

SSR-Ex

Online TRO and Chlorine Monitor for Hazardous Environments



The SSR-Ex instrument has been specifically designed to measure TRO and to operate in hazardous atmospheres meeting the IECEx and ATEX ratings as stated in the specifications. The instrument uses an IECEx approved purge/pressurization controller called the Air Sentinel II.

This instrument is sectioned such that all the electrical or powered devices are in the upper, purged section of the enclosure, while the lower (wetted parts) section contains no power at all and can be operated and maintained in a safe condition even with the main enclosure door open.

The SSR-Ex has been designed to meet the design criteria specified by Standard Methods for the Examination of Water and Wastewater (21st Edition) Method 4500-Cl G. DPD Colorimetric Method. The SSR-Ex uses a 515nm LED for measurement.

SSR-Ex Standard Features:

- Range 0 - 15 PPM (mg/l) using the colorimetric DPD Methodology
- Small footprint - Takes up very little space
- Local display/user interface provided with each instrument
 - User selectable response time
 - Purged compartmented sections permit maintenance without powering the system down
 - Remote standby OR MODBUS remote actuation required for each test measurement start
- Easy to change reagent packaging—no power down required to maintain
- Integrated sample pump
- Suitable for IECEx/ATEX Zone 1 and Zone 2
- Air Sentinel II purge/pressurization controller
- 4–20 mA and MODBUS outputs operate simultaneously if desired
- Enclosure features an emergency drain
- Required air filter/dryer is supplied with purchase of unit
- No bypass key or procedure needed
- Color coded reagent packaging

Theory of Operation

The SSR-Ex analyzer uses two solenoid pumps for reagent delivery, one peristaltic pump for sample water (FLOW) and one air driven valve for draining of the cuvette (PURGE). By incorporating the Air Sentinel II it is appropriate for use in environments with potentially hazardous conditions. The SSR-Ex must have a remote input to initiate a reading cycle. This can be actuated either by use of an externally applied 24V signal or through MODBUS input.

There are no electrical or electronic devices in the lower or wet section of the enclosure. This section of the enclosure is completely safe to open at any time for maintenance such as reagent replacement. The upper section of the enclosure houses all the electrical and electronic controls. This electrical compartment, when purged with dry, oil free air, is safe for use in a hazardous environment (see ratings for specifics). The main enclosure door must be opened to give access to the wet area for changing the reagent and for maintenance. Opening the main enclosure door does not violate the containment of the purged electrical area.

The sample stream for the analyzer is provided by an easy maintenance peristaltic pump assembly which is powered from inside the purged section of the electronics enclosure. Only the pump tube and rollers are in the wet area. Reagent solutions are added by two separate reagent pumps (one for indicator solution and a second for buffer solution) housed in the upper section of the enclosure. The reagent solutions are in the wetted section.

The LED's and the photodetector are connected to the optical assembly using light pipes. The detector light pipe is positioned 180° from the 515nm LED light pipe. A replaceable glass cuvette separates the LED and detector light pipes and maintains the proper path length for the sample measurement. Use of light pipes allows the wet area to be free of any electrical connection, permitting the section to be safely opened for maintenance. Sample water, provided by the peristaltic pump, flows in the inlet at the bottom of the optical assembly, through the measurement cuvette and out through either the overflow drain or the main drain.

This flow is used to provide sample to be measured and to flush the system between measurements. DPD reagents are dispensed from two replaceable reagent bags located in the lower left corner. Proper addition of the reagents produces a color reaction when an oxidant is present in the sample. The degree of color is dependent on the amount of oxidant in the sample water, the oxidant concentration is derived by measurement of the color developed and measured at 515 nm and is processed by the electronics to provide the reading in either PPM or mg/l.

The measurement chamber is visible to the operator to allow viewing of the operations in the optics including flow of sample and color change after reagent addition.

During normal operation, the SSR-Ex will run through a timed cycle. A simplified cycle will consist of the following sequences:

Flushing	Sample flow
Purging	PURGE valve opens
Zeroing	No flow with cuvette full
Adding Reagents	One pulse of the reagent pumps
Sample Reaction	Reaction of reagents with Oxidant sample
Reading Resulting sample	No flow with cuvette full
Purging	PURGE valve opens to remove the reacted sample and water

SSR-Ex Features & Benefits

Compartmentalized Design

The unique, compartmentalized design allows the user to perform maintenance and reagent changes to the SSR-Ex without powering down the entire system. The integrated Air Sentinel II ensures that the electronics portion of the analyzer is continually purged with dry air.

Air Sentinel II

The integrated Air Sentinel II purge controller ensures that the system can only be powered when the electronics compartment is properly purged with dry air. The Air Sentinel II was designed specifically to work with the SSR-Ex to allow it to meet the rigorous standards required for IECEx approval.

Remote Standby or MODBUS control

Measurement operations must be actuated either by MODBUS input or by a 24 volt signal provided by an external device (user supplied).

Simplified Calibration

The SSR-Ex can be easily calibrated directly using a proprietary secondary calibration solution or by comparison to a handheld photometer.

Rugged Design

The SSR-Ex was designed from the start to provide service to ballast water operations and builds on proven technology developed by industry leading ballast water manufacturer, HF scientific, inc.

Optics

The SSR-Ex uses advanced optic technology to enable the measurement chamber to be free of any electronics. The LED's and detectors used for measurement are connected to the optics via "light pipes" thereby eliminating the electronics from the measurement area.

Built-in Sample Pump

The SSR-Ex uses a long life peristaltic pump to deliver sample to the optics. This same peristaltic pump is used (when desired) to deliver calibration solution to the SSR-Ex enabling the user to easily confirm that the unit is measuring properly.

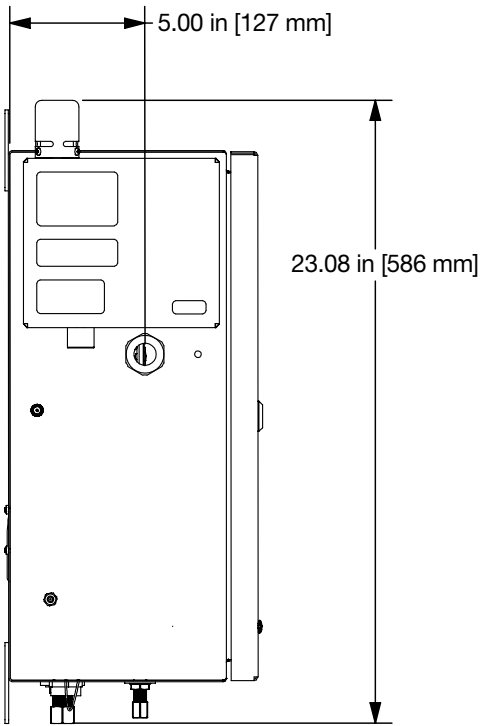


Technical Specifications

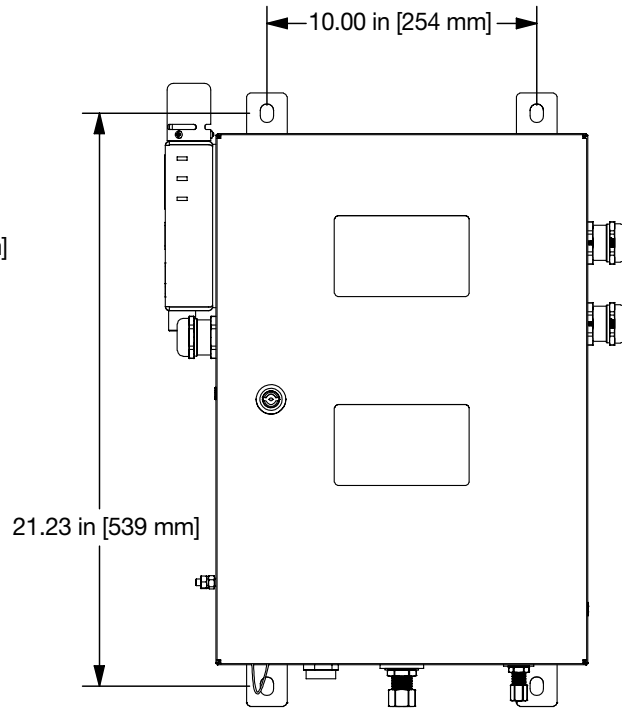
Measurement Range	0.00 – 15.00 mg/L (PPM)
Accuracy	±10% of reading or ±0.03 mg/L (PPM) whichever is greater for range of 0-15.0 mg/L (PPM)
Resolution	0.01 mg/L (PPM)
Cycle Time	Adjustable; 45 seconds to 10 minutes
Display	3.5" Color Graphic
Alarms	Two programmable, 120-240 VAC 2A Form C Relay
Analog Output	Powered 4-20 mA, 1000 W drive, isolated
Communications Port	Bi-directional RS-485 with Modbus
Water Pressure	Integral pressure regulator, maximum pressure 3 bar (45 PSI)
Flow Rate to Waste	150 ml/min maximum
Operating Temperature	0°C – 55°C (32°F – 131°F)
Wetted Materials	Polyethylene, Borosilicate Glass, Reslyn, FKM, Polypropylene, 316 Stainless Steel, Acetal, EPDM, Silicone, Modified PPO
Sample Temperature Range	0°C – 55°C (32°F – 131°F)
Power Supply	100 to 240VAC, 47-63 Hz, 150VA
Insulation Rating	Double Insulated, Pollution Degree 2, Overvoltage Category II
Enclosure	Powder coated steel with windows. IP55 Rating
Environmental Conditions	Altitude up to 2000 meters Up to 95 % RH (non-condensing)
IECEX Hazloc Rating	II 2G Ex pxb IIC T4 Gb 0°C ≤ Ta ≤ 55°C
Requirements	Water and oil-free, Particles <5u, ISA Grade Hydrocarbon Free. Full time clean dry air at 5.5 - 7 bar (80-101.5 PSI) @35 SLPM (1.2 SCFM) @ 20°C (68°F) Max
Regulatory Compliance and Certifications	IECEX, ATEX, submitted to DNVGL-CG-0339, tested to USCG 46 CFR Part 162 subsection 162.060-30
Shipping Weight	27.2 kg (60 lbs.) Reagents are Shipped Separately
Shipping Dimensions	93 cm X 62 cm X 32 cm (36½" X 24½" X 12½")

SSR-Ex Dimensions

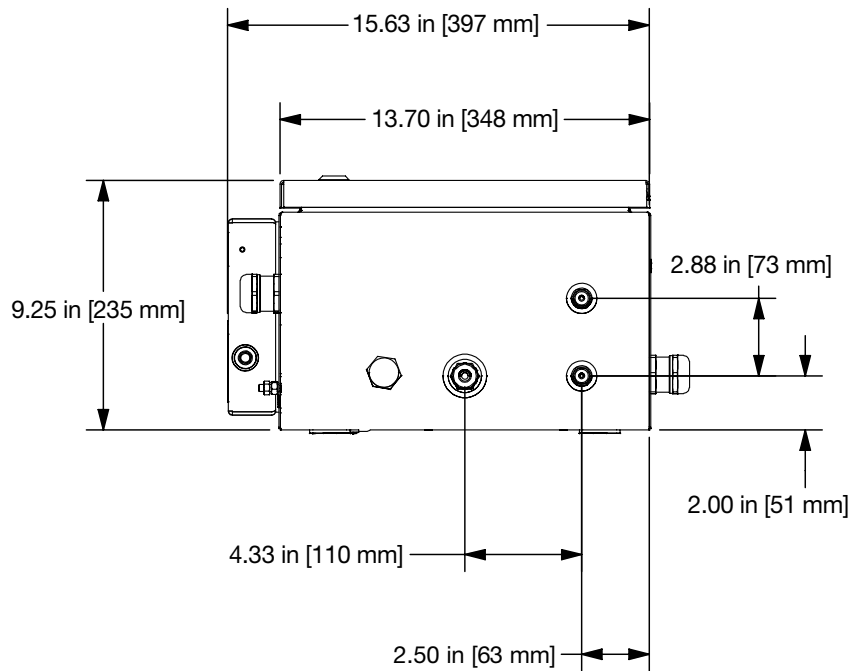
Side:



Front:



Bottom:



Accessories

PART NO.	DESCRIPTION
09931	Liquid Reagent Kit Total Chlorine
09958	JAW Dry Reagent Kit Total Chlorine
25096	Check Valve Flushing Kit
28141	Pump Head Replacement Kit
28142	Reagent Tubing Replacement Kit
28143	Strainer/Regulator Kit
28144	Calibration Kit for SSR-EX
100004	Air Cleaner Assembly
110012	T-strainer / Pressure regulator assembly
25018S	Replacement Cuvette
28625	Replacement T-Strainer Screen



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USA: T: (239) 337-2116 • Toll-Free (888) 203-7248 • F: (239) 332-7643 • HFscientific.com
 Latin America: T: (52) 81-1001-8600 • F: (52) 81-8000-7091 • HFscientific.com