CLF10sc & CLT10sc 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 CLF10sc and CLT10sc 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 CLF10sc and CLT10sc 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 CLF10sc or CLT10sc 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 CLF10sc and CLT10sc 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 CL10sc and CLT10sc analyzers can be used for reporting chlorine residual measurements in accordance with EPA Method 334.0.

HACH®
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	90 ppb (0.09 ppm) or lower
(LOQ) 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 45ºC (32 to 113ºF)
Storage Temperature (panel only)	-20 to 60ºC (-4 to 149ºF)
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:

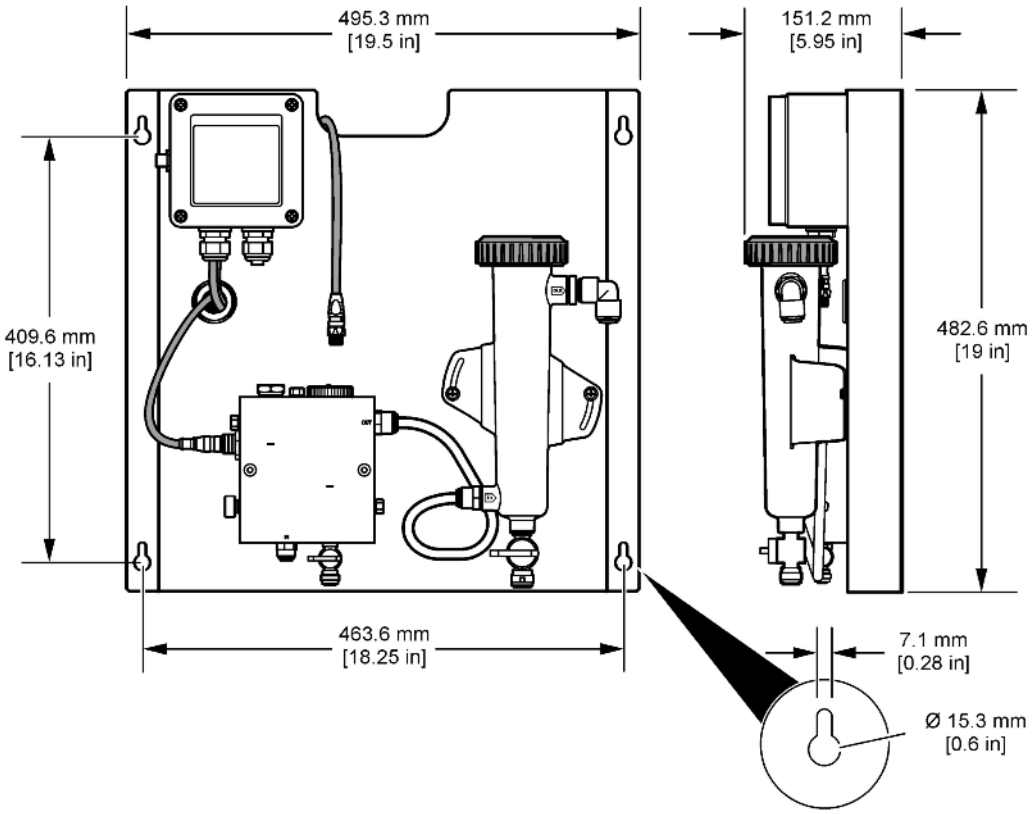
Cathode (working electrode):
$HOCl + H^+ + 2\bar{e} \rightarrow Cl^- + H_2O$ (reduction of hypochlorous acid)

Anode (reference electrode):
$Cl^- + Metal \rightarrow Metal\text{-}Cl + \bar{e}$ (oxidation of the anodic material)

In a three-electrode amperometric system, such as used in the CLF10sc and CLT10sc, 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

CLF10sc Free Chlorine Analyzer (Panel Only)

LXV45A.99.13022 w/ pHD Differential Sensor

LXV45A.99.12022 w/ pH Combination Sensor

LXV45A.99.11022 Grab Sample Only

CLT10sc Total Chlorine Analyzer (Panel Only)

LXV45B.99.13022 w/ pHD 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 pHD Differential Analog pH Sensor, Ryton

9181600 Combination Analog pH Sensor, Ryton

Replacement Parts

8626200 Sensor, Free Chlorine, SS Tip

8628900 Sensor, Total Chlorine, SS Tip

8633100 Membrane Replacement Kit, Free and Total Chlorine, SS Tip

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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