Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Technical Information

CCS240 and CCS241

Sensors for chlorine dioxide
Amperometric, membrane-covered sensors for installation in the CCA250 assembly

Application

Chlorine dioxide is used for disinfection of water. Its dosing must be carefully controlled to suit the application. Too low a concentration makes the degree of disinfection questionable. Too high a concentration can result in corrosion effects, impairment of taste or skin irritation.
The CCS240 and CCS241 sensors are applied for measurement of chlorine dioxide in the following fields:

- Drinking water treatment
- Pool water treatment
- Industrial water treatment

Your benefits

- Measurement in the CCA250 flow assembly is almost independent of flow rate in the range above 30 l/h
- No zero point calibration necessary. This means complicated installation of an active carbon filter, as in open chlorine dioxide sensors, is not necessary.
- Measured values are not affected by conductivity fluctuation of the medium.
- The CCS240 sensor is ready for measurement after a polarisation time of approx. 10 ... 30 minutes. The CCS241 sensor requires 45 ... 90 min.
- Easy membrane replacement thanks to ready-made membrane head
- Recalibration intervals approx. 1 ... 4 months under constant operating conditions

TI00114C/07/EN/13.12
71189770

Endress+Hauser
People for Process Automation

Function and system design

Function

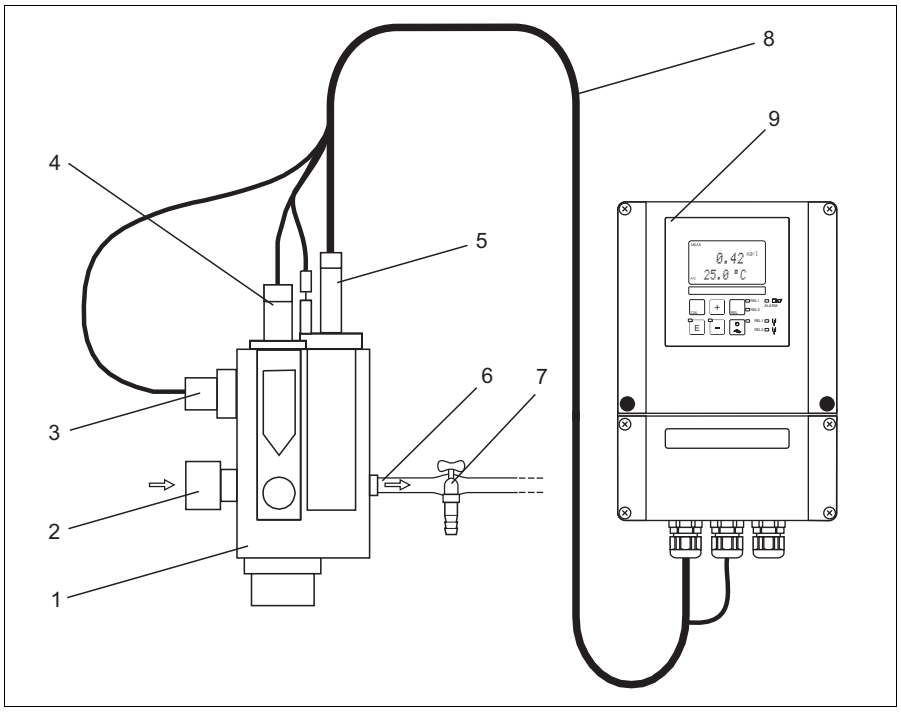
The CCS240 and CCS241 sensors are used for measurement of chlorine dioxide. The membrane-covered CCS240 / CCS241 sensors consist of a cathode serving as the working electrode and an anode acting as the counter electrode. These electrodes are immersed in an electrolyte. Electrodes and electrolyte are separated from the medium by a membrane. The membrane prevents the loss of electrolyte and the penetration of contaminants.
To calibrate the measuring system, determine the content of chlorine dioxide using the DPD method. You need a photometer with the pertaining reagents. The determined value is the calibration value for the transmitter.

Measuring principle

The concentration of chlorine dioxide is determined according to the amperometric measuring principle. The chlorine dioxide (ClO_2) contained in the medium diffuses through the sensor membrane and is reduced to chloride ions (Cl^-) on the gold cathode. On the silver anode, silver is oxidized to silver chloride. The electron release of the gold cathode and electron acceptance on the silver anode result in a current flow which is proportional to the chlorine dioxide concentration in the medium. This process takes place within a wide pH and temperature range.
The transmitter transforms the current signal into the measuring unit concentration in mg/l.

Measuring system

A complete measuring system comprises at least:
- Chlorine dioxide sensor
- Liquisys M CCM223/253 transmitter
- Special measuring cable
- Flow assembly
- Reference measuring instrument for determination of chlorine dioxide according to the DPD method



Measuring system in the flow mode (example)

1	*CCA250 flow assembly*	*6*	*Medium outlet*
2	*Medium inlet*	*7*	*Sampling tap*
3	*Inductive proximity switch for flow*	*8*	*Sensor cable*
4	*monitoring*	*9*	*Transmitter*
5	*Mounting places for pH/ORP sensors Chlorine dioxide sensor*		

Input

Measured variable

Chlorine dioxide (ClO_2)

Measuring range

CCS240 (for industrial water, pool water):	0.05 to 20 mg ClO_2/l
CCS241 (for drinking water applications):	0.01 to 5 mg ClO_2/l

Performance characteristics

Response time

T_{90} < 2 min
T_{99} < 5 min

Polarisation time

CCS240:

First polarization:	30 min
Repolarization:	10 min

CCS241:

First polarization:	90 min
Repolarization:	45 min

Drift

typically < 1.5 % per month

Electrolyte service life

typically 12 months

Installation

Installation instructions

The flow assembly CCA250 is designed for on-site installation of the sensor. In addition to the chlorine or chlorine dioxide sensor, a pH and an ORP sensor can be installed. A needle valve regulates the flow within the range of 30 to 120 l/h (7.9 to 31.7 US.gal/h).

When installing the sensor, note the following:

- The flow must be at least 30 l/h (7.9 US.gal/h).
  If the flow drops below this value or stops completely, this can be detected by an inductive proximity switch and an alarm signal plus locking of the dosage pumps can be triggered.
- If the medium is fed back into a surge tank, pipeline or the like, ensure that the thus generated back pressure on the sensor does not exceed 1 bar (14.5 psi) and remains constant.
- Negative pressure at the sensor, e.g. by feedback of medium to the suction side of a pump, must be avoided.

For further installation instructions, see the Operating Instructions of the flow assembly.

Environment

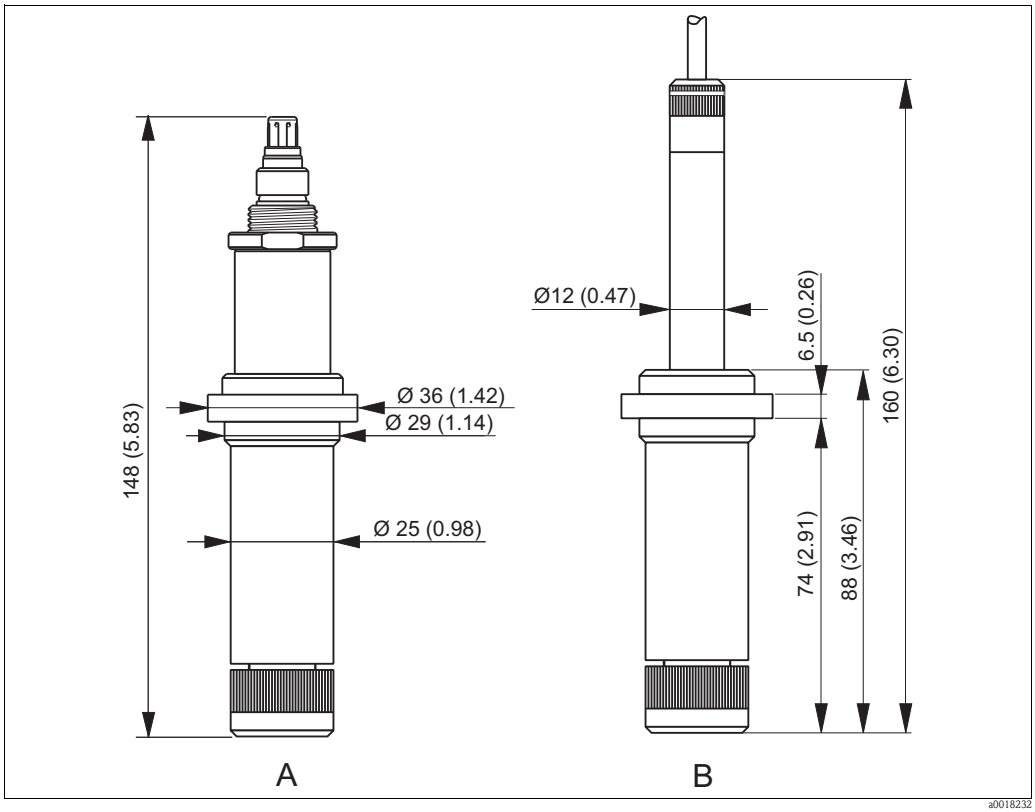
Storage temperature	Filled with electrolyte: 5 to 50 °C (41 to 122 °F) Without electrolyte: –20 to 60 °C (–4 to 140 °F)
Ingress protection	IP 68 (membrane side up to the mounting collar Ø 36 mm (Ø 1.42"))

Process

Temperature range	2 to 45 °C (36 to 113 °F)
pH range	in stability range of ClO_2 (typical application range pH 4 to 10)
Pressure	Medium in the CCA250 assembly: max. 1 bar (14.5 psi)
Flow	in the CCA250 assembly: min. 30 l/h (8 US.gal./h)
Flow velocity	min. 15 cm/s (0.5 ft/s)

Mechanical construction

Dimensions



Dimensions

A Version with TOP68 plug head
B Version with fixed cable

Weight	approx. 0.5 kg (1.1 lb.)
Material	Sensor shaft: PVC Membrane: PTFE Membrane cap: PBT (GF 30), PVDF Cathode: Gold Anode: Silver / silver chloride
Cable connection	Version with fixed cable (3 m (9.84 ft)), four cores, double-screened, low noise Version with TOP68: To be used with CPK9-N*A1B (* = length of cable)
Cable length	max. 30 m (98 ft) (cable extension included)
Temperature sensor	NTC, 10 kΩ at 25 °C (77 °F)

Ordering information

Order code

You can create a valid and complete order code using the Endress+Hauser Configurator tool on the Internet.

Enter the following address into your browser to access the relevant product page:
www.products.endress.com/ccs240 or
www.products.endress.com/ccs241

1. You can choose from the following options on the product page located on the right:

Product page function
:: Add to product list
:: Price & order information
:: Compare this product
:: Configure this product

2. Click "Configure this product".
3. The configurator opens in a separate window. You can now configure your device and receive the complete order code that applies for the device.
4. Afterwards, export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the page.

Product structure CCS240

The following product structure represents the status of printing. You can create a complete and valid order code on the Internet using the configurator tool.

	Version	
	N	with NTC temperature sensor, 3 m cable
	P	plug TOP68, with NTC temperature sensor
CCS240-		complete order code

Product structure CCS241

The following product structure represents the status of printing. You can create a complete and valid order code on the Internet using the configurator tool.

	Version	
	N	with NTC temperature sensor, 3 m cable
	P	plug TOP68, with NTC temperature sensor
CCS241-		complete order code

Scope of delivery

The scope of delivery comprises:
- 1 chlorine dioxide sensor
- 1 bottle filled with electrolyte (50 ml)
- 1 cap for protection and storage
- 1 replacement cartridge with pretensioned membrane
- Operating Instructions, English

Accessories

Installation accessories

Flowfit CCA250
- Flow assembly for chlorine, chlorine dioxide, pH and ORP sensors
- Ordering acc. to product structure (–> online Configurator, www.products.endress.com/cca250)
- Technical Information TI062C/07/EN

Compact measuring station CCE10/CCE11
- Panel mounted ready for connection for holding one transmitter, with flow assembly CCA250
- Ordering acc. to product structure, s. Technical Information TI440C/07/EN

Connection accessories

Junction box VBC
- Metallic junction box for cable extension,
- Dimensions (W x D x H): 125 x 80 x 54 mm / 4.92 x 3.15 x 2.13 inches
- Order no. 50005181

CYK71 measuring cable
- Non-terminated cable for the connection of sensors (e.g. conductivity sensors) or the extension of sensor cables
- Sold by the meter, order numbers:
  - non-Ex version, black: 50085333
  - Ex version, blue: 51506616

CPK9 special measuring cable
- For sensors with TOP68 plug-in head, for high-temperature and high-pressure applications, IP 68
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

Transmitter

Liquisys M CCM223/253
- Transmitter for chlorine, field or panel-mounted housing, Hart® or PROFIBUS available
- Ordering acc. to product structure (–> online Configurator, www.products. endress.com/ccm223 or www.products. endress.com/ccm253)
- Technical Information TI214C/07/EN

Maintenance /calibration

CCM182
- Microprocessor-controlled photometer for determining chlorine and pH value
- Measuring range for chlorine: 0.05 - 6 mg/l
- Measuring range for pH value: 6.5 - 8.4
- Order no.: CCM182-0

Service kit CCS24x
- For chlorine dioxide sensors CCS240/CCS241
- 2 replacement cartridges, filling electrolyte 50 ml, polishing sheets
- Order no. 71076922

Polishing sheets COY31-PF
- 10 pieces for cleaning of the gold cathode
- For oxygen and chlorine sensors
- Order no. 51506973

Instruments International

Endress+Hauser
Instruments International AG
Kaegenstrasse 2
4153 Reinach
Switzerland

Tel.+41 61 715 81 00
Fax+41 61 715 25 00
www.endress.com
info@ii.endress.com

Endress+Hauser

People for Process Automation

TI00114C/07/EN/13.12
71189770