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Technical Information
Memosens CUS71E

Ultrasonic interface sensor

Application

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

Advantages

- Make the invisible visible for better process control:
  Memosens CUS71E measures the interface layers even at large depth and harsh environments to reliably control and optimize your process.
- High plant availability by reliable measurement and cleaning:
  Automated measurement and integrated cleaning increase system availability while delivering consistent measurement results with minimal manual effort.
- Wide operation range for demanding environments:
  Monitor interface layers across a broad range of applications. From drinking water to hazardous areas, supported by a complete solution including assembly and transmitter for safe operation.
- Reliable results under challenging conditions:
  High temperatures and saline media can distort the measurements if they are not compensated. The integrated temperature and medium compensation ensures reliable results even under varying process conditions.
- Seamless integration and easy commissioning:
  The commissioning wizard supports you step by step, enabling fast integration even in unknown conditions.
- Optimize chemical dosing with a unique sedimentation factor:
  Gain deeper process insights with the unique sedimentation factor as a quality indicator. Optimize the use of precipitation chemicals and reduce operating costs without compromising process stability.

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Function and system design

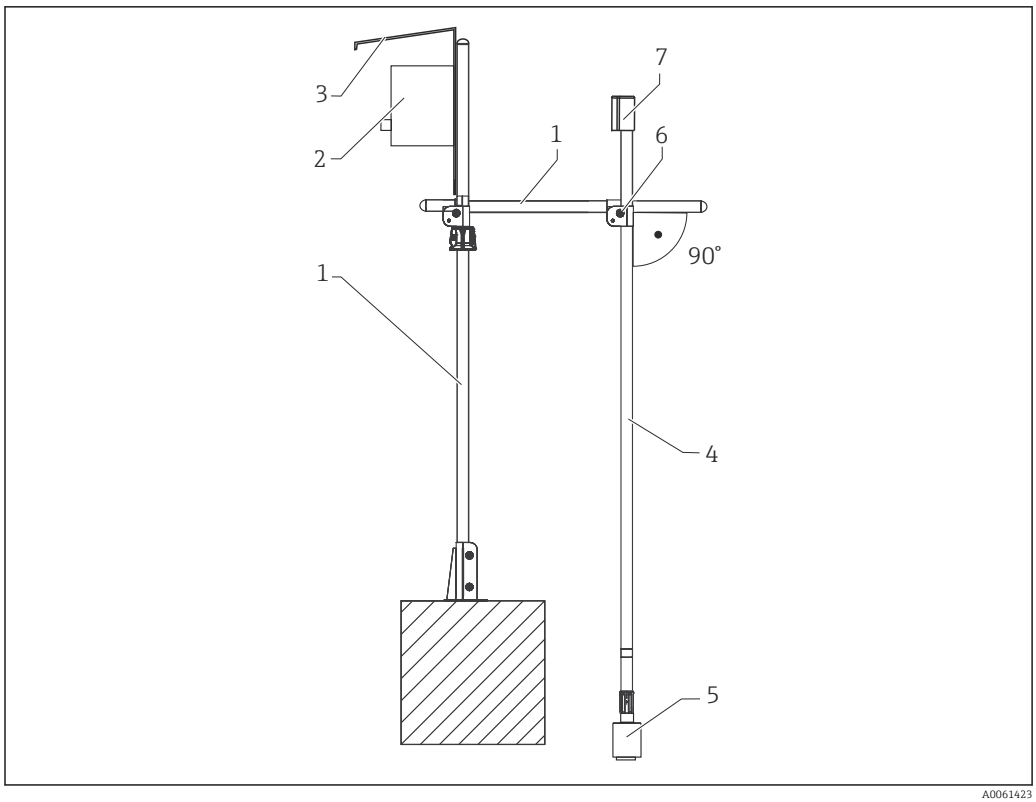
Measuring principle

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.

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

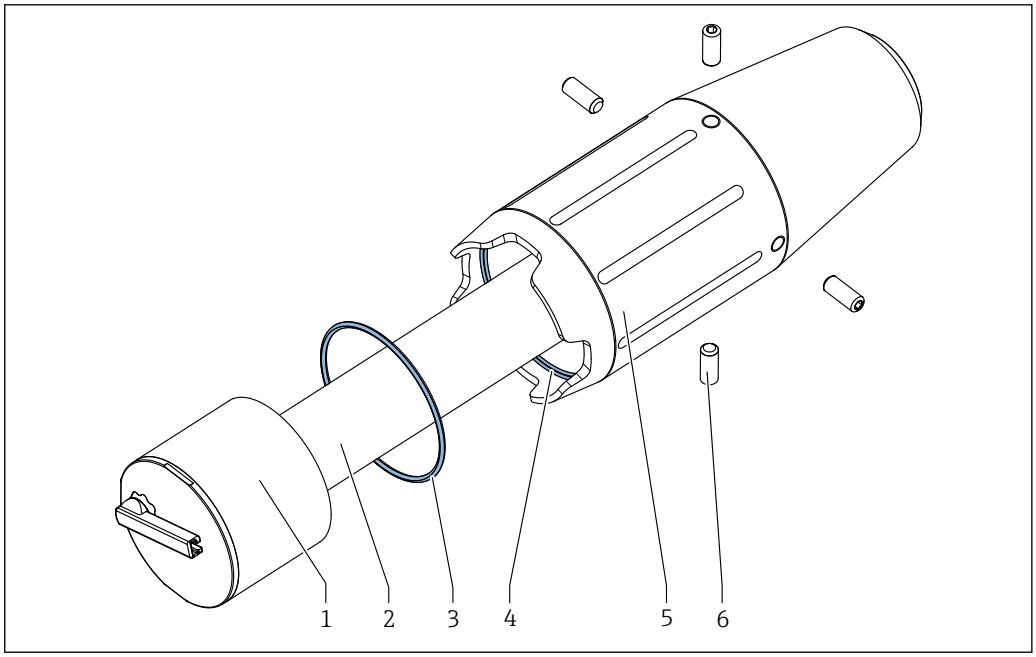


1 Ultrasonic interface sensor with basin holder and multichannel transmitter

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

Measuring system with pendulum adapter and sensor protection

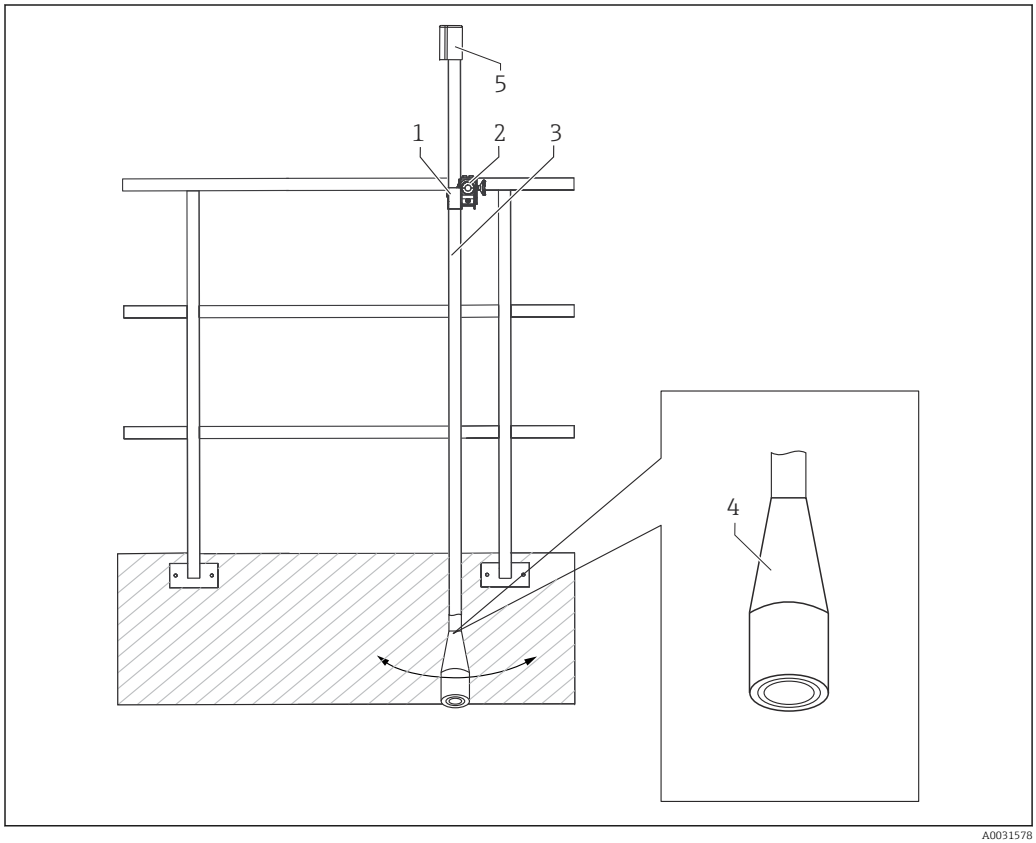
The sensor protector protects the ultrasonic sensor from being damaged by the surface skimmer.In hazardous zones, operate sensors only with the sensor protector installed.



2 Mounting the sensor protector

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

Measuring system with pendulum holder



3 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*

Input

Measured variable

- Interface
- Basin depth
- Temperature
- Sedimentation factor

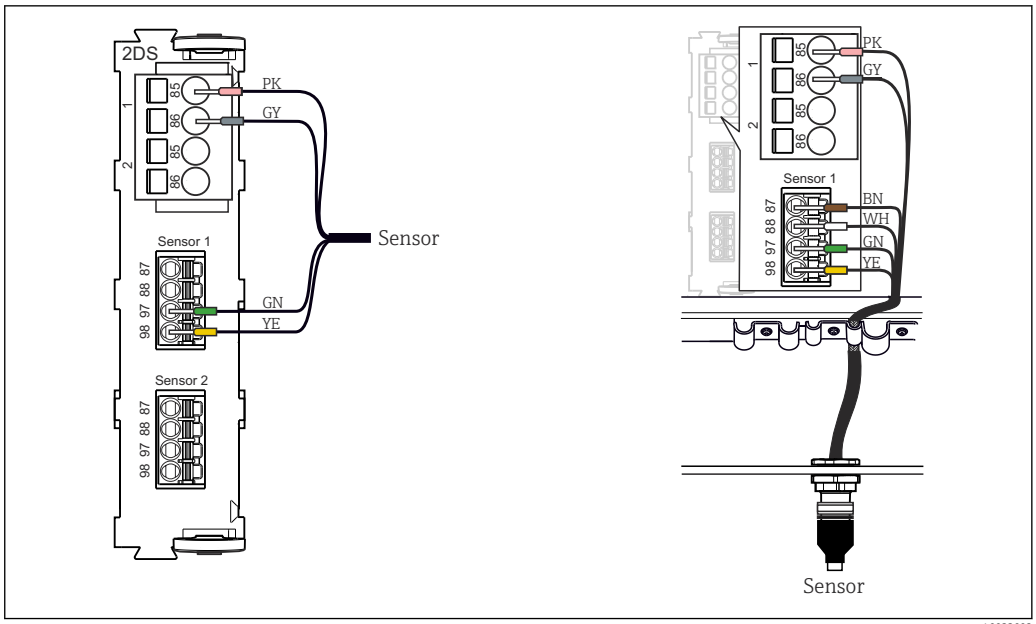
Measuring range

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

Power supply

Electrical connection

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)



4 *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)

Power consumption	24 V_{DC} (−15 % / 20 %), 3 W
Overvoltage protection	Overvoltage category 1

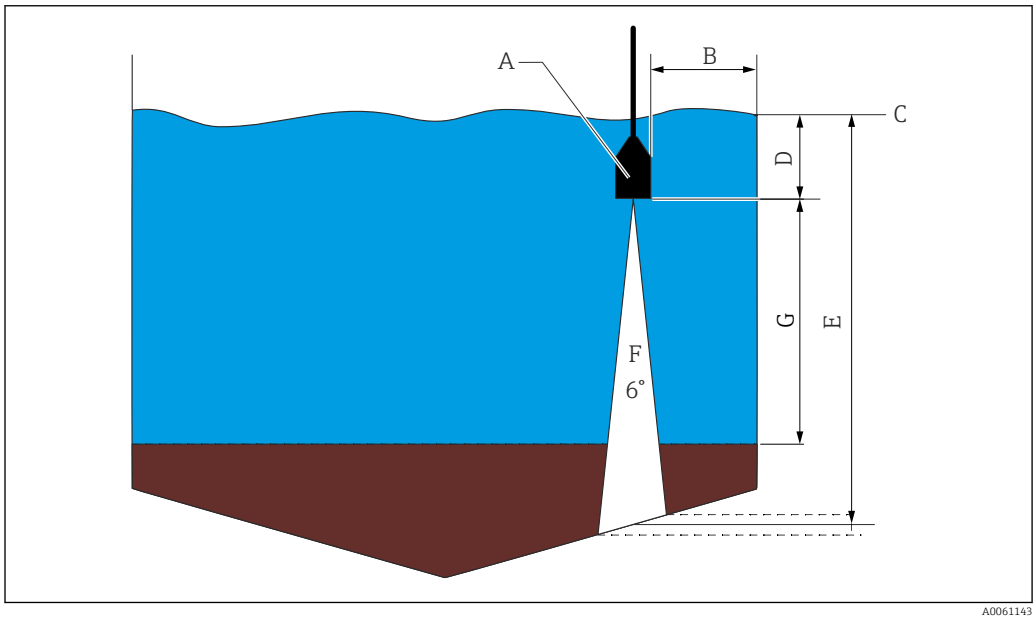
Performance characteristics

Reference operating conditions	20 °C (68 °F), 1013 hPa
Measurement error	± 0.1 m (0.33 ft) or ± 2 % for a measuring range of 0.3 to 10 m (1 to 32 ft)
Measured value resolution	15 mm (0.05 ft) for a measuring range of 0.3 to 10 m (1 to 32 ft)
Calibration	The sensor is factory-configured when delivered.

Installation

Installation instructions

Installation instructions



5 *Tank configuration*

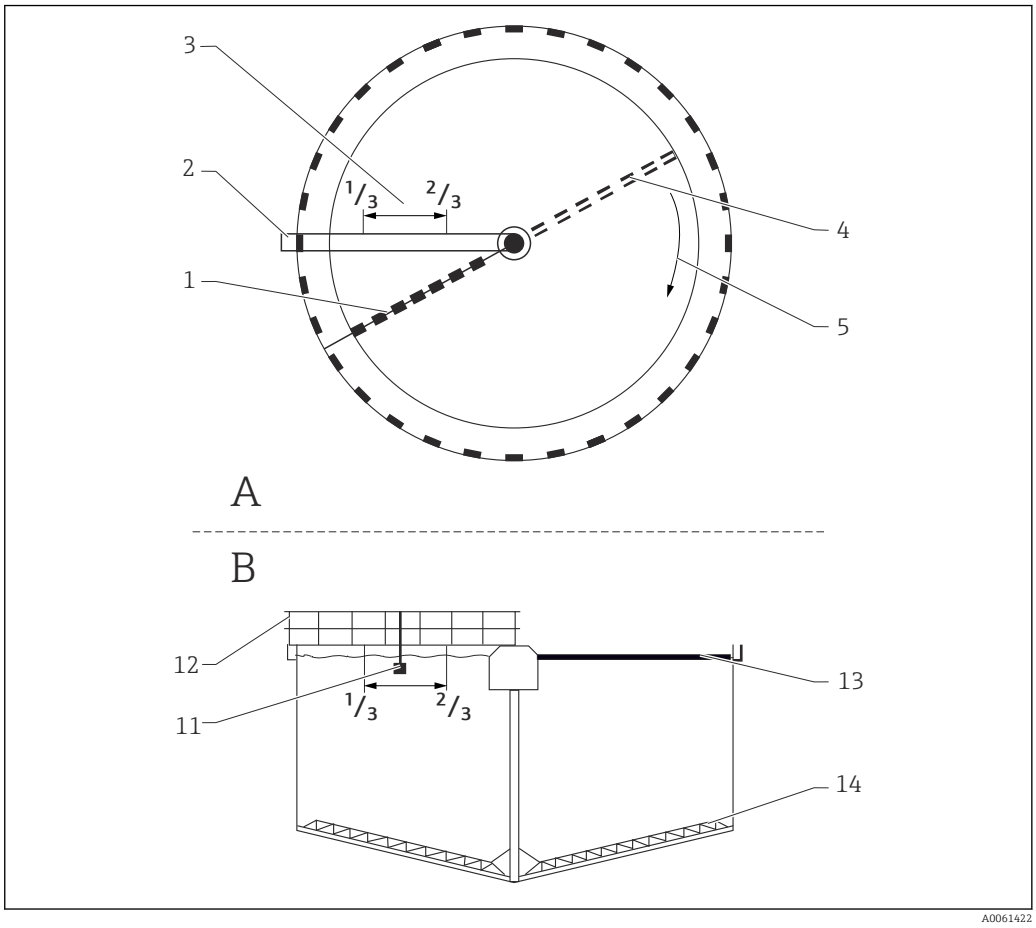
A Sensor
B Minimum distance between the sensor and the tank edge
C Fixed reference point (preferably water surface, alternatively basin edge, bridge etc.)
D Sensor immersion depth
E Basin depth
F Ultrasonic cone opening angle 6 °
G Minimum distance to the upper interface

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)

Circular clarifier



6 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		

Environment

Storage temperature	-25 to +70 °C (-13 to +158 °F)
Relative humidity	10 to 100 %
Degree of protection	▪ IP 68 (1.83 m (6 ft) water column over 24 hours) ▪ IP 66 ▪ Type 6P
Operating altitude	3 000 m (9 842.5 ft) maximum
Fouling	Degree of fouling 2 (micro environment) Pollution degree 4 (macro environment)

Process

Process temperature

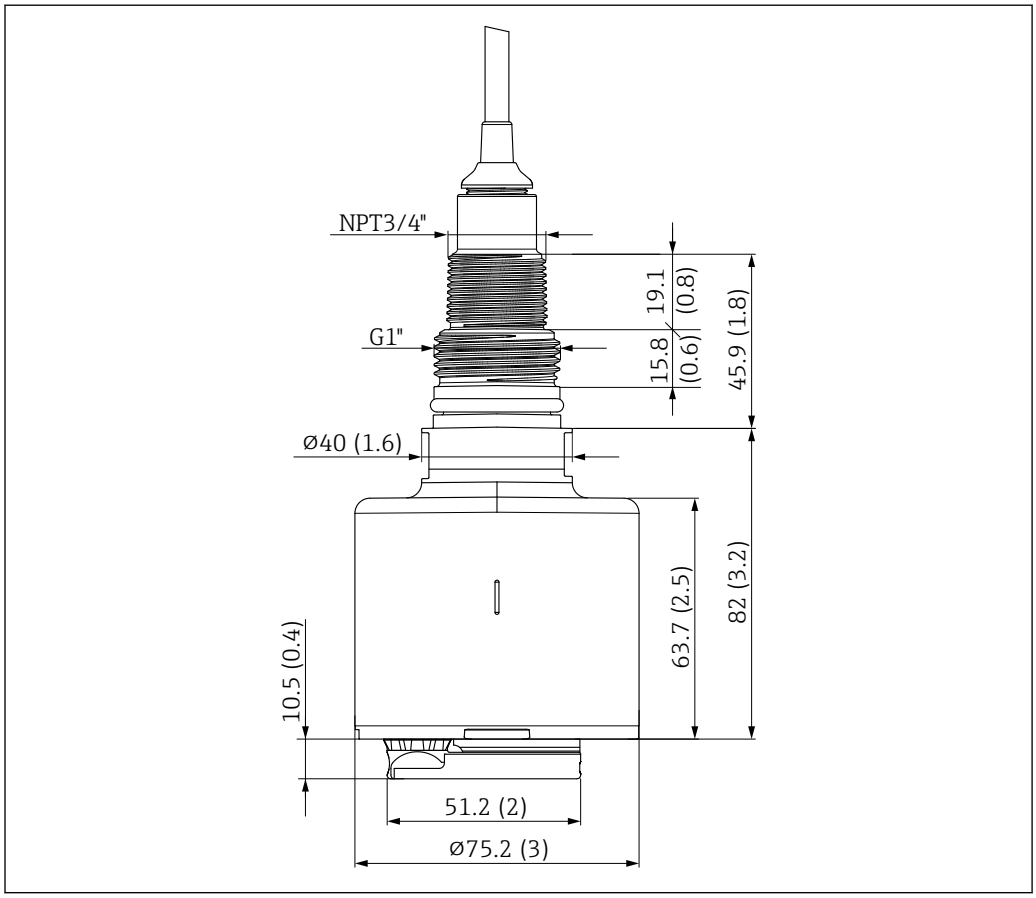
5 to 80 °C (41 to 176 °F)

Process pressure

0 to 1 bar (0 to 14.5 psi)

Mechanical construction

Dimensions



7 Dimensions. Unit: mm (in)

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)

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

Process connections

G1 and NPT ¾"

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**.

EAC

The product has been certified in accordance with the TR CU 020/2011 directive applicable in the Eurasian Economic Union (EAEU). The EAC conformity mark has been affixed to the product.

Device safety

- EN IEC 61010-1
- CAN/US General Purpose

Additional certifications and declarations

The following test certificates, attestations and declarations (e.g., certificates of conformity) are available for the product depending on the selected version:
Drinking Water Directive (EU) 2020/2184

Ordering information

Product page

www.endress.com/CUS71E

Product Configurator

On the product page there is a **Configure** button to the right of the product image.

1. Click this button.
   ↳ The Configurator opens in a separate window.
2. Select all the options to configure the device in line with your requirements.
   ↳ In this way, you receive a valid and complete order code for the device.
3. Export the order code as a PDF or Excel file. To do so, click the appropriate button on the right above the selection window.

For many products you also have the option of downloading CAD or 2D drawings of the selected product version. Click the **CAD** tab for this and select the desired file type using picklists.

Scope of delivery

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

Accessories

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

► For accessories not listed here, please contact your Service or Sales Center.

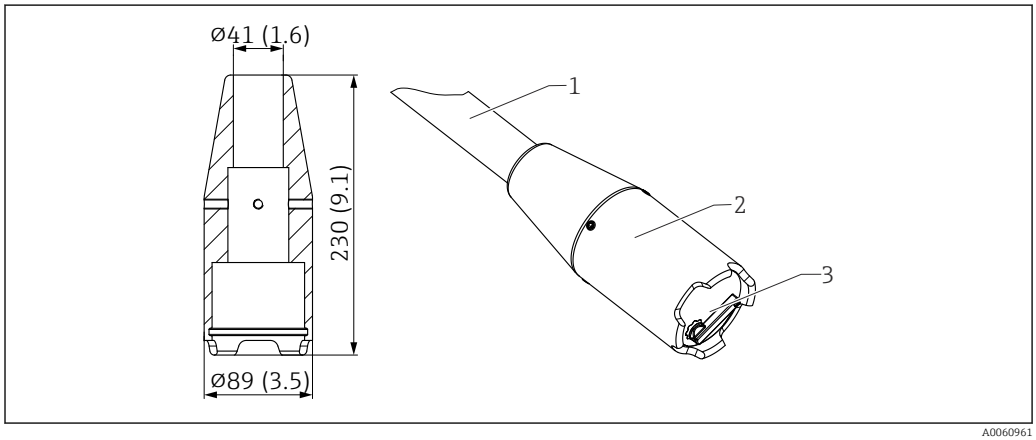
Device-specific accessories

Assemblies

FlexdipCYA112
- 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



8 *Sensor protectorUnit: mm (in)*

1 Assembly
2 Sensor protector
3 Sensor

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 capstone, 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

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

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