

# Monitoring Sodium In Power Plants

## Orion ionplus® Low-Level Sodium Monitor

### Power

Efficiency reductions and equipment failures attributable to corrosion and deposition cost the power industry billions of dollars every year. These costs can be reduced by maintaining a balance in water and steam chemistries through continuous monitoring of chemical species such as sodium that are involved in the corrosion process.



### Critical sodium monitoring requirements

- Sensitivity to ppb/ppt range
- Suppress interferences and eliminate contamination
- Accurate, reliable, repeatable calibrations and measurements
- Reliable and easy-to-use with minimal maintenance

For more information on Sodium monitoring in power plants, ask your technical sales person for the 2111LL Sodium Application paper or visit the Thermo web site at [www.thermo.com/](http://www.thermo.com/) water to download your free copy.

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### Orion ionplus® Low-Level Sodium Monitoring In Power Plants

The popularity of continuous sodium monitoring in power plants has increased over the last few years due to a greater awareness of the effects of low-level sodium contamination on turbines and the trend toward higher operating pressures in modern steam generators. The literature contains an abundance of references explaining cracking, embrittlement and turbine failures due to corrosion with sodium as a major contributing factor.

Steam purity is the most critical parameter for optimizing plant performance since operating at high temperatures and pressures increases the corrosive impact. In addition to monitoring the steam, other circuit components such as boiler feed water and condensate return require continuous monitoring to maximize system uptime.

Monitoring the sodium ion content of steam and water circuits to produce stable and reproducible results requires a very well

designed and maintained system. The system must optimize the fluidic design with the sensing technology to enable very low-level (ppb) measurement of the contaminants across the linear range of the analyzer.

The Orion ionplus Sodium Monitor (Cat. No. 2111LL) meets all of the criteria for accurate and dependable sodium monitoring and more. The 2111LL incorporates patented Orion technologies including the:

- ROSS Ultra® electrodes
- Newly developed flow-cell design
- "Marquee" help screen
- Orion pump-less reagent addition and DKA calibration system

In addition the 2111LL ergonomics include an easy to read LCD display and all of the performance features to exceed all turbine sodium monitoring compliance standards.

# Orion ionplus® Low-Level Sodium

## Orion ionplus Low-Level Sodium Monitor Features & Benefits

Features	Benefits
ACCURATE and PRECISE measurements even at the lowest levels of detection (range 0.001 ppb to 10 ppm)	Reliable, low level measurements and wide range with selectable resolution up to 4 significant digits
Patented ROSS Ultra® reference and sensing electrodes	Superior accuracy and stability over a wider and variable temperature range
Patented flow cell with air stirring and sample air transport	Automatic sample handling and contamination control with no moving parts
Patented "scrolling marquee"	"Intuitive" menu-driven digital user interface
Selectable calibration cycles and long reagent usage cycles per bottle	Less frequent handling, no hazardous waste
"Pump-less" liquid handling system	Automatic sample & pH conditioning with no pumps or solenoids to break down
Double known addition calibration method	Easy to perform and high degree of accuracy
Simple calibration sequence	Less complexity and maximum accuracy
Whole monitor fits on 1811EL "footprint" and electronics can be remotely mounted up to 3 meters away from fluidics using optional electrode extension cables	Flexibility in mounting and easy to replace an aging monitor with no additional mechanical mounting hardware or changes in bolt configuration
Auto-ranging electronics with large, backlit and easy to read LCD display	Monitor determines best range
2 galvanically separated signal outputs (4-20 mA) with freely scaleable linear or logarithmic outputs	Choose the output to suit the application
Outputs for both temperature & measurement	More outputs for better monitoring
Data Log of previous measurements and calibration	Measurement, calibration & error history
Self diagnostics	Ease of maintainability

## Ordering Information for Orion ionplus Low-Level Sodium

Orion Cat. No.	Description
2111LL	Low-level sodium monitor w/ROSS Ultra® sodium & reference electrodes, automatic temperature compensation probe (ATC), sodium standard kit
2111FP	Low-level sodium monitor, fluidics only
211100	Low-level sodium monitor, electronics only
181148	Calibration kit with carrying case, 0.1 mL pipette, box of pipette tips, and wash bottle
181140	Sodium standard solution kit with (2) 2 oz bottles of standard "1" (19.1 ppm Na standard), (2) 2 oz bottles of standard "2" (192 ppm Na standard) and (1) 2 oz bottle of rinse solution.
181141	(High Level) sodium standard solution kit with (2) 2 oz bottles of standard "1" (1910 ppm Na standard), (2) 2 oz bottles of standard "2" (19200 ppm Na standard) and (1) 2 oz bottle of rinse solution
210048	ROSS Ultra sodium screw cap electrode
210058	ROSS Ultra reference screw cap electrode
150072	(5) 2 oz bottles of reference electrode internal filling solution
2100TP	2100 series temperature probe with solution ground
211192	Sodium consumables kit for one year – includes: (6) Diisopropylamine (DIPA) reagent (6 x 0.8 L bottle) with diffusion tubing kit, diffusion bottle adapter/cap, (1) standard solutions kit, (1) sodium electrode, (1) reference electrode, (5) 2 oz bottles reference filling solution, (1) O-ring kit, (1) check valve, (1) set of pipette tips, (1) restriction tube assembly, (2) 60 micron inlet filters and (1) filter gasket
21003M	Three (3) meter extension cables for 210048 & 210058
2111EK	Electrode kit with (1) 210048 sodium electrode and (1) 210058 reference electrode
181113	Sodium electrode etch solution
211190	(1) Diisopropylamine (DIPA) reagent (1 x 0.8 L bottle) with diffusion tubing kit
211191	(6) Diisopropylamine (DIPA) reagent (6 x 0.8 L bottle) with diffusion tubing kit
211194	Diffusion tubing kit (2 x 4 inch lengths and O-rings)
2111MK	Maintenance kit includes (2) electrode cables (1) diffusion tubing kit, (1) sample filter, (1) O-ring kit, (1) check valve, (1) flow cell sample tube, (1) shut off valve, (1) restrictor tubing, (1) air filter, (1) tubing for re-circulation block, (1) reagent bottle cap

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