

TECHNICAL PRODUCT SHEET

# SMARTCELL CONTROL SYSTEM

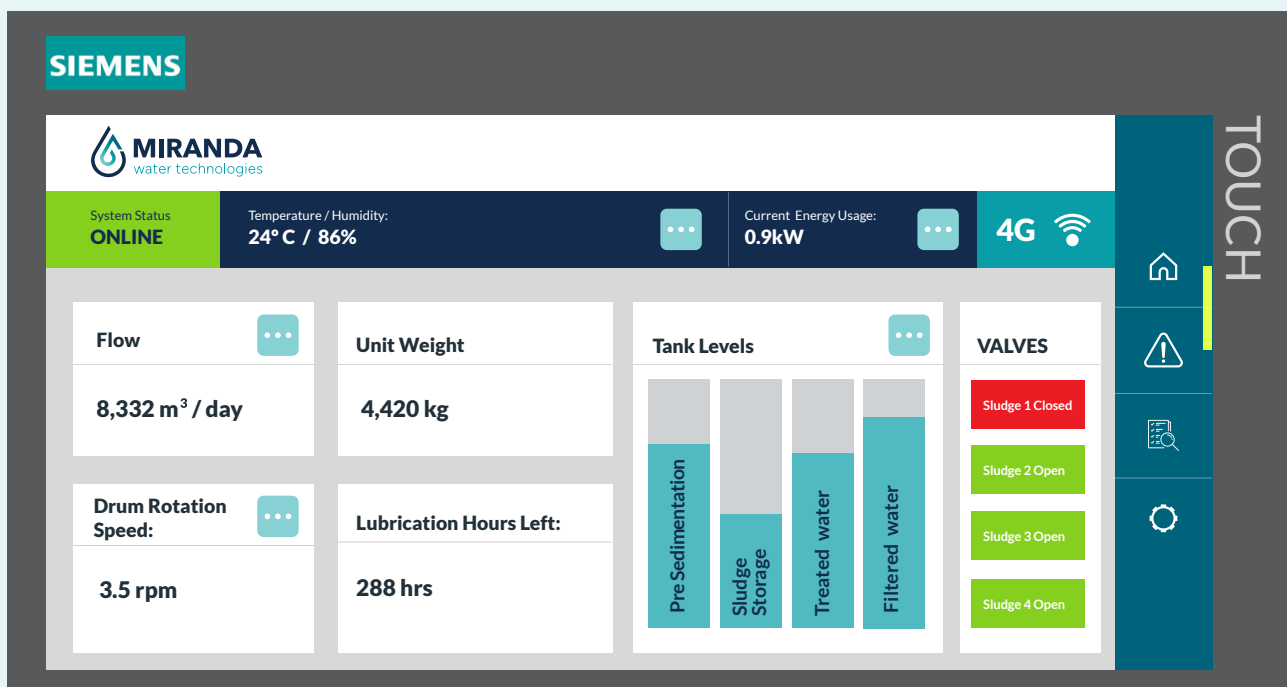
Miracell® Edition



## System Overview

The SmartCell Control System is a purpose-built automation and monitoring solution designed to optimize the performance of both current and legacy versions of the Miracell® Rotating Biological Contactor (RBC). Tailored for decentralized wastewater treatment applications, this intelligent system enables real-time diagnostics, adaptive process control, and centralized management of essential treatment functions.

By transforming the Miracell® from a passive unit into an actively managed system, SmartCell enhances energy efficiency, ensures regulatory compliance, and reduces operational costs. Whether deployed in resorts, industrial facilities, or remote communities, SmartCell provides operators with greater control, reliability, and real-time visibility both on site and through remote access.



# Key Features and Benefits



## Real-Time Monitoring

### Continuous Data Collection

Monitors key performance indicators such as flow rate, temperature, pH, unit weight (in kilograms and pounds), energy consumption (in kilowatts), and drum rotation speed (in revolutions per minute).

### Vibration and Drum Slip Detection

Detects mechanical anomalies early to prevent system failures and reduce maintenance costs.

### Environmental Sensors

Measures ambient temperature (in degrees Celsius and Fahrenheit), relative humidity (percentage), and influent wastewater characteristics to support optimal biological performance.



## Advanced Process Automation

### Drum Rotation Speed Control

Automatically adjusts drum speed based on influent loading and biological activity to optimize treatment efficiency.

### Predictive Maintenance Alerts

Issues scheduled notifications for lubrication, filter replacement, and general servicing to reduce unplanned downtime and extend equipment lifespan.

### Automated Sludge Removal

Operates sludge discharge valves based on system inputs to maintain consistent and efficient solids management.



## Supervisory Control Integration

### Programmable Logic Controller (PLC) with Modbus, Profinet, and Profibus Support

Allows seamless integration with industrial Supervisory Control and Data Acquisition (SCADA) systems.

### Remote Dashboard Access

Enables secure monitoring and control via Wide Area Network (WAN), fourth-generation (4G) cellular network, or cloud-based platforms.

### Digital Human-Machine Interface (HMI)

Provides an intuitive on-site touchscreen interface for local system monitoring and configuration.



## Customizable Subsystem Monitoring

### Pump Performance Monitoring

Detects abnormal flow or pressure levels to prevent pump failures and unplanned shutdowns.

### Ultrafiltration and Sand Filter Tracking

Monitors filtration system pressure and output to ensure effective operation and water quality.

### Disinfection System Monitoring

Verifies disinfectant dosing levels and system integrity to support compliance with health and safety standards.



## Resilient System Design

### Redundant Alert Channels

Delivers real-time alerts through Short Message Service (SMS), email, and automated phone calls to ensure immediate operator notification.

### Automated Emergency Protocols

Initiates controlled system shutdown or flow rerouting during abnormal conditions to protect equipment and maintain treatment compliance.

### Retrofit Compatibility

Integrates easily with existing Miracell® installations, adding advanced functionality without the need for full system replacement.

# Technical Specifications

| PARAMETER                   | SPECIFICATION  |
|-----------------------------|--|
| <b>Application</b>          | Smart control system designed exclusively for Miracell® Rotating Biological Contactor (RBC) units                            |
| <b>Core Functions</b>       | Real-time monitoring, automated process control, predictive maintenance, and system alerts                                   |
| <b>Monitored Parameters</b> | Flow rate, pH, temperature, vibration, drum rotation speed, energy consumption, and tank levels                              |
| <b>Control Protocols</b>    | Supports Modbus, Profinet, and Profibus industrial communication standards   |
| <b>Connectivity</b>         | Wide Area Network (WAN), fourth-generation (4G) cellular network, and local Human-Machine Interface (HMI) access             |
| <b>User Interface</b>       | Industrial-grade touchscreen HMI and secure web-based dashboard  |
| <b>Power Supply</b>         | Compatible with standard industrial alternating current (AC) voltage ranges  |
| <b>Maintenance Features</b> | Scheduled servicing, predictive maintenance alerts, and filter life notifications  |
| <b>System Integration</b>   | Provides lightweight Supervisory Control and Data Acquisition (SCADA) functionality for complete Miracell® process oversight |



# SYSTEM INTEGRATION

# FLOW DIAGRAM



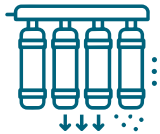
1. SmartCell Control System



2. Miracell® RBC Drum Rotation Monitoring and Control



3. Automated Sludge Valve Operation



4. Filtration and Disinfection Monitoring



5. Energy Consumption and Flow Rate Monitoring



6. User Interface and Alerts

## STAGE

## DESCRIPTION

1 SmartCell Control System

Provides centralized automation, monitoring, and control for Miracell® operations.

2 Miracell® RBC Drum Rotation Monitoring and Control

Regulates drum speed based on influent characteristics and biological activity.

3 Automated Sludge Valve Operation

Controls sludge discharge valves based on sensor inputs to maintain consistent solids management.

4 Filtration and Disinfection Monitoring

Tracks the performance and status of filtration units and disinfectant dosing systems.

5 Energy Consumption and Flow Rate Monitoring

Measures electrical load and hydraulic flow for performance optimization.

6 User Interface and Alerts

Interface (HMI), remote dashboard access, and automated notifications via SMS, email, and phone alerts.



**Optimize the Miracell® system with intelligent, integrated control. Discover automation engineered to enhance performance, reliability, and regulatory compliance.**

## CONTACT US TO LEARN MORE

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