Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

CCS120

Sensor for total chlorine

Application

- Drinking water conditioning
- Pool water conditioning
- Service water conditioning

Your benefits

- Flow and immersion installation
- Works with the well known assemblies:
  CCA250
  CYA611
- Works with the transmitter CCM223/253
- Retrofitable in existing applications
- Sensor selection via menu of the transmitter CCM223/253
- Temperature sensor NTC 10K

TI388C/07/en/11.04
51517374

Endress+Hauser

People for Process Automation

Function and system design

Measuring principle

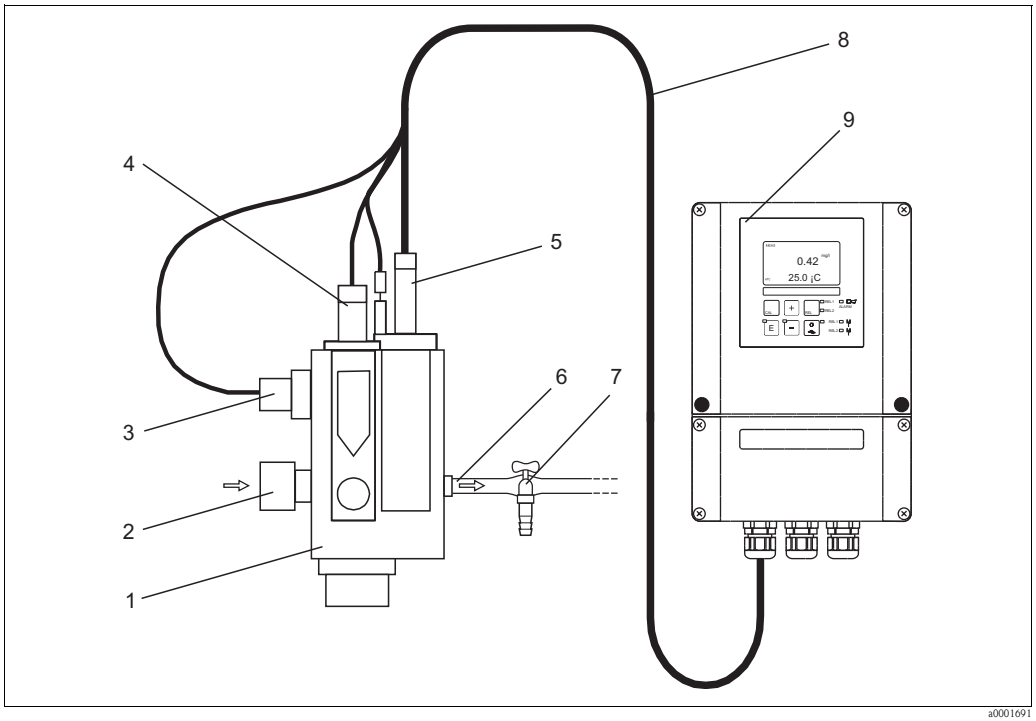
The amperometric sensor is based on the conversion of the measuring variable chlorine in electrical current. Two electrodes covered by an electrolyte are in contact to the medium via a membrane. It has a platinum working electrode and a silver halogenide coated counter or reference electrode. The chlorine compounds contained in the medium diffuse through the membrane. The constant polarisation voltage between the two electrodes instigates the electrochemical reaction of the chlorine compounds on the working electrode. The resulting current is measured as a primary signal (amperometric measurement principle). It is proportional to the chlorine concentration within the sensor's operating range and only slightly pH dependant for this type of sensor. The primary signal is converted by the amplifier electronics of the sensor into a 0 ... 5 µA output signal which is displayed by the transmitter.

Function

The sensor CCS120 is a membrane-capped amperometric two electrode sensor. It is used for continuous measurement of total chlorine.
Total chlorine consists of free chlorine (HOCl, OCl^-) and bound chlorine (chloramines).
To calibrate the measuring system, determine the content of chlorine using the DPD 4 method. To do so, you need a photometer with the pertaining reagents. The determined value is the calibration value for the transmitter.

Measuring system

A complete measuring system in the flow mode comprises at least:
- Chlorine sensor
- Transmitter Liquisys M CCM223/253
- Special measuring cable
- Flow assembly

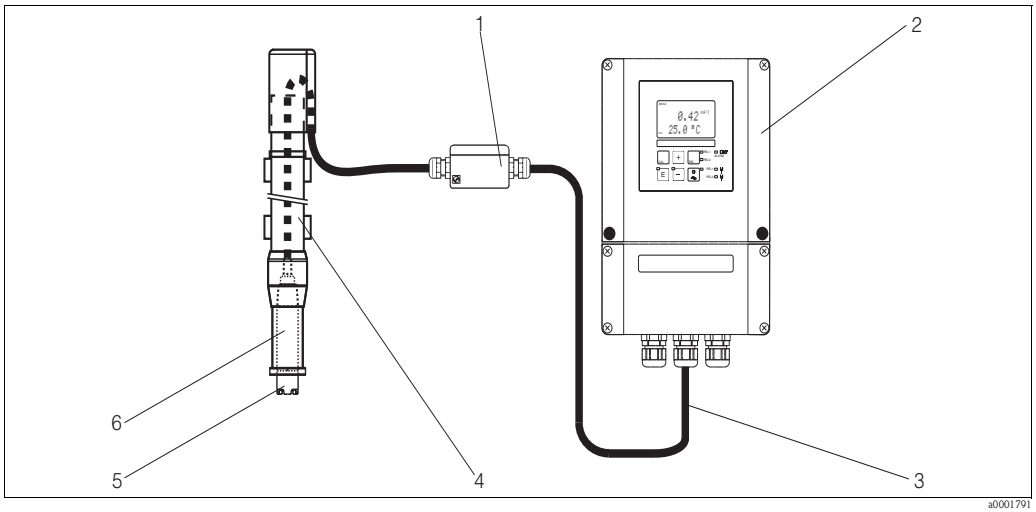


Measuring system in the flow mode (example)

1	*Flow assembly CCA250*	*6*	*Medium outlet*
2	*Medium inlet*	*7*	*Sampling tap*
3	*Inductive proximity switch for flow monitoring*	*8*	*Measuring cable CPK9-N*A1B*
4	*Mounting place for pH/redox sensor*	*9*	*Transmitter*
5	*Chlorine sensor CCS120*		

The described above measuring system is available as CCE-system (fully mounted on a board).

A complete measuring system in the immersion mode comprises at least:
- Chlorine sensor
- Transmitter Liquisys M CCM223/253
- Special measuring cable
- Immersion assembly
- Assembly adapter G1



Measuring system in the immersion mode (example)

1	*Junction box VBM*	*4*	*Immersion assembly CYA611*
2	*Transmitter*	*5*	*Chlorine sensor CCS120*
3	*Measuring cable CYK71*	*6*	*Assembly adapter G1*

Input

Measured variables

Total chlorine

Free chlorine (Cl_2 (dissolved), HOCl, OCl^-)
Bound chlorine (chloramines)
Organic bound chlorine (e.g. cyanuric acid derivates)

Measuring range

0.1 ... 10 mg/l

Standard slope

110 ... 120 nA/(mg/l)

Output

Output signal

0 ... 5 µA for connection to transmitter Liquisys M CCM223/253 with software version 2.32 or later

Power supply

Power supply

15 V DC, 10 mA

Performance characteristics

Response time	T_{90} approx. 60 s (as concentration rises and falls)
Resolution	0.01 mg/l
pH range	6.5 ... 9.5 pH dependency: jump from pH 7 to pH 8: approx. -10 % for free chlorine
Conductivity range	0.03 ... 40 mS/cm
Temperature range	5 ... 45 °C (41 ... 113 °F), no quick changes in temperature allowed
Pressure	Medium in the assembly CCA250: max. 1 bar (14.5 psi)
Flow	optimum: 40 ... 60 l/h (10.56 ... 15.84 US.gal/h) minimum: 30 l/h (7.92 US.gal/h) maximum: 100 l/h (26.40 US.gal/h)
Minimum input flow velocity	optimum: 20 ... 30 cm/s (0.7 ... 1.0 ft/s) minimum: 15 cm/s (0.5 ft/s) maximum: 50 cm/s (1.6 ft/s)
Cross sensitivity	Oxidising reagents e.g. bromine, iodine, ozone, chlorine dioxide, permanganates result in false positive results. Reducing reagents like sulphides, sulphites, tiosulphates, and hydrazine result in false negative results.
Service life membrane cap	Typically 3 - 6 months, depending on water quality

Installation

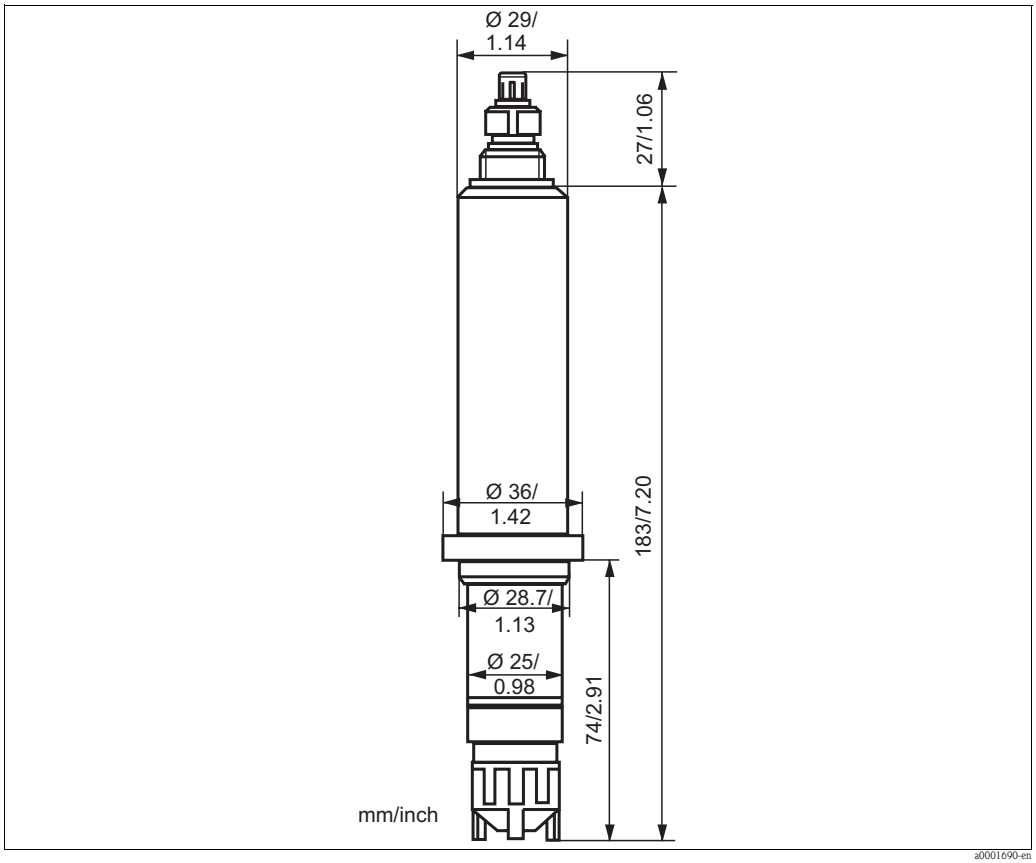
Installation conditions	The minimum flow may not drop below 30 l/h (7.92 US.gal/h). The minimum input flow velocity may not drop below 15 cm/s (0.5 ft/s).

Environment

Storage temperature	Filled with electrolyte: 5 ... 50 °C (41 ... 122 °F) Without electrolyte: -20 ... +60 °C (-4 ... +140 °F)
Ingress protection	IP 68

Mechanical construction

Design, dimensions



Dimensions

Weight	approx. 0.14 kg (0.3 lb.)	
Material	Electrode shaft	PVC
	Membrane cap	PPE
Temperature sensor	NTC 10 kΩ at 25 °C (77 °F)	
Plug-in head	TOP68 plug-in head	
Cable length	max. 15 m (49.22 ft)	

Ordering information

Sensor CCS120

Order no. 51516342

CCE system

The CCE compact chlorine system is a factory-assembled and wired panel for transmitter with flow assembly CCA250-A1. It consists of four modules:

Module	Order no.
Sensor CCS120	51516342
CCE-1 board	50041731
Measuring cable for CCE1	51517204
Liquisys M (of your choice)	CCM253..... (see Technical Information TI 214C/07/en)

In North America, the four modules are available as a complete package (115 V, CSA).
Order no. 51517437

Accessories

Connection accessories

- Junction box VBM
  for cable extension, with 10 terminals, IP 65 / NEMA 4X

  Cable entry Pg 13.5 — Order no. 50003987
  Cable entry NPT ½" — Order no. 51500177
- Measuring cable CCS120-1M, cable length: 1 m (3.28 ft), for compact chlorine system CCE1
  order no. 51517204
- Special measuring cable CPK9-N*A1B PM wire internally
  For sensors with TOP68 plug-in head, for high-temperature and high-pressure applications, IP 68
  Ordering acc. to product structure, see Technical Information (TI 118C/07/en)

Installation accessories

- Flow assembly CCA250
  for chlorine, chlorine dioxide, pH and redox;
  (Technical Information TI062C/07/en, order no. 50057220)
- Immersion assembly Dipfit W CYA611
  for sensor immersion in basins, open channels and tanks, PVC;
  Ordering acc. to product structure (Technical Information TI 166C/07/en)
- Adapter G1 to install the sensor CCS120 into the assembly CYA611
  order no. 51517442
- Compact chlorine system CCE1
  Factory-assembled and wired panel for transmitter with flow assembly CCA250-A1; see also Technical Information TI 014C/07/en

Transmitter

- Liquisys M CCM223/53
  Transmitter for chlorine, field or panel-mounted housing,
  Hart® or PROFIBUS available,
  Ordering acc. to product structure, see Technical Information (TI 214C/07/en)

Maintenance/calibration

- Photometer CCM182; microprocessor controlled photometer for chlorine, pH value, cyanuric acid;
  Chlorine measuring range: 0.05 - 6 mg/l
  pH measuring range: 6.5 - 8.4
- Electrolyte for CCS120, 50 ml
  order no. 51516343
- Service kit for CCS120, consists of 2 membrane caps and 1 bottle electrolyte (50 ml)
  order no. 51517284

Documentation

Transmitters	■ Liquisys M CCM223/253, Technical Information TI 214C/07/en; order no. 51502336
Compact system	■ Compact chlorine system CCE1, Technical Information TI 014C/07/en; order no. 50050696
Measuring cables	■ CPK1-12, Technical Information TI 118C/07/en; order no. 50068526
Assemblies	■ Flow assembly CCA250, Technical Information TI 062C/07/en; order no. 50057220 ■ Immersion assembly CYA611, Technical Information TI 166C/07/en; order no. 50085985

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