

Multiple parameter water quality analyzer

From brine and wastewater to clean drinking water, the Thermo Scientific™ Orion™ Chlorine XP Water Quality Analyzer is designed to provide accurate, stable measurements of routine water quality parameters. With minimal maintenance, low cost of ownership, and multiple parameter measurement in one unit, the Orion Chlorine XP analyzer is a comprehensive water quality monitor.

The Orion Chlorine XP analyzer measures free, total, and both free-total chlorine in water. Design features help minimize the need for periodic calibrations and offer compatibility with many disinfectant processes. It utilizes an optical DPD-reagent based measurement technology that can be configured to use the least amount of reagents, while maintaining outstanding accuracy.

Features

High performance & reliability

- Outstanding performance in harsh sample conditions (sea water, colored water, oil-water mix)
- 0-10 ppm measurement range in most applications
- Self zero calibration before each reading
- Wet tested for 24 hours before shipping
- 2 year warranty¹

Low price and cost of ownership

- Free and total chlorine and pH, temperature in one analyzer saves from purchasing separate analyzers



- Low and customizable reagent consumption (default ~0.033 ml/sample) can last up to 2 months at 5 minute cycle times

Low maintenance

- Light source self calibration adjustment
- Hands-free self cleansing of the photocell
- Automatic elimination of bubbling in the photocell
- Maintenance reminders and alarms (once a year on average)
- Auto buffer recognition at 4, 7, and 10

Additional features

- Up to 6, 4-20 mA isolated current outputs
- 6 relays
- RS 485, Modbus® protocol support
- Optional Ethernet protocol to operations center



Orion Chlorine XP Water Quality Analyzer

Markets

- Drinking Water
- Food and Beverage
- Industrial

Applications

The Chlorine XP analyzer can be used as a general purpose chlorine measurement analyzer along with other parameters – pH, temperature, ORP, and flow in water quality measurement applications. Other applications include:

- **Drinking water treatment** – Most drinking water plants use chlorine as a preferred method of water disinfection and distribution monitoring. The Chlorine XP analyzer is designed to provide rapid feedback for chlorine dosing in water disinfection, as well as monitoring for chlorine levels during water distribution. Using an EPA approved DPD method with up to two months of reagent usage, the Chlorine XP analyzer is designed to deliver lower operating costs.
- **Power generation** – Power plants measure free and total chlorine for cooling water effluent to meet the regulatory limits for chlorine discharge. The Chlorine XP analyzer measures as low as 10 ppb for total chlorine in water, which is well below the minimum detection limits for most regulatory standards.
- **Food and beverage manufacturing** – Food and beverage plants need to measure chlorine before water goes through the reverse osmosis (RO) process. This is because chlorine can shorten the life of the RO membrane by chemically reacting with the membrane. The Chlorine XP analyzer is designed to provide low level detection (up to 10 ppb) and a quick response time, extending the life span of RO membranes which helps reduce operating costs for the plant.
- **Dialysis treatment** – Dialysis treatment centers monitor the chlorine level in kidney dialysis machines to make sure that it doesn't come into contact with blood. Chlorine/ chloramines in water used for dialysis can result in serious adverse patient reactions. The Chlorine XP analyzer is designed to measure less than 0.5 ppm (max. limit) total chlorine and provide quick response time, resulting in RO life extension and improved carbon filter efficiency.

The operating system is designed to be simple and intuitive. Once installed and calibrated, the Chlorine XP analyzer automatically releases the proper quantity of chemicals depending on measurement frequency. The standard Chlorine XP analyzer model comes with chlorine measurement, and can be configured to measure any combination of free chlorine, total chlorine, and both free-total chlorine.



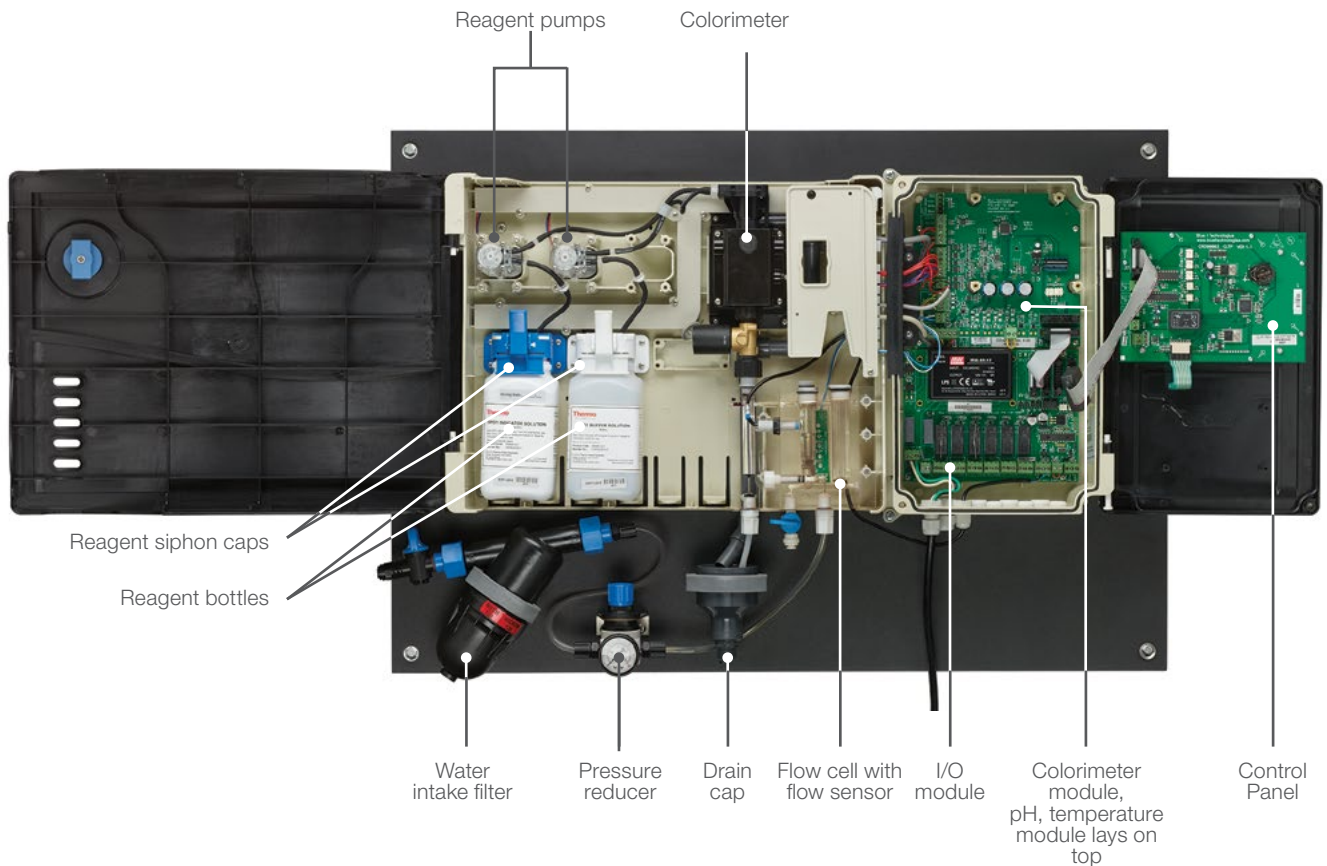
Inside Orion Chlorine XP Water Quality Analyzer

DPD Method

The DPD (N, N-diethyl-p-phenylenediamine) method for residual chlorine was first introduced by Dr. A.T. Palin in 1957². Over the years it has become the standard method for determining free and total chlorine in water and wastewater. When DPD reacts with small amounts of chlorine at a near neutral pH, a colored dye is the principal oxidation product. The DPD dye color is measured photometrically at wavelengths ranging from 490 to 555 nanometers (nm), which results in accurate reading of both free and total chlorine concentrations in water.

Free chlorine (hypochlorous acid + hypochlorite ions) reacts with the Free Chlorine Indicator (DPD1) causing a color change in the sample from clear to red. The buffer is used to ensure reaction at a consistent pH. The more free chlorine that is present, the darker the red color that forms. The color intensity is proportional to concentration as specified by the Beer-Lambert law.

Total chlorine is often used for monitoring combined chlorine (chloramines) levels. The presence of chloramines is an indicator of the level of organics present and can reduce the ability to disinfect the sample adequately. Combined chlorine is the difference between the total chlorine and free chlorine. When free chlorine and total chlorine need to be measured in sequence, the Total Chlorine Indicator (DPD3) is added to the sample already containing the Free Chlorine Indicator (DPD1) and buffer. The combined chlorine reacts with the Total Chlorine Indicator causing an increase in the red color. The total chlorine is determined from the color change and the combined chlorine is calculated from the difference between the total and free chlorine. When only total chlorine test is needed, the Total Chlorine Indicator (DPD4) is added to the sample causing color change and the levels of total chlorine is determined.



Product Specifications

| Specification | Description |
|------------------------------------|---|
| Performance | |
| Accuracy | ±5% |
| Repeatability | ±0.01 mg/L |
| Minimum detection limit | 10 ppb |
| Zero-point adjustment | Self zero before each reading |
| Cycle time | 2 to 10 minutes |
| Flow monitoring | Rotary flow switch (see Additional Requirements section for inlet/outlet pressure) |
| Parameters | FC, TC, F&TC, pH, Temp. |
| Measuring range | 0 to 10 ppm (Chlorine); 0-14 (pH) |
| Reliability | |
| Warranty | 2 years ¹ |
| Validation | Contact factory |
| USEPA accepted method ³ | Yes |
| CSA certified | Yes |
| CE certified | Yes |
| Operation requirements | |
| Maintenance | 1-2 months for reagent replacement and filter cleaning |
| Calibration | Every 6 months (pH only) |
| Reagent usage | DPD up to 2 months at 5 min. cycle time |
| Power consumption | Approx. 60 VA |
| Power supply | 100-240 VAC, 50/60Hz, 1.8A |
| Weight | 24 lbs (11 kg) |
| Dimensions (W x H x D) | 67 cm x 33 cm x 14 cm 26.0 in x 13.0 in x 5.5 in |
| Options/features | |
| Alarms | Optional, see manual |
| Enclosure | IP65-rated enclosures (NEMA 4 equivalent) |
| Local I/O | 2 standard 4-20 mA outputs 4 optional 4-20 mA outputs |
| Memory | 256 K |
| Lines | 1000 |
| Event logger | Yes |
| Total relay on time | Yes |
| Display type | 5.5 in graphic monochromatic; character LCD with background light alarms and status |
| Password | Operator and technician |
| Servicing/maintenance | Self-cleaning photocell (minimum service requirement) |
| Additional requirements | |
| Sample and drain connection | Pressurized sample inlet and gravity drain |
| Sample temperature | 33.8°F to 113 F (1°C to 45°C) |
| Ambient temperature | 15°F to 131°F (-10°C to 55°C) |
| Inlet pressure | 5-15 psi |
| Sample conditioning | Not required |

Ordering Information

| Product | Cat. No. |
|--|------------|
| Free Chlorine only with 2 x 4-20 mA outputs | CXP71 |
| Total Chlorine only with 2 x 4-20 mA outputs | CXP72 |
| Free & Total Chlorine combined, 2 x 4-20 mA outputs | CXP73 |
| Free Chlorine + pH + Temp. 2 x 4-20 mA outputs | CXP71PH |
| Total Chlorine + pH + Temp. 2 x 4-20 mA outputs | CXP72PH |
| Free & Total Chlorine combined + pH + Temp 2 x 4-20 mA outputs | CXP73PH |
| Reagents | |
| 5 sets of DPD1 reagents for Free Chlorine | CXPRGDPD1F |
| 5 sets of DPD4 reagents for Total Chlorine | CXPRGDPD4T |
| 5 sets of DPD3 reagents for Total Chlorine (need to be used with DPD1 for CXP73 and CXP73PH) | CXPRGDPD3T |

Spare Parts Ordering Information

| Product | Description | Cat. No. |
|---|---|------------|
| All configurations | Additional 2 channels 4-20 mA internal module | CXPSP2CMOD |
| Yearly replacement kit for Free or Total Chlorine: CXP71, CXP72, CXP71PH, CXP72PH | Yearly replacement kit (Free Chlorine), including: <ul style="list-style-type: none"> • Injectors module • Pump head x 2 • Neoprene tube - 1 m • Rotating flow switch • Grease | CXPKTYRKFC |
| Yearly replacement kit for Free & Total Chlorine: CXP73, CXP73PH | Yearly replacement kit (Free and Total Chlorine), including: <ul style="list-style-type: none"> • Injectors module x 3 needles • Pump head x 3 • Neoprene tube • Rotating flow switch • Grease | CXPKTYRKFT |

¹Subject to terms of manufacturer's standard limited warranty. Please contact your sales representative for more details.

²V.A. Argent, "A Short History of Palintest Ltd.", April 2009

³Steven C. Wendelken, Derek E. Losh, and Patricia S. Fair, Office of Ground Water and Drinking Water, "EPA Method 334.0: Determination of Residual Chlorine in Drinking Water Using an On-line Chlorine Analyzer", September 2009

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