

EMS Controller RMC-DR-02



Introduction

EMS Controller RMC-DR-02 is a highly reliable, industrial-grade edge controller developed by Renepoly for renewable energy plants, energy storage systems, microgrids, and distributed energy applications.

The controller connects conventional energy equipment with modern smart grid and microgrid systems. It collects data from smart meters, PCS, BMS, protection devices, sensors, and controllers, and maps data from different devices and protocols into standardized IEC 61850 information models for seamless interoperability.

More than a protocol converter, RMC-DR-02 provides local data processing, edge computing, and microgrid control, enabling real-time data calculation, status and quality management, and execution of energy management strategies. Supporting both retrofits and new projects, it reduces reliance on upper-level systems and integration complexity while improving response speed, reliability, interoperability, scalability, and edge intelligence.

Features

- IEC 61850 Standardized Communication

Supports IEC 61850-based MMS and GOOSE communication for real-time monitoring, status reporting, control commands, and event messaging, enabling reliable communication for smart grid applications.

- Edge Computing & Microgrid Logic Execution

Provides local data processing and edge computing for real-time data calculation, aggregation, status and quality management, as well as microgrid control and energy management. This reduces reliance on upper-level systems while improving response speed, real-time performance, and operational reliability.

- Flexible Integration and Easy Upgrades

Supports flexible mapping between field device data and IEC 61850 information models, enabling system upgrades without large-scale equipment replacement and adapting to diverse device configurations and integration requirements.

Applications

EMS Controller RMC-DR-02 is adaptable to multiple scenarios:

PV (Photovoltaic) power generation, smart energy storage, Integrated PV and Storage, integrated PV, Storage and Charging, and off-grid Solar, Storage and Diesel Generator System.

- Photovoltaic Power Generation

Integrate PV generation with AI forecasting for intelligent monitoring and output optimization.

- Smart Energy Storage

Control charge/discharge cycles to enhance efficiency and extend battery life. Enable intelligent resource dispatch.

- Integrated PV and Storage

Providing green charging for electric vehicles balancing grid loads, and enabling energy recycling.

- Integrated PV-BESS-Charging System

Provide electric vehicles green charging while balancing grid loads and enabling energy recycling.

- Off-grid Solar, Storage and Diesel Generator System

Integrates photovoltaic generation, energy storage, diesel generators, and other energy resources through coordinated control to achieve multi-energy complementarity and reliable power supply. Suitable for remote villages, islands, mining sites, telecommunications base stations, and other off-grid applications.

- Existing System Retrofit & Upgrade

For existing projects using conventional communication protocols such as Modbus, EMS Controller RMC-DR-02 enables IEC 61850 connectivity while retaining existing field equipment, eliminating the need for large-scale equipment replacement and reducing the complexity and cost of system upgrades and retrofits.



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Functional Features

- Multi-Protocol Communication
Supports IEC 61850 MMS/GOOSE, Modbus TCP/RTU, IEC 60870-5-104, DNP3, and MQTT, enabling connectivity between field devices, EMS, and remote dispatch platforms.
- Multi-Device Connectivity and Standardized Modeling
Supports PCS, BMS, smart meters, protection devices, and circuit breakers. Maps device data to standardized IEC 61850 information models for unified data management and system interoperability.
- Intelligent Data Processing and O&M Management
Supports real-time measurement, status, alarm, and control command processing, as well as high-speed GOOSE status exchange, event reporting, local configuration, and communication diagnostics for microgrid monitoring, control, and O&M.
- Flexible Data Acquisition and Control
Supports multiple digital inputs/outputs and relay control to meet complex system integration requirements.
- Local and Remote Management
Enables both on-site interaction via HMI and remote access via the cloud platform for real-time monitoring, strategy deployment, and alarm generation.
- High Reliability and Scalability
Operates over a wide temperature range (-40°C to 80°C) with 22-26V DC input voltage. DIN rail mounting facilitates integration and maintenance.
- Security Protection Mechanisms
Features hardware isolation, software permission control, and operation log recording to ensure system operational security.

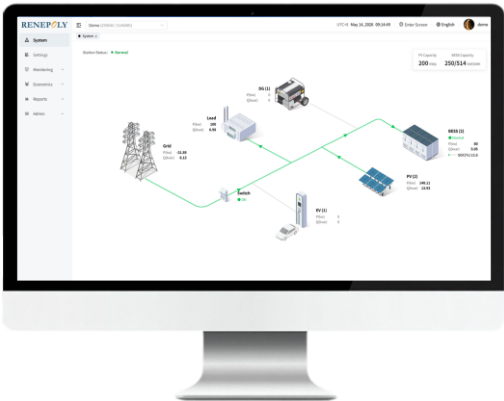


Fig.1 - Advanced monitoring and control via ReneCloud

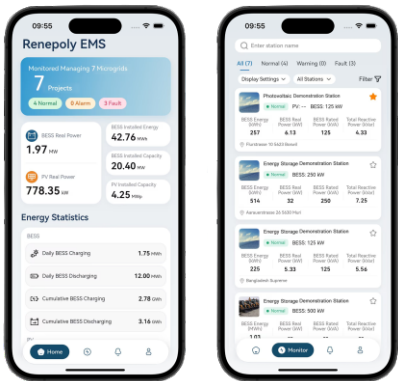


Fig.2 – Fast and flexible management via ReneApp

Specifications

Power Supply	24V DC $\pm$ 2V, >20W plus DO load power required.
Power Consumption	24V DC $\pm$ 2V, typical power consumption of 16W.
DO Load Capacity	Additional power may be required for DO (Digital Output) loads. Up to 36W when 8 DO channels support external loads. (24V DC output, total current $\leq$ 1.5A, max. 0.7A per channel.)
Communication Protocol (Standard)	IEC 61850 MMS、IEC 61850 GOOSE、Modbus TCP/RTU、MQTT
Communication Protocol (Licensed / Chargeable options)	60870-5-104、DNP3、OCPP、OPC-UA
RS485 Interface	10
CAN Interface	1
Ethernet Interface	4
Digital Inputs	8, Input level meets Type 1 requirements (high-level threshold $\geq$ 15 V)
Digital Outputs	8
Mechanical Relay Outputs	4
Device System	Linux RT
Processor	ARM A7 Dual-Core 650 MHz (Max 650 MHz) + ARM Cortex-M4 (Max 209 MHz)
USB 2.0 Interfaces	2
Type-C Interface	1
TF Card Slot	1 (supports up to 128G)
Nano SIM Card Slot	1 (supports 4G)
Dimensions	154*150*50mm (excluding DIN rail clip)
Weight	700g
Operating Temperature	-40°C to 80°C
Operating Humidity	5%-95%

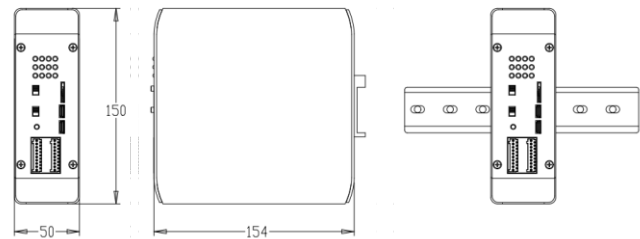


Fig. 3 – Product Dimension