

Technical Information

Memosens CCS58E

Digital sensor with Memosens technology for determining ozone



Application

Memosens CCS58E is an ozone sensor for skid builders and end customers. It measures reliably in:

- Wastewater - to guarantee safe discharge
- Drinking water - to ensure sufficient disinfection
- Process water - to provide hygienic packaging and bottling

Your benefits

- The robust membrane technology guarantees high surfactant resistance and optimum suitability for cleaning processes such as bottle cleaning.
- Highest specificity for ozone ensures reliable measured values for safe disinfection processes.
- Heartbeat Technology offers advanced capabilities, such as the electrolyte counter for predictive maintenance intervals.
- Fast commissioning is ensured by factory calibration and plug-and-play installation of the sensor.
- Convenient combination with other relevant liquid analysis parameters, such as pH and ORP, by connection to the Liquiline multi-parameter transmitter.

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Function and system design

Measuring principle

Ozone levels are determined in accordance with the amperometric measuring principle.

The ozone (O₃) contained in the medium diffuses through the sensor membrane and is reduced to hydroxide ions (OH⁻) at the working electrode. At the counter electrode, silver is oxidized to silver bromide. Electron donation at the working electrode and electron acceptance at the counter electrode causes a current to flow which is proportional to the concentration of ozone in the medium. This process does not depend on the pH value over a wide range.

The transmitter uses the current signal to calculate the measured variable for concentration in mg/l (ppm).

Operating principle

The sensor consists of:

- Membrane cap (measuring chamber with membrane)
- Sensor shaft with counter-electrode with large surface area and a working electrode embedded in plastic

The electrodes are in an electrolyte which is separated from the medium by a membrane. The membrane prevents the electrolyte from leaking and protects against contaminant penetration.

The measuring system is calibrated by means of a colorimetric comparison measurement in accordance with the DPD method for ozone. The calibration value determined is entered in the transmitter.

Cross-sensitivity

- There are no cross-sensitivities for: free chlorine, free bromine, total chlorine, total bromine, hydrogen peroxide, peracetic acid.
- There is minimum cross-sensitivity to chlorine dioxide.



All photometric tests demonstrate a cross-sensitivity to oxidizing substances and can therefore falsify the reference value.

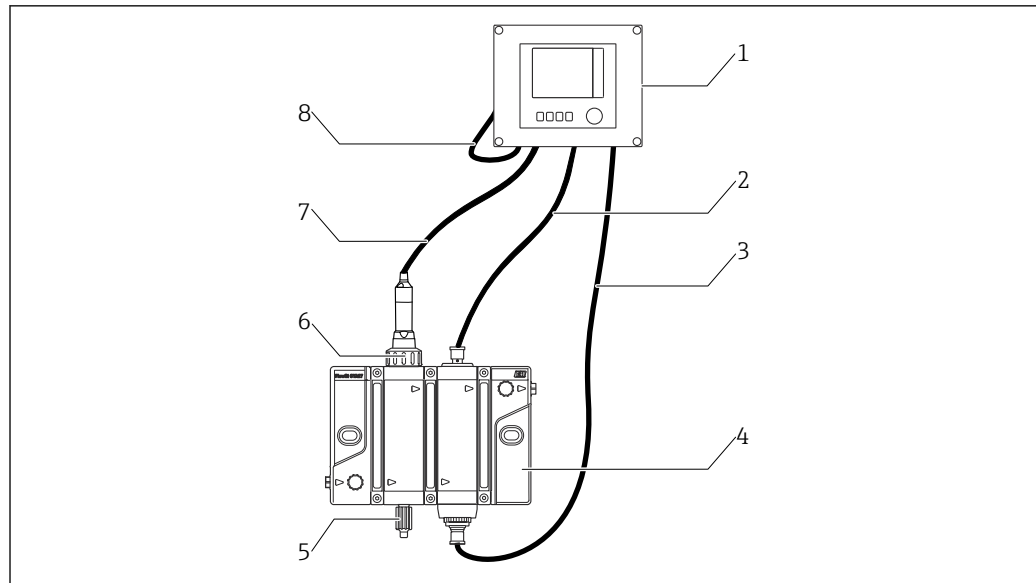


Surfactants do not affect the measuring performance.

Measuring system

A complete measuring system comprises:

- Disinfection sensor CCS58E (membrane-covered, Ø25 mm) with appropriate mounting adapter
- Flowfit CYA27 flow assembly
- Measuring cable CYK10, CYK20
- Transmitter, e.g. Liquiline CM44x with firmware 01.13.00 or higher or CM44xR with firmware 01.13.00 or higher
- Optional: extension cable CYK11
- Optional: proximity switch
- Optional: Flexdip CYA112 immersion assembly
- Optional: pH sensor CPS31E



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1 Example of a measuring system

- 1 Transmitter Liquiline CM44x or CM44xR
- 2 Cable for inductive switch
- 3 Cable for status lighting on assembly
- 4 Flowfit CYA27 flow assembly
- 5 Sampling valve
- 6 Disinfection sensor Memosens CCS58E (membrane-covered, $\varnothing 25$ mm)
- 7 Measuring cable CYK10
- 8 Power supply cable Liquiline CM44x or CM44xR

Dependability

Reliability

Memosens

Memosens makes your measuring point safer and more reliable:

- Non-contact, digital signal transmission enables optimum galvanic isolation
- Dust- and waterproof (IP 68)
- Sensor can be calibrated in a lab, thus increasing the availability of the measuring point in the process
- Intrinsically safe electronics mean operation in hazardous areas is not a problem.
- Predictive maintenance thanks to recording of sensor data, e.g.:
 - Total hours of operation
 - Hours of operation with very high or very low measured values
 - Hours of operation at high temperatures
 - Calibration history

Maintainability

Easy handling

Sensors with Memosens technology have integrated electronics that store calibration data and other information (e.g. total operating hours or operating hours under extreme measuring conditions). Once the sensor has been connected, the sensor data are transferred automatically to the transmitter and used to calculate the current measured value. As the calibration data are stored in the sensor, the sensor can be calibrated and adjusted independently of the measuring point. The result:

- Easy calibration in the measuring lab under optimum external conditions increases the quality of the calibration.
- Pre-calibrated sensors can be replaced quickly and easily, resulting in a dramatic increase in the availability of the measuring point.
- The availability of sensor data means that maintenance intervals can be accurately defined and predictive maintenance is possible.
- The sensor history can be documented with external storage media and evaluation programs.
- The application range of the sensor can be determined based on its previous history.


Safety

Data security thanks to digital data transmission

Memosens technology digitizes the measured values in the sensor and transmits the data to the transmitter via a non-contact connection that is free from potential interference. The result:

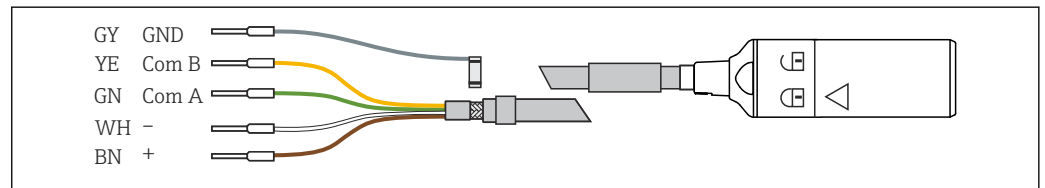
- Automatic error message if sensor fails or connection between sensor and transmitter is interrupted
- Immediate error detection increases measuring point availability


Input

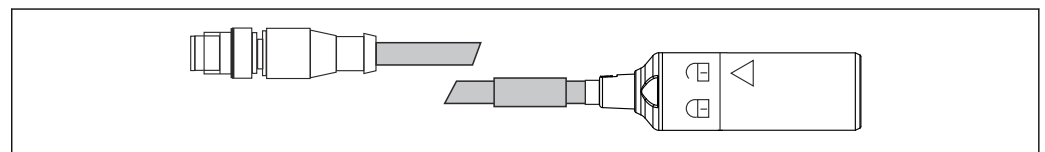
Measured variables	Ozone	[mg/l, µg/l, ppm, ppb]
	Temperature	[°C, °F]
Measuring range	0 to 2 mg/l (ppm)	
	 The sensor is not suitable for checking the absence of ozone.	
Signal current	135 to 340 nA per 1 mg/l (ppm) O ₃	


Power supply

Electrical connection is electrically connected to the transmitter is performed via the Memosens data cable CYK10 or CYK20 measuring cable.



 2 *Measuring cable CYK10*



 3 *CYK10 with M12 plug, electrical connection*

Performance characteristics

Reference operating conditions	Temperature	15 °C (59 °F) ±2 °C (±3.6 °F)
	pH value	pH 7.2 ±0.2
	Flow	140 cm/s (4.6 ft/s) ±5 cm/s (±0.16 ft/s)
	Sample water	Drinking water
Response time	T ₉₀ < 8 min (440 s) (under reference operating conditions)	
Polarization time	Initial commissioning	60 min
	Recommissioning	20 min

Measured value resolution of sensor	At most, the smallest possible measured value resolution under reference conditions is 0.05 % of the measured value above the limit of quantification (LOQ).	
Measurement error	±2 % and ±5 µg/l (ppb) of value measured (depending on which value is higher)	
	LOD (limit of detection) ¹⁾ 0.018 mg/l (ppm)	LOQ (limit of quantification) 0.061 mg/l (ppm)
	1) Based on ISO 15839. The measured error includes all the uncertainties of the sensor and transmitter (electrode system). It does not contain all the uncertainties caused by the reference material and adjustments that may have been performed.	
Repeatability	CCS58E-***31AC	0.055 mg/l (ppm)
Nominal slope	226 nA per 1 mg/l	
Long-term drift	1 % per month	
Operating time of the electrolyte	3 to 6 months	
	Operating time of membrane cap	
	With electrolyte	Cap replacement once per year
	Without electrolyte	Can be stored for unlimited period at 5 to 40 °C (41 to 104 °F)
Intrinsic consumption	The intrinsic consumption of ozone at the sensor is negligible.	

Installation

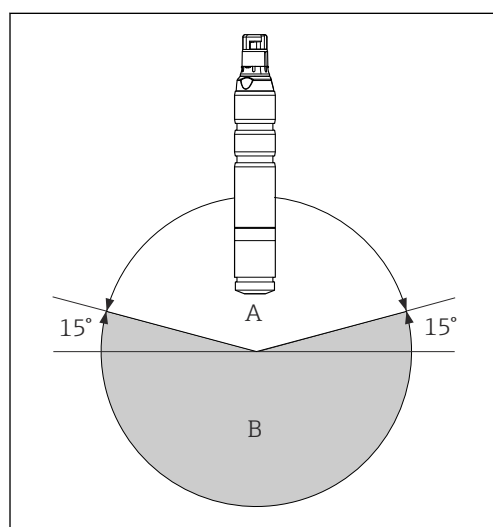
Orientation

NOTICE

Do not install upside-down!

Incorrect sensor functionality as electrolyte film is not guaranteed at the working electrode.

- ▶ Install the sensor in an assembly, support or appropriate process connection at an angle of at least 15 ° to the horizontal.
- ▶ Other angles of inclination are not permitted.
- ▶ Follow the instructions for installing the sensor in the Operating Instructions of the assembly used.



A Permitted orientation
B Incorrect orientation

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Immersion depth At least 55 mm (2.17 in).

This corresponds to the mark (▼) on the sensor.

Installation instructions

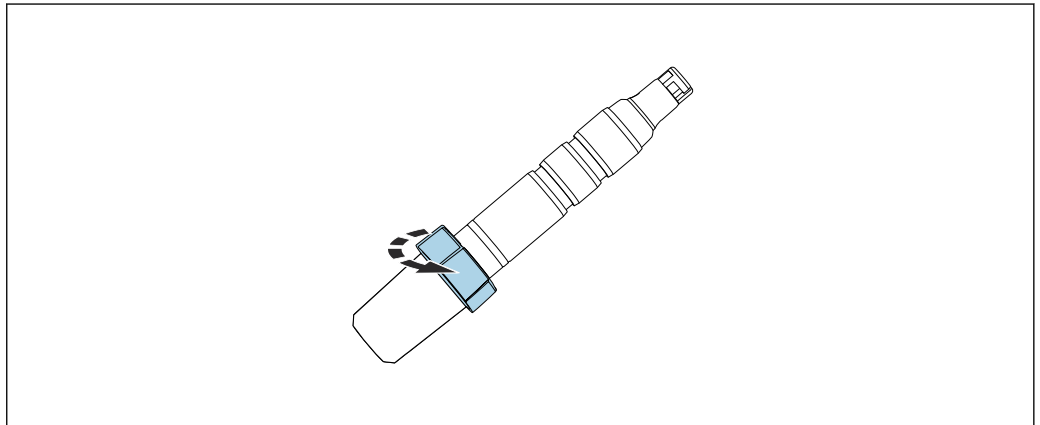
Preparing the sensor

Removing protection cap from sensor

NOTICE

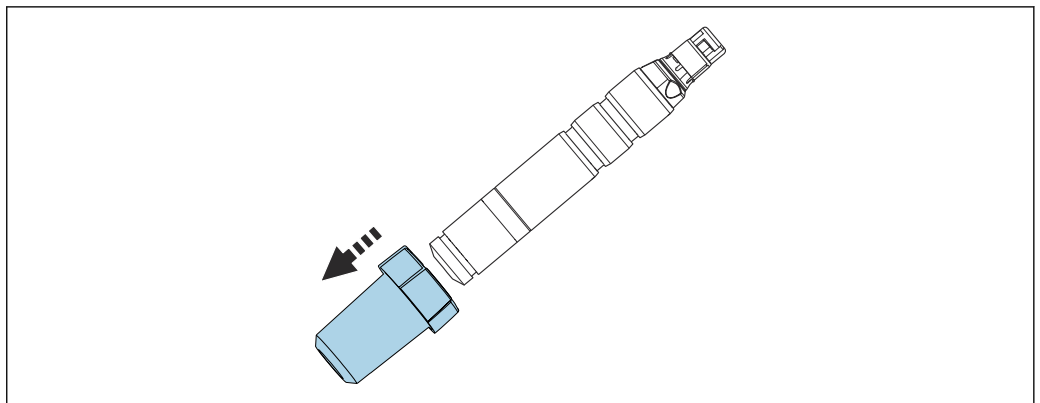
Negative pressure causes damage to the sensor's membrane cap

- ▶ When supplied to the customer and when in storage, the sensor is fitted with a protection cap.
- ▶ Release the top part of the protection cap by turning it.



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- ▶ Carefully remove protection cap from sensor.



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Filling the membrane cap with electrolyte

i Please note the information on the safety data sheet to ensure safe use of the electrolyte.

NOTICE

Damage to membrane and electrodes, air bubbles

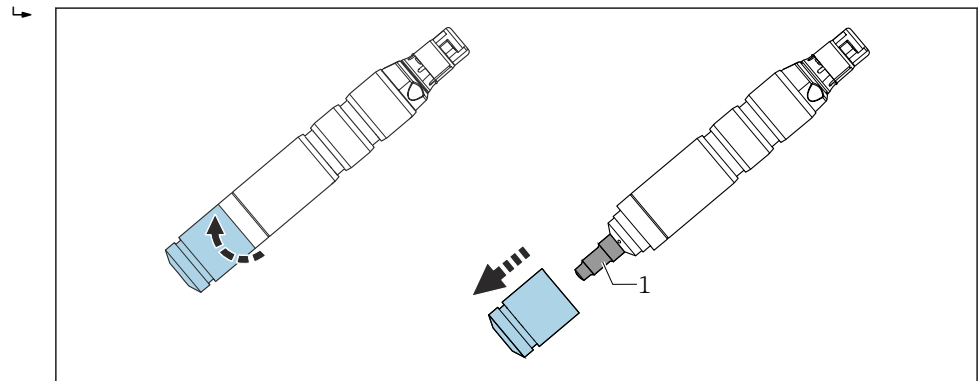
Possibility of measured errors to complete failure of the measuring point

- ▶ Avoid damage to membrane and electrodes.
- ▶ The electrolyte is chemically neutral and is not hazardous to health. Do not swallow it and avoid contact with eyes.
- ▶ Keep the electrolyte bottle closed after use. Do not transfer electrolyte to other vessels.
- ▶ Observe the use-by date on the label.
- ▶ Avoid air bubbles when pouring electrolyte into membrane cap.
- ▶ The membrane cap can be reused several times if only the electrolyte is being replaced. However, repeated installation puts considerable strain on the membrane.

Fill membrane cap with electrolyte

i The sensor is dry when delivered from the factory. Before using the sensor, fill the membrane cap with electrolyte.

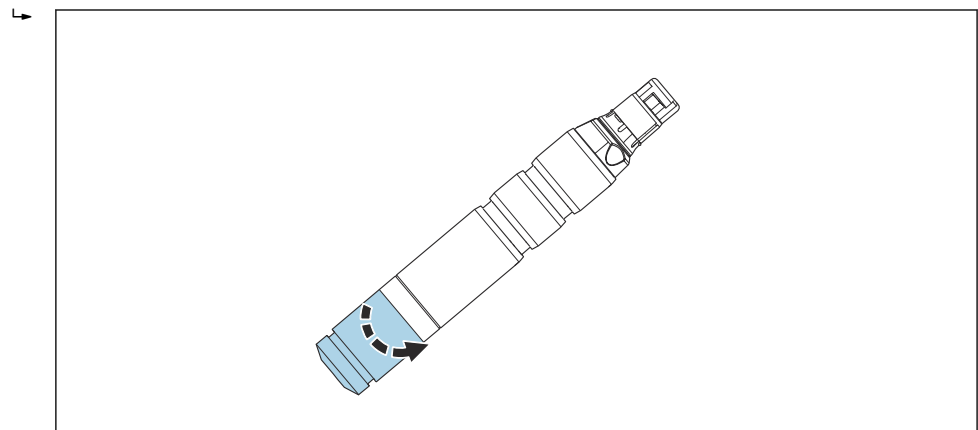
1. Carefully rotate membrane cap and remove.



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1 Electrode body

2. Fill approx. 7 ml (0.24 fl oz) of electrolyte into the membrane cap until it is level with the start of the internal thread.
3. Slowly screw on the membrane cap as far as the end stop. While tightening, excess electrolyte is forced out at the thread.



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4. If necessary, pat the sensor and membrane cap dry using a cloth.
5. Reset operating hours counter for electrolyte on transmitter under **Menu/Calibration/ <Sensor disinfection>/Disinfection/Change electrolyte or Change sensor cap and electrolyte/Save**

Installing the sensor in the Flowfit CYA27 assembly

The sensor can be installed in the Flowfit CYA27 flow assembly. In addition to the installation of the ozone sensor, this assembly also enables the simultaneous operation of several other sensors and flow monitoring.

i If several modules are used, install the Memosens CCS58D Memosens CCS58E sensor in the first module after the inlet module for the best possible flow conditions.

Please note the following during installation:

- ▶ Guarantee the minimum flow to the sensor (29 cm/s (1.0 ft/s) and the minimum volume flow of the assembly (5 l/h or 30 l/h).
- ▶ If the medium is fed back into an overflow basin, pipe or similar, the resulting counterpressure on the sensor may not exceed 1 bar relativ (14.5 psi relativ) (2 bar abs. (29 psi abs.)) and must remain constant.
- ▶ Avoid negative pressure at the sensor, e.g. due to medium being returned to the suction side of a pump.
- ▶ To avoid buildup, heavily contaminated water should also be filtered.

Installing the sensor in flow assemblies

When using other flow assembly, ensure:

- ▶ A minimum flow velocity of 29 cm/s (1.0 ft/s) must be ensured at the membrane.
- ▶ The flow direction is upwards. Transported air bubbles must be removed so that they do not collect in front of the membrane.
- ▶ The membrane must be exposed to direct flow.
- ▶ Observe the minimum immersion depth.

Installing the sensor in the CYA112 immersion assembly


Alternatively, the sensor can be installed in an immersion assembly with a G1" threaded connection.

 Additional installation instructions can be found in the Operating Instructions for the assembly: www.endress.com/cya112

Environment

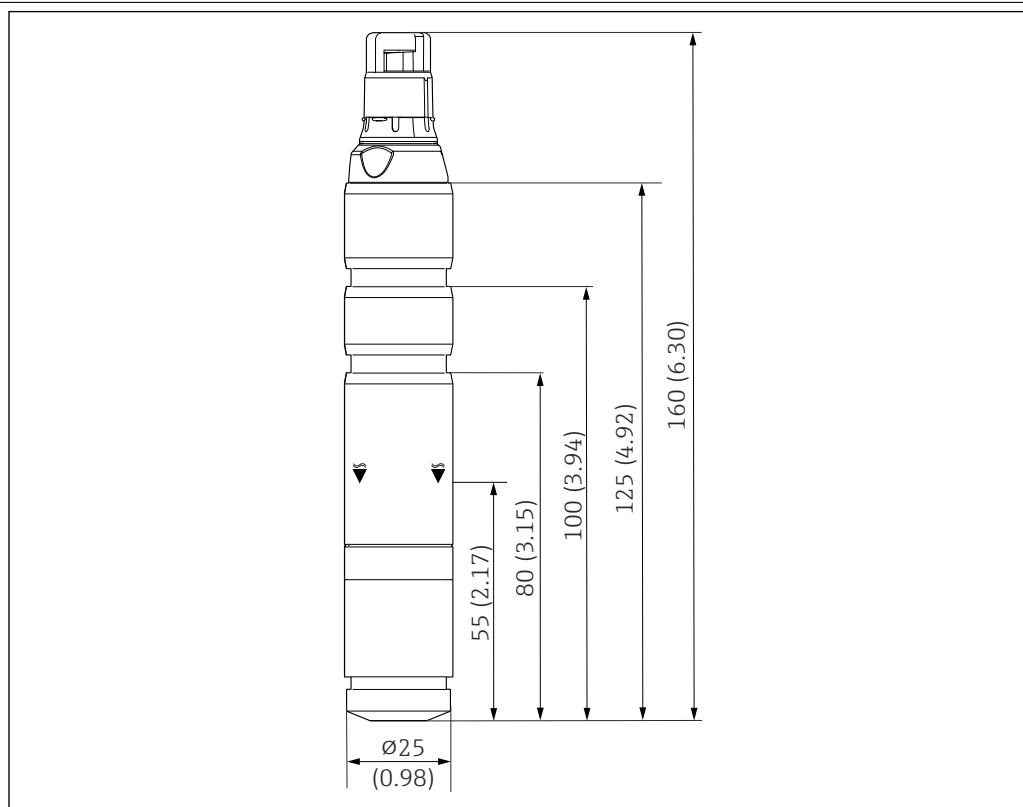
Ambient temperature	0 to 55 °C (32 to 131 °F)	
Storage temperature	Without membrane cap and electrolyte	0 to 55 °C (32 to 131 °F)
Degree of protection	IP68 (1.8 m (5.91 ft)) water column over 7 days at 20 °C (68 °F)	

Process

Process temperature	0 to 45 °C (32 to 110 °F), non-freezing	
Pressure	1 bar relativ (14.5 psi relativ) (2 bar abs. (29 psi abs.)), no pressure shocks or vibrations	
pH range	Calibration	pH 4 to 8
	Measurement	pH 4 to 9 ¹⁾
	Material resistance	pH 2 to 11
	As of pH values > 9 ozone is unstable and decomposes.	
	1) At pH 4 and in the presence of chloride ions (Cl ⁻), Cl ₂ is produced, which is also measured by the reference test.	
Conductivity	0.03 to 40 mS/cm	
	The sensor can also be used in media with a very low conductivity, such as demineralized water.	
	 If the salt content is high, iodine and bromine can occur; this affects the reference value.	
Flow	At least 7 l/h (1.8 gal/h), in the Flowfit CYA27 flow assembly (5 l version)	
	At least 30 l/h (7.9 gal/h), in the Flowfit CYA27 flow assembly (30 l version)	
Flow	At least 29 cm/s (1.0 ft/s)	

Mechanical construction

Dimensions



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4 Dimensions in mm (in)

Weight		
	Membrane cap	14.45 g (0.5 oz)
Sensor, total	93.45 g (3.3 oz)	

Materials		
	Membrane cap sleeve	PVC
	Sensor shaft	PVC
	Membrane	Plastic film
	Membrane holder	Stainless steel 1.4571
	Electrode body	PEEK
Sealing ring	Silicone rubber	

Cable specification max. 100 m (330 ft), incl. Cable extension


Certificates and approvals

Current certificates and approvals for the product are available via the Product Configurator at www.endress.com.

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

The **Configuration** button opens the Product Configurator.

Ordering information



Product page	www.endress.com/ccs58e
Product Configurator	<p>Detailed ordering information is available from your nearest sales organization www.addresses.endress.com or in the Product Configurator at www.endress.com:</p> <ol style="list-style-type: none"> 1. Select the product using the filters and search field. 2. Open the product page. 3. Select Configuration. <p> Product Configurator - the tool for individual product configuration</p> <ul style="list-style-type: none"> ▪ Up-to-the-minute configuration data ▪ Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language ▪ Automatic verification of exclusion criteria ▪ Automatic creation of the order code and its breakdown in PDF or Excel output format ▪ Ability to order directly in the Endress+Hauser Online Shop
Scope of delivery	<p>The scope of delivery comprises:</p> <ul style="list-style-type: none"> ▪ Disinfection sensor (membrane-covered, Ø25 mm) with protection cap ▪ Bottle with electrolyte (100 ml (3.38 fl oz)) ▪ Emery paper ▪ Operating Instructions ▪ Manufacturer's certificate

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.

Maintenance kit CCV05	<p>Order according to product structure</p> <ul style="list-style-type: none"> ▪ 1 x membrane cap, 1 x electrolyte 100 ml (3.38 fl oz), 1 x emery paper, 2 x O-ring, silicone ▪ 1 x electrolyte 100 ml (3.38 fl oz)
Device-specific accessories	<p>Memosens data cable CYK10</p> <ul style="list-style-type: none"> ▪ For digital sensors with Memosens technology ▪ Product Configurator on the product page: www.endress.com/cyk10 <p> Technical Information TI00118C</p> <p>Memosens laboratory cable CYK20</p> <ul style="list-style-type: none"> ▪ For digital sensors with Memosens technology ▪ Product Configurator on the product page: www.endress.com/cyk20 <p>Flowfit CYA27</p> <ul style="list-style-type: none"> ▪ Modular flow assembly for multiparameter measurements ▪ Product Configurator on the product page: www.endress.com/cya27 <p> Technical Information TI01559C</p>

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

Photometer PF-3

- Compact hand-held photometer for determining the reference measured value
- Color-coded reagent bottles with clear dosing instructions
- Order No.: 71257946

Adapter kit CCS5x(D/E) for CYA27

- Clamping ring
- Thrust collar
- O-ring
- Order No. 71372027

Adapter kit CCS5x(D/E) for CYA112

- Adapter incl. O-rings
- 2 studs for locking in place
- Order No. 71372026

Complete quick fastener kit for CYA112

- Adapter, inner and outer parts incl. O-rings
- Tool for mounting and disassembly
- Order No. 71093377 or mounted accessory of CYA112

COY8

Zero-point gel for oxygen and disinfection sensors

- Disinfectant-free gel for the verification, zero point calibration and adjustment of oxygen and disinfection measuring points
- Product Configurator on the product page: www.endress.com/coy8



Technical Information TI01244C



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www.addresses.endress.com