 ft) maximum

13.4.5 Fouling

Degree of fouling 2 (micro environment)

Pollution degree 4 (macro environment)

13.5 Process

13.5.1 Process temperature

5 to 80 °C (41 to 176 °F)

13.5.2 Process pressure

0 to 1 bar (0 to 14.5 psi)

13.6 Mechanical construction

13.6.1 Dimensions

→ Section "Installation"

13.6.2 Weight

Product	Weight
Sensor:	260 g (9.2 oz)
Sensor with wiper:	345 g (12.2 oz)
Sensor with wiper and sensor protector:	965 g (34 oz)

13.6.3 Materials

Sensor housing:	PPS GF40
Wiper arm:	PPS GF40
Wiper blade:	EPDM or silicone
Skimmer:	EPDM or silicone
Seals:	EPDM
Wiper shaft and screw	Stainless steel 1.4571

13.6.4 Process connections

G1 and NPT ¾"

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