

Ultra low level accuracy and reliability with years of proven performance ...

Protect your turbine with sodium measurements made simple.

## Thermo Scientific Orion 2111LL

Low Level Sodium Monitor



### Markets

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

### Applications

- Ultra Pure Water Analysis
- Demineralized Water / RO
- Boiler Feedwater
- Drum Boilers
- Steam Condensate / CDP

### Superior Performance and Ease of Operation

As the need for ultra pure water production advances, the power industry looks to the most trusted sodium monitor to keep pace. The new Thermo Scientific Orion 2111LL ultra low level sodium monitor exceeds the demands of high purity water measurements.

The fast response of the Orion 2111LL protects your turbine against destructive sodium levels with precise, real-time indication of sodium contaminants. Increase efficiency, prevent corrosive deposits and maximize uptime.

Trust your results – the Orion 2111LL provides stable and drift-free measurements using Thermo Scientific Orion ROSS Ultra® electrode technology. Choose the global leader in sodium ISE technology for maximum results every time.

Save your valuable time and money – our easy to order reagent kits are available in pre-packaged bottles for safe and convenient replacement.

### Advantages

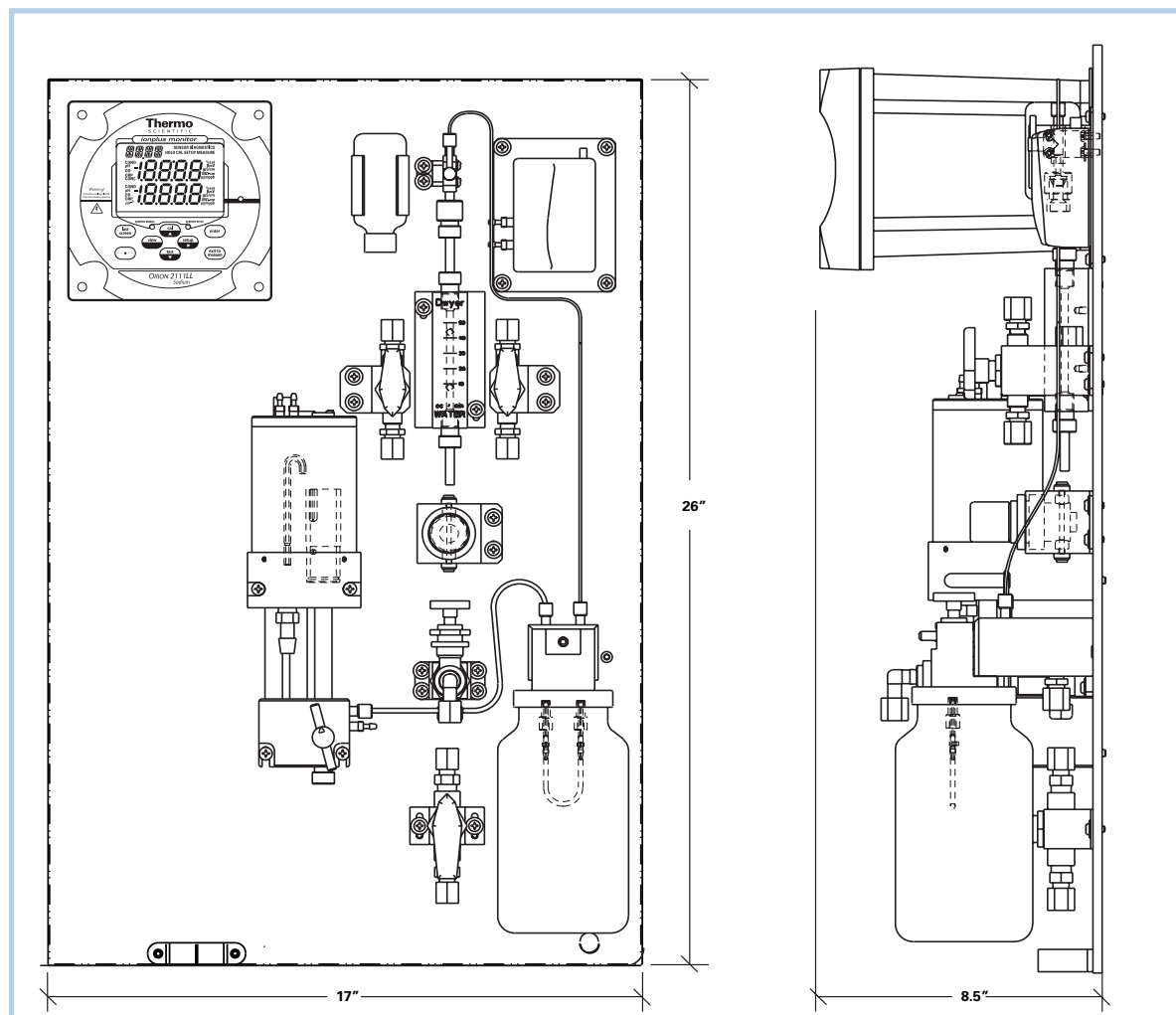
- Ultra low level detection to 0.001 ppb for trace detection in high purity water and steam generation
- Superior stability using ROSS Ultra electrode technology for high performance and accuracy without the need for frequent calibrations
- Rapid response to ultra low level changes, real time notification of sodium conditions and protection from costly feedwater breakthrough and steam carryover
- Orion DIPA reagent reduces hazardous waste disposal costs with complete DIPA reagent consumption.
- Easy to operate and calibrate – the easy to read, step-by-step calibration process ensures a successful calibration the first time and every time.

### Benefits

- Ultra low level sodium detection to 10 parts per trillion with high accuracy and precision
- 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 – utilize the new superior ROSS Ultra sodium electrode technology
- Minimize operator time and maintenance without the use of complicated moving parts or pumps that often require frequent attention and expensive spare part expenditures
- Extend reagent consumption up to 3 months 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 desired level of performance – all password protected if preferred
- Simple and fast calibration cycles using double known addition – quickly have your system back online 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 2111LL is retrofitable to the Thermo Scientific Orion 1811EL panel mounting footprint

### Dimensions

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





## Thermo Scientific Orion 2111LL Low Level Sodium Monitor

<b>Specific Ion Measurements</b>	<b>Range:</b> 0.001 ppb to 10 ppm
	<b>Resolution:</b> 2, 3 or 4 digits
	<b>Accuracy (with DKA cal):</b> ± 5% or 0.01 ppb
	<b>Reagent:</b> Diisopropylamine
<b>Response Time</b>	<b>With freshly etched electrode, during calibration:</b> Reach 95% of final reading within 2 minutes of injecting a standard solution
<b>Units Displayed</b>	ppb, ppm (auto ranging), mV, temperature
<b>mV Measurement</b>	<b>Range:</b> ± 1999.9 mV
	<b>Resolution:</b> 0.1 mV
	<b>Relative accuracy:</b> ± (0.5 mV + 0.1%)
<b>Temperature Measurement</b>	<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
<b>Specific Ion Calibrations</b>	<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
<b>Sample Conditions</b>	<b>Temperature:</b> 5 to 45 °C
	<b>Total acidity:</b> Less than 50 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
	<b>Sample inlet:</b> 1/4" NPTF tube fitting
	<b>Sample drain:</b> 3/4" NPT male
	<b>Grab sampler supported:</b> YES
<b>Display</b>	Custom backlit LCD with temperature, concentration, mV, error codes and menu driven prompts
<b>Inputs</b>	<b>ATC:</b> 2 x NTC 30K
	<b>Specific ion input &amp; reference:</b> Potentiometric

<b>Outputs</b>	<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>Physical Size</b>	<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 panel mounting footprint.	
	<b>Power</b>	
	<b>Input:</b> 85 - 132 or 170 - 264 VAC	
	<b>Software Features</b>	<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
<b>Startup reset:</b> YES		
<b>Meter Features</b>	<b>Hardware calibration function:</b> YES	
	<b>Non-volatile memory:</b> YES	
	<b>Battery backup:</b> YES	
	<b>Expansion bus:</b> Serial communication & power	
	<b>Waterproof enclosure:</b> IP66 & NEMA 4X	
<b>Regulatory and Safety</b>	CE, CSA, FCC Class A limits	
	<b>Environmental Operating Conditions</b>	
	<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	
<b>Case Material</b>	Valox 364	
<b>Shock and Vibration</b>	<b>Vibration, shipping/handling:</b> 0 - 60 Hz @ 1 G Load	
	<b>Shock, drop test in packaging:</b> 36" on all sides and corners	

## Thermo Scientific Orion 2111LL Low Level 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.	Low Level Sodium Monitor Packages
2111LLEN	<b>Low Level Sodium Monitor With Protective Enclosure Package</b> – includes low level sodium monitor with protective enclosure, ROSS sodium electrode (210048), ROSS Ultra reference electrode (210058), ATC probe (2100TP), standard solutions kit (181140), CD user guide and options kit
2111LL	<b>Low Level Sodium Monitor Instrument Only Package</b> – includes low level sodium monitor, ROSS sodium electrode (210048), ROSS Ultra reference electrode (210058), ATC probe (2100TP), standard solutions kit (181140), CD user guide and options kit
Cat. No.	Reagent Packages and Accessories
211192	<b>Low Level Sodium Consumables Kit</b> – for one year operation, includes (6) x 0.8 L bottles diisopropylamine (DIPA) reagent with (6) diffusion tubing kits (211194), reagent bottle adapter, (1) standard solutions kit with 19.1 ppm and 192 ppm Na <sup>+</sup> standards and etch solution, (1) sodium electrode, (1) reference electrode, (5) x 2 oz bottles reference filling solution, (1) O-ring kit, (1) check valve, (1) set of 100 pipette tips, (1) restriction tube assembly, (2) x 60 micron inlet filters and (1) filter gasket
211190	<b>Diisopropylamine Reagent</b> – for 60 days operation, includes (1) x 0.8 L bottle DIPA reagent and (1) diffusion tubing kit (211194)
211191	<b>Diisopropylamine Reagent</b> – for one year operation, includes (6) x 0.8 L bottle DIPA reagent and (6) diffusion tubing kits (211194)
211194	<b>Diffusion Tubing Kit</b> – (1) x 4 inch diffusion tubing assembly with O-rings
211198	<b>Diffusion Tubing Kit</b> – (1) x 8 inch diffusion tubing assembly with O-rings
181148	<b>Calibration Kit with Carrying Case</b> – includes 0.1 mL pipette, box of pipette tips, wash bottle, (1) x 2 oz bottle standard 1 (19.1 ppm Na <sup>+</sup> ), (1) x 2 oz bottle standard 2 (192 ppm Na <sup>+</sup> ) and (1) x 2 oz bottle of etch solution (181113)
181140	<b>Sodium Standard Solutions Kit</b> – includes (2) x 2 oz bottles of standard 1 (19.1 ppm Na <sup>+</sup> ), (2) x 2 oz bottles of standard 2 (192 ppm Na <sup>+</sup> ) and (1) x 2 oz bottle of etch solution (181113)
181141	<b>High Level Sodium Standard Solutions Kit</b> – includes (2) x 2 oz bottles of standard 1 (1910 ppm Na <sup>+</sup> ), (2) x 2 oz bottles of standard 2 (19200 ppm Na <sup>+</sup> ) and (1) x 2 oz bottle of etch solution (181113)
181113	<b>Sodium Electrode Etch Solution</b> – (1) x 2 oz. bottle
210048	<b>ROSS® Sodium Electrode</b> – for use with 2111LL
210058	<b>ROSS Ultra® Reference Electrode</b> – for use with 2111LL, includes (1) x 2 oz bottle reference filling solution (150072)
150072	<b>Reference Electrode Filling Solution</b> – (5) x 2 oz bottles, for use with 210058 reference electrode
2111EK	<b>Electrode Kit</b> – includes (1) sodium electrode (210048), (1) reference electrode (210058) and (1) x 2 oz bottle reference filling solution (150072)
2100EC	<b>Electrode Cables</b> – (2) x 1 meter cables for 210048 and 210058 electrodes
21003M	<b>Extension Cables</b> – (2) x 3 meter cables for 210048 and 210058 electrodes

Cat. No.	Reagent Packages and Accessories (cond't)
2100TP	<b>2100 Series Automatic Temperature Probe</b> – with ground (30 kΩ)
2001XT	<b>2100 Series Automatic Temperature Probe</b> – with 10 meter extension cable and ground (30 KΩ)
Cat. No.	Field Replaceable Parts
2100EN	2100 series enclosure
2111FP	Fluidics panel assembly only
2100BP	Steel back panel assembly
2111LLEP	2111LL electronics faceplate
2100NV	Inlet valve assembly
2100BV	Needle valve assembly
2111RG	Regulator assembly
2111FM	Flow meter assembly
2111SV	Calibration shutoff valve assembly
2111RT	Restrictor tube assembly
2111RMA	Reagent manifold assembly
2100DRBA	Reagent bottle adapter assembly
2111DBB	Reagent bottle bracket for DIPA reagent bottle
2111NT	Inlet tube assembly
2111PA	Air pump assembly
2111RVA	Right air valve
2111LVA	Left air valve
2100AF	Air filter
2111VC	Check valve
2100TG	Tygon tubing (4 ft)
2100PS	Power supply assembly
2100FK115	Fuse kit assembly 115 V
2100FK230	Fuse kit assembly 230 V
2111FC	Flow cell assembly
2111CA	Flow cell cap assembly
2111LLOK	O-ring kit
2111ST	Sensing tube for flow cell
181170	(2) Inlet sample filters
2111DV	Diverter valve
2111MK	<b>Maintenance Kit</b> – includes (2) electrode cables, (1) diffusion tubing kit, (1) sample filter, (1) O-ring kit, (1) check valve, (1) sensing tube, (1) shut off valve, (1) restrictor tubing assembly, (1) air filter, (1) inlet tubing assembly and (1) reagent bottle cap and adapter
2111LLSK	<b>Service Kit</b> – includes (1) electronics faceplate (2111LLEP), (1) air pump assembly (2111PA), (1) regulator assembly (2111RG), (2) electrode cable with gland assemblies for sensing and reference electrodes, (1) power supply assembly (2100PS) and (1) fuse kit assembly (2100FK115 and 2100FK230)

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S-2111LL-E 0608 Rev.B

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