

# Software Release Note

## superEMS™ 4.1

<b>Release Date</b>	04/11/2024 – 11/12/2024
<b>Version</b>	superEMS™ 4.1
<b>Candidates</b>	All sites

### Overview

The superEMS™ 4.1 will standardise control and performance across all Energy Renaissance installations and will function seamlessly alongside the superBMS™ 4.1 release, ensuring consistency and interoperability between the Battery Management System (BMS) and EMS across all sites. The deployment of superEMS™ 4.1 will follow closely on the release of superBMS™ 4.1, as both systems have been developed and tested in tandem to ensure cohesive operation. This alignment of the EMS and BMS versions provides a consolidated architecture to enhance system reliability, diagnostic clarity, and operational efficiency, particularly in mixed hardware environments.

### Key Features and Enhancements

#### 1) System-Wide Compatibility and Control

- a. **Unified EMS for Gen1 and Gen2 Hardware:** superEMS™ 4.1 is engineered to operate uniformly across all installed systems, removing the need for multiple versioning and enabling simplified operational management.
- b. **Full Compatibility with superBMS™ 4.1 Firmware:** This release synchronises EMS and BMS operations, ensuring both systems are updated concurrently to the latest standard, which is integral for optimised energy storage management and safety functions.

#### 2) Enhanced Functional Control and Operational Efficiency

- a. **Virtual Synchronous Generator (VSG) Mode:** Supports virtual grid synchronisation, enabling energy flows that more accurately replicate grid dynamics in off-grid and islanding scenarios.
- b. **SuperModbus Mode enhancements:** Enhances Modbus communication capabilities to streamline data flows and operational commands between superEMS™ and superBMS™, increasing the precision of performance monitoring.
- c. Full paralleling support.
- d. Reporting warnings and faults to the server correctly.



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- e. Greatly expanded warnings and fault alerts (for a detailed list, [see here](#))
- f. Warnings and faults on no racks connected
- g. `soc`, `soh`, `min\_cell\_voltage`, `max\_cell\_voltage`, `temp`, `min\_cell\_temp`, and `max\_cell\_temp` return zero values when no racks are connected.
- h. Register 8201 (Voltage) returns output/pcs/load voltage (not input/battery voltage)
- i. Modbus FC always reads from BMS 0x03
- j. *superEMS™ Mode enhancements:***
  - i. Full paralleling support.
  - ii. Reporting warnings and faults to the server correctly.
  - iii. Expanded warnings and fault alerts
  - iv. Six-hour timer for low cell voltage under 3V working and charge up to 90% SoC
  - v. Register 8201 (Voltage) returns output/pcs/load voltage (applies to Gen2 racks only)
  - vi. Modbus FC always reads from BMS 0x03
- k. *PID-Based Distributed Control with Scheduling Capabilities:*** This integration supports localised control adjustments and system scheduling via PID controllers, providing fine-grained energy management aligned with site-specific demand and generation profiles.
- l. *Local State of Charge (SoC) Monitoring:*** Supports local SoC data monitoring for real-time State of Charge tracking directly via Modbus RTU on RS485-1 or Modbus TCP. This feature ensures consistent data transmission from battery racks to the main EMS controller, enabling parallel rack management and improving decision-making precision in charging and discharging cycles.
- m. Port RS485-1 must not be in use.
- n. Main controller must be configured as "Main superModbus".
- o. *User Interface (UI) Enhancements:***
  - i. Reporting warnings and faults to the server correctly.
  - ii. Expanded warnings and fault alerts (for a detailed list, [see here](#))
  - iii. Resolved error code 200 bug
  - iv. Changed Fixed to Cleared recover the message.
  - v. Resolved periodic email alert issues on faults.
  - vi. Resolved misc. Real-time presentation layer issues
  - vii. Bar diagrams present accurately
  - viii. Bar diagrams charging faster.
  - ix. Resolved scheduling interface bugs
  - x. Reduced one-month data download of Excel file download to ~10 seconds for one month.
  - xi. Info tab is now editable by admin users.



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### 3) Advanced Energy Management Algorithms

- a. **Version 2 of Off-Grid PV Algorithm:** This upgraded algorithm enhances system performance in off-grid scenarios, particularly by maximising photovoltaic (PV) utilisation and prioritising battery charging in low-grid or generator-dependent configurations.
- b. **New Logging System with Automated Record Management:** superEMSTM 4.1 incorporates a logging system that automatically manages records, deleting entries older than one year, which optimises storage and focuses on relevant operational data.

### 4) Battery Management Safety and Diagnostics

- a. **Minimum Cell Voltage Threshold Adjustment:** To support improved battery health and longevity, the minimum cell voltage is now set at 3V (for up to six hours as a protection timer), an increase from the previous threshold of 2.96V.
- b. **Refined Fault Indicators:** For superRackTM Outdoor units, the red LED indicator now activates solely in the presence of critical system faults, providing a simplified and clear diagnostic signal across sites. The LED will show red when the contactors are open, and there are no faults.

### 5) Performance Monitoring and Data Management

- a. **Scheduled Logging and Data Integrity:** The logging system removes outdated records automatically and ensures data accuracy and storage efficiency, enabling more straightforward, long-term monitoring across all installations.

## Deployment Strategy and Testing

The pre-release testing phase will consist of an initial local test completed to confirm system stability. A beta release will undergo testing across diverse operational scenarios, allowing for the final refinement of functions before general release and will verify superEMSTM 4.1's performance in combination with superBMSTM 4.1 across various environments and load profiles. Given the interdependent structure of these systems, installations of superEMSTM 4.1 will follow successful implementations of superBMSTM 4.1 in Gen2 sites.

## Expected Impact on Installed Base

Upon deployment, all Energy Renaissance installations can transition to this unified EMS and BMS architecture (Gen2) and EMS (Gen1), reducing variability in system operations across sites. This standardisation is expected to simplify support requirements, streamline updates, and enhance system longevity, mainly through optimised battery management and efficient integration with PV and grid power sources.



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## Support and Additional Information

For comprehensive technical information on installation, configuration, and troubleshooting, please refer to the superEMST™ user manual and Installation Guide at <https://energyrenaissance.com/resource-centre/>.

For any additional queries or specific deployment assistance, contact our support team at [service@energyrenaissance.com](mailto:service@energyrenaissance.com).



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