

CLF10 sc & CLT10 sc FREE & TOTAL REAGENTLESS CHLORINE ANALYZERS

Applications

- Drinking Water
- Wastewater
- Power
- Industrial Water



Hach's answer to reagentless amperometric chlorine measurement.

From the leaders in disinfection monitoring, the right instrument for reagentless chlorine analysis.

Exclusive Self Diagnostics

The CLF10 sc and CLT10 sc analyzers leverage Hach's exclusive self diagnostics to alert users when the process has changed or the instrument needs servicing. Diagnostic features include the Cal Watch algorithm for warning of pH and chlorine calibration deviation and a non-contacting flow sensor for notification of insufficient sample flow.

Real-Time Process Control

The CLF10 sc and CLT10 sc analyzers allow for real-time control of disinfection processes by providing continuous readings that indicate when treatment conditions have changed.

No Reagent Replacement, No Waste Stream

Chlorine measurement with an amperometric analyzer such as the CLF10 sc or CLT10 sc does not require reagents, eliminating the need for routine reagent replacement and waste stream management.

Compatible with Hach's "Plug and Play" Digital Controllers

The CLF10 sc and CLT10 sc analyzers can be used with any Hach sc digital controller. Just plug in the analyzer and it's ready to use without software configuration.

EPA Compliant According to Method 334.0

The CLF10 sc and CLT10 sc analyzers can be used for reporting chlorine residual measurements in accordance with EPA Method 334.0.



Be Right™

Specifications*

Chlorine Sensor

Measurement Range	0 to 20 ppm
Lower Limit of Detection (LOD)	30 ppb (0.03 ppm) or lower
Limit of Quantitation (LOQ)	90 ppb (0.09 ppm) or lower
Resolution	0.001 ppm (1 ppb)
Accuracy	Free Chlorine: ±3% of the reference test** (DPD) at constant pH less than 7.2 (±0.2 pH unit) ±10% of the reference test** (DPD) at stable pH less than 8.5 (±0.5 pH unit from the pH at calibration) Total Chlorine: ±10% of the reference test** (DPD) at stable pH less than 8.5 (±0.5 pH unit from the pH at calibration) ±20% of the reference test** (DPD) at stable pH greater than 8.5
Repeatability	30 ppb or 3%, whichever is greater
Response Time	Free Chlorine: 140 seconds or less for 90% change (T_{90}) at a stable temperature and pH Total Chlorine: 100 seconds or less for 90% change (T_{90}) at a stable temperature and pH
Sampling Time	Continuous
Interferences	Free Chlorine: Monochloramine, chlorine dioxide, ozone, and chalk deposits Total Chlorine: Chlorine dioxide, ozone, and chalk deposits
Pressure Limit	0.5 bar, no pressure impulses and/or vibrations
Sample Flow Rate	30 to 50 L/hour (7.9 to 13.2 gal/hour), Optimal is 40 L/hour (10.5 gal/hour)
Sample pH	4-9 (Use of pH electrode to control sample pH in analyzer is recommended)
Sample Temperature (compensated for fluctuations)	5 to 45°C (41 to 113°F)
Temperature Compensation	Internal temperature sensor
Storage Temperature	Sensor: 0 to 50°C (32 to 122°F) dry, without electrolyte Electrolyte: 15 to 25°C (59 to 77°F)

Power Requirements	12 Vdc, 30 mA maximum (supplied by controller)
Dimensions (sensor only)	195 mm (7.68 in.)/25 mm (0.98 in.) (length/diameter)
Cable Length	1 m (between gateways and sc-controller)
Cable Connection	5 pin, M12 connector
Measurement Method	Reagentless, electrochemical, three-electrode amperometric system
Calibration Methods	1-point or 2-point (zero and slope) calibration
Material	Corrosion-resistant materials, (stainless steel, PVC, silicon rubber and polycarbonate)
Warranty	1-year warranty on the electrode body, includes the electronics

Panel (including SS Panel, Gateway, Chlorine Sensor Flow Cell, pH Sensor Flow Cell)

Operating Temperature	0 to 45°C (32 to 113°F)
Storage Temperature (panel only)	-20 to 60°C (-4 to 149°F)
Power Requirements	12 Vdc ±10%, at 100 mA maximum (supplied by sc controller)
Mounting	Flat, vertical surface
Connections	Sample Line: 1/4-inch OD Drain Line (pH Flow Cell Outlet): 1/2-inch ID
Panel Dimensions	48.3 x 49.5 x 15.1 cm (19 x 19.5 x 5.95 in.) (with panel-mounted components)
Weight	Approximately 5.5 kg (12 lbs) (panel and empty panel-mounted components only)
Controller Platform	sc controller models

Complete Analyzer (Panel + Sensor)

Waterproof Rating	Current rating for sc100/1000/200 controllers and gateway – IP65 (NEMA 4X)
Certification	CE / ETL, EMC
Shipping Weight	Approximately 9.1 kg (20 lbs)

*Subject to change without notice.

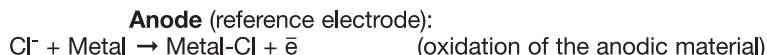
**Reference measurement must be conducted at the analyzer sampling point.

Principle of Operation

Amperometry is an electrochemical technique that measures the change in current resulting from chemical reactions taking place on the electrodes. The generated current is proportional to the analyte concentration. A typical amperometric sensor consists of two dissimilar electrodes—an anode and a cathode (i.e. silver/platinum or copper/gold, respectively).

Typically, the electrodes are covered with a membrane cap containing electrolyte, providing for better selectivity of the analysis. Additionally, a small constant electrical voltage is applied across the electrodes.

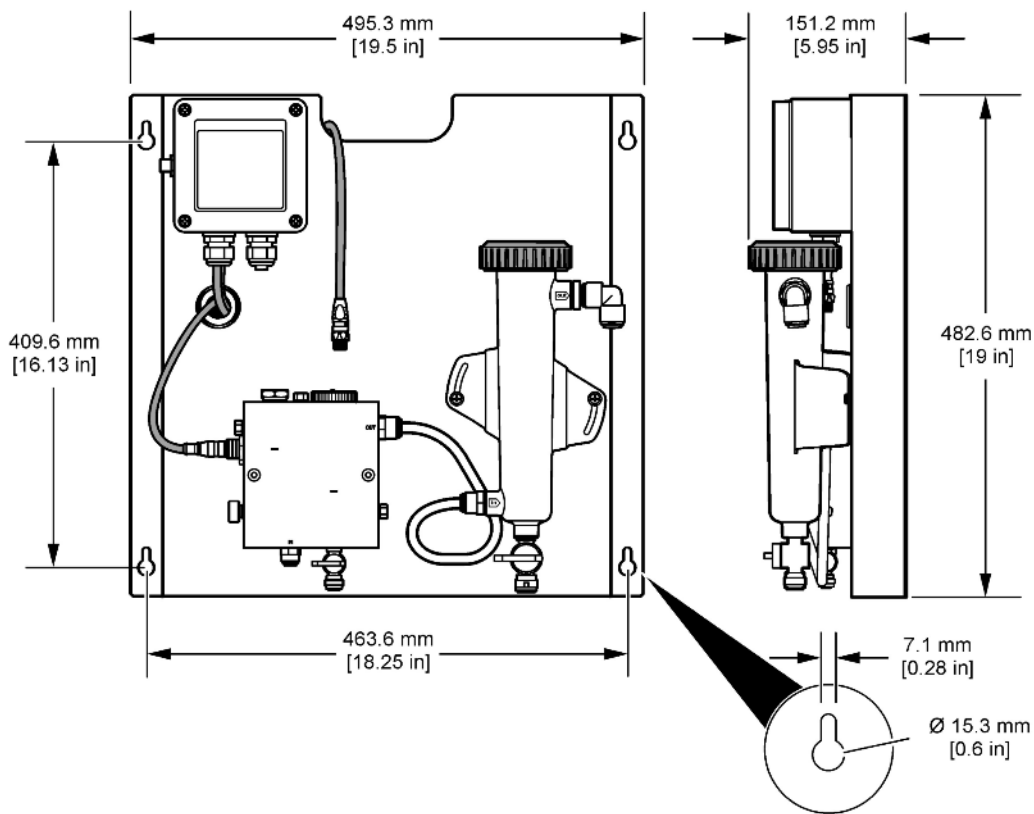
Below is a general schematic of the reduction-oxidation reaction taking place in a simple 2-electrode amperometric system:



In a three-electrode amperometric system, such as used in the CLF10 sc and CLT10 sc, the anode is essentially split into two parts—a reference and an auxiliary (or counter) electrode. These systems are always supported by special electrical circuit directing the voltage between all electrodes. The three-electrode design generally makes the measurements more stable and provides longer life for the working and reference electrodes.

Dimensions

The analyzer should be installed in an accessible location.* It can be mounted on a flat, vertical surface (such as a wall, panel, stand, etc.). It should allow for access for any checking or maintenance. Sample flow should meet the specifications on previous page.



*Do not mount the panel in direct sunlight. Indoor or enclosed installation is recommended. Shield the panel and panel components from any condensing moisture or humidity, especially at the sensor/cable interface.

Ordering Information

CLF10 sc Free Chlorine Sensor with sc200 Controller and SS Panel

2980900	CLF10 sc, sc200 Single Input, pH/D
2981000	CLF10 sc, sc200 Single Input, Combo pH
2981100	CLF10 sc, sc200 Single Input, Grab Sample
2982200	CLF10 sc, sc200 Dual Input Combo pH
2982100	CLF10 sc, sc200 Dual Input, pH/D
2982300	CLF10 sc, sc200 Dual Input, Grab Sample
2981200	CLF10 sc, sc200 Single Input, pH/D, Metric
2981300	CLF10 sc, sc200 Single Input, Combo pH, Metric
2981400	CLF10 sc, sc200 Single Input, Grab Sample, Metric
2982400	CLF10 sc, sc200 Dual Input, pH/D, Metric
2982500	CLF10 sc, sc200 Dual Input, Combo pH, Metric
2982600	CLF10 sc, sc200 Dual Input, Grab Sample, Metric
2987500	CLF10 sc, sc200 Single Input, pH/D, 24 Vdc, Metric
2987600	CLF10 sc, sc200 Single Input, Combo pH, 24 Vdc, Metric
2987700	CLF10 sc, sc200 Single Input, Grab Sample, 24 Vdc, Metric

CLT10 sc Total Chlorine Sensor with sc200 Controller and SS Panel

2981500	CLT10 sc, sc200 Single Input, pH/D
2981600	CLT10 sc, sc200 Single Input, Combo pH
2981700	CLT10 sc, sc200 Single Input, Grab Sample
2982700	CLT10 sc, sc200 Dual Input, pH/D
2982800	CLT10 sc, sc200 Dual Input, Combo pH
2982900	CLT10 sc, sc200 Dual Input, Grab Sample
2981800	CLT10 sc, sc200 Single Input, pH/D, Metric
2981900	CLT10 sc, sc200 Single Input, Combo pH, Metric
2982000	CLT10 sc, sc200 Single Input, Grab Sample, Metric
2983000	CLT10 sc, sc200 Dual Input, pH/D, Metric
2983100	CLT10 sc, sc200 Dual Input, Combo pH, Metric
2983200	CLT10 sc, sc200 Dual Input, Grab Sample, Metric
2987400	CLT10 sc, sc200 Single Input, pH/D, 24 Vdc, Metric
2987800	CLT10 sc, sc200 Single Input, Combo pH, 24 Vdc, Metric
2987900	CLT10 sc, sc200 Single Input, Grab Sample, 24 Vdc, Metric

Note: See LIT2665 for more information about the combinations possible with the sc200.

CLT10 sc Total Chlorine Analyzer Panel Only

LXV45B.99.13022	w/ pH/D Differential Sensor
LXV45B.99.12022	w/ pH Combination Sensor
LXV45B.99.11022	Grab Sample Only

Metric sizing available for all configurations.

Accessories

LZY051	Acidification/Cleaning Kit
9159900	Sample Conditioning Kit
9181500	pH/D Differential Analog pH Sensor, Ryton
9181600	Combination Analog pH Sensor, Ryton

Replacement Parts

9150400	Sensor, Free Chlorine
9150300	Sensor, Total Chlorine
9160200	Membrane Replacement Kit, Free Chlorine Sensor
9180900	Membrane Replacement Kit, Total Chlorine Sensor
9160600	Electrolyte, Free Chlorine Sensor 100 mL
9181400	Electrolyte, Total Chlorine Sensor 100 mL

Lab Products for Method 334.0

5870062	Pocket Colorimeter II System, Chlorine MR/HR
1426810	Chlorine Standard Solution, 10-mL Voluette® Ampule, 50–75 mg/L 16/pkg
2980500	DPD Chlorine-MR Spec✓ Secondary Standards Kit

For more information on this method, please visit: www.hach.com/method334

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Hach Company reserves the right to alter specifications to equipment at any time.



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