



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

## Technical Information

# CCS120

Sensor for total chlorine



### Applications

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

### Your benefits

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

## Function and system design

### Measuring principle

The amperometric sensor is based on the conversion of the measuring variable chlorine in an 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 polarization 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 to 5  $\mu$ A output signal which is displayed by the transmitter.

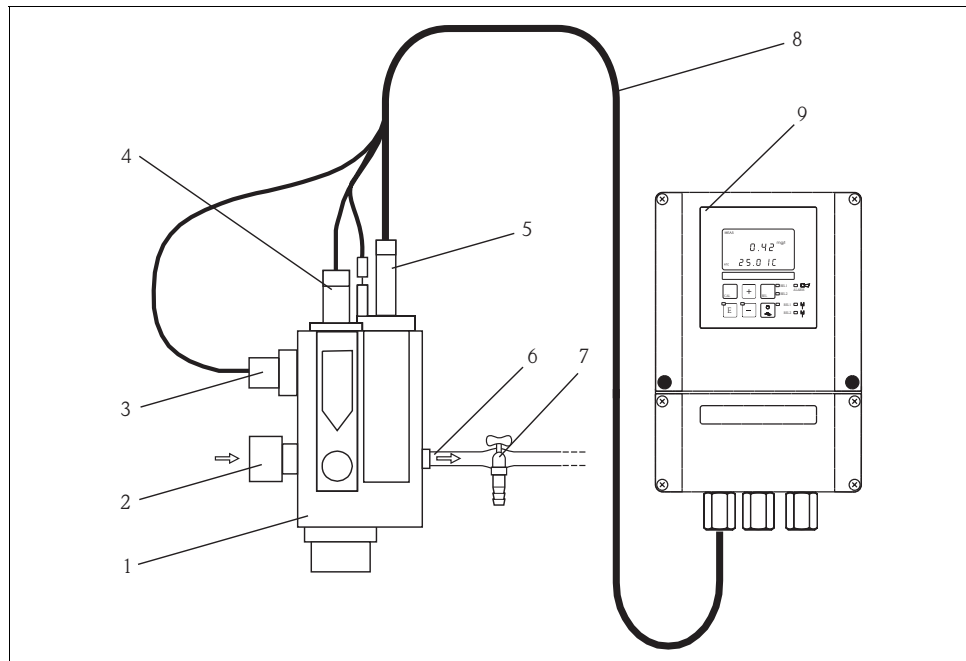
### Function

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 ( $\text{HOCl}$ ,  $\text{OCl}^-$ ) 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 for flow measurement consists of:

- Chlorine sensor
- Transmitter Liquisys M CCM223/253
- Special measuring cable
- Flow electrode holder assembly



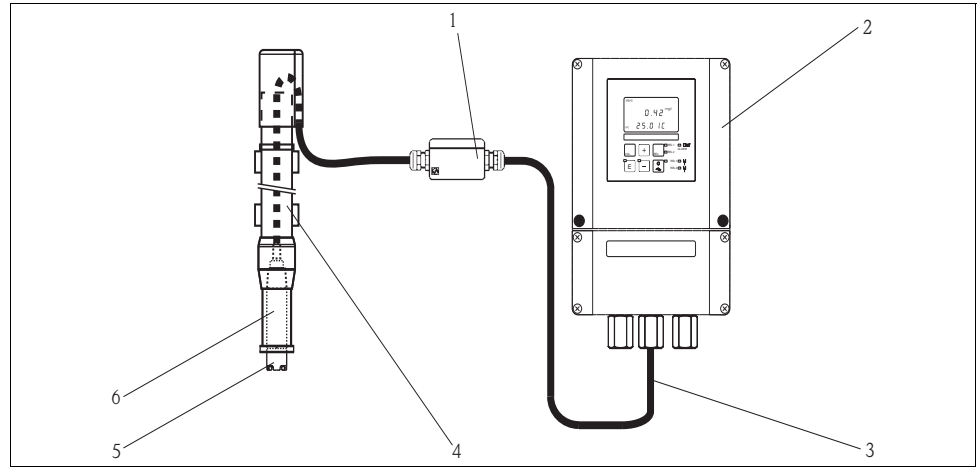
Measuring system in the flow mode (example)

- |   |  |   |                            |
|---|--|---|----------------------------|
| 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/ORP 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 for immersion consists of:

- 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

<b>Measured variables</b>	Total chlorine	Free chlorine Cl <sub>2</sub> (dissolved), HOCl, OCl <sup>-</sup> Bound chlorine (chloramines) Organic bound chlorine (e.g. cyanuric acid derivatives)
<b>Measuring range</b>	0.1 to 10 ppm (mg/l)	
<b>Standard slope</b>	110 to 120 nA (ppm)	

## Output

<b>Output signal</b>	0 to 5 µA for connection to transmitter Liquisys M CCM223/253 with software version 2.32 or later
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## Power supply

<b>Power supply</b>	15 V DC, 10 mA
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## Performance characteristics

<b>Response time</b>	T <sub>90</sub> approx. 60 s (as concentration rises and falls)	
<b>Resolution</b>	0.01 ppm (mg/l)	
<b>pH range</b>	6.5 to 9.5 pH dependency: jump from pH 7 to pH 8: approx. -10 % for free chlorine	
<b>Conductivity range</b>	0.03 to 40 mS/cm	
<b>Temperature range</b>	41 to 113°F (5 to 45°C), rapid changes in temperature are not allowed	
<b>Pressure</b>	Medium in the assembly CCA250: max. 14.5 psi (1 bar)	
<b>Flow</b>	optimum:	10.56 to 15.84 US.gal/h (40 to 60 l/h)
	minimum:	7.92 US.gal/h (30 l/h)
	maximum:	26.40 US.gal/h (100 l/h)
<b>Minimum input flow velocity</b>	optimum:	0.7 to 1.0 ft/s (20 to 30 cm/s)
	minimum:	0.5 ft/s (15 cm/s)
	maximum:	1.6 ft/s (50 cm/s)
<b>Cross sensitivity</b>	Oxidizing 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.	
<b>Service life membrane cap</b>	Typically 3 to 6 months, depending on water quality	

## Installation

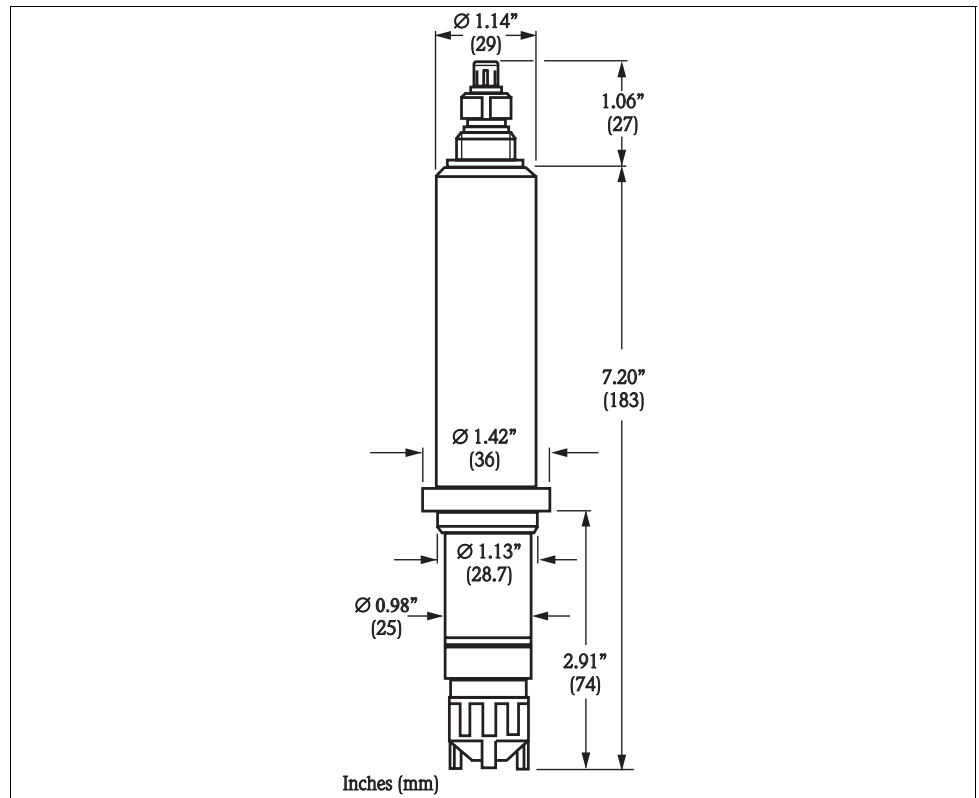
<b>Installation conditions</b>	The minimum flow may not drop below 7.92 US.gal/h (30 l/h). The minimum input flow velocity may not drop below 0.5 ft/s (15 cm/s).
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## Environment

<b>Storage temperature</b>	Filled with electrolyte: 41 to 122°F (5 to 50°C) Without electrolyte: -4 to +140°F (-20 to +60°C)
<b>Ingress protection</b>	NEMA 6 (IP 68)

## Mechanical construction

### Design, dimensions



Dimensions

a0001690-en

<b>Weight</b>	approx. 0.3 lb. (0.14 kg)	
<b>Material</b>	Electrode shaft	PVC
	Membrane cap	PPE
<b>Temperature sensor</b>	NTC 10 k $\Omega$ at 77°F (25°C)	
<b>Plug-in head</b>	TOP68 plug-in head	
<b>Cable length</b>	max. 50 ft (15 m)	

## 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/24/ae)

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, NEMA 4X (IP 65)
  - Cable entry Pg 13.5 Order no. 50003987  
Cable entry NPT ½" Order no. 51500177
  - Measuring cable CCS120-1M, cable length: 3.28 ft (1 m), 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 orp;  
(Technical Information TI062C/24/ae)
  - Immersion assembly Dipfit W CYA611  
for sensor immersion in basins, open channels and tanks, PVC;  
Ordering acc. to product structure (Technical Information TI 166C/24/ae)
  - 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/24/ae)

- Maintenance/calibration**
- Photometer CCM182; microprocessor controlled photometer for chlorine, pH value, cyanuric acid;  
Chlorine measuring range: 0.05 - 6 ppm (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

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