Thermo Scientific
Orion 1816DO Dissolved Oxygen Analyzer
Low and trace level parts per billion measurement

Our dissolved oxygen instruments are best suited for your most challenging low and trace level ppb applications. Versatile and easy-to-use, our Thermo Scientific™ Orion™ 1816DO analyzer offers unbeatable response with the highest accuracy available.

The Orion 1816DO low level dissolved oxygen analyzer is designed to continuously analyze the oxygen across a wide variety of low and trace level ppb level applications. Highly accurate measurement performance with proven reliability, the 1816DO analyzer offers effective process control you can trust.

Our rugged and sensitive galvanic dissolved oxygen sensor with rapid response offers high performance results with confidence. The galvanic dissolved oxygen sensor incorporates unique “Guard Ring” technology that is capable of consuming oxygen and associated gases. Trace oxygen detection has never been easier with the pre-assembled, screw-on, bonded Teflon® membrane caps for sensor refurbishment in minutes, returning your system quickly to sub ppb range measurements, optimal for critical applications.

Advantages:
• Measures low level dissolved oxygen within ± 0.1 ppb
• Stable, drift resistance readings provide months of reliable measurements
• Easy to install screw-on pre-bonded Teflon membrane cap for fast replacement in minutes
• Galvanic probe technology with absolute zero oxygen ensures the most accurate low range dissolved oxygen readings
• One-button automatic calibration is quick and simple
• Advanced diagnostics include fault tolerance and dual programmable alarms with self and sensor diagnostic alert

Markets:
• Power
• Pulp and Paper
• Chemical Processing

Applications:
• Boiler Feed Water
• Ultra Pure Water
• Process Steam
• Deaerator Outlet
• Condensate
• Oxygen Feed Control for Plants Using Oxygenated Treatment (OT)
Product Benefits

- "Absolute zero", less drift and better stability — the 1816DO analyzer offers continuous high accuracy dissolved oxygen analysis in critical steam loops.
- Galvanic sensor speed of response allows sensitive, selective, reliable and verifiable measurements with complete assurance below 1 ppb.
- Sensors unique “Guard Ring” eliminates dissolved oxygen in the electrolyte to prevent false high readings and returns to low ppb range quickly every time.
- Extremely easy to use while maximizing uptime — simple automatic calibration with less maintenance using the quick screw pre-assembled Teflon membrane caps has you back online in less than 5 minutes.
- Cell chemistry regenerates the electrolyte, thus optimizing sensor life and extends the required maintenance cycle by years.
- High quality stainless steel flow cell design to prevent oxygen ingress with double shielded ppb dissolved oxygen sensor produces stable sub-ppb readings without “charging” as with other sensors.
- The 1816DO provides 1000 running data points for rapid trend analysis, true auto-ranging performance combined with 3 advanced levels of security to provide confidence and protect your data's integrity.
- Easy installation of the analyzer and stainless steel fluidics panel has your plant up and running in minutes with results you can see.

Sample Panel Features

- Robust stainless steel panel for fast installation.
- ppb dissolved oxygen sensor with guard ring for optimum response.
- Stainless steel flow cell.
- Double-shielded sensor cable for stable readings.
- Online automatic calibration.
- Magnetite grit bypass.
- Siphon-drain system.

Diagram of Sample Flow
Accuracy Dissolved Oxygen: ± 2% reading or 0.1 μg/L, whichever is greater
Temperature: ± 0.1 °C

Precision Dissolved Oxygen: ± 2% reading or 2 digits
Temperature: ± 0.1 °C

Response Time 90% within 30 sec (default), function of flow and temperature

Temperature Compensation Auto: -5.0 °C to 105 °C (23.0 °F to 221 °F)
Manual: -5.0 °C to 105 °C (23.0 °F to 221 °F)

Sample Conditions Flow: 50 mL/min to 200 mL/min
Temperature: 2 °C to 45 °C (35.0 °F to 113 °F) w/ standard DO
Pressure: <400 kPa (60 psi, 4 bar)
Drain: Atmospheric

Sample Inlet 1/4 in NPT tube fitting
Sample Outlet 3/4 in MNPT fitting

Security 3 access-level security; partial and/or all settings may be protected via 3 and/or 4 digit security.

Alarms Two independent, assignable, programmable, configurable, fail-safe NO/NC or auto-range BCD alarm relays; SPDT, Form C, rated 10A 115V/5A 230V, 5 position BCD contact closure.

Outputs Two continuous, assignable, programmable 4 mA to 20 mA or 0 mA to 20 mA outputs; isolated, max. load 600 Ω; convertible from VDC to VDC or 0 VDC to 5 VDC.

Display Four and one half LCD digits, 2.0 cm (0.8 in) displays for dissolved oxygen, atmospheric pressure, temperature, efficiency, error codes, prompts and diagnostic information (back-lit display optional)

Display Ranges Dissolved Oxygen: 0.00 mg/L to 10.00 mg/L or 0.01 μg/L to 9,999 μg/L
Temperature: -5.0 °C to 105 °C (23.0 °F to 221 °F)
Barometric Pressure: 72 to 130 kPa

Keypad 8 push-button entry keys
LEDs 2 alarms (A and B), 1 auto, 1 error

Case Dimensions 16.0 cm (H) x 26.0 cm (W) x 9.0 cm (D)

Panel Dimensions 36 cm (W) x 66 cm (H)
14 in (W) x 26 in (H)

Weight 11.4 kg (25.0 lb)
Shipping Weight 13.6 kg (30.0 lb)
Shipping Dimensions 46 cm x 30 cm x 23 cm (18 in x 12 in x 9 in)

Environmental Data
Temperature Operational: 5.0 °C to 45 °C (41.0 °F to 113 °F)
Storage: -10.0 °C to 55 °C (14.0 °F to 131 °F)
Relative Humidity: 5.0 °C to 45 °C (41.0 °F to 113 °F)

Environment Ratings Housing: IP65 (Nema 4X)
Pollution Category: II
Installation Category: 2

Electrical Ratings 115/230 VAC, 0.25A, 50/60 Hz

Electrical Requirements 115/230 VAC ±10%, 50 W

Certifications CSA C22.2 1010.1-92 (eqv. IEC 1010.1 LR 109591-3 UL Std No 3111-1; CE EN50081, EN55011; EN61000

Cross-section of Probe Sensor

silver cathode
Teflon® membrane
lead anode
KOH fill solution
sensor body
insulator
**Product Specifications**

© 2013 Thermo Fisher Scientific Inc. All rights reserved. Teflon is a registered trademark of E. I. du Pont de Nemours and Company, Wilmington, DE USA. Swagelok is a registered trademark of Swagelok Company, Solon, OH USA. All other trademarks are the property of Thermo Fisher Scientific Inc. & its subsidiaries.

---

**Thermo Fisher Scientific**  
Water Analysis Instruments  
Chelmsford, MA USA  
Quality Management System  
Registered to ISO 9001

thermoscientific.com/processwater

© 2013 Thermo Fisher Scientific Inc. All rights reserved. Teflon is a registered trademark of E. I. du Pont de Nemours and Company, Wilmington, DE USA. Swagelok is a registered trademark of Swagelok Company, Solon, OH USA. All other trademarks are the property of Thermo Fisher Scientific Inc. & its subsidiaries.

---

**Orion 1816DO Dissolved Oxygen Analyzer**

**Global support** — with experience that comes from supporting our customers for over 35 years throughout the world, our water quality specialists and customer support teams offer a quick, thorough and professional response to any problem encountered.

**Focus on user benefits** — we work closely with you to define your needs, and ensure you are using the analyzer in a way that improves your bottom line. For more information, contact your local water quality specialists, call 1-800-225-1480 or visit www.thermoscientific.com/processwater.

---

**Product Ordering Information**

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Dissolved Oxygen Analyzer Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1816DO</td>
<td>Low-level dissolved oxygen analyzer, complete with stainless steel flow cell (223115-S01), maintenance kit (181622), dissolved oxygen probe (181621) and 10 foot shielded cable, 115/230 V</td>
</tr>
<tr>
<td>18116D2</td>
<td>Low-level dissolved oxygen analyzer only, 115/230 V (does not include probe or flow cell)</td>
</tr>
<tr>
<td>1816FP*</td>
<td>316 stainless steel fluidics panel for online calibration, includes inlet valve, magnetite grit bypass, atmospheric pressure relief and grab sample chamber, flow cell outlet and siphon drain system</td>
</tr>
<tr>
<td>181621</td>
<td>Low-level dissolved oxygen probe with 10 foot shielded cable</td>
</tr>
<tr>
<td>18162X</td>
<td>Low-level dissolved oxygen probe with customized cable length, up to a 30 foot shielded cable (customer must specify at time of order)</td>
</tr>
<tr>
<td>181622</td>
<td>Maintenance kit, includes membrane module, O-ring and probe electrolyte solution</td>
</tr>
<tr>
<td>223115-S01</td>
<td>316 stainless steel flow cell only</td>
</tr>
<tr>
<td>223119-S01</td>
<td>Micro display board</td>
</tr>
<tr>
<td>223120-S01</td>
<td>Power board</td>
</tr>
<tr>
<td>223121-S01</td>
<td>Cable, interboard connector</td>
</tr>
</tbody>
</table>

* Note: The 1816DO image is shown with the 1816FP fluidics panel. The 1816DO requires purchase of the 1816FP.

---

sold and serviced in Canada by:

IC Controls
Process Water Analysis Equipment since 1979

www.iccontrols.com
sales@iccontrols.com
Phone: (519) 941-8161, (800) 265-9161