Reliable sodium analysis in critical sample streams

Designed for accuracy and reliability with years of proven experience

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

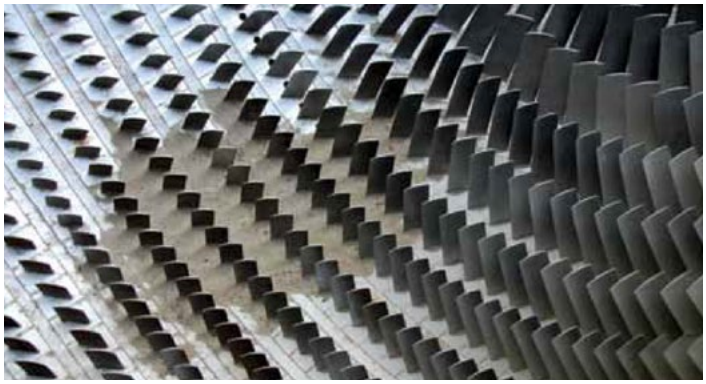
Offered in three application packages, Orion 2111XP Analyzer is uniquely designed to accommodate the changing requirements for successful sodium analysis. Additionally, flexible reagent kits are available in prepackaged bottles for safe and convenient replacement, saving valuable time and money.

Available packages

- Ammonia package – for general purpose sodium measurements, providing up to 45 days of continuous operation
- Disopropylamine (DIPA) package – best suited for low detection range, providing up to 60 days of continuous operation
- Cation/high acid package – for cation exchange breakthrough and high acid samples, providing up to 45 days of continuous operation

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

Orion 2111XP Sodium Analyzer

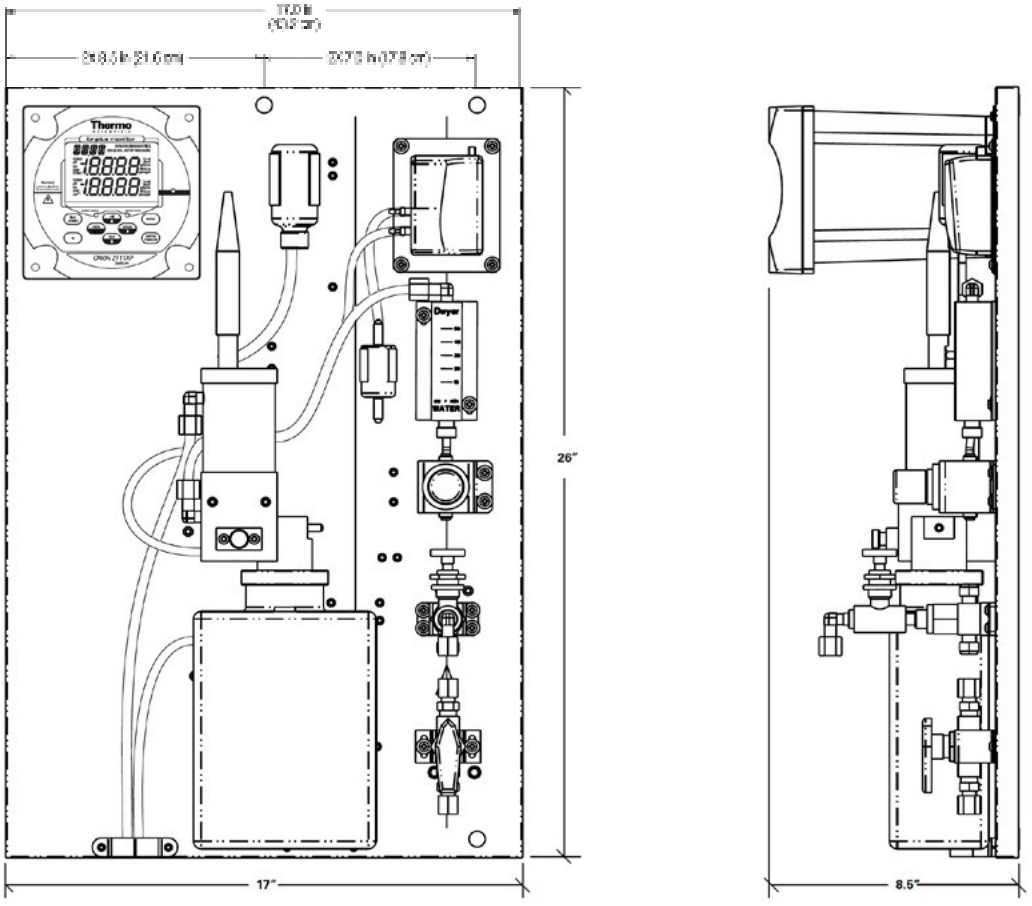
ThermoFisher SCIENTIFIC

Features

- Detection limit of 0.1 ppb offers flexible application packages ideal for continuous sodium analysis in a wide variety of samples
- Protect against the costly effects of corrosion with sensitive, and verifiable measurements that provide early warning detection of sodium
- Simple step-by-step scrolling instruction for setup, calibration, operation and diagnostics menus is easy to use while maximizing uptime
- Large operator friendly backlit display for viewing measurements even with the lowest light conditions
- Superior ROSS™ ultra sodium electrode technology provides fast and stable measurements, limiting unnecessary calibration cycles due to drift
- Minimize operator time and maintenance without the use of complicated moving parts that often require frequent attention and expensive spare part expenditures
- Innovative reagent addition design extends reagent consumption up to 3 months (application specific) and conditions sample pH while suppressing interfering ions and reducing costly waste disposal fees
- Advanced user interface with detailed calibration, measurement and diagnostic logs for early action level notification, configurable for facility's desired level of performance and password protected if preferred
- Simple and fast calibration cycles using double known addition to securely and quickly get the system back online
- Expandable modules for grab sample and low level verification to meet the strictest guidelines of QA/QC validation programs
- Retrofitable to the Thermo Scientific™ Orion™ 1811EL/1811AO Analyzer panel mounting footprint
- Modbus® communication card option available

Dimensions

Orion 2111XP Analyzer installation dimensions shown without optional protective enclosure.



Global support

With experience that comes from supporting our customers for over 50 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.

Product Specifications

Specification	Description
Specific ion measurements	**2111XA - Ammonia application package**
	Reagent: Ammonia
	Range: 0.30 ppb to 200 ppm
	Resolution: 1, 2 or 3 digits
	Accuracy (with DKA cal): ± 5% or 0.3 ppb
	2111XD - DIPA application package
	Reagent: Disopropylamine
	Range: 0.10 ppb to 10 ppm
	Resolution: 1, 2 or 3 digits
	Accuracy (with DKA cal): ± 5% or 0.1 ppb
	2111XC - Cation/high acid application package
	Reagent: Ammonia
	Range: 0.1 ppb to 200 ppm
	Resolution: 1, 2 or 3 digits
	Accuracy (with DKA cal): ± 5% or 2 ppb
Response time	With freshly etched electrode, during calibration: Reach 95% of final reading within 2 minutes of injecting a standard solution
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
	Offline calibration: Yes
	Offline calibration points: 1 point
	Pre-programmed standard values: Yes
	Custom programmed standard values: Yes
Sample conditions	Temperature: 5 to 45˚C
	Total alkalinity: 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 and menu driven prompts
Inputs	ATC: 2 x NTC 30K (second ATC with second parameter card)
	Specific ion input & reference: Potentiometric
Outputs	Analog output: Galvanically isolated
	Number of analog outputs: 2, both outputs dedicated to sodium; individual user-selectable ranges
	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 V AC, 5 A, 30 V DC
	Minimum value alarm: Yes
	Maximum value alarm: Yes
	Error alarm: Yes
	Calibration/offline alarm: Yes
	Programmable min & max values: Yes
Physical size	Electronics: 144 x 144 x 187 mm
	Entire system: 65 x 45 x 27 cm (26'' x 17'' x 11'') Fits on Orion 1811EL panel mounting footprint
Power	Input: 100-120V 200mA / 200-240V 100mA; 50-60 Hz 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
Electronics	Waterproof enclosure: IP66 & NEMA 4X
Regulatory and safety	CE, CSA, 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

Ordering Information

Description	Cat. No.
Low level sodium analyzer packages	
Sodium Analyzer With Protective Enclosure Package – 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. (Application package 2111XA, 2111XD or 2111XC must be purchased separately)	2111XPENG
Sodium Analyzer With Protective Enclosure Package – 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. (Application package 2111XA, 2111XD or 2111XC must be purchased separately)	2111XPEN
Sodium Analyzer Instrument Only Package – 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
Sodium Analyzer Instrument Only Package – 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)	2111XP
Application packages	
Ammonia Application Package – Ammonia reagent bottle adapter (2100ARBA) and diffusion tubing (150060)	2111XA
DIPA Application Package – DIPA reagent bottle adapter (2100DRBA) and diffusion tubing (211194)	2111XD
Cation/High Acid Application Package – Ammonia reagent bottle adapter (2100ARBA) and diffusion tubing (181160)	2111XC
Reagent packages	
Ammonia Application Package – 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	211160XP
Reagent-less Ammonia Application Consumables Package – 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	211160XPF*
Ammonia Reagent – for 30 days operation, includes (1) x 2 L bottle (application-specific diffusion tubing not included)	181130
Includes (1) x 2 L bottle empty for use with Ammonia Reagent (applicationspecific diffusion tubing not included)	181130FOR
Ammonia Application Diffusion Tubing– (1) x 4 ft thick-walled diffusion tubing, for use with ammonia reagent	150060
Diisopropylamine Application Consumables Package – 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	211192XP
Reagent-less Diisopropylamine Application Consumables Package – 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	211192XPF*
Diisopropylamine Reagent – for 60 days operation, includes (1) x 0.8 L bottle DIPA reagent and (1) diffusion tubing kit (211194)	211190
Reagent-less Diisopropylamine Reagent – For one year operation, includes (6) x 8 inch diffusion tubing assemblies with O-rings for use with DIPA reagent	211191FOR*
Reagent-less Diisopropylamine Reagent – For 60 days of operation, includes (1) x 8 inch diffusion tubing assemblies with O-rings for use with DIPA reagent	211190FOR*
Diisopropylamine Reagent – for one year operation, includes (6) x 0.8 L bottles DIPA reagent and (6) diffusion tubing kits (211194)	211191

Reagent packages (cont'd)	
Diisopropylamine Application Diffusion Tubing Kit – (1) x 4 inch diffusion tubing assembly with O-rings for use with DIPA reagent	211194
Diisopropylamine Application Diffusion Tubing Kit – (1) x 8 inch diffusion tubing assembly with O-rings for use with DIPA reagent	211198
Cation/High Acid Application Consumables Package – 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	211150XP
Reagent-less Cation/High Acid Application Consumables Package – 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	211150XPF*
Cation/High Acid Application Diffusion Tubing – (3) x 5' 8" thin-walled diffusion tubing for use with ammonia reagent	181160
Sodium electrodes and accessories	
Electrode Kit – includes sodium electrode (210045), reference electrode (210056) and (1) x 2 oz bottle reference electrode filling solution (181073)	2111XPEK
Sodium Sensing Electrode – for use with 2111XP	210045
Sodium Reference Electrode – for use with 2111XP, includes (1) x 2 oz bottle reference electrode filling solution (181073)	210056
Reference Electrode Filling Solution – (5) x 2 oz bottles, for use with reference electrode (210056)	181073
Electrode Cables – (2) x 1 meter cables for 210045 and 210056 electrodes	2100EC
2100 Series Automatic Temperature Probe – with ground (30 kΩ)	2100TP
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)	2111XPCAL
Field replaceable units Refer to user guide for complete list	
2100 series enclosure	2100EN
Fluidics panel assembly only	2100FP
Bypass/needle valve assembly	2100BV
Regulator assembly	2111RG
Flow meter assembly	2111FM
Restrictor tube assembly	2111RT
Flow cell assembly	2100FC
Air pump assembly	2100PA
Air filter assembly	2100AF
Check valve	2100VC
Reagent bottle adapter for use with DIPA reagent	2100DRBA
Reagent bottle adapter for use with ammonia reagent	2100ARBA
O-ring kit	2100OK
Power supply assembly	2100PS
2111XP electronics faceplate	2111XPEP

*For International Use Only

Find out more at **thermofisher.com/processwater**

ThermoFisher SCIENTIFIC