TECHNICAL PRODUCT SHEET

R/OCELL®

Advanced Reverse Osmosis System

MIRANDA water technologies

System Overview

R/OCell® is a modular reverse osmosis system engineered for high-efficiency water purification. It uses advanced membrane filtration to remove contaminants from various feedwater sources, delivering consistent, potable-quality output. Intelligent automation and real-time monitoring enable precise control, early fouling detection, and predictive maintenance to minimize downtime and extend system life.

With multiple feedwater configurations and scalable capacity, R/OCell® adapts easily to changing demands. Its corrosion-resistant construction and low-maintenance design ensure reliable performance in challenging environments.

Installed as a standalone unit or integrated into existing infrastructure, R/OCell® provides a robust and adaptable solution for modern water treatment.

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Key Features and Benefits

Energy-Efficient Operation
Optimized for low energy consumption with integrated energy recovery to reduce operating costs and support sustainability.

Smart Monitoring
Remote access and real-time diagnostics enable proactive system management and minimize downtime.

Low-Maintenance
Engineered for long-term reliability with minimal servicing.

Modular and Scalable
Adapts to varying capacity needs and water quality conditions, including brackish, seawater, ocean, and well water.

Customizable Configuration
Manufactured to meet industry-specific requirements.

Turnkey Deployment
Pre-assembled, containerized, and climatized for rapid installation in any environment.

Feedwater Configuration Options

R/OCell® supports multiple feedwater configurations and performs reliably across a wide range of salinity levels and contamination profiles. Each system is configured to meet the specific treatment needs of the source water.

Seawater
- Designed for high-salinity sources
- Supports salinity levels from 25,000 to 45,000 PPM

Brackish Water
- Suitable for moderate salinity conditions
- Supports salinity levels from 2,500 to 4,000 PPM

Contaminated Water
- Configured for removal of heavy metals, bacteria, viruses, and other specific pollutants

Custom Applications
- Engineered for specialized treatment challenges, including PFAS and emerging contaminants
- Custom system designs available upon request

Technical Specifications

PARAMETER	BRACKISH / CONTAMINATED	SEAWATER
pH	6.5 – 8.5	6.5 – 8.5
Total Dissolved Solids (TDS)	< 4,000 mg/L	< 45,000 mg/L
Total Suspended Solids (TSS)	< 10 mg/L	< 10 mg/L
Turbidity	< 1 NTU	< 1 NTU
Total Hardness (as $CaCO_3$)	< 18 mg/L (ppm)	< 18 mg/L (ppm)
Design Temperature	10 – 35 °C	10 – 35 °C
Inlet Pressure	2 – 3 bar	2 – 3 bar
Recovery Rate	40 – 70%	45 – 50%
Power Supply	380V / 480V / 600V, 3-phase, 50/60 Hz	380V / 480V / 600V, 3-phase, 50/60 Hz

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System Configuration Options

R/OCELL® MOBILE

- Pre-installed in a 40-foot climate-controlled container
- Includes integrated storage room for system components and tools

Available flow rates:

- **40,000 L/day**
- **80,000 L/day**
- **120,000 L/day**
- **180,000 L/day**
- **240,000+ L/day**

R/OCELL® RAILMOUNT

- Mounted on a heavy-duty rail system for easy access and repositioning
- Ideal for flexible installation and mobile servicing

Available flow rates:

- **40,000 L/day**
- **80,000 L/day**
- **120,000 L/day**
- **180,000 L/day**
- **240,000+ L/day**

R/OCELL® FLEXKIT

- Delivered as a pre-assembled modular kit
- Integrates quickly with existing on-site infrastructure
- Scalable output capacity based on project requirements
- Flow rates starting at **10,000 L/day**, expandable to high-capacity installations
- Ideal for customized deployments and variable demand

Standard Features

- Chemical dosing system
- Media filtration
- 5-micron spun filter
- 0.5-micron cartridge filter
- UV disinfection
- Re-mineralization using dolomite
- Clean-in-Place (CIP) with automated backwash
- Integrated HMI and PLC controller with 16 free input and 16 free output ports
- Conductivity and TDS sensors for salinity and performance tracking
- pH analyzer with auto-calibration

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Optional Equipment and Sensors

- Raw water pump controller with integrated motor protection relay
- High-level float switch for product water storage tank
- Low-level float switch for product water storage tank
- High-level sensor for intermediate raw water holding tank
- Low-level sensor for intermediate raw water holding tank
- Leak detection sensors with panel notification interface
- Ultrasonic level transmitter for product water tank monitoring
- Pressure transmitter for building feed line monitoring
- Magnetic or ultrasonic flow meter for building distribution line
- Chlorine residual analyzer for product water quality verification
- Ambient temperature and humidity sensor for product tank monitoring
- Vibration sensor for pump health diagnostics
- Real-time amperage and voltage monitoring
- Input and output expansion modules (16, 32, or 64 channel configurations)
- Redundant PLC controller for failover control
- Industrial IoT gateway with remote access, firewall, and data logging
- Modbus TCP/IP converter for BMS and SCADA integration
- Wireless networking module for internet and local connectivity

Specific to R/OCELL® MOBILE

- Internal and external lighting
- IP surveillance cameras for perimeter and access point monitoring*
- Steel security access door with tamper sensor*
- Multichannel alarm and event notification system*
- Ambient noise sensor for equipment diagnostics*

*** Optional Feature**

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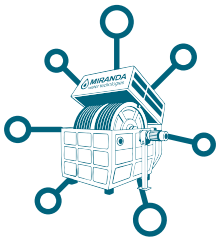


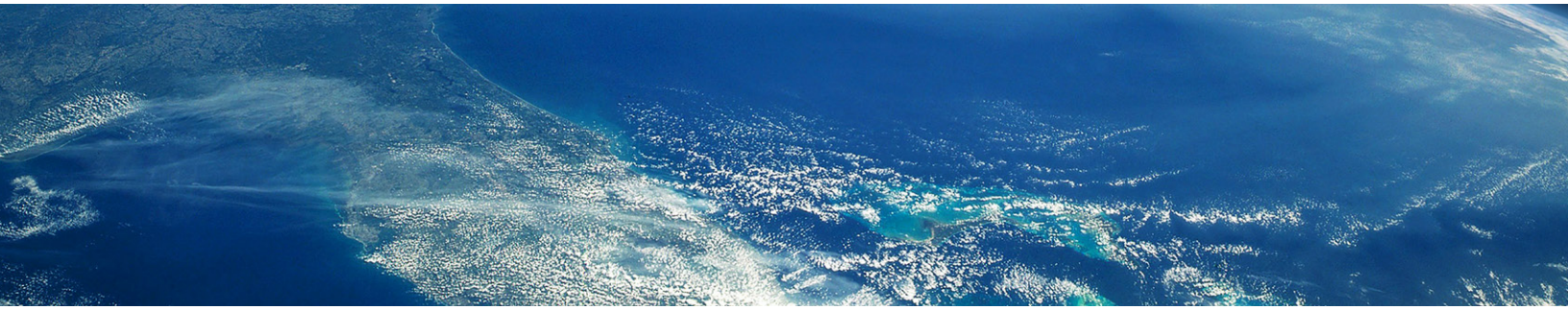
MIRACELL® Connectivity

The R/OCell® system integrates with SmartCell Control, providing seamless interoperability with Miranda's Miracell® wastewater treatment system. This integration enables unified monitoring and control of membrane and biological processes through a shared HMI and SCADA-ready interface. It also enables real-time data sharing, remote diagnostics, and full-system optimization.

R/OCELL® | TREATMENT PATHWAY: From Intake to Output

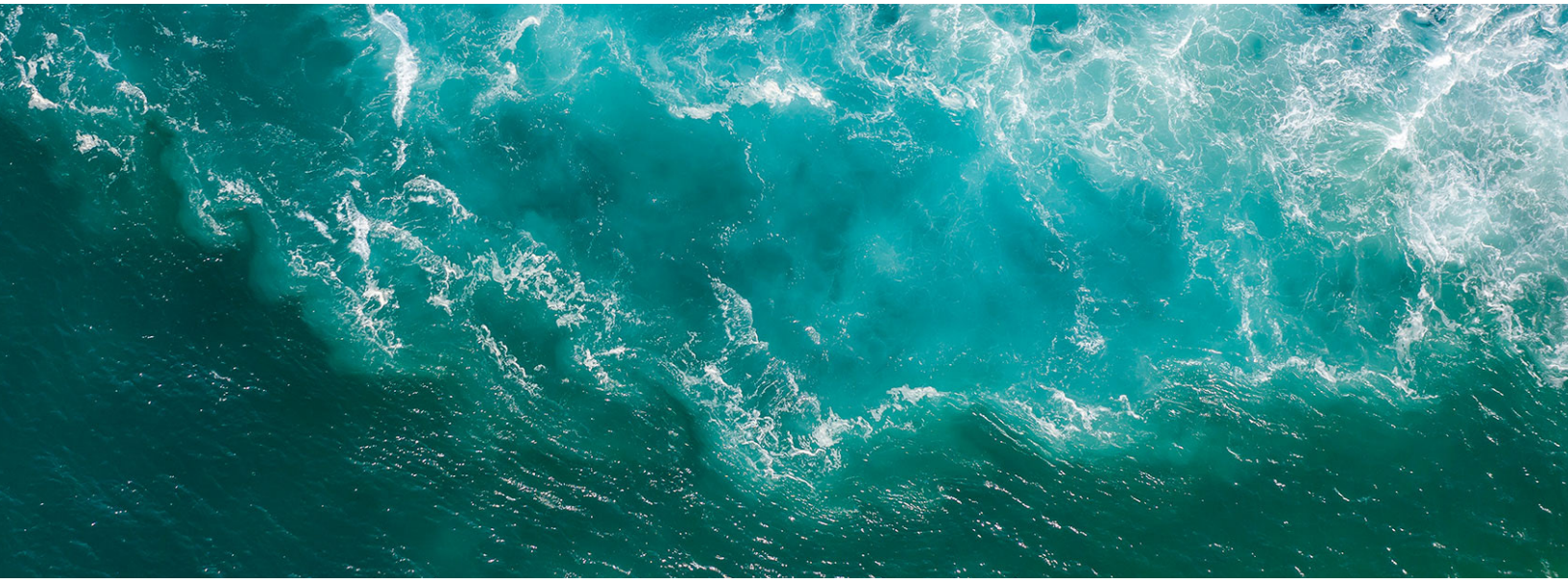
1. Feedwater Intake
2. Pre-Treatment
3. High-Pressure Pumping
4. Reverse Osmosis Membrane Filtration
5. Post-Treatment

6. Clean-In-Place (CIP) System
7. Product Water Handling
8. Automation, Control & Monitoring
9. Safety, Diagnostics & Security
10. Integration with Miracell® and SmartCell Control



The R/OCell® system follows a multi-stage process to transform raw water into clean, potable-quality water with integrated real-time control, diagnostics, and monitoring.

STAGE	DESCRIPTION
1 Feedwater Intake	The process begins with feedwater drawn from various sources. The system handles seawater (25,000–45,000 PPM salinity), brackish water (2,500–4,000 PPM), and contaminated water with heavy metals, bacteria, or viruses. It can also be customized for applications such as PFAS removal.
2 Pre-Treatment	Feedwater undergoes media filtration to remove larger particulates, followed by a 5-micron spun filter and a 0.5-micron cartridge filter for finer particles. UV disinfection neutralizes bacteria and viruses. A chemical dosing system adjusts pH and adds anti-scalants or biocides. Re-mineralization using dolomite may be applied post-RO to restore essential minerals.
3 High-Pressure Pumping	Water is pressurized to pass through membranes. Optional controls include a raw water pump controller and motor protection relay for enhanced performance and protection.
4 Reverse Osmosis Membrane Filtration	Pressurized water passes through semi-permeable membranes, removing dissolved salts and contaminants. System performance is monitored via conductivity and TDS sensors, a pH analyzer with auto-calibration, and pressure transmitters.
5 Post-Treatment	Re-mineralization using dolomite may improve taste and safety. A chlorine residual analyzer verifies disinfection, and optional sensors ensure water quality and system integrity.
6 Clean-In-Place (CIP) System	The CIP system automatically cleans and flushes membranes. Automated backwash removes fouling and restores performance.
7 Product Water Handling	Treated water is stored and distributed using tanks, float switches, ultrasonic level transmitters, and flow meters.
8 Automation, Control & Monitoring	The system is managed by an HMI and PLC controller with free input/output ports. An optional redundant PLC provides failover control. Features include multichannel alarms, remote access, data logging, IIoT connectivity, and Modbus TCP/IP support. It is fully SCADA-ready for BMS/SCADA integration.
9 Safety, Diagnostics & Security	Sensors monitor for leaks, vibration, noise, and humidity. Security features include steel access doors with tamper sensors, IP cameras, and diagnostic tools that enable real-time alerts and event notifications.
10 Integration with Miracell® and SmartCell Control	The R/OCell® system integrates with SmartCell Control for unified control of membrane and biological treatment. A shared interface enables real-time data sharing, remote diagnostics, and system-wide optimization.



Discover efficient and scalable water purification with R/OCell®.

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