

System Overview

The RMS Controller series is an industrial and commercial grade automation platform engineered to serve as the supervisory control core of the RMS Rain Harvesting System. It performs continuous acquisition of real-time field data, including tank levels, flow signals, and device status and executes embedded control logic to regulate rainwater collection, pumping, and distribution equipment. This logic governs functions such as pump staging, valve actuation, system mode transitions, fault handling, and interlocks, ensuring safe and reliable system operation.

In addition to equipment control, the platform provides comprehensive system visibility through persistent monitoring and real-time operational data reporting. The controller captures and displays system states, sensor values, and performance metrics through the integrated touch-screen HMI, enabling operators to track operating conditions, identify abnormal events, and validate ongoing system performance. Its continuous reporting of flow values, alarm conditions, and device status supports preventive maintenance, performance verification, and integration with supervisory systems for broader facility-level oversight.

Manufacturing & Compliance

All RMS controllers are manufactured, programmed, assembled, and factory-tested in a UL 508A-certified panel shop, ensuring compliance with nationally recognized industrial control panel construction standards. This certification requires adherence to rigorous requirements for component selection, wiring methods, short-circuit current ratings, labeling, safety interlocks, and enclosure construction, ensuring that each controller meets stringent reliability and safety criteria. The factory-testing process includes verification of I/O functionality, alarm logic, communication integrity, and operational sequencing to confirm proper performance prior to field installation. By completing all assembly and testing under UL 508A guidelines, RMS ensures consistency, traceability, and long-term durability across all controllers deployed in rainwater management applications.

Human-Machine Interface (HMI)

The controller incorporates a color touch-screen interface for system visualization, configuration, and diagnostics. The HMI provides graphical status, alarm indication, parameter entry, and operator control. The interface supports customizable screens for system-specific functionality.

HMI Specifications

Parameter	Specification
Display Type	TFT color touch screen
Screen Size	200 Series: 10.4" 200 Mini Series: 7" 150 Series: 3.5"
Resolution	800 × 600 (SVGA)
Backlight	White LED
Touch Technology	Resistive analog

Communications Interface

The RMS 200 and 200 Mini Controller incorporates standardized serial communication capabilities to support seamless integration with Building Automation Systems (BAS) and Building Management Systems (BMS).



Communication is provided through an RS-485 physical interface utilizing the MODBUS RTU protocol, allowing external supervisory systems to perform both monitoring and control functions over a reliable, industry-standard fieldbus. BACnet protocol is available as an option.

The communication interface enables exchange of real-time operational data, including system status, sensor values, pump/valve states, flow information, and alarm conditions. In addition, faults and alarms generated by the controller may be transmitted directly to BAS/BMS platforms or local annunciation devices, providing remote visibility into critical system conditions and facilitating centralized facility oversight.

Note, building automation is not available for the RMS 150 Series Controller.

Communications Specifications

Interface	Specification
Physical Layer	RS-485 connector
Protocol	MODBUS RTU (monitoring and control). BACnet optional
Alarm Output	Faults and alarms may be transmitted to BAS/BMS or local annunciators

Input/Output (I/O) Architecture

The I/O subsystem of the RMS Controller is designed as a flexible, modular architecture that supports a wide range of field devices used in rainwater harvesting, pumping, level monitoring, and mechanical system automation. The controller's hardware accommodates variations in project configuration by allowing each available input and output channel to be individually assigned, mapped, and configured through software, enabling it to adapt to differing tank geometries, sensor types, pump arrangements, and site-specific control strategies.

RMS Controller	Standard Analog I/O	Standard Digital I/O
200 Series	4	16
200 Mini Series	2	10
150 Series	2	10

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Input/Output (I/O) Architecture (continued..)

The controller's software allows the designer and/or operator to decide exactly what each input or output should do. This includes:

- Assigning purpose for each input, such as reading tank levels, flow meters, pressure sensors, float switches, or valve positions.
- Adjusting and calibrating sensor signals, especially for analog devices like 4–20 mA sensors, so the controller interprets readings correctly.
- Setting alarm trigger points, such as when water is too high or too low, when a pump fails, or when a sensor isn't working.
- Choosing what each output controls, like starting or stopping pumps, opening valves, switching relays, or moving actuators.

- Defining how the system logic behaves, including safety locks, sequences, pump rotation, and other automatic control actions.
- Setting fail-safe behavior, which determines what important outputs should do if communication is lost or if an alarm occurs—ensuring the system stays safe.

This design approach enhances maintainability, reduces commissioning time, and allows the RMS Series 200 to serve as a standardized platform across diverse installation types while still providing project-specific functionality.



Enclosure General Specifications

Parameter	Specification
Dimensions	200 and 200 Mini Series: 18" x 16" x 10" 150 Series: 16" x 14" x 10"
Material	Polycarbonate
Enclosure Rating	UL Type 1
Operating Temperature	32–122 °F (0–50 °C)
Relative Humidity	10–95% (non-condensing)
Disconnect	Pad-lockable disconnect switch
Local Alarms	Red LED and buzzer for indication
Circuit Protection	All circuit-breaker construction; no fuses required
Wiring Termination	Triple-deck screw terminal blocks within enclosure

Controller Customization & User Interface Screens

The RMS Controller firmware includes a fully customizable suite of operator interface screens designed to support system commissioning, real-time monitoring, diagnostics, and ongoing maintenance activities. These screens are presented through the integrated color touch-screen HMI, which provides graphical system visualization, parameter adjustment, and alarm interaction.

Main System Screen

The Main System Screen provides a comprehensive real-time visualization of all major system components and their operational status.

This screen serves as the primary interface for system overview and includes:

- Live status indicators for pumps, valves, sensors, tank levels, and other connected devices.
- Dynamic color or symbol changes to indicate active, faulted, or standby conditions.
- System-wide operating mode visibility (e.g., automatic, manual, alarm state).
- At-a-glance representation of current operating conditions to assist operators in quickly identifying issues or verifying proper function.

This screen is typically used by maintenance staff, facility operators, and building managers who require immediate situational awareness.



Setup / Configuration Screen

The Setup Screen provides access to all configurable system parameters, allowing technicians to adjust settings to meet project-specific performance and control criteria.

The configuration functions generally include:

- Parameter entry for pump staging, lead/lag rotation, and control setpoints.
- Input scaling and calibration for sensors such as level transmitters, pressure transducers, or flow devices.
- Adjustment of alarm thresholds (e.g., high water, low water, pump fail).
- Control logic configuration including delays, interlocks, and automatic restart behaviors.
- Optional protected access via user-level permissions to prevent unauthorized changes.

This screen is used primarily during initial commissioning, system tuning, and when operational changes are required due to system modifications or seasonal demand.

Manual Control Screen

The Manual Control Screen is designed for field service, troubleshooting, and commissioning activities, providing direct interaction with system outputs and real-time visibility into input states.

Capabilities include:

- Direct operator-initiated control of pumps, solenoid valves, relays, and auxiliary equipment.
- Real-time monitoring of corresponding input values, allowing technicians to verify sensor behavior during manual operations.
- Safe override features to ensure controlled manual operation without compromising system safety systems.
- Ideal for verifying I/O wiring, component function, and operational logic during installation or repair.

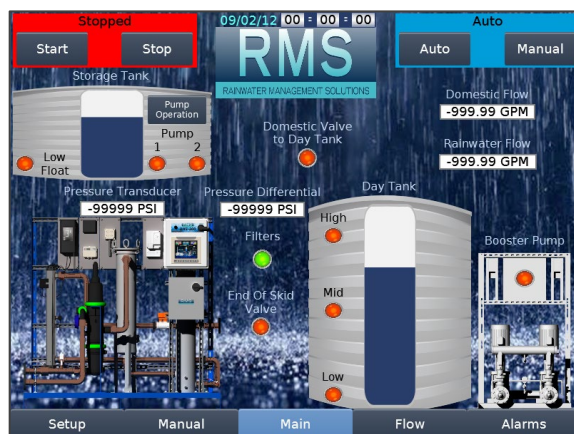
This screen is frequently used by service technicians and integrators.

Flow Monitoring Screen

The Flow Screen provides detailed flow-related performance data for systems equipped with flow meters.

Displayed information typically includes:

- Real-time instantaneous flow rate from one or multiple flow meters.



Sample Main Screen

- Totalized flow values used for consumption tracking, system performance reporting, or regulatory compliance documentation.
- Indicators for flow activity such as demand, recirculation, bypass, or irrigation draw.
- Long-term flow accumulation that can assist in preventative maintenance planning or system sizing verification.

This screen is valuable for facility operators monitoring water usage and overall system efficiency.

Alarm & Fault Screen

The Alarm & Fault Screen consolidates all system alarms, warnings, and fault history into a unified interface.

Functions include:

- Display of active alarms with clear indication of severity and affected components.
- Historical log of previous alarms with time stamps to support troubleshooting and trend analysis.
- Operator acknowledgment interface to allow reset or clearance of alarms once conditions have been addressed.
- Integration with audible/visual annunciation hardware and BAS/BMS communication for remote monitoring.

This screen is central to system reliability, providing immediate visibility into abnormal or unsafe operating conditions.

