

RoboSense

Real-Time Ion-Specific Process Data

RoboSense is a multi-node process sampler that delivers real-time, ion-specific concentration measurement across industrial desalination and lithium refining systems. By continuously monitoring key ions at multiple process nodes, it enables:

- Lithium refinery online optimization
- Dynamic plant water recovery, chemical consumption, and energy optimization
- Informed and automated adjustment as feedstocks vary, providing insights to maximize uptime
- Continuous plant health monitoring and proactive scaling risk management
- Integration with digital twins

RoboSense eliminates reliance on conservative, pre-programmed operating envelopes and reactive maintenance, as well as long-lead manual sampling, to maximize performance without compromising reliability.

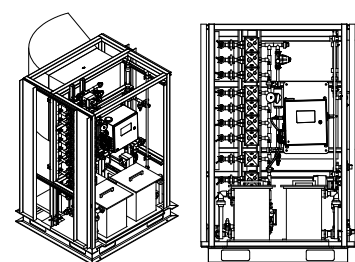
Built around industry-leading ion-specific analyzers, RoboSense packages these analyzers with the ability to sample various process locations, flush, and report real-time data through well-known industrial PLC systems. RoboSense reports to a distributed control system for optional proactive, informed, and automated decision making.

Key Technical Specifications

Monitored Species	Analyzer dependent; contact us
Architecture	Single device with automated multi-node valving
Sampling	Automated sequential node sampling with flush cycles. Can accept up to 10 different samples.
Process Integration	Master PLC (Allen Bradley) integrates with various networks
Maintenance Mode	Automated cleaning flush with minimal manual intervention



RoboSense modular skid



RoboSense technical diagram

Asset Protection

RoboSense predictive scaling analysis employs early corrective action to extend membrane life and reduce unplanned downtime.

Operational Intelligence

Continuous data acquisition, remote monitoring capabilities, and digital twin compatibility support transition from reactive to automated control.

Process Efficiency

Unlock higher achievable recovery rates, reduce chemical consumption and optimize brine management with elimination of conservative envelopes.

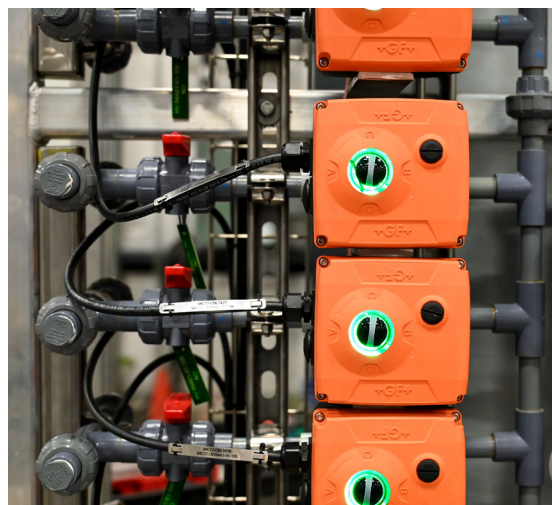
Off-Site Constructed and Commissioned

Saltworks factory builds RoboSense systems at our quality-controlled production facility, with in-house supply chain and engineering.

Utility Parameters

The defined utility and installation requirements below enable RoboSense to operate reliably as a permanently installed, continuous process monitoring system.

Dimensions (WxLxH)	48" x 54" x 80"
Weight	~800 lbs
Pressure/Temp. Rating	40 psi @ 1-45 °C
Installation Environment	Rated for indoor use (+5 - 50 °C)
Power/External Interface	120 VAC, 60 Hz, 1 pH, network / Ethernet
Connections	Sample, waste, and utility water: 1/2" NPT
Utilities	Water for flushing
Equipment Included	Waste tank & flush tanks with level switches



RoboSense multi-sensor valve points

Target Applications by Industry

Industrial Desalination	High-recovery reverse osmosis systems
Semiconductor Manufacturing	Hydrofluoric acid wastewater (HFW) treatment and brine concentration
Lithium Refining	Lithium yield optimization
Water Reuse / Zero Liquid Discharge (ZLD)	Brine concentration maximization
Industrial Wastewater	Variable ion load streams

Case Studies

RoboSense has been implemented in operating industrial facilities to provide continuous, multi-node process chemistry monitoring. The following case studies highlight its role in mitigating scaling risk, improving recovery, and supporting stable plant operation.

Semiconductor Wastewater (HFW)

Challenge	CaF ₂ scaling risk during RO brine concentration of hydrofluoric wastewater
Solution	Continuous Ca ²⁺ & F ⁻ monitoring enable recovery adjustment below saturation limits
Outcomes	- Improved system uptime - Increased water recovery rate - Eliminated reactive scaling events



Lithium Refining Facility

Challenge	Suboptimal lithium yield and excessive water use due to scaling ion variability
Solution	Continuous Li ⁺ and key scaling ion monitoring for real-time process adjustment
Outcomes	- Improved lithium yield - Reduced water consumption - Improved overall system uptime

