



Technical Information

Memosens CCS58D

Digital sensor with Memosens technology for determining ozone



Application

Memosens CCS58D is an ozone sensor for skid manufacturers and end customers. It measures reliably in:

- Drinking water - ensures adequate disinfection
- Process water - for hygienic packaging and bottling
- Wastewater - to ensure safe wastewater

Your benefits

- The almost exclusive specificity for ozone ensures reliable measured values for safe disinfection processes.
- The robust membrane technology guarantees high surfactant resistance and optimum suitability for cleaning processes such as bottle cleaning.
- Integrated Heartbeat Technology offers an electrolyte counter, for example, for predictive, application-specific maintenance intervals.
- Can be easily combined with other relevant liquid analysis parameters, such as pH and ORP, by connecting to the Liquiline multi-parameter transmitter.
- Fast commissioning ensured thanks to factory calibration and sensor plug & play installation.

Other advantages provided by Memosens technology

- Maximum process safety
- Data security thanks to digital data transmission
- Very easy to use as sensor data are saved in the sensor
- Predictive maintenance can be performed by recording sensor load data in the sensor

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Function and system design

Measuring principle

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

The ozone (O_3) 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).

Mode of operation

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-sensitivities ¹⁾

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.

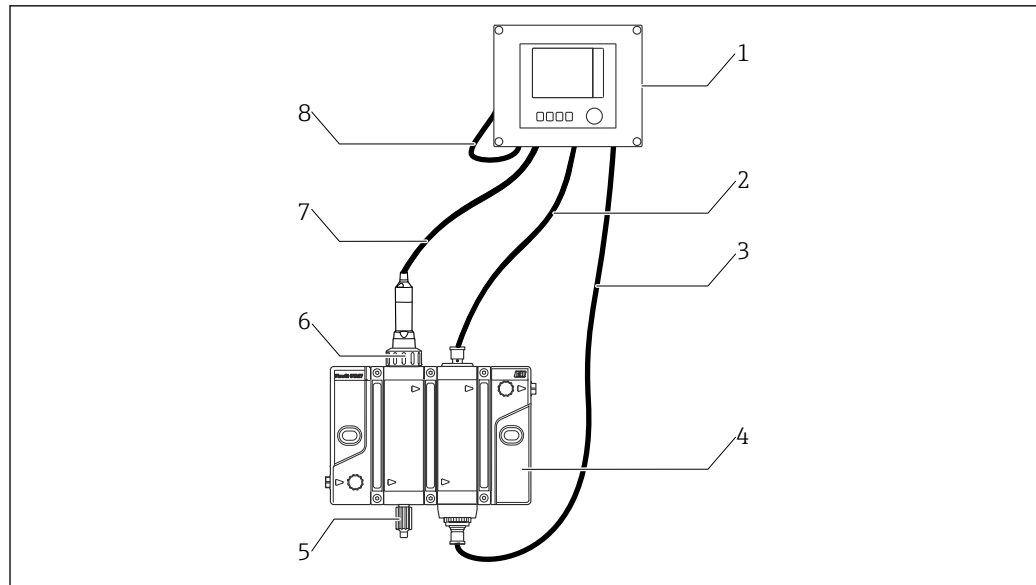
 Surfactants do not affect the measuring performance.

Measuring system

A complete measuring system comprises:

- Disinfection sensor Memosens CCS58D (membrane-covered, Ø25 mm) with corresponding installation adapter
- Flow assembly e.g. Flowfit CYA27
- Measuring cable CYK10, CYK20
- Transmitter, e.g. Liquiline CM44x with firmware 01.08.00 or higher or CM44xR with firmware 01.08.00 or higher
- Optional: extension cable CYK11
- Optional: proximity switch

1) The listed substances have been tested individually and with different concentrations. A reaction to mixtures was not investigated.



A0044943

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 Flow assembly, e.g. Flowfit CYA27
- 5 Sampling valve
- 6 Disinfection sensor Memosens CCS58D (membrane-covered, Ø25 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 hours of operation 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.
- Thanks to the availability of the sensor data, maintenance intervals can be accurately defined and predictive maintenance is possible.
- The sensor history can be documented with external data carriers and evaluation programs.
- Thus, the current application of the sensors can be made to depend on their 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:

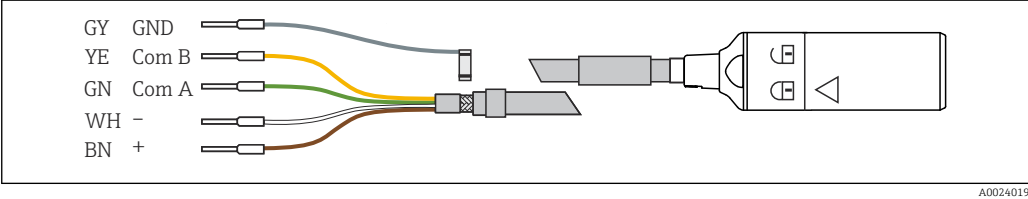
- Automatic error message if sensor fails or connection between sensor and transmitter is interrupted
- Immediate error detection increases measuring point availability

Input

Measured values	Ozone Temperature	[mg/l, µg/l, ppm, ppb] [°C, °F]
Measuring range	0.1 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	

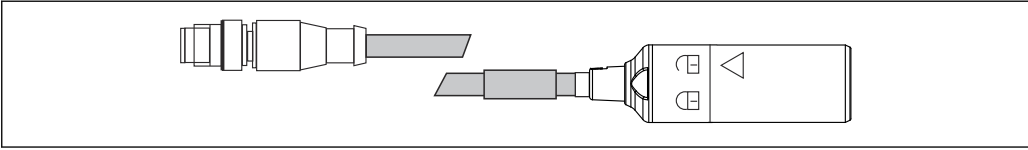
Power supply

Electrical connection The electrical connection to the transmitter is established using the measuring cable CYK10 or CYK20.



2 Measuring cable CYK10 /CYK20

- To extend the cable, use measuring cable CYK11. The maximum cable length is 100 m (328 ft).



3 CYK10 with M12 plug, electrical connection

Performance characteristics

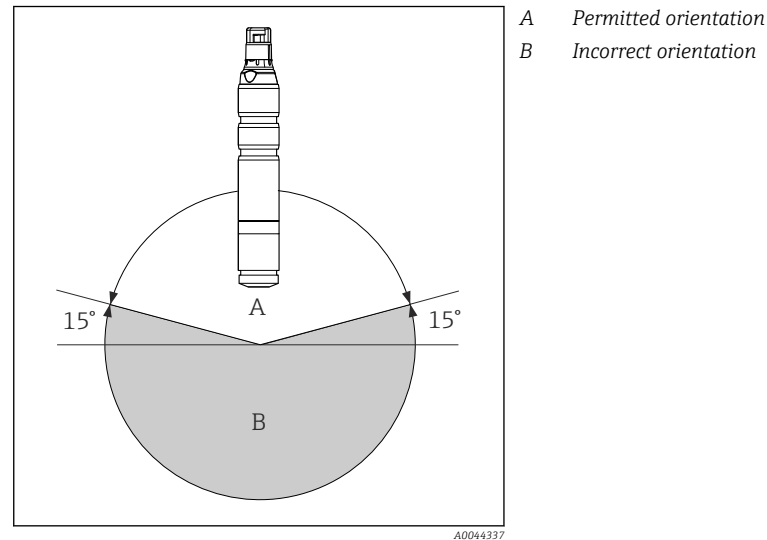
Reference operating conditions	Temperature	15 °C (59 °F) ± 2 °C (± 3.6 °F)
	pH value	pH 7.2 ± 0.2
	Flow	140 cm/s (4.6 ft/s) ± 5 cm/s (± 0.16 ft/s)
	Sample water	Drinking water
Response time	$T_{90} < 8$ min (440 s) (under reference operating conditions)	
Measured value resolution of sensor	At most, the smallest possible measured value resolution under reference conditions is 0.05 % of the measured value above the limit of quantification (LOQ).	
Maximum measured error	± 2 % and ± 5 µg/l (ppb) of value measured (depending on which value is higher)	
	LOD (limit of detection) ¹⁾	LOQ (limit of quantification)
	0.018 mg/l (ppm)	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	0.055 mg/l (ppm)	
Nominal slope	226 nA per 1 mg/l	
Long-term drift	1 % per month	
Polarization time	Initial commissioning	120 min
	Recommissioning	30 min
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)
Ozone intrinsic consumption	The intrinsic consumption of ozone at the sensor is negligible.	

Installation

Orientation

Do not install upside-down!

- ▶ 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.



4 Orientation

Immersion depth

At least 55 mm (2.17 in). This corresponds to the mark (▼) on the sensor.

Installation instructions

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 also allows the simultaneous operation of multiple other sensors and flow monitoring.

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

Please note the following during installation:

- ▶ Ensure 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 must 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.

Installation in other flow assemblies

When using other flow assemblies, please ensure the following:

- ▶ A flow velocity of at least 29 cm/s (1.0 ft/s) must always 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 flow must be directed to the membrane.
- ▶ Observe the minimum immersion depth.

Installing the sensor in immersion assembly CYA112

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

i For detailed information on "Installing sensor in Flexdip CYA112 assembly", see Operating Instructions for assembly

Environment

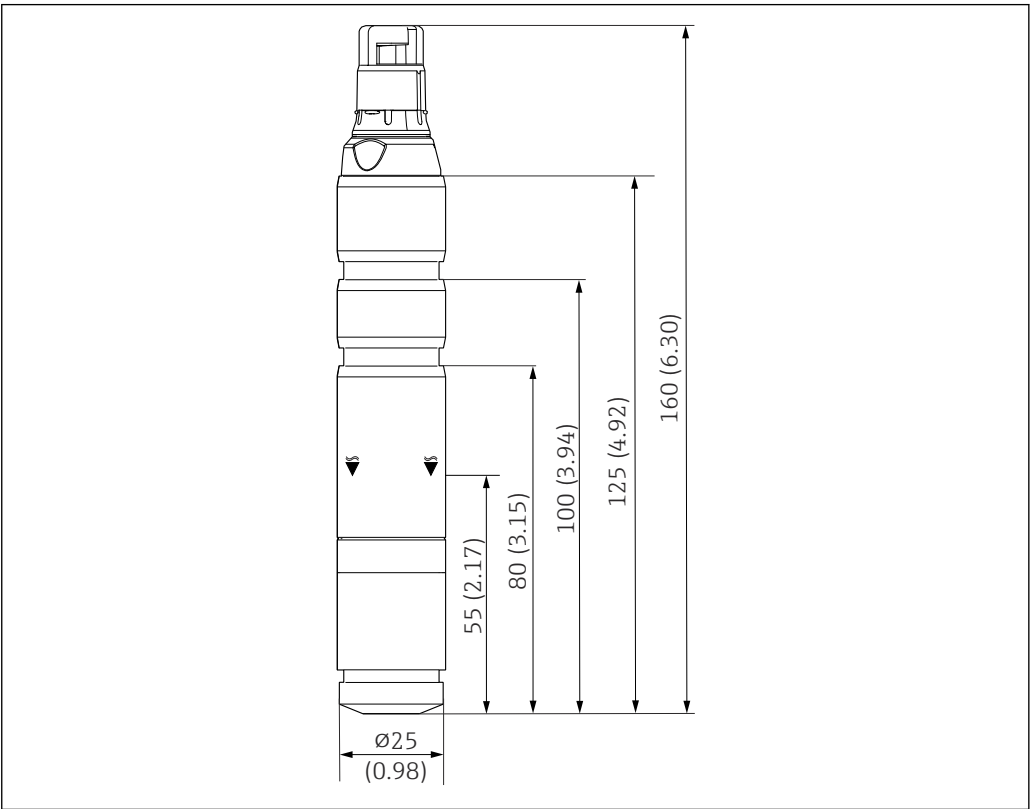
Ambient temperature range	0 to 55 °C (32 to 131 °F)	
Storage temperature	Without the membrane cap and electrolyte	0 to 55 °C (32 to 131 °F)
Degree of protection	IP68	

Process

Process temperature	0 to 45 °C (32 to 110 °F), non-freezing	
Process pressure	1 bar relativ (14.5 psi relativ) (2 bar abs. (29 psi abs.)), no pressure shocks or vibrations	
pH range	Calibration Measurement Material resistance As of pH values > 9 ozone is unstable and decomposes. 1) At pH 4 and in the presence of chloride ions (Cl ⁻), free chlorine is produced, which is also measured by the reference test.	pH 4 to 8 pH 4 to 9 ¹⁾ pH 2 to 11
Conductivity	0.03 to 40 mS/cm  If the salt content is high, iodine and bromine can occur; this affects the reference value. The sensor can also be used in media with a very low conductivity, such as demineralized water.	
Flow	At least 7 l/h (1.8 gal/h), in the Flowfit CYA27 (5 l version) and Flowfit CCA151 flow assembly At least 30 l/h (7.9 gal/h), in the Flowfit CYA27 (30 l version) flow assembly At least 45 l/h (11.9 gal/h), in the Flowfit CCA250 flow assembly	
Minimum flow	At least 29 cm/s (1.0 ft/s)	

Mechanical construction

Dimensions



5 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

Cable specification

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

Certificates and approvals

CE mark

Declaration of conformity

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EU directives. The manufacturer confirms successful testing of the product by affixing to it the CE mark.

Ex approvals ²⁾**cCSAus NI Cl. I, Div. 2**

This product complies with the requirements defined in:

- UL 61010-1
- ANSI/ISA 12.12.01
- FM 3600
- FM 3611
- CSA C22.2 NO. 61010-1-12
- CSA C22.2 NO. 213-16
- Control drawing: 401204

Ordering information

Product page

www.endress.com/ccs58d

Product Configurator

Detailed ordering information is available for your nearest sales organization

www.addresses.endress.com or in the Product Configurator under www.endress.com:

1. Click **Corporate**
2. Select the country
3. Click **Products**
4. Select the product using the filters and search field
5. Open the product page

The **Configuration** button to the right of the product image opens the Product Configurator.

**Product Configurator - the tool for individual product configuration**

- 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

The scope of delivery comprises:

- 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

2) Only if connected to CM44x(R)-CD*

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.

Maintenance kit CCV05

Order according to product structure

- 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

Memosens data cable CYK10

- For digital sensors with Memosens technology
- Product Configurator on the product page: www.endress.com/cyk10



Technical Information TI00118C

Memosens laboratory cable CYK20

- For digital sensors with Memosens technology
- Product Configurator on the product page: www.endress.com/cyk20

Flowfit CYA27

- Modular flow assembly for multiparameter measurements
- Product Configurator on the product page: www.endress.com/cya27



Technical Information TI01559C

Flowfit CCA151

- Flow assembly for disinfection sensors
- Product Configurator on the product page: www.endress.com/cca151



Technical Information TI01357C

Flowfit CCA250

- Flow assembly for disinfection and pH/ORP sensors
- Product Configurator on the product page: www.endress.com/cca250



Technical Information TI00062C

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) for CYA27 and CCA151

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

Adapter kit CCS5x(D) for CCA250

- Adapter incl. O-rings
- 2 studs for locking in place
- Order No. 71372025

Adapter kit CCS5x(D) 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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