

Ballast Water



**Online TRO and
Chlorine Monitoring
Solutions**



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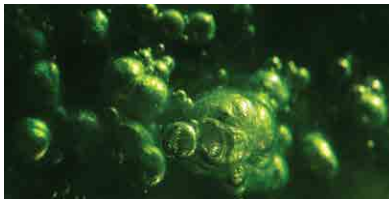
 **scientific**
Water Quality Measurement Systems

Ballast Water



Ballast water

is essential for safe & efficient shipping operations and stabilizing steel-hulled vessels at sea. Ballast water provides a variety of critical functions, such as maintaining balance, stability, and structural integrity on non-cargo voyages or when cargo is unloaded. Ballast water is also used to compensate for fuel and water consumption during at-sea operations.



While the benefits of ballast water are numerous, it can also post serious ecological, economic, and health problems when marine species carried in a ships' ballast water are transported to a new location. Bacteria, microbes, small invertebrates, eggs, cysts, and larvae of various species can be transferred from their native environment to a new geographic area. Once there they can reproduce and become invasive, out-compete native species, and multiply into pest proportions. The effects can be devastating, and data shows that bio-invasions are both on the rise and continue to impact new locations. GESAMP-BWWG (Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection-Ballast Water Working Group) recommends the DPD colorimetric measurement as the preferred method for TRO.

At HF scientific, we are committed to improving the quality of the world's water supply through innovative design, manufacture, and distribution of the highest quality laboratory, field, and online products for the marine and shipping industry. We believe our work is critical to preserving a healthy planet, and we take that mission seriously. Our rugged, dependable, and easy-to-use instrumentation provides accurate measurement of the total residual oxidant (TRO) of ballast water, desalination, or wastewater treatment equipment onboard. For 30+ years HF scientific has used its expertise to develop specialized devices

for measuring and assessing water quality, including equipment for monitoring parameters such as free and total chlorine, turbidity, streaming current, and UV% transmission.

Our scientists, engineers, and technicians are continually enhancing and expanding our product line to better serve new and existing customers worldwide. Contact us directly to learn how we can provide innovative water quality & measurement solutions for all your needs.

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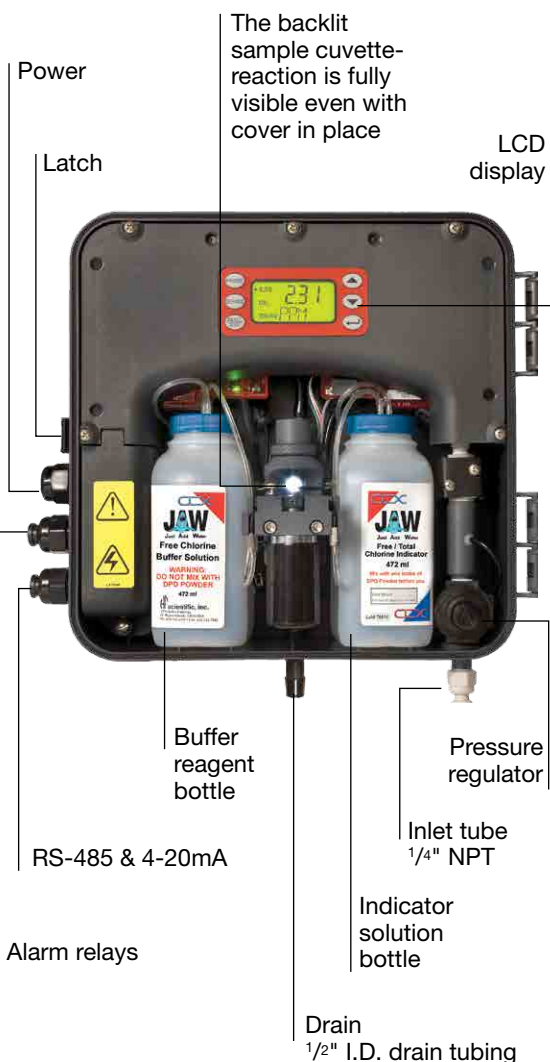


Online Total Residual Oxidant & Chlorine Monitor

The CLX Online Total Residual Oxidant (TRO) & Chlorine Monitor is an economical and low-maintenance instrument designed for processes that require continuous monitoring and control of TRO and chlorine levels. The CLX offers complete manual or automatic control of dosing through its user-selectable cycle times, 4-20mA and RS-485 with Modbus output for controlling feed pumps, and user-selectable alarms. The instrument is housed in a strong, shatterproof case with easy access to all service functions and reagents.



CLX with cover removed



Features

- **NEW!** Optional extended range to 15 mg/l $\pm 10\%$ accuracy
- Total residual oxidant & chlorine monitoring
- Low reagent use for low operating costs
- Designed for unattended operation up to 30 days*
- Low-cost, proven colorimetric DPD chemistry
- User-selectable cycle times
- Microprocessor-based technology
- Ballast water, drinking water & wastewater applications
- 4-20mA and RS-485 with Modbus output
- USEPA accepted methodology
- Standard Method 4500-Cl G, DPD colorimetric method
- Certifications:
 - Lloyds Register Test Specification for Vibration and 22 Degree Tilt Test. En 60954: 2002 Section 8.2, 8.4, 8.7, Specification test No1: Section 14
 - IEC 6-parameter Environmental Marine Test for high humidity, high temperature (86°C), low temperature (-5°C), salt spray
- Certified by American Bureau of Shipping (ABS) for marine use and DNV.

*Depending on sample cycle times and BWMS monthly operation times

Ordering Information

Cat. No.	Description
20040	CLX Online Total Residual Oxidant & Chlorine Monitor complete with operating manual. Reagents must be purchased separately.
09950	Replacement tubing/cuvette kit
28895	High range option. 0-15 mg/l
28896	60 seconds to 10 minute cycle time
25264	Remote standby
25279	Auto drain

Reagent Kits

	Cat. No.	
	J.A.W.**	Liquid
Total Chlorine 30 day supply	09952	09948
Total Chlorine 60 day supply	09954	09936
Total Chlorine 12 month supply	09956	09938

**Just Add Water (and supplied DPD reagent)

Specifications

Range:	0 - 10 mg/l. 0-15 mg/l available
Cycle Time:	User selectable: 60 seconds - 10 minutes Other optional cycle times available. Consult factory.
Accuracy:	0 - 6 mg/l - $\pm 5\%$ or 0.03 mg/l (whichever is greater) 6 - 10 mg/l - $\pm 10\%$ High range option 0-15 mg/l - $\pm 10\%$ or 0.03 mg/l (whichever is greater)
Resolution:	0.01 mg/l
Method:	USEPA accepted DPD method of analysis for measuring Total Residual Chlorine
Standard Outputs:	4-20 mA and RS-485 with Modbus
User Alarms:	2 user-selectable alarms for sample concentration
Operating Temperature:	See note below***
Input Pressure:	0.3 bar - 10.3 bar (5 - 150psi)
Enclosure:	ABS Plastic, IP66
Power:	100 - 240 VAC Auto Switchable 47-63hz
Certifications:	CE, UL, CSA, (ETL, ETLc)
Shipping Dimensions:	40.6cm x 40.6cm x 24.1cm (16" x 16" x 9.5")
Shipping Weight:	3.9kg (8.6 lbs)
Dimensions:	32.6cm x 31cm x 12.9cm (12.82" x 12.25" x 5.06")
Flow Rate to Waste:	200-400 ml/min
Warranty:	Two years

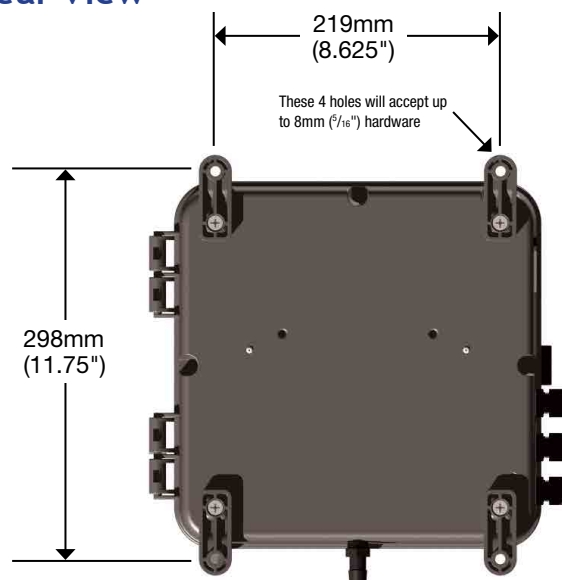
Specifications subject to change without notice.

*** Operating temperature of CLX Monitor 0° - 55°C (32° to 131°F)
Operating temperature for 30-day reagent life 0° - 40°C (32° to 104°F)
Reagent life will be <30 days if operating monitor above 40°C (104°F)

Front view



Rear view



Side view





Extended Reagent Life Online TRO and Chlorine Monitor

The CLX-XT Extended Reagent Life Online TRO and Chlorine Monitor is an economical and low-maintenance instrument for shipboard ballast water, potable water, or wastewater applications requiring continuous monitoring and control of total chlorine or total residual oxidant (TRO) levels. This marine-grade monitor allows for up to 90 days of unattended operation. The CLX-XT offers complete manual or automatic control of dosing through its user-selectable cycle times, 4-20mA and RS-485 with Modbus output for controlling feed pumps, and user-selectable alarms. The instrument is housed in a strong, shatterproof IP66 (except fan IP54) case with easy access to all service functions and reagents.



*Reagent life up to 90 days**



Features

- **NEW!** Optional high range to 15 mg/l $\pm$ 10% accuracy
- Optimized for high-temperature marine applications in high ambient temperatures up to 55°C (131°F)
- Low operating costs
- Cooling effect extends reagent life to 3 months*
- Designed for unattended operation up to 90 days*
- Colorimetric DPD chemistry
- User-selectable cycle times
- User-selectable alarms for sample concentration
- Ballast water treatment, drinking water & wastewater applications
- 4-20mA and RS-485 with Modbus output
- USEPA accepted methodology
- Certified to:
 - Lloyds Register Test Specification for Vibration and 22 Degree Tilt Test
 - ABS and DNV

*Depending on sample cycle times and BWMS monthly operation times

Ordering Information

Cat. No. Description

28030	CLX-XT Extended Reagent Life Online TRO and Chlorine Monitor complete with operating manual. Reagents must be purchased separately.
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Reagent Kit

Cat. No.

Total Chlorine reagent for CLX-XT 12 month supply	09991
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(based on estimated BWMS operational cycles)

Accessories/Options

Cat. No.

Replacement tubing/cuvette kit	09950XT
High range option. 0-15 mg/l	28895
60 seconds to 10 minute cycle time	28896
Remote standby	25264
Auto drain	25279

Specifications

Range:	0 - 10 mg/l. 0-15 mg/l available.
Cycle Time:	User selectable: 60 seconds - 10 minutes
Accuracy:	0 - 6 mg/l - $\pm 5\%$ or 0.03 mg/l of Cl ₂ (whichever is greater) 6 - 10 mg/l - $\pm 10\%$ High range option 0-15 mg/l $\pm 10\%$ or 0.03 mg/l of Cl ₂ (whichever is greater)
Resolution:	0.01 mg/l
Method:	USEPA accepted DPD method of analysis for measuring Total Residual Chlorine
Standard Outputs:	4-20 mA and RS-485 with Modbus
User Alarms:	2 user-selectable alarms for sample concentration
Operating Temperature:	0° - 55°C (32° to 131°F)
Input Pressure:	0.3 bar - 10.3 bar (5 - 150psi)
Enclosure:	IP66 (except fan IP54)
Power:	100 - 240 VAC Auto Switchable 47-63hz
Certifications:	CE, UL, CSA, (ETL, ETLc)
Flow Rate to Waste:	200-400 ml/min
Shipping Dimensions:	52cm x 52cm x 33cm (20½" x 20½" x 13")
Shipping Weight:	11.8 kg (26 lbs) Reagents are shipped separately
Dimensions:	40cm x 46.5cm x 21.6cm (15.7" x 18.3" x 8.5")

Specifications subject to change without notice.

CLX-XT Monitor





Extended Reagent Life Online TRO and Chlorine Monitor

The steel encased CLX-XT2 Extended Reagent Life Online TRO and Chlorine Monitor is an economical and low-maintenance instrument for shipboard ballast water, potable water, or wastewater applications that require continuous monitoring and control of total chlorine or total residual oxidant (TRO) levels. This marine-grade monitor allows for up to 90 days of unattended operation. The CLX-XT2 offers complete control of dosing & monitoring ballast water discharge through user-selectable sample cycle times, 4-20mA and RS-485 with Modbus output for controlling feed pumps, and user-selectable alarms. The CLX-XT2 is housed in a strong, steel-coated IP56 (except fan IP54) case offering easy access to all service functions and reagents.



*Reagent life up to 90 days**



Features

- **NEW!** High range to 15 mg/l (option) $\pm$ 10% accuracy
- Optimized for high-temperature marine applications in high ambient temperatures up to 55°C (131°F)
- Low operating costs
- Cooling effect extends reagent life to 3 months*
- Designed for unattended operation up to 90 days*
- Colorimetric DPD chemistry
- User-selectable cycle times
- User-selectable alarms for sample concentration
- Ballast water treatment, drinking water & wastewater applications
- 4-20mA and RS-485 with Modbus output
- USEPA accepted methodology

*Depending on sample cycle times and BWMS monthly operation times

Ordering Information

Cat. No. Description

28033	CLX-XT2 Extended Reagent Life Online TRO and Chlorine Monitor complete with operating manual. Reagents must be purchased separately.
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Reagent Kit

Cat. No.

Total Chlorine reagent for CLX-XT2 12 month supply (based on estimated BWMS operational cycles)	09991
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Accessories/Options

Cat. No.

Replacement tubing/cuvette kit	CALL
High range option. 0-15 mg/l	28895
60 seconds to 10 minute cycle time	28896
Remote standby	25264
Auto drain	25279

Specifications

Range:	0 - 10 mg/l. 0-15 mg/l available
Cycle Time:	User selectable: 60 seconds - 10 minutes
Accuracy:	0 - 6 mg/l - $\pm 5\%$ or 0.03 mg/l of Cl ₂ (whichever is greater) 6 - 10 mg/l - $\pm 10\%$ High range option 0-15 mg/l $\pm 10\%$ or 0.03 mg/l of Cl ₂ (whichever is greater)
Resolution:	0.01 mg/l
Method:	USEPA accepted DPD method of analysis for measuring Total Residual Chlorine
Standard Outputs:	4-20 mA and RS-485 with Modbus
User Alarms:	2 user-selectable alarms for sample concentration
Operating Temperature:	0° - 55°C (32° to 131°F)
Sample Input Pressure:	0.3 bar - 10.3 bar (5 - 150psi)
Enclosure:	IP56 (except fan IP54)
Power:	100 - 240 VAC Auto Switchable 47-63hz
Certifications:	CE, UL, CSA, (ETL, ETLc)
Flow Rate to Waste:	200-400 ml/min
Shipping Dimensions:	61cm x 61cm x 33cm (24" x 24" x 13")
Shipping Weight:	11.8kg (26lbs)
Dimensions:	40cm x 46.5cm x 21.6cm (15.7" x 18.3" x 8.5")

CLX-XT2 Monitor with door open



Specifications subject to change without notice.



Extended Reagent Life Online TRO and Chlorine Monitor for Hazardous Atmospheres

The CLX-Ex and CLX-Ex2 Online TRO Monitors are rugged, safe, and low-maintenance instruments for shipboard ballast water treatment systems that require continuous monitoring and control of total residual oxidant (TRO) levels in hazardous atmospheres. The CLX-Ex and CLX-Ex2 offer complete manual or automatic control of dosing through its user-selectable cycle times, 4-20mA and RS-485 with Modbus output for controlling feed pumps, and user-selectable alarms. The CLX-Ex has 316 stainless steel enclosure while the steel CLX-Ex2 has a visible window.



*Reagent life up to 90 days**



Features

- **NEW!** Optional high range to 15 mg/l $\pm$ 10% accuracy
- Optimized for marine applications
- Designed for atmospheres where combustible fuel vapors may be present
- Housing certified for IECEx
- Suitable for Class 1, Zone 1, and Zone 2 environments
- Operates in ambient temperatures up to 55°C (131°F)
- Low operating costs & long reagent life
- Designed for unattended operation up to 90 days*
- Colorimetric DPD chemistry
- User-selectable cycle times
- User-selectable alarms for sample concentration
- Ballast water treatment, drinking water & wastewater applications
- 4-20mA and RS-485 with Modbus output
- USEPA accepted methodology
- Certified by ABS

*Depending on sample cycle times and BWMS monthly operation times

Ordering Information

Cat. No.	Description
28031	CLX-Ex Online TRO and Chlorine Monitor complete with operating manual. Reagents must be purchased separately.
28034	CLX-Ex2 Online TRO and Chlorine Monitor complete with operating manual. Reagents must be purchased separately.

Reagent Kit

	Cat. No.
Total Chlorine reagent for CLX-Ex, CLX-Ex2. 12 month supply	09991

(based on estimated BWMS operational cycles)

Accessories/Options

	Cat. No.
Replacement tubing/cuvette kit	09950
High range option. 0-15 mg/l	28895
60 seconds to 10 minute cycle time	28896

Specifications

Range:	0 - 10 mg/l
Cycle Time:	User Selectable: 60 seconds - 10 minutes
Accuracy:	0 - 6 mg/l - $\pm 5\%$ or 0.03 mg/l of Cl ₂ (whichever is greater) 6 - 10 mg/l - $\pm 10\%$ High range option 0-15 mg/l $\pm 10\%$ or 0.03 mg/l of Cl ₂ (whichever is greater)
Resolution:	0.01 mg/l
Method:	USEPA accepted DPD method of analysis for measuring Total Residual Chlorine
Standard Outputs:	4-20 mA and RS-485 with Modbus
User Alarm:	User-selectable alarm for sample concentration
Operating Temperature:	0° - 55°C (32° to 131°F)
Sample Pressure:	0.3 bar - 10.3 bar (5 - 150psi)
Compressed Air Pressure:	5.5 - 7 bar (80 - 101.5psi)
Enclosure:	IP66
Power:	240 VAC, 47-63 Hz, 250VA
Certifications:	CE, IECEx, (Ex px IIC T4 Gb 0°C ≤ Ta ≤ 55°C)
Flow Rate to Waste:	200-400ml/min
Shipping Dimensions:	93cm x 62cm x 32cm (36.5" x 24.5" x 12.5")
Shipping Weight:	32kg (70lbs) Reagents are shipped separately
Dimensions:	50cm x 48cm x 23.8cm (19.7" x 18.7" x 9.4")

Specifications subject to change without notice.

CLX-Ex Monitor angle view



CLX-Ex2 Monitor angle view





To order products in this brochure, contact your local HF scientific representative in your region.

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Additional system information and products specifications are available at HFscientific.com.



A Watts Water Technologies Company

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