

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

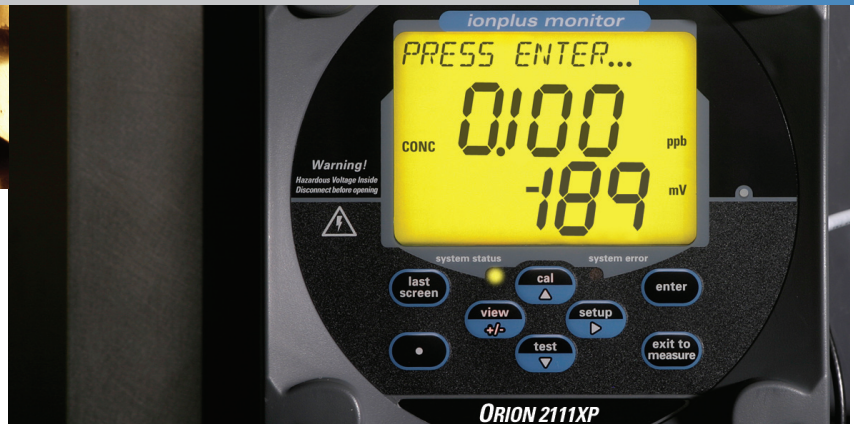
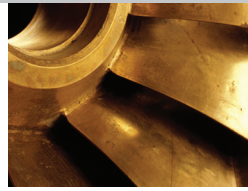


Markets

- 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

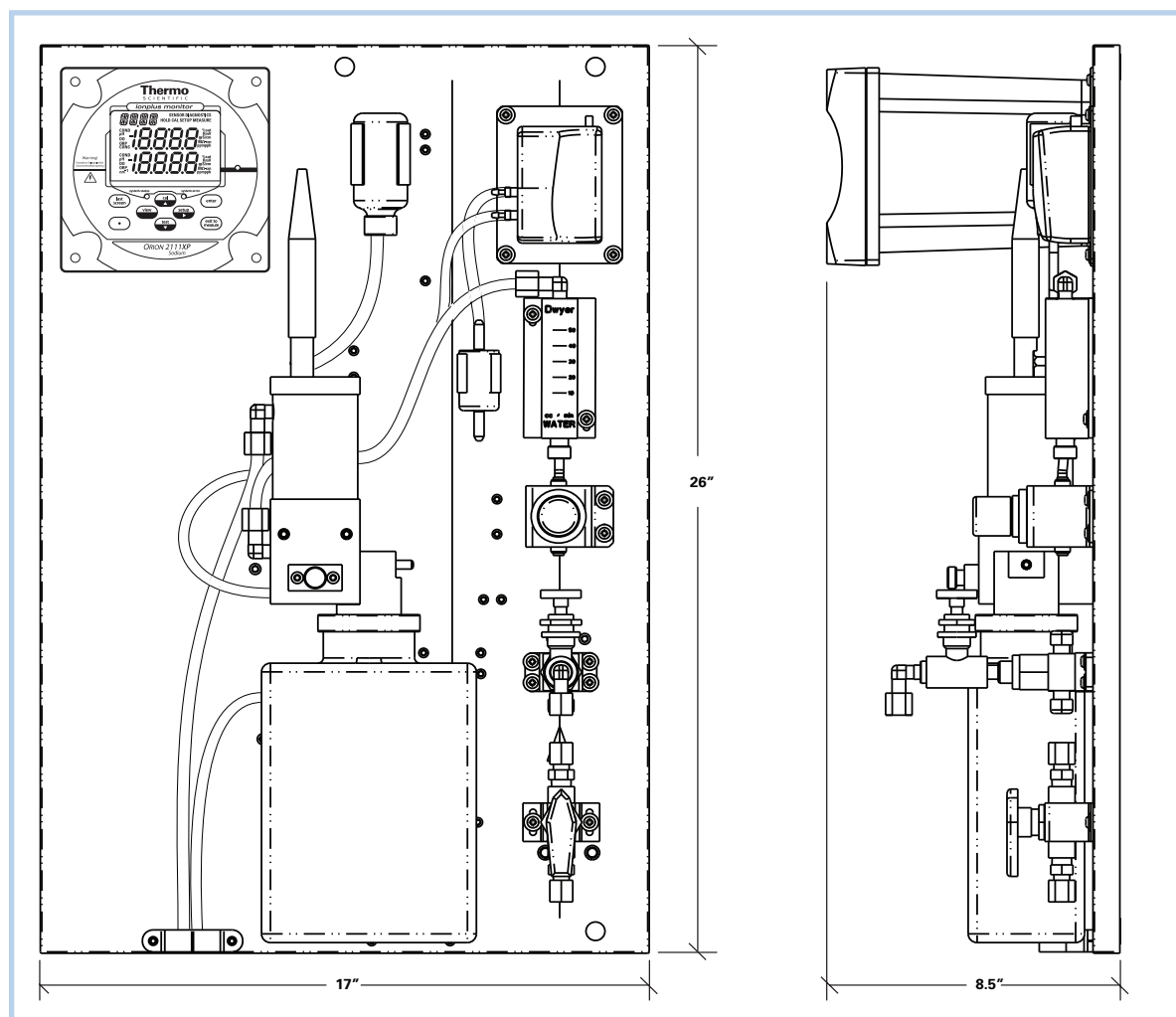
Maximize up time- the Orion 2111XP provides stable and drift free measurements- eliminating the need for frequent calibration.

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

| | |
|----------------------------------|---|
| Specific Ion Measurements | <p>2111XA– Ammonia Application Package: Reagent: Ammonia Range: 0.30 ppb - 200 ppm Resolution: 1, 2, 3 digits Accuracy (with DKA cal): ± 5% or 0.3 ppb</p> |
| | <p>2111XD– DIPA Application Package: Reagent: Diisopropylamine Range: 0.10 ppb - 10 ppm Resolution: 1, 2, 3 digits Accuracy (with DKA cal): ± 5% or 0.1 ppb</p> |
| | <p>2111XC– Cation / High Acid Application Package: Reagent: Ammonia Range: 1.0 ppb - 200 ppm Resolution: 1, 2, 3 digits Accuracy (with DKA cal): ± 5% or 2 ppb</p> |
| Response Time | <p>With freshly etched electrode, during calibration: Reach 95% of final reading within 2 minutes of injecting a standard solution</p> |
| Units Displayed | ppb, ppm (auto ranging) |
| mV Measurement | Range: ± 1999.9 mV |
| | Resolution: 0.1 mV |
| | Relative accuracy: ± (0.5 mV + 0.1%) |
| Temperature Measurement | Range: - 10 to 120 °C |
| | Resolution: 0.1 °C |
| | Relative accuracy: ± 0.5 °C |
| | Continuous temperature readings: YES |
| | ATC probe connection detection: YES |
| Specific Ion Calibrations | DKA calibration: YES |
| | DKA calibration points: 3 points |
| | Off-line calibration: YES |
| | Off-line calibration points: 1 point |
| | Pre-programmed standard values: YES |
| | Custom programmed standard values: YES |
| Sample Conditions | Temperature: 5 to 45 °C |
| | Total acidity: less than 250 ppm CaCO ₃ |
| | Inlet pressure: 8 to 100 psig |
| | Flow rate: • 40 mL/min nominal set by pressure regulator (DIPA and Ammonia applications) • 25 mL/min nominal set by pressure regulator (cation/high acid applications) |
| | Sample inlet: 1/4" NPTF tube fitting |
| | Sample drain: 3/4" NPT male |
| | Grab sampler supported: YES |
| | |
| Display | Custom backlit LCD with temperature, concentration, mV, error codes, menu driven prompts |
| Inputs | ATC: 2 x NTC 30K |
| | Specific ion input & reference: Potentiometric |

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

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.

| Cat. No. | Sodium Monitor Packages |
|-----------------------------|---|
| 2111XPEN | Sodium Monitor With Protective Enclosure Package- 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 | Sodium Monitor Instrument Only Package- 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 |
| Application Packages | |
| 2111XA | Ammonia Application Package- Ammonia reagent bottle adapter (2100ARBA) and diffusion tubing (150060). |
| 2111XD | DIPA Application Package- DIPA reagent bottle adapter (2100DRBA) and diffusion tubing (211194) |
| 2111XC | Cation/High Acid Application Package- Ammonia reagent bottle adapter (2100ARBA) and diffusion tubing (181160) |
| Reagent Packages | |
| 211160XP | Ammonia Application Consumables Package- 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* | Reagent-less Ammonia Application Consumables Package- 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 | Ammonia Reagent- (1) x 2 L bottle, for 30 days operation (application-specific diffusion tubing not included) |
| 150060 | Ammonia Application Diffusion Tubing- (3) pieces of 5' 8" thin walled diffusion tubing for use with ammonia reagent |
| 211192XP | Diisopropylamine Application Consumables Package- 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* | Reagent-less Diisopropylamine Application Consumables Package- 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 | Diisopropylamine Reagent- (1) x 0.8 L DIPA reagent for 60 days operation, complete with (1) diffusion tube assembly (211194) |
| 211191 | Diisopropylamine Reagent- (6) x 0.8 L DIPA reagent for 60 days operation, complete with (6) diffusion tube assemblies (211194) |
| 211190FOR* | Reagent-less Diisopropylamine Reagent- (1) x 0.8 L empty bottle for use with DIPA reagent, complete with (1) diffusion tube assembly (211194) |
| 211191FOR* | Reagent-less Diisopropylamine Reagent- (6) x 0.8 L empty bottles for use with DIPA reagent, complete with (6) diffusion tube assemblies (211194) |
| 211194 | Diisopropylamine Application Diffusion Tube- twist and lock assembly for use with DIPA reagent |

| Cat. No. | Reagent Packages (continued) |
|--|---|
| 211150XP | Cation/High Acid Application Consumables Package- 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* | Reagent-less Cation/High Acid Application Consumables Package- 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 | Cation/High Acid Application Diffusion Tubing- (3) pieces of 5' 8" thin walled diffusion tubing for use with ammonia reagent |
| Sodium Electrodes and Accessories | |
| 2111XPEK | Electrode Kit- contains sodium reference electrode (210056) with filling solution (181073) and sodium sensing electrode (210045) |
| 210045 | Orion Sodium Sensing Electrode- for use with 2111XP |
| 210056 | Orion Sodium Reference Electrode- for use with 2111XP, includes reference electrode filling solution (181073) |
| 181073 | Reference electrode filling solution- (5) x 2 oz bottles for use with reference electrode (210056) |
| 2100TP | Orion Automatic Temperature Probe- for use with 2111XP |
| 2111XPCAL | Calibration Kit- 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 ⁺), (1) x 2 oz bottle low level standard 2 (192 ppm Na ⁺), (1) x 2 oz bottle high level standard 1 (1910 ppm Na ⁺), (1) x 2 oz bottle high level standard 2 (19200 ppm Na ⁺), and sodium electrode etch solution (181113) |
| Field Replaceable Units | |
| 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