

More Thermo Scientific Orion sodium monitors 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 Monitor

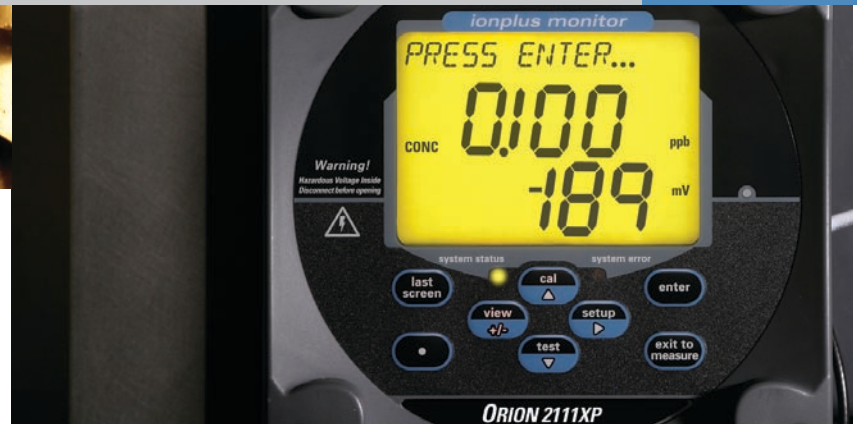
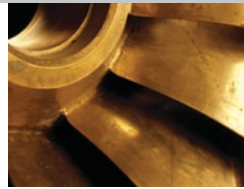


### Markets

- 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 Orion 2111XP Sodium Monitor offers unmatched reliability in analyzing critical sample streams throughout the power/steam generation and industrial water industry. 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 monitoring.

The Orion 2111XP is offered in 3 application packages that are uniquely designed to accommodate the changing requirements for successful sodium monitoring.

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

- **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

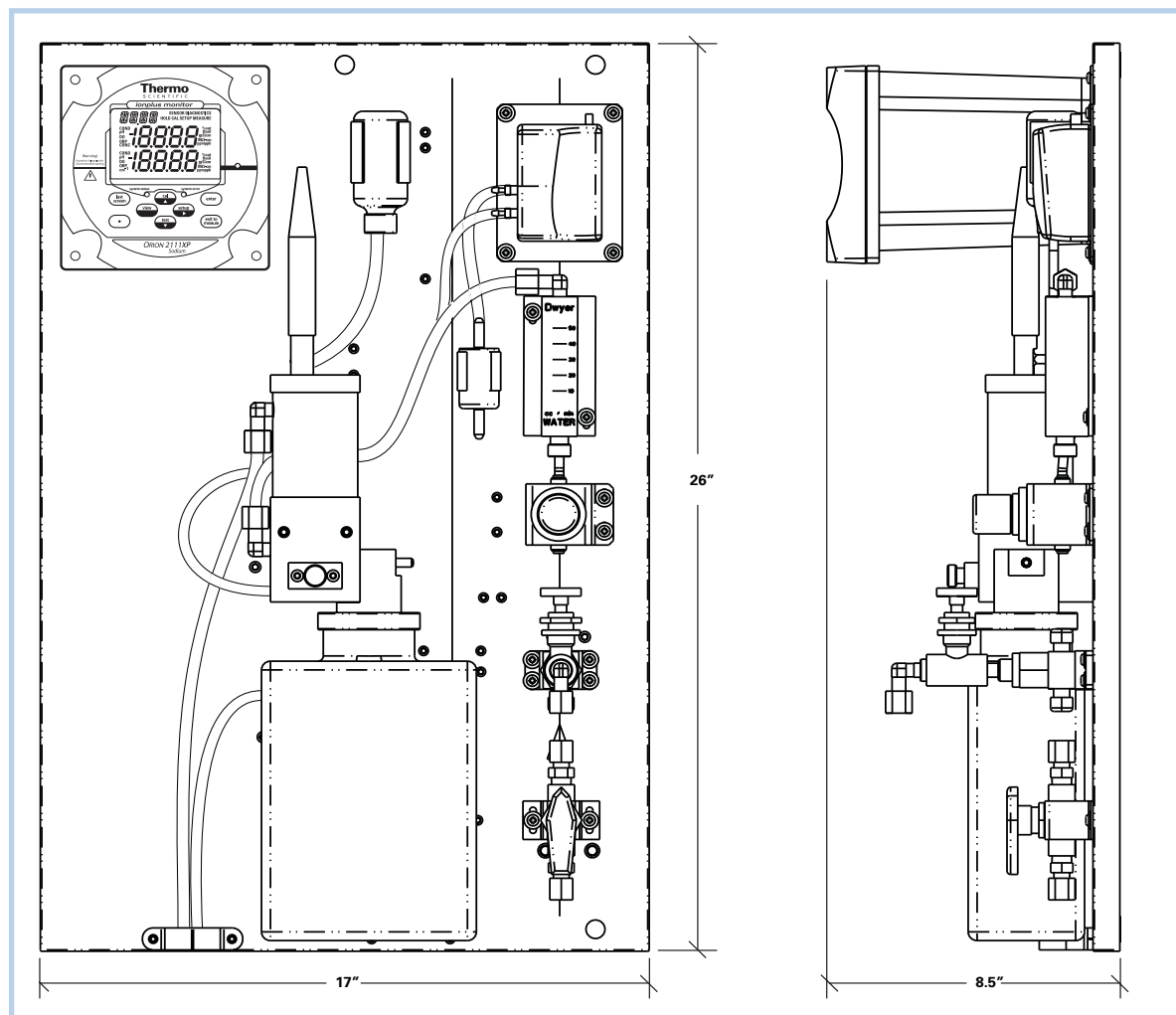
Maximize up time- the Orion 2111XP provides stable and drift free measurements- eliminating the need for frequent calibration.

### Benefits

- Detection limit of 0.1 ppb- the Orion 2111XP offers flexible application packages ideally suited for continuous sodium monitoring 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 set-up, calibration, operation and diagnostics menus
- Measurements at a glance from any distance for even the lowest light conditions using the large operator friendly visible backlit display
- Fastest 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 facilities 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 Orion 1811EL/1811AO panel mounting footprint

### Dimensions

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





Thermo Scientific Orion 2111XP Sodium Monitor

<b>Specific Ion Measurements</b>	<p><b>2111XA– Ammonia Application Package:</b>  <b>Reagent:</b> Ammonia  <b>Range:</b> 0.30 ppb - 200 ppm  <b>Resolution:</b> 1, 2, 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 - 10 ppm  <b>Resolution:</b> 1, 2, 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 - 200 ppm  <b>Resolution:</b> 1, 2, 3 digits  <b>Accuracy (with DKA cal):</b> ± 5% or 2 ppb</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>Units Displayed</b>	ppb, ppm (auto ranging)
<b>mV Measurement</b>	<p><b>Range:</b> ± 1999.9 mV  <b>Resolution:</b> 0.1 mV  <b>Relative accuracy:</b> ± (0.5 mV + 0.1%)</p>
<b>Temperature Measurement</b>	<p><b>Range:</b> - 10 to 120 °C  <b>Resolution:</b> 0.1 °C  <b>Relative accuracy:</b> ± 0.5 °C  <b>Continuous temperature readings:</b> YES  <b>ATC probe connection detection:</b> YES</p>
<b>Specific Ion Calibrations</b>	<p><b>DKA calibration:</b> YES  <b>DKA calibration points:</b> 3 points  <b>Off-line calibration:</b> YES  <b>Off-line calibration points:</b> 1 point  <b>Pre-programmed standard values:</b> YES  <b>Custom programmed standard values:</b> YES</p>
<b>Sample Conditions</b>	<p><b>Temperature:</b> 5 to 45 °C  <b>Total acidity:</b> less than 250 ppm CaCO<sub>3</sub>  <b>Inlet pressure:</b> 8 to 100 psig  <b>Flow rate:</b>                  • 40 mL/min nominal set by pressure regulator (DIPA and Ammonia applications)                  • 25 mL/min nominal set by pressure regulator (cation/high acid applications)  <b>Sample inlet:</b> 1/4" NPTF tube fitting  <b>Sample drain:</b> 3/4" NPT male  <b>Grab sampler supported:</b> YES</p>
<b>Display</b>	Custom backlit LCD with temperature, concentration, mV, error codes, menu driven prompts
<b>Inputs</b>	<p><b>ATC:</b> 2 x NTC 30K  <b>Specific ion input &amp; reference:</b> Potentiometric</p>

<b>Outputs</b>	<p><b>Analog output:</b> Galvanically isolated  <b>Number of analog outputs:</b> 2, one dedicated to sodium, one to temperature; shared ground  <b>Output selections:</b> 0 - 20 mA or 4 - 20 mA  <b>Programmable range:</b> YES  <b>Log &amp; linear output options:</b> YES, user selectable  <b>Alarm outputs:</b> 3  <b>Number of relay outputs:</b> 3  <b>Maximum relay load:</b> 250 VAC, 5 A, 30 VDC  <b>Minimum value alarm:</b> YES  <b>Maximum value alarm:</b> YES  <b>Error alarm:</b> YES  <b>Calibration/offline alarm:</b> YES  <b>Programmable min &amp; max values:</b> YES</p>
<b>Physical Size</b>	<p><b>Electronics:</b> 144 x 144 x 186 mm  <b>Entire system:</b> 65 x 45 x 27 cm (26" x 17" x 11")                  Fits on 1811EL / 1811AO panel mounting footprint.</p>
<b>Power</b>	<b>Input:</b> 85-132 or 170-264 V AC
<b>Software Features</b>	<p><b>Self-test &amp; diagnostics:</b> YES  <b>Real time clock:</b> YES  <b>Meter serial number:</b> YES  <b>Password protection:</b> YES  <b>Programmable alarms:</b> High, low, error, calibration/offline  <b>Reset function:</b> YES</p>
<b>Meter Features</b>	<p><b>Startup reset:</b> YES  <b>Hardware calibration function:</b> YES  <b>Non-volatile memory:</b> YES  <b>Battery backup:</b> YES  <b>Expansion bus:</b> Serial communication &amp; power  <b>Waterproof enclosure:</b> IP66 &amp; NEMA 4X</p>
<b>Regulatory and Safety</b>	CE, CSA, UL, FCC Class A limits
<b>Environmental Operating Conditions</b>	<p><b>Ambient operating temperature:</b> 5 to 45 °C  <b>Relative humidity:</b> 5 to 95% non-condensing  <b>Storage temperature:</b> - 20 to 60 °C  <b>Storage humidity:</b> 5 % to 95 %, non-condensing</p>
<b>Case Material</b>	Valox 364
<b>Shock and Vibration</b>	<p><b>Vibration, shipping/handling:</b> 0 - 60 Hz @ 1 G Load  <b>Shock, drop test in packaging:</b> 36" on all sides and corners</p>

**Thermo Scientific Orion 2111XP Sodium Monitor**

- **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 monitor 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 Monitor Packages
2111XPEN	<b>Sodium Monitor With Protective Enclosure Package-</b> To be used with expandable application packages 2111XA, 2111XD, or 2111XC. Comes with sodium monitor packaged with sensing electrode (210045), reference electrode (210056), ATC (2100TP), solution kits (181140 & 181141), CD user guide, and options kit
2111XP	<b>Sodium Monitor Instrument Only Package-</b> To be used with expandable application packages 2111XA, 2111XD, or 2111XC. Comes with sodium monitor packaged with sensing electrode (210045), reference electrode (210056), ATC (2100TP), solution kits (181140 & 181141), CD user guide, and options kit
<b>Application Packages</b>	
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)
<b>Reagent Packages</b>	
211160XP	<b>Ammonia Application Consumables Package-</b> for one year operation, consists of (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, consists of (12) x 2 L empty reagent 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> (1) x 2 L bottle, for 30 days operation (application-specific diffusion tubing not included)
150060	<b>Ammonia Application Diffusion Tubing-</b> (1) x 4 ft piece of thick walled diffusion tubing for use with ammonia reagent
211192XP	<b>Diisopropylamine Application Consumables Package-</b> for one year operation, consists of (6) x 0.8 L DIPA reagent (211191), (6) diffusion tube assemblies (211194), reagent bottle adapter (2111RBA), 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, consists of (6) x 0.8 L empty bottles, (6) diffusion tube assemblies (211194), reagent bottle adapter (2111RBA), 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> (1) x 0.8 L DIPA reagent for 60 days operation, complete with (1) diffusion tube assembly (211194)
211191	<b>Diisopropylamine Reagent-</b> (6) x 0.8 L DIPA reagent for 60 days operation, complete with (6) diffusion tube assemblies (211194)
211190FOR*	<b>Reagent-less Diisopropylamine Reagent-</b> (1) x 0.8 L empty bottle for use with DIPA reagent, complete with (1) diffusion tube assembly (211194)
211191FOR*	<b>Reagent-less Diisopropylamine Reagent-</b> (6) x 0.8 L empty bottles for use with DIPA reagent, complete with (6) diffusion tube assemblies (211194)
211194	<b>Diisopropylamine Application Diffusion Tube-</b> twist and lock assembly for use with DIPA reagent

Cat. No.	Reagent Packages (continued)
211150XP	<b>Cation/High Acid Application Consumables Package-</b> for one year operation, consists of (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, consists of (12) x 2 L empty reagent 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) pieces of 5' 8" thin walled diffusion tubing for use with ammonia reagent
<b>Sodium Electrodes and Accessories</b>	
2111XPEK	<b>Electrode Kit-</b> contains sodium reference electrode (210056) with filling solution (181073) and sodium sensing electrode (210045)
210045	<b>Orion Sodium Sensing Electrode-</b> for use with 2111XP
210056	<b>Orion Sodium Reference Electrode-</b> for use with 2111XP, includes reference electrode filling solution (181073)
181073	<b>Reference electrode filling solution-</b> (5) x 2 oz bottles for use with reference electrode (210056)
2100TP	<b>Orion Automatic Temperature Probe-</b> for use with 2111XP
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)
<b>Field Replaceable Units</b>	
2100EN	2100 series enclosure only
2100FP	Fluidics panel assembly only
2100BP	Steel back panel assembly
2100NV	Inlet valve assembly
2100BV	Bypass/needle valve assembly
2100RG	Regulator assembly
2100DA	Drain and clamp assembly
2100FM	Flow meter assembly
2100RT	Restrictor tube assembly
2100FC	Flow cell assembly
2100PA	Air pump assembly
2100AF	Air filter assembly
2100DV	Diverter valve assembly
2100VC	Check valve
2100DRBA	2100 series reagent bottle adapter for use with DIPA reagent
2100ARBA	2100 series reagent bottle adapter for use with ammonia reagent
2100OK	O-ring kit
2100FK115	Fuse kit assembly 115 V
2100FK230	Fuse kit assembly 230 V
2100PS	Power supply assembly
2111XPEP	2111XP electronics faceplate

\* For International use only