

Automation · Energy Solution

Intelligent Energy Management System



EMS solution for optimal operation of ESS Intelligent Energy Management System - UNBRO's i-EMS

Facilities for ESS operation consist of environmental monitoring facilities and major facilities such as batteries, PCS, and power distribution as well as various sensors such as temperature, humidity sensors, HVAC, fire detection. For optimal operation(charging and discharging) of ESS, various status information is collected, stored and monitored in real time. It maintains optimal condition and functions according to the purpose. In addition, when connecting new renewable energy(solar power), it guarantees stable system output so that power can be provided efficiently.

EMS is an intelligent energy management system that provides optimized functions of ESS.

i-EMS features

Battery Synchronization/PCS Control

It collects ESS battery information in real time, considers the state of the battery such as SOC, voltage and current and it controls charge and discharge according to PCS characteristics.



Stabilized charge and discharge

By applying an intelligent algorithm, optimal prediction is performed every 15 minutes to perform stable charging and discharging.



Provide ESS operation status

Plans and details for ESS charging and discharging are provided in various forms and operational performance is provided based on the details of execution.



PLC application

It provides stability of control by adopting PLC(if necessary, redundant configuration) to collect and monitor various real-time data in the field. It is also provided through an OPC-UA, Modbus interface.



Intelligent charge and discharge control

During charge and discharge control, a multi-step algorithm is applied for battery life and efficient use.



i-EMS advantages



Web-based monitoring

- Web-based Dashboard
- Remote monitoring and control
- Independent and multi-monitoring(control and monitoring can be separated)



ESS/PCS N:N control

- BMS control for ESS battery operation
- BMS: PCS N:N manual, automatic control function
- Interface with Battery Monitoring System



Providing communication and data exchange

- Communication with various facilities by applying PLC
- Ethernet communication through L2 Switching
- Monitoring and interface with HVAC, UPS, environmental monitoring equipment, fire fighting equipment, etc.



Interface and monitoring of major facilities

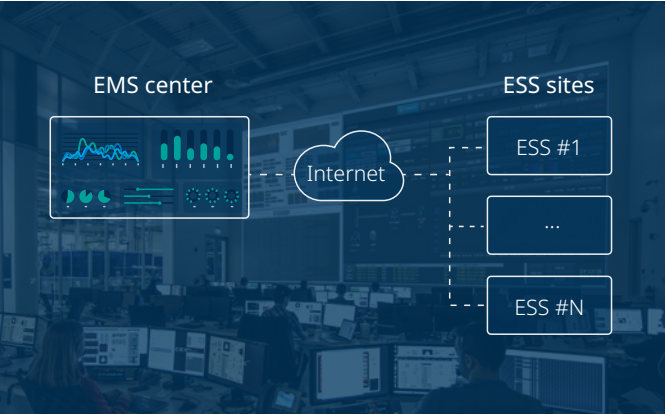
- Monitoring and control PCS, battery
- Monitoring and storage protection relays
- Monitoring and interface with HVAC, UPS, environmental monitoring equipment, fire fighting equipment, etc.(control, if necessary)



Enhanced security and stable operation(Optional)

- USB memory certified type with administrator mode with enhanced security
- Push button for emergency control in case of emergency (charging, discharging, standby, operation, stop)
- Alarm warning and warning light in case of charging/discharging failure

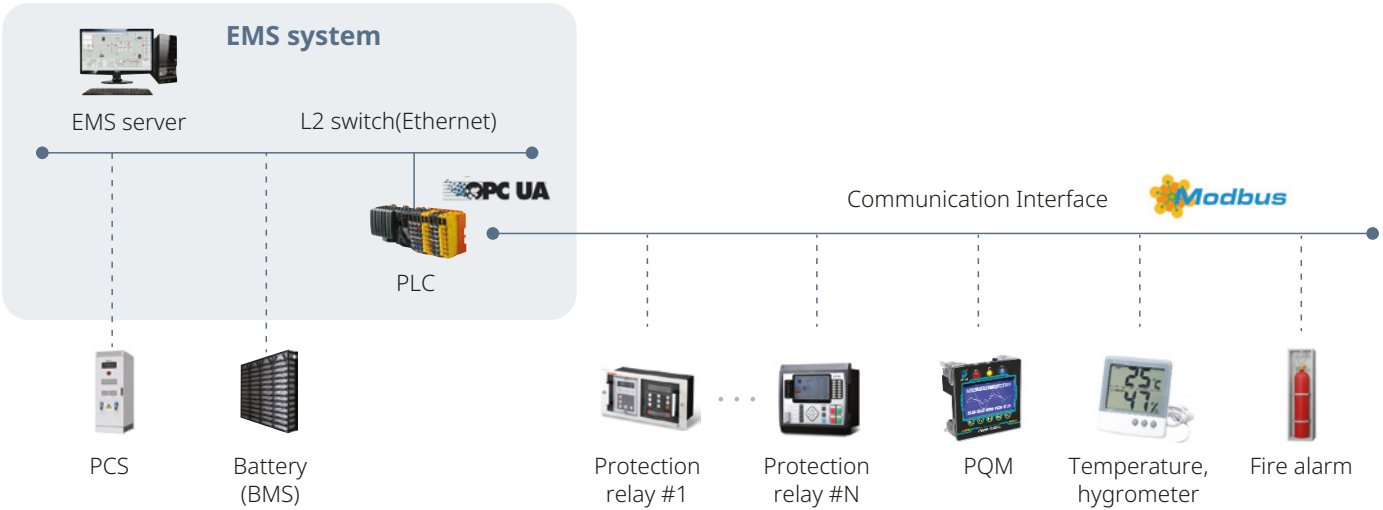
i-EMS configuration



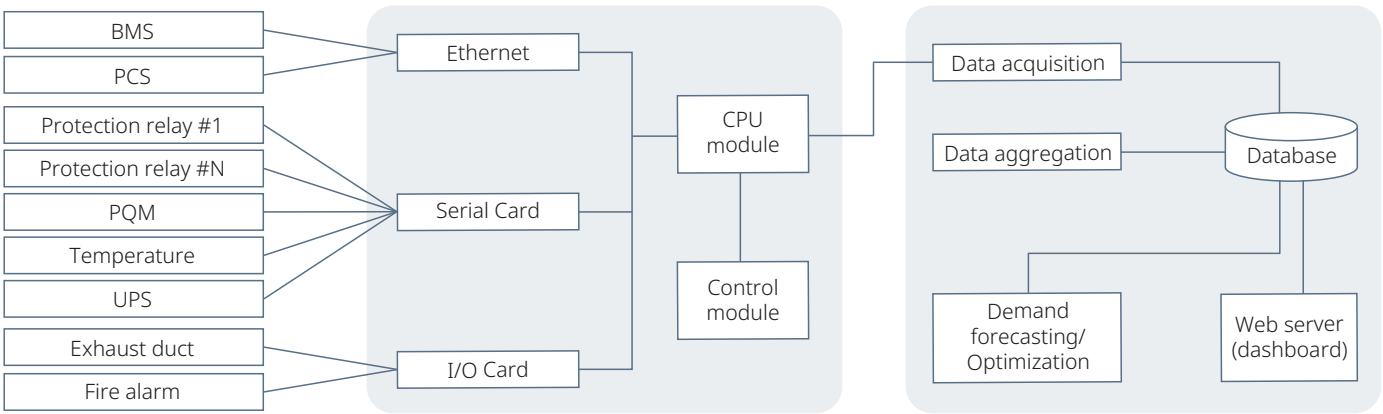
EMS operation center

- The EMS operation center is built so that all ESS sites can be integrated and operated.
- The EMS of the site is in charge of ESS operation, condition monitoring, and information collection.
- UNBRO's EMS software realizes optimal ESS operation through communication with batteries, PCS and other related equipment.
- The site and the operation center are connected to the Internet, and the operation PC at the site is operated by interworking with the EMS of the center.
- The ESS operation solution will be integrated and operated when the ESS site is expanded in the future.

H/W configuration



Data flow



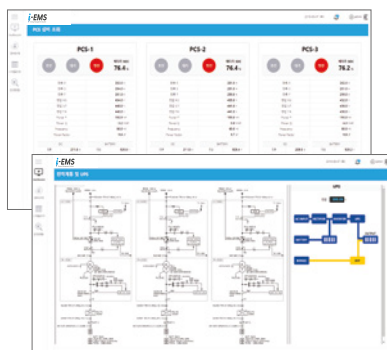
i-EMS dashboard



ESS operation summary information (battery and PCS status information)

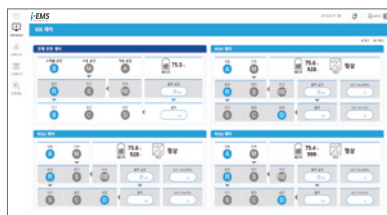
Today's power peak value, current power rate by time zone, displays general information such as target charging and discharging amount, displays remaining schedule, power usage status and status of each ESS unit

Facility Status



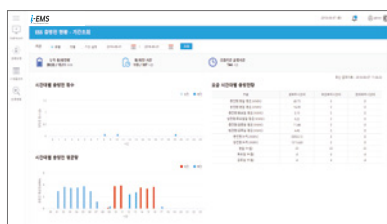
Battery	Provides detailed voltage and temperature(Max, Min) display
PCS	Display detailed charging and discharging, standby status, voltage, active current, reactive current, frequency, power factor
Protection relay	Provides information on extra high voltage, high voltage, low voltage, relays and watt-hour meters on-site
Other facilities	Provides information of transformer temperature, room temperature, humidity, UPS and environmental monitoring equipment
Power grid	Display of relay elements(applicable to design drawings) on single line diagrams

Schedule facility



Operation mode	Support of PCS operation mode(automatic, schedule, manual, independent, interworking)
Charging and discharging facility	Charge, discharge, standby, status control
Multi-step control	Intelligently set SOC and values for stable and efficient operation during charging and discharging.
Schedule management	Set special days(such as holidays) that do not charge and discharge

Operation Status



ESS Status	ESS charging and discharging operating history by time and period is checked every 15 minutes and download function
Power status	Ability to search and download power consumption and ESS charge and discharge amount by date
Schedule management	View and download temperature history of each battery rack and temperature history of each PCS PEBB(provides status data in case of abnormality)

Battery information Monitoring & Archiving System

BiMAS

By collecting and monitoring status information in real time, it improves battery efficiency and provides systematic operation information.



BiMAS(Battery information monitoring & archiving system) performs communication, monitoring, alarm and storage functions with System BMS, Rack BMS and Module BMS to monitor and store operation information of ESS battery.

BiMAS monitors battery for ESS in real time, searches accumulated database, downloads historical database and converts database to Excel format.

Main function



Provide status monitoring

Collecting battery database and monitoring status by system and Rack BMS unit



Detecting battery alarms & events, and sending via SMS

Real-time detection and protection by setting charging rate, SOH, voltage, current of battery alert notifications and sending events via SMS



Searching historical database by system and Rack BMS unit and export to Excel format

Management and searching accumulated database and automatic report output

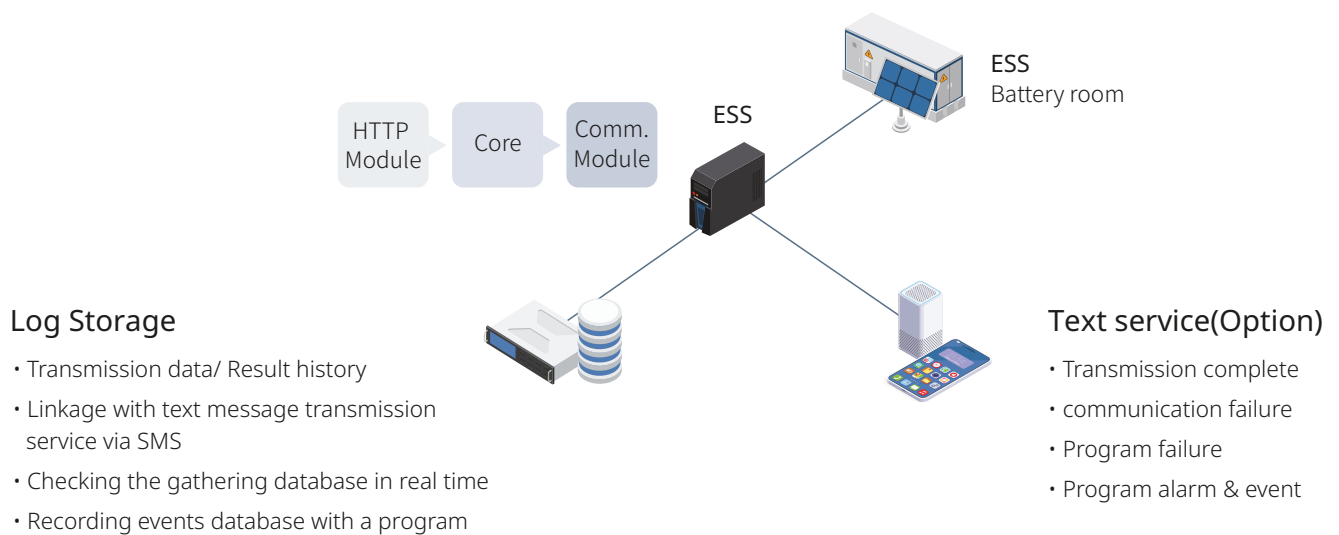


Real-time historical database search and storage

Real-time BMS database search



BiMAS block diagram



We efficiently provide monitoring and control and optimal solutions in the field of industrial facilities.



Battery safety check

We provide a safety solution that checks for abnormalities in industrial equipment



System security

It protects the database of the devices and allows authorized user to manage it



Maintenance service

We provide continuous inspection and safety check services to improve work capacity

intelligent-EMS

