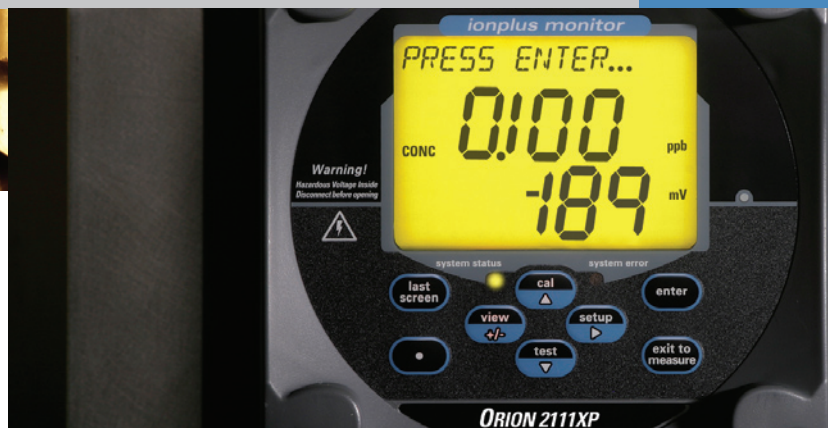


More of our sodium analyzers  
have been sold than all others  
combined...

Designed for accuracy and  
reliability with years of proven  
performance – it's easy to  
see why!

## Thermo Scientific Orion 2111XP

### Sodium Analyzer



#### Markets

- Power
- Semiconductor
- Chemical-Petrochemical
- Pulp and Paper

#### Applications

- Feedwater / Make-Up Water
- Boiler Feedwater
- Drum Boilers
- Demineralized Water
- Steam Condensate
- Cation Exchange Breakthrough
- High Acid Samples

#### Superior Performance and Ease of Operation

The new Thermo Scientific Orion 2111XP sodium analyzer offers unmatched reliability in analyzing critical sample streams throughout the power/steam generation and industrial water industries. The Orion 2111XP is ideally suited to meet the demanding needs of high purity water measurements and high acid-cation exchange applications, all in one system and all from one of the most trusted names in sodium analyzing.

The Orion 2111XP is offered in three application packages that are uniquely designed to accommodate the changing requirements for successful sodium analyzing.

Our flexible reagent kits are available in prepackaged bottles for safe and convenient replacement – save your valuable time and money!

#### Advantages

- **Ammonia Package** – for general purpose sodium measurements, provides up to 45 days of continuous operation
- **Diisopropylamine (DIPA) Package** – best suited for low detection range, provides up to 60 days of continuous operation
- **Cation/High Acid Package** – for cation exchange breakthrough and high acid samples, provides up to 45 days of continuous operation

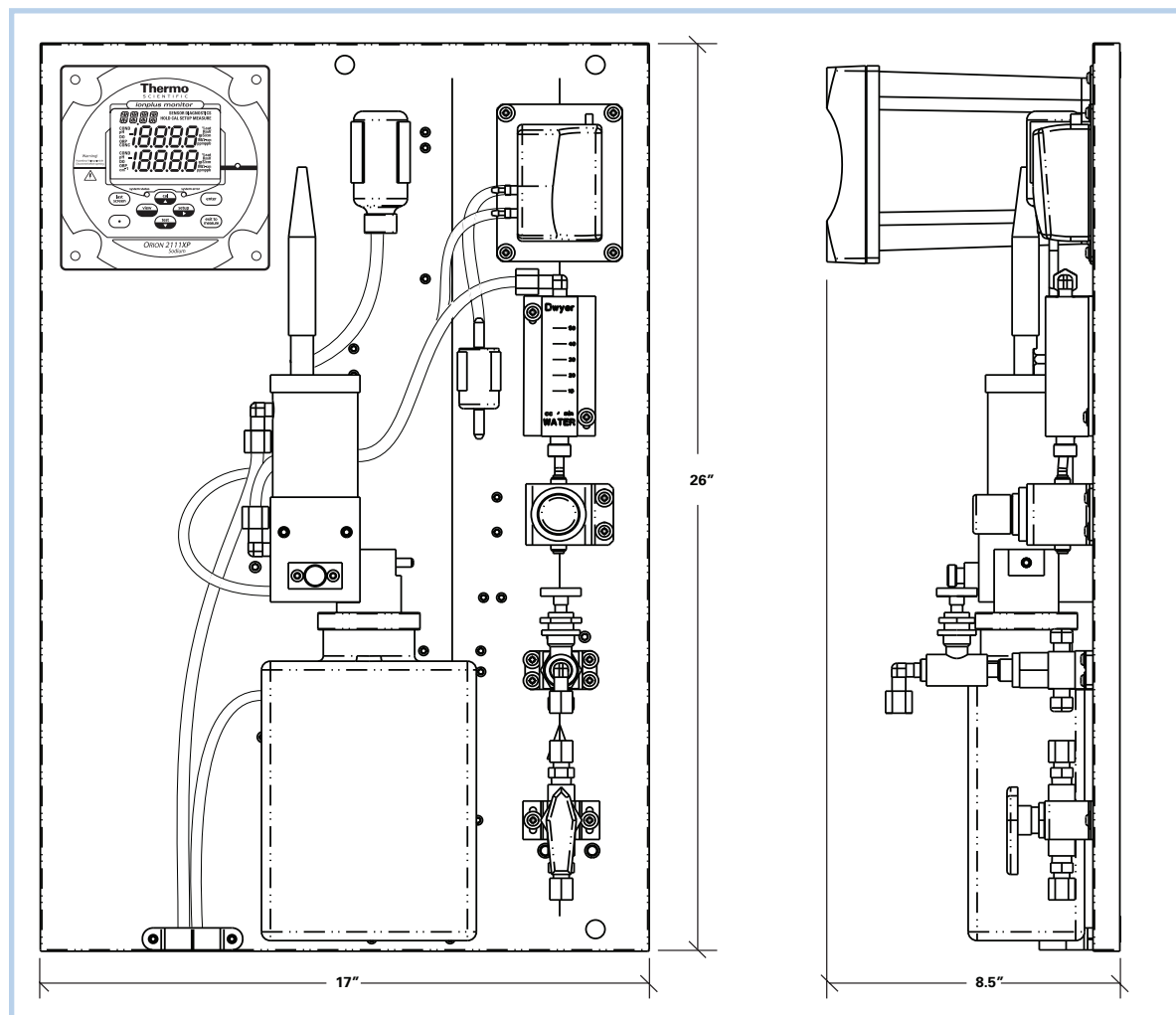
Maximize up time – the Orion 2111XP provides stable and drift free measurements, eliminating the need for frequent calibration.

### Benefits

- Detection limit of 0.1 ppb – the Orion 2111XP offers flexible application packages ideally suited for continuous sodium analyzing in a wide variety of samples
- Protect against the costly effects of corrosion with sensitive, selective, reliable and verifiable measurements that provide early warning detection of sodium
- Extremely easy to use while maximizing uptime – simple step-by-step scrolling instruction for setup, calibration, operation and diagnostics menus
- Measurements at a glance from any distance for even the lowest light conditions using the large operator friendly backlit display
- Fastest and most stable measurements, limiting unnecessary calibration cycles due to drift with new superior Orion sodium electrode technology
- Minimize operator time and maintenance without use of complicated moving parts or pumps that often require frequent attention and expensive spare part expenditures
- Extend reagent consumption up to 3 months (application specific) while reducing costly waste disposal fees—innovative and simple reagent addition design conditions sample pH for optimal sodium electrode performance while suppressing interfering ions
- Advanced user interface with detailed calibration, measurement and diagnostic logs for early diagnostic and action level notification, configurable for your facility's desired level of performance – all password protected if preferred
- Simple and fast calibration cycles using double known addition – quickly have your system back on line with security and confidence
- Expandable modules for grab sample and low level verification to meet the strictest guidelines for QA/QC validation programs
- Easy installation has your plant up and running in minutes – the Orion 2111XP is retrofitable to the Thermo Scientific Orion 1811EL/1811AO panel mounting footprint

### Dimensions

Thermo Scientific Orion 2111XP installation dimensions shown without optional protective enclosure.





## Thermo Scientific Orion 2111XP Sodium Analyzer

<b>Specific Ion Measurements</b>	<p><b>2111XA – Ammonia Application Package:</b>  <b>Reagent:</b> Ammonia  <b>Range:</b> 0.30 ppb to 200 ppm  <b>Resolution:</b> 1, 2 or 3 digits  <b>Accuracy (with DKA cal):</b> ± 5% or 0.3 ppb</p> <p><b>2111XD – DIPA Application Package:</b>  <b>Reagent:</b> Diisopropylamine  <b>Range:</b> 0.10 ppb to 10 ppm  <b>Resolution:</b> 1, 2 or 3 digits  <b>Accuracy (with DKA cal):</b> ± 5% or 0.1 ppb</p> <p><b>2111XC – Cation / High Acid Application Package:</b>  <b>Reagent:</b> Ammonia  <b>Range:</b> 1.0 ppb to 200 ppm  <b>Resolution:</b> 1, 2 or 3 digits  <b>Accuracy (with DKA cal):</b> ± 5% or 2 ppb</p>	<b>Outputs</b> <p><b>Analog output:</b> Galvanically isolated</p> <p><b>Number of analog outputs:</b> 2, one dedicated to sodium, one to temperature; shared ground</p> <p><b>Output selections:</b> 0 - 20 mA or 4 - 20 mA</p> <p><b>Programmable range:</b> YES</p> <p><b>Log &amp; linear output options:</b> YES, user selectable</p> <p><b>Alarm outputs:</b> 3</p> <p><b>Number of relay outputs:</b> 3</p> <p><b>Maximum relay load:</b> 250 VAC, 5 A, 30 VDC</p> <p><b>Minimum value alarm:</b> YES</p> <p><b>Maximum value alarm:</b> YES</p> <p><b>Error alarm:</b> YES</p> <p><b>Calibration/offline alarm:</b> YES</p> <p><b>Programmable min &amp; max values:</b> YES</p>
<b>Response Time</b>	<p><b>With freshly etched electrode, during calibration:</b>                      Reach 95% of final reading within 2 minutes of injecting a standard solution</p>	<b>Physical Size</b> <p><b>Electronics:</b> 144 x 144 x 186 mm</p> <p><b>Entire system:</b> 65 x 45 x 27 cm (26" x 17" x 11")                      Fits on 1811EL / 1811AO panel mounting footprint.</p>
<b>Units Displayed</b>	<p>ppb, ppm (auto ranging)</p>	<b>Power</b> <p><b>Input:</b> 85-132 or 170-264 V AC</p>
<b>mV Measurement</b>	<p><b>Range:</b> ± 1999.9 mV</p> <p><b>Resolution:</b> 0.1 mV</p> <p><b>Relative accuracy:</b> ± (0.5 mV + 0.1%)</p>	<b>Software Features</b> <p><b>Self-test &amp; diagnostics:</b> YES</p> <p><b>Real time clock:</b> YES</p> <p><b>Meter serial number:</b> YES</p> <p><b>Password protection:</b> YES</p> <p><b>Programmable alarms:</b> High, low, error, calibration/offline</p> <p><b>Reset function:</b> YES</p>
<b>Temperature Measurement</b>	<p><b>Range:</b> - 10 to 120 °C</p> <p><b>Resolution:</b> 0.1 °C</p> <p><b>Relative accuracy:</b> ± 0.5 °C</p> <p><b>Continuous temperature readings:</b> YES</p> <p><b>ATC probe connection detection:</b> YES</p>	<b>Meter Features</b> <p><b>Startup reset:</b> YES</p> <p><b>Hardware calibration function:</b> YES</p> <p><b>Non-volatile memory:</b> YES</p> <p><b>Battery backup:</b> YES</p> <p><b>Expansion bus:</b> Serial communication &amp; power</p>
<b>Specific Ion Calibrations</b>	<p><b>DKA calibration:</b> YES</p> <p><b>DKA calibration points:</b> 3 points</p> <p><b>Off-line calibration:</b> YES</p> <p><b>Off-line calibration points:</b> 1 point</p> <p><b>Pre-programmed standard values:</b> YES</p> <p><b>Custom programmed standard values:</b> YES</p>	<b>Electronics</b> <p><b>Waterproof enclosure:</b> IP66 &amp; NEMA 4X</p>
<b>Sample Conditions</b>	<p><b>Temperature:</b> 5 to 45 °C</p> <p><b>Total acidity:</b> Less than 250 ppm CaCO<sub>3</sub></p> <p><b>Inlet pressure:</b> 8 to 100 psig</p> <p><b>Flow rate:</b></p> <ul style="list-style-type: none"> <li>• 40 mL/min nominal set by pressure regulator (DIPA and Ammonia applications)</li> <li>• 25 mL/min nominal set by pressure regulator (cation/high acid applications)</li> </ul> <p><b>Sample inlet:</b> 1/4" NPTF tube fitting</p> <p><b>Sample drain:</b> 3/4" NPT male</p> <p><b>Grab sampler supported:</b> YES</p>	<b>Regulatory and Safety</b> <p>CE, CSA, FCC Class A limits</p>
<b>Display</b>	<p>Custom backlit LCD with temperature, concentration, mV, error codes and menu driven prompts</p>	<b>Environmental Operating Conditions</b> <p><b>Ambient operating temperature:</b> 5 to 45 °C</p> <p><b>Relative humidity:</b> 5 to 95% non-condensing</p> <p><b>Storage temperature:</b> - 20 to 60 °C</p> <p><b>Storage humidity:</b> 5 % to 95 %, non-condensing</p>
<b>Inputs</b>	<p><b>ATC:</b> 2 x NTC 30K</p> <p><b>Specific ion input &amp; reference:</b> Potentiometric</p>	<b>Case Material</b> <p>Valox 364</p>
		<b>Shock and Vibration</b> <p><b>Vibration, shipping/handling:</b> 0 - 60 Hz @ 1 G Load</p> <p><b>Shock, drop test in packaging:</b> 36" on all sides and corners</p>

## Thermo Scientific Orion 2111XP Sodium Analyzer

- **Global support** – with experience that comes from supporting our sodium 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.thermo.com/water](http://www.thermo.com/water).

Cat. No.	Sodium Analyzer Packages
2111XPEN	<b>Sodium Analyzer With Protective Enclosure Package</b> – includes sodium analyzer with protective enclosure and internal grab sampler, sodium electrode (210045), reference electrode (210056), ATC probe (2100TP), sodium standard solution kits (181140 and 181141), CD user guide and options kit (Ships with application package 2111XD)
2111XPENG	<b>Sodium Analyzer With Protective Enclosure Package</b> – includes sodium analyzer with protective enclosure, sodium electrode (210045), reference electrode (210056), ATC probe (2100TP), sodium standard solution kits (181140 and 181141), CD user guide and options kit (Ships with application package 2111XD)
2111XP	<b>Sodium Analyzer Instrument Only Package</b> – includes sodium analyzer and internal grab sampler, sodium electrode (210045), reference electrode (210056), ATC probe (2100TP), sodium standard solution kits (181140 and 181141), CD user guide and options kit (Application package 2111XA, 2111XD or 2111XC must be purchased separately)
2111XPG	<b>Sodium Analyzer Instrument Only Package</b> – includes sodium analyzer, sodium electrode (210045), reference electrode (210056), ATC probe (2100TP), sodium standard solution kits (181140 and 181141), CD user guide and options kit (Application package 2111XA, 2111XD or 2111XC must be purchased separately)

Cat. No.	Application Packages
2111XA	<b>Ammonia Application Package</b> – Ammonia reagent bottle adapter (2100ARBA) and diffusion tubing (150060).
2111XD	<b>DIPA Application Package</b> – DIPA reagent bottle adapter (2100DRBA) and diffusion tubing (211194)
2111XC	<b>Cation/High Acid Application Package</b> – Ammonia reagent bottle adapter (2100ARBA) and diffusion tubing (181160)

Cat. No.	Reagent Packages
211160XP	<b>Ammonia Application Consumables Package</b> – for one year operation, includes (12) x 2 L bottles ammonia reagent (181130), diffusion tubing (150060), standard solution kit (181141), sodium electrode (210045), reference electrode (210056), (5) x 2 oz. bottles reference filling solution (181073), O-ring kit, check valve, pipet tips (0.1 mL), restriction tube assembly and inlet filters
211160XPF*	<b>Reagent-less Ammonia Application Consumables Package</b> – for one year operation, includes (12) x 2 L empty bottles for use with ammonia reagent (181130), diffusion tubing (150060), standard solution kit (181141), sodium electrode (210045), reference electrode (210056), (5) x 2 oz. bottles reference filling solution (181073), O-ring kit, check valve, pipet tips (0.1 mL), restriction tube assembly and inlet filters
181130	<b>Ammonia Reagent</b> – for 30 days operation, includes (1) x 2 L bottle (application-specific diffusion tubing not included)
181130FOR	Includes (1) x 2 L bottle empty for use with Ammonia Reagent (application-specific diffusion tubing not included)
150060	<b>Ammonia Application Diffusion Tubing</b> – (1) x 4 ft thick-walled diffusion tubing, for use with ammonia reagent
211192XP	<b>Diisopropylamine Application Consumables Package</b> – for one year operation, includes (6) x 0.8 L bottles DIPA reagent (211191), (6) diffusion tubing kits (211194), reagent bottle adapter, standard solution kit (181140), sodium electrode (210045), reference electrode (210056), (5) x 2 oz. bottles reference filling solution (181073), O-ring kit, check valve, pipet tips (0.1 mL), restriction tube assembly and inlet filters
211192XPF*	<b>Reagent-less Diisopropylamine Application Consumables Package</b> – for one year operation, includes (6) x 0.8 L empty bottles, (6) diffusion tube kits (211194), reagent bottle adapter, standard solution kit (181140), sodium electrode (210045), reference electrode (210056), (5) x 2 oz. bottles reference filling solution (181073), O-ring kit, check valve, pipet tips (0.1 mL), restriction tube assembly and inlet filters
211190	<b>Diisopropylamine Reagent</b> – for 60 days operation, includes (1) x 0.8 L bottle DIPA reagent and (1) diffusion tubing kit (211194)
211191FOR*	<b>Reagent-less Diisopropylamine Reagent</b> – For one year operation, includes (6) x 8 inch diffusion tubing assemblies with O-rings for use with DIPA reagent
211190FOR*	<b>Reagent-less Diisopropylamine Reagent</b> – For 60 days of operation, includes (1) x 8 inch diffusion tubing assemblies with O-rings for use with DIPA reagent
211196	(6) x 8 inch pack

\* For International Use Only

Cat. No.	Reagent Packages (cont'd)
211191	<b>Diisopropylamine Reagent</b> – for one year operation, includes (6) x 0.8 L bottles DIPA reagent and (6) diffusion tubing kits (211194)
211194	<b>Diisopropylamine Application Diffusion Tubing Kit</b> – (1) x 4 inch diffusion tubing assembly with O-rings for use with DIPA reagent
211193	(1) x 8 inch pack
211198	<b>Diisopropylamine Application Diffusion Tubing Kit</b> – (1) x 8 inch diffusion tubing assembly with O-rings for use with DIPA reagent
211150XP	<b>Cation/High Acid Application Consumables Package</b> – for one year operation, includes (12) x 2 L bottles ammonia reagent (181130), diffusion tubing (181160), standard solution kit (181140), sodium electrode (210045), reference electrode (210056), reference electrode filling solution (181073), O-ring kit, check valve, pipet tips (0.1 mL), restriction tube assembly and inlet filters
211150XPF*	<b>Reagent-less Cation/High Acid Application Consumables Package</b> – for one year operation, includes (12) x 2 L empty bottles for use with ammonia reagent (181130), diffusion tubing (181160), standard solution kit (181140), sodium electrode (210045), reference electrode (210056), (5) x 2 oz. bottles reference electrode filling solution (181073), O-ring kit, check valve, pipet tips (0.1 mL), restriction tube assembly, and inlet filters
181160	<b>Cation/High Acid Application Diffusion Tubing</b> – (3) x 5' 8" thin-walled diffusion tubing for use with ammonia reagent
Cat. No.	Sodium Electrodes and Accessories
2111XPEK	<b>Electrode Kit</b> – includes sodium electrode (210045), reference electrode (210056) and (1) x 2 oz bottle reference electrode filling solution (181073)
210045	<b>Sodium Sensing Electrode</b> – for use with 2111XP
210056	<b>Sodium Reference Electrode</b> – for use with 2111XP, includes (1) x 2 oz bottle reference electrode filling solution (181073)
181073	<b>Reference Electrode Filling Solution</b> – (5) x 2 oz bottles, for use with reference electrode (210056)
2100EC	<b>Electrode Cables</b> – (2) x 1 meter cables for 210045 and 210056 electrodes
2100TP	<b>2100 Series Automatic Temperature Probe</b> – with ground (30 kΩ)
2111XPCAL	<b>Calibration Kit</b> – includes carrying case, 0.1 mL pipet (207524-001), pipet tips (207525-001), wash bottle, (1) x 2 oz bottle low level standard 1 (19.1 ppm Na <sup>+</sup> ), (1) x 2 oz bottle low level standard 2 (192 ppm Na <sup>+</sup> ), (1) x 2 oz bottle high level standard 1 (1910 ppm Na <sup>+</sup> ), (1) x 2 oz bottle high level standard 2 (19200 ppm Na <sup>+</sup> ) and sodium electrode etch solution (181113)
Cat. No.	Field Replaceable Units - For a complete listing refer to the user guide
2100EN	2100 series enclosure only
2100FP	Fluidics panel assembly only
2100BV	Bypass/needle valve assembly
2100RG	Regulator assembly
2100FM	Flow meter assembly
2100RT	Restrictor tube assembly
2100FC	Flow cell assembly
2100PA	Air pump assembly
2100AF	Air filter assembly
2100VC	Check valve
2100DRBA	Reagent bottle adapter for use with DIPA reagent
2100ARBA	Reagent bottle adapter for use with ammonia reagent
2100OK	O-ring kit
2100PS	Power supply assembly
2111XPEP	2111XP electronics faceplate

©2009 Thermo Fisher Scientific Inc. All rights reserved.  
All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries.

### Process Water Instruments

**North America**  
166 Cummings Center  
Beverly, MA 01915 USA  
Toll Free: 1-800-225-1480  
Tel: 1-978-232-6000  
Dom. Fax: 1-978-232-6015  
Int'l Fax: 978-232-6031

**Europe**  
P.O. Box 254, 3860 AG Nijkerk  
Wallerstraat 125K, 3862 CN  
Nijkerk, Netherlands  
Tel: (31) 033-2463887  
Fax: (31) 033-2460832

**Asia Pacific**  
Blk 55, Ayer Rajah Crescent  
#04-16/24, Singapore 139949  
Tel: 65-6778-6876  
Fax: 65-6773-0836

[www.thermo.com/processwater](http://www.thermo.com/processwater)



S-2111XP-E 0609 Rev.E

**Thermo**  
SCIENTIFIC