



User Manual



Industrial and Commercial
Energy Storage Systems

V1.0-2025-08

Note

The content of the documentation may be updated regularly due to product version upgrades or for other reasons. Unless otherwise specified, the content of the documentation does not replace the safety instructions found on the product labels or in the user manuals. All descriptions contained in this document are provided for informational purposes only.

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1.Preface

This document mainly contains product information, installation wiring details, configuration and commissioning instructions, troubleshooting guidance, and battery system maintenance procedures. Before installing or using this product, please read this manual carefully to familiarize yourself with the safety instructions, as well as the product’s functions and features.

This document may be updated regularly. The latest version and additional product information can be found on the official website.

1.1Applicable Products

This document applies to the following system configurations in various scenarios:

ESS-215KWh/100KW

ESS-241KWh/100KW

1.2 Requirements for Operating Personnel

- 1.Wear a protective helmet, insulating gloves, insulating shoes, and safety goggles when operating or maintaining the energy storage system. Wearing watches or other metallic accessories is strictly prohibited.
- 2.Only qualified electricians are allowed to operate or maintain this product using complete professional electrical equipment
- 3.Must be able to assess assigned tasks and identify potential hazards.
- 4.Must be capable of administering first aid to injured personnel immediately.
- 5.Must understand applicable maintenance standards for the product.
- 6.Must comply with local laws, regulations, ordinances, and standards.

1.3 Symbol Definitions

To improve the usability of this manual, the following symbols are used to highlight important information. Please read the symbols and corresponding explanations carefully.

 Danger
Indicates a high potential hazard that, if not avoided, could result in death or serious injury
 Warning
Indicates a moderate potential hazard that, if not avoided, could result in death or serious injury.
 Caution
Indicates a low potential hazard that, if not avoided, could result in moderate or minor injury
 Note
Highlights supplementary information and may also contain tips or advice to optimize product use, help solve a problem, or save time.

2.Safety Instructions

The safety instructions in this document must be strictly followed when using the device.

 **Caution**

This device has been developed and tested in strict compliance with safety requirements. However, as it is an electrical device, all corresponding safety instructions must be observed before each use. Improper use may result in serious injury or property damage.

2.1 General Security

 **Caution**

- The content of this documentation may be regularly updated due to product version upgrades or other reasons. Unless otherwise stated, this documentation does not replace the safety instructions on the product labels. All descriptions in this document are for reference only
- Read this document carefully before installation to become familiar with the product and the precautions to take.
- All work on the devices must be carried out by qualified and competent electricians who are fully familiar with the applicable standards and safety instructions at the project site.
- To ensure personal safety, use insulated tools and wear personal protective equipment (PPE) when handling the devices. When working with electronic components, wear anti-static gloves, anti-static wrist straps, and anti-static clothing to protect the devices from electrostatic damage.
- The manufacturer is not responsible for material or bodily damage resulting from the installation, use, or configuration of batteries that do not comply with this documentation. For more information on product warranty, please contact authorized distributors.

2.2 Battery Safety

 **Danger**

- This battery system is a high-voltage system and operates at high voltage during equipment operation. Before handling any equipment within the system, ensure the equipment is de-energized to prevent electric shock hazards. Strictly adhere to all safety precautions in this manual and safety labels on the equipment during operation.
- Inverters used with the battery must be approved by the battery manufacturer. A list of approved inverters and batteries is available on the official website.
- Do not disassemble, modify, or repair the battery or control enclosure without official authorization from the device manufacturer, as this may cause electric shock or damage the device. The manufacturer is not responsible for resulting damage.
- Do not strike, pull, compress, or step on the device. Do not expose batteries to fire, as this could cause an explosion.
- Do not expose batteries to high temperatures. Ensure no heat sources are near the batteries and avoid direct sunlight. Temperatures above 60 °C pose a fire risk.
- Do not use batteries or control enclosures with visible defects, cracks, damage, or other abnormalities. A damaged battery may leak electrolyte.
- To protect the battery and its components during transport, ensure personnel are professionally trained. Document all handling operations and ensure device stability to prevent falls.
- Battery devices are heavy. Use personnel appropriate to the weight of the devices to avoid exceeding safe handling limits and causing injury.
- If the battery does not start, contact after-sales service immediately; otherwise, the battery may be irreversibly damaged.
- Do not move the battery system while it is operating. For battery replacement or addition, please contact after-sales service.

 **Precautions**

- Ensure that the battery system remains intact during transport and storage.
- Transport must be carried out by qualified personnel, and all operations must be documented.
- Secure the devices properly to prevent tipping; a toppled device can cause damage and injury.
- Using cables in high-temperature environments may cause aging or deterioration of insulation. Maintain a minimum distance of 30 mm between cables and heating components or surrounding hot areas.
- Group cables of the same type together. Keep different types of cables at least 30 mm apart during installation. Avoid twisting or crossing cables.

Explanation of Symbols			
	Potential hazards exist during the operation of the devices. Take protective measures when using them.		Fire Safety: Keep the device away from open flames or ignition sources.
	High Voltage Danger: High voltage is present during device operation. Ensure devices are powered off before performing any work.		Keep Away from Children: Keep the device out of reach of children
	Proper Use Required: Under extreme conditions, there is a risk of explosion.		Do Not Lift During Operation: Do not lift the device once the battery system is connected or operating.
	Corrosive Electrolyte: The device contains corrosive electrolyte. Avoid contact with leaked electrolyte or its vapors.		Do Not Disconnect DC Connections While Operating: Avoid disconnecting DC connections while the device is in operation.
	Flammable Materials: The battery contains flammable substances. Exercise caution in case of fire risk		Recycling Symbol: Indicates recyclable components
	Heavy Objects: Handle heavy objects carefully to prevent crush injuries.		CE Certification Mark: Shows compliance with CE standards.
	Personal Protective Equipment: Wear appropriate PPE during installation, operation, and maintenance.		Protective Conductor Connection Point: Indicates grounding point.
	Read Manual: Read the product manual carefully before putting the device into operation		Waste Disposal: Do not dispose of the device with household waste. Dispose of it according to local laws and regulations or return it to the device manufacturer.

2.3 Emergency Response Measures

Battery Electrolyte Leakage

- If electrolyte leaks from the battery module, avoid contact with the spilled liquid or its vapors. Electrolyte is corrosive and can cause skin irritation or burns upon contact. In case of accidental contact, take the following measures:
- Inhalation: Leave the contaminated area immediately and seek medical attention without delay.
 - Eye Contact: Rinse eyes thoroughly with clean water for at least 15 minutes and seek medical attention immediately.
 - Skin Contact: Wash the affected area thoroughly with clean water and soap, then seek medical attention immediately.
 - Ingestion: Induce vomiting and seek medical attention immediately.

Fire

- Batteries pose a fire risk at temperatures above 150 °C. Battery fires may release toxic and hazardous gases.
- To prevent fires, ensure that carbon dioxide, Novac1230, or FM-200 fire extinguishers are available near the equipment.
- Do not use ABC dry powder extinguishers to combat battery fires. Firefighters must wear protective clothing and self-contained breathing apparatus (SCBA).

Electrostatic Protection

- The accumulation of static electricity may cause electric shocks, fires, explosions, electronic component failures, and damage. Energy storage systems contain circuit boards or other static-sensitive components. To prevent or mitigate the hazards of static electricity, effective electrostatic protection must be implemented to suppress static generation, accelerate static dissipation, and neutralize static charges. Prevention methods include but are not limited to:
1. During component replacement, all uninstalled equipment components should be kept in electrostatic-shielding packaging bags. Temporarily removed components should be placed on anti-static foam pads.
 2. Do not touch solder joints, pins, or exposed circuitry.

3. Product Overview

3.1 Product Overview

Function Overview

- 1.A single air-cooled integrated energy storage cabinet with a capacity of 215 kWh constitutes one energy storage unit. It consists of 10 air-cooled battery modules, a high-voltage cabinet, a distribution box, and a 100 kW PCS with EMS components.
- 2.Each air-cooled module is made up of 24 battery cells connected in series, with a nominal capacity of 280 Ah. The high-voltage cabinet houses the battery cluster management unit as well as protection and control electronics, which monitor the operating status and protect the entire battery cluster.
- 3.The integrated cabinet features a compartmentalized design separating the battery space from the electrical space, facilitating installation and maintenance.

3.2 Application Scenarios

Grid side:

- Peak shaving and valley filling;
 - Load leveling;
 - Fast frequency regulation;
 - Improved operational stability and grid reliability;
- In microgrids, energy storage systems help maintain dynamic balance and ensure voltage stability for critical loads.

Consumer Side:

- Shifting electricity consumption to off-peak hours
- Reducing electricity costs and utilizing time-of-use pricing differences
- Providing backup power to mitigate demand peaks

3.3 Main Functions

1. The battery system monitors operating parameters (voltage, current,temperature, SOC/SOH, etc.) and adjusts charging/discharging and energy storage according to battery status and actual performance of PV modules.
2. The system features high-voltage sampling and state feedback for protective devices (circuit breakers, fuses, etc.). In case of battery faults,the system generates alerts and limits charge/discharge current or power to protect the electrical system.
3. The Battery Management System (EMS) controls cooling, heating, and temperature/humidity settings for air conditioning.
4. The integrated energy storage cabinet meets IP54 protection standards and is suitable for outdoor use.
5. The cabinet is equipped with a gas-based fire extinguishing system. The EMS continuously monitors internal temperature and smoke to prevent fires, including battery combustion.

System Model Specification

ESS 215KWh 100KW

Number	Meaning	Description
1	Series Code	Integrated Energy Storage System
2	Usable Energy Capacity	•215 kWh: Usable capacity is 215.04 kWh •241 kWh: Usable capacity is 241.15 kWh
3	Output Power	100 kW: Maximum output power of this energy storage system is 100 kW

4.Equipment Inspection

4.1 Pre-Acceptance Inspection

Before accepting the product, carefully check the following items:

- 1.Inspect the exterior packaging for any damage such as deformation,punctures, cracks, or other signs that may have affected the equipment inside the crate. If damage is found, do not open the packaging and contact your distributor.
- 2.Verify that the equipment model is correct. If there is a discrepancy, do not open the packaging and contact your distubutor.
- 3.Check that the type and quantity of delivered items are correct, and inspect them for any external damage.If damage is found, please contact your distributor.

4.2 Delivery Contents



Energy Storage System x 1



red DC wiring harness* 10



Black DC Wire Harness* 1



Product Manual* 1
Delivery Note * 1
Certificate of Conformity* 1



DC-DC Module x 1 (Optional)



Router x 1 (optional)

5.Transport

5.1 Product Transport

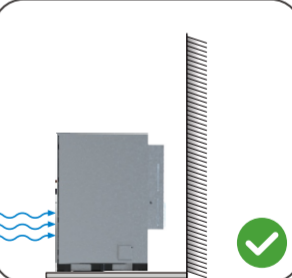
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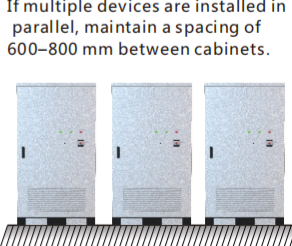
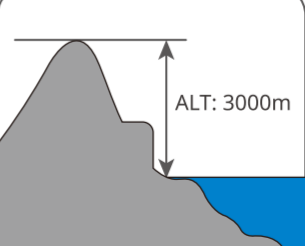
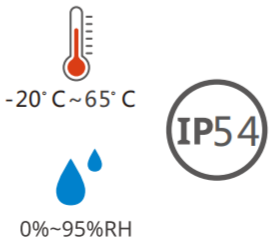
Before transport, ensure that the product is adequately protected to prevent wear or scratches. Transport the device without removing padded protections if necessary.

- 1.The device must not be installed in flammable, explosive, or corrosive environments.
- 2.During installation, avoid hidden water pipes, cables, or other concealed structures in walls.
- 3.The installation environment must be protected from direct sunlight, rain, and snow. Installation in sheltered locations is recommended; if necessary, install sun protection devices.
- 4.The installation space must meet the device's ventilation and heat dissipation requirements and allow sufficient clearance for operation.
- 5.The device' s protection rating must be suitable for outdoor use, and ambient temperature and humidity must remain within specified limits.
- 6.Installation height should facilitate operation and maintenance, ensure proper visibility of indicators and labels, and allow easy access to connections.
- 7. Installation height must not exceed 3000 meters above sea level.
- 8.Keep the device away from strong magnetic fields to avoid electromagnetic interference. If radio stations or wireless communication devices under 30 MHZ are nearby, ensure the distance between the battery and EMI sources is more than 30 m.
- 9.For wall-mounted installation, allow 2–3 m of space to ensure adequate airflow for cooling and to enable the rear door to open.
- 10.The device follows an airflow pattern with front intake and rear exhaust. Install it in an open, unobstructed location.

Installation Safety Requirements

- 1. Install the device out of reach of children and avoid locations where accidental contact is possible. The device surface may become hot during operation: risk of burns







5.2 Lifting operations

⚠ Caution

During all lifting operations, crane safety regulations must be strictly followed.

1.To prevent fatalities or injuries, no personnel should be within a 10-meter radius of the work area, especially beneath the crane boom or under suspended or moving equipment.
2.Lifting operations must be suspended in adverse weather conditions such as heavy rain, dense fog, or strong winds.

5.2.1 Preparation Before Lifting

- 1.Crane preparation
The total weight of the equipment (including packaging) is approximately 2.45 tons. Choose the crane capacity according to the total weight and on-site conditions. Recommended capacity: 5 to 8 tons.
- 2.Lifting Device Preparation:
Steel cable (required diameter: 18 mm, length: 8 m), shackles, support bars, etc.

5.2.2 Lifting Procedure:

1. Remove the outer wooden packaging before lifting.
2. Use a crane with suitable capacity for loading and unloading. Nylon slings (or straps) or steel cables can be used for lifting.
3. Lifting must strictly follow the lifting diagram (see Appendix 5.2.1 below).
4. Lift vertically; dragging the equipment on the ground or pushing/pulling it on a surface is prohibited.
5. When the cabinet is 300 mm above the ground, stop the operation to check the lifting device connections. Lifting may only resume once all connections are secure.
6. Lift slowly and monitor the balance of the cabinet at all times; avoid excessive speed.
- 7.No personnel should stand under the external cabinet or crane during lifting operations.



Figure 5.2.1-Lifting diagram of the 215 kWh air-cooled integrated energy storage cabinet (industrial/commercial).

5.3 Forklift Operation

⚠ Caution

1.Strictly follow forklift safety rules during all operations.
2.Maintain a minimum distance of 10 meters from the work area, especially beneath the forks and around the moving machine, to avoid fatalities or injuries.
3.Operations must be suspended in adverse weather conditions such as heavy rain, dense fog, or strong winds.
4. Always adhere to the mechanical limits of the energy storage system during transport and handling. Package dimensions (LxWxH): 1160x1710x2100mm
Weight: Approximately 2.45 tons

Requirements for Forklift Use:

- 1.The forklift must have sufficient lifting capacity (minimum recommended: 5 tons).
- 2.The forklift forks must cover the full depth of the integrated cabinet, i.e., the forks should be at least 1500 mm long
- 3.Forklift access points on the integrated cabinet are shown in Figure 5.3.1 below.
- 4.During lifting, lowering, and movement, proceed slowly and evenly; a test lift should be conducted first.
- 5.For safe handling with a forklift, it is recommended to pass a safety strap around the integrated cabinet and secure it to the forklift crossbar.
- 6.Specific procedures for forklift operation are shown in Figure 5.3.2 below.

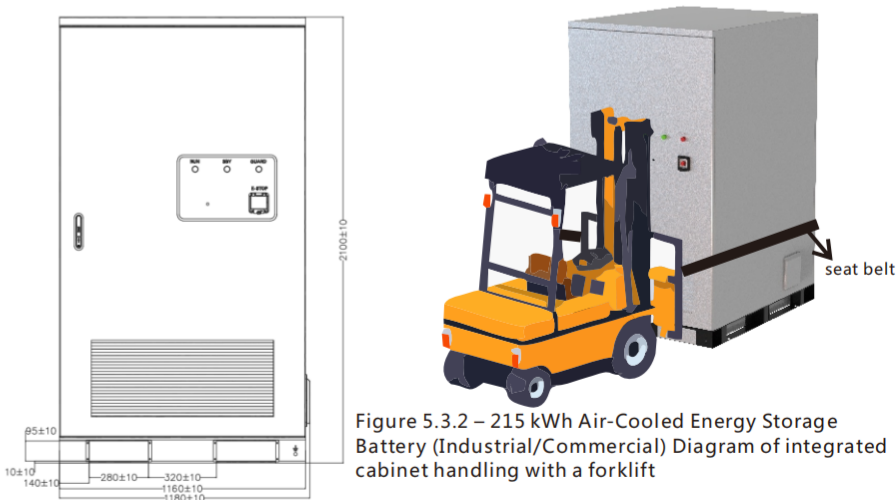


Figure 5.3.1 – 215 kWh Air-Cooled Energy Storage Battery (Industrial/Commercial) Diagram of forklift pallet access points on the integrated cabinet

Figure 5.3.2 – 215 kWh Air-Cooled Energy Storage Battery (Industrial/Commercial) Diagram of integrated cabinet handling with a forklift

6. Equipment Installation

6.1 Installation Notes

Danger

The integrated energy storage battery cabinet is a high-voltage energy storage device classified as hazardous material. Unauthorized personnel or improper use can result in severe consequences such as electric shock, burns, or explosions. Installation and maintenance of the integrated energy storage cabinet must only be performed by qualified personnel. Strict adherence to applicable safety regulations is mandatory during operation.

Warning

1. When lowering the cabinet with a crane, ensure it does not come into contact with people.
2. Establish a designated safety zone during installation work.
3. Handle the integrated cabinet carefully during lifting.
4. Installation must only be performed by personnel trained in high-voltage operations.
5. Do not install the cabinet if it has defects, cracks, or damage.
6. Do not attempt to open, disassemble, repair, handle, or modify the cabinet during installation.
7. Do not perform installation in adverse weather conditions, such as heavy rain or sandstorms.
8. To protect the cabinet and its components during transport, handle it carefully; avoid impacts, pulling, rubbing, or stepping on it. Do not subject the cabinet to excessive external forces.
9. Do not insert any foreign objects into the cabinet parts.
10. Do not expose the enclosure or its components to open flames.
11. Do not install the cabinet near heating devices.
12. Do not immerse the integrated cabinet or its components in water or any liquid.
13. Place the cabinet on a flat surface and ensure it is stable, does not wobble, and will not tip over.
14. Consider the load-bearing capacity and strength of the installation surface when installing the energy storage systems.

- All internal devices of the energy storage system have been securely connected and tested before shipment. On-site installation requires connecting external communication cables and series cables to the PACK integrated cabinet, as well as connecting external auxiliary power cables.
- The installation procedure is illustrated in Figure 6.2.1 below: Energy Storage System Installation Procedure. A detailed description is provided in Table 6.1.1: Detailed Installation Process Description.

Chart 6.1.1 Detailed Installation Procedure

Installation Process	Description
Preparation Before Installation	1. Inspect the exterior of the integrated cabinet for damage; 2. Check the interior of the integrated cabinet for damaged or loose components; 3. Verify all parts are present and complete; 4. Confirm the installation environment meets requirements; 5. Confirm whether the project site possesses necessary installation equipment.
Structural Installation	1. Use a crane to hoist the integrated cabinet onto the precast foundation. 2. Secure the integrated cabinet according to project requirements.
Electrical Connection	1. Connect the grounding point; 2. Connect the communication and signal cables from the integrated cabinet's slave unit to the master unit; 3. Connect the power cables from the integrated cabinet's master and slave units to the user; 4. Connect the communication cables from the integrated cabinet's master unit to the user.

6.2 Preparation Before Installation

6.2.1 Requirements for the Installation Environment

The installation of energy storage systems shall meet the following requirements:

Table 6.2.1 Installation Environment Requirements for Energy Storage Systems

Project	
Installation Site Requirements	The air intake and exhaust ports must be professionally treated to prevent rain, wind, sand, and dust ingress.
	Outdoor areas with good ventilation and high airflow
	Necessary fireproofing, waterproofing, and rodent-proofing measures
Foundation Requirements	Surface slope $\leq 1^\circ$ Seismic resistance > 8 degrees
	The installation surface must be level and dry; standing water on the floor is strictly prohibited.
Space Requirements	Ensure the ground surface is level and stable, and capable of supporting the weight of the energy storage equipment.
Ambient temperature	Sufficient space must be provided in front of, behind, to the sides, and above the equipment for ventilation, maintenance, and escape.
Relative humidity	$-20 \sim +50^\circ\text{C}$
Elevation	$\leq 95\%$, no condensation
	$\leq 2000\text{m}$

6.2.2 Installation Site Requirements

Energy storage equipment must be installed on concrete or other non-combustible surfaces. The installation surface must be level, secure, and flat, with sufficient load-bearing capacity. Depressions or inclinations are not allowed.

- When constructing the foundation, provisions must be made for cable routing, including trenches or dedicated cable passages.
- The equipment has a bottom cable outlet, so cable routing should go through trenches. These trenches must be pre-installed on site and meet the following requirements:
 - Trenches must provide adequate protection against water and moisture to prevent cable aging and short circuits that could disrupt normal operation of the energy storage equipment.
 - Due to the high power delivered by the installation, thicker cables are required. The trench design must provide sufficient space to accommodate these cables.
 - The client can determine the number of cable routes as needed, ensuring that the routes adequately support the weight and dimensions of the equipment.
- During cable installation, communication cables, power cables, and electrical lines must be installed separately. DC and AC circuits require separate wiring.
- The spacing between different cables must be greater than 300 mm.
- The installation site must be dry, well-ventilated, and away from Class A fire hazard areas or flammable /explosive zones.
- The construction ground must be sufficiently compacted; the recommended relative density of the soil at the installation site is $> 98\%$. If the soil is loose, appropriate measures must be taken to ensure foundation stability

6.2.3 Equipment Ventilation Requirements

Energy storage equipment generates significant heat during operation. Excessive temperatures can affect electrical and mechanical parameters and potentially damage the equipment. To ensure adequate heat dissipation, the installation environment must meet the following requirements:



Note

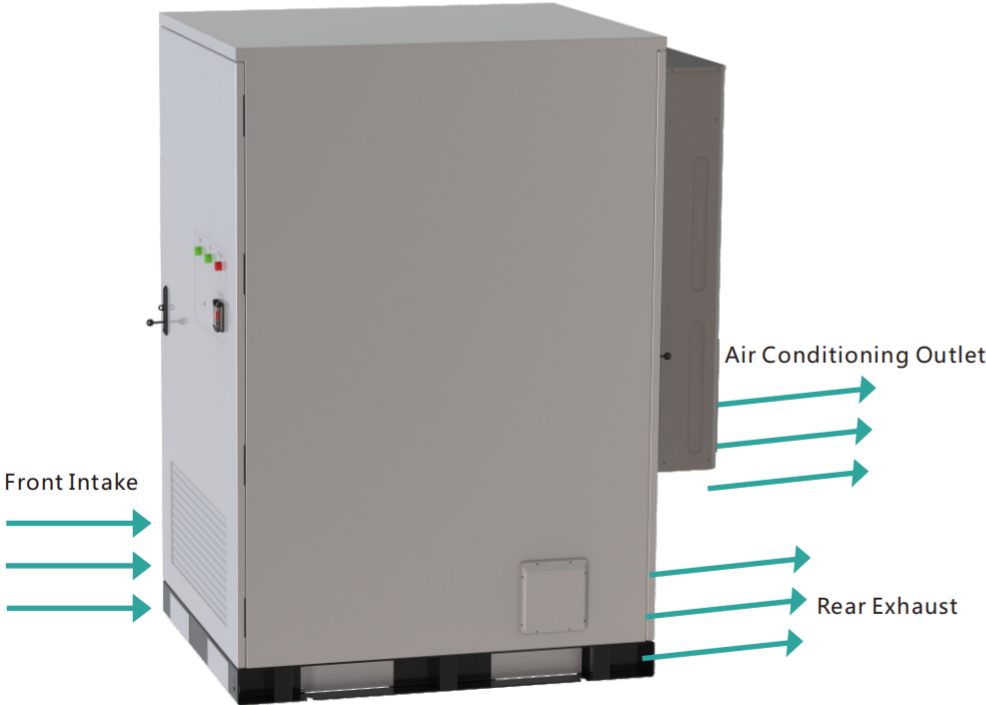
1. Equipment must be installed in a well-ventilated environment.

2. Air intake openings must allow sufficient fresh air supply.

3. The equipment's ventilation system must be separated from other ventilation systems in the control room.

4. In case of overheating, check that ventilation openings are not obstructed.

The integrated energy storage cabinet has front air intake and rear exhaust, with the front and rear openings positioned as follows:



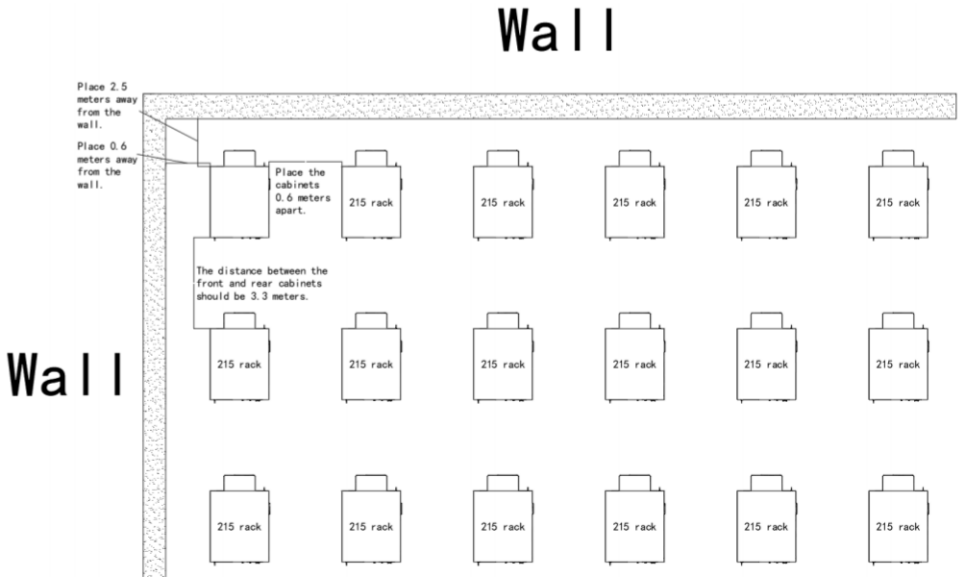
6.2.4 Installation Tool Preparation

Tools	Quantity	Instructions for Use
Forklift	1 unit	For indoor and outdoor transportation. Designed for loads exceeding 5 tons, with cargo lengths exceeding 1500 mm and center distances exceeding 600 mm.
Crane	1 unit	Load capacity: 5–8 tons
Straps	8m	Flexible straps, wire ropes, or tie-down straps for crane transport
Socket and Wrench	1 set	For fixed applications, the maximum torque must exceed 30 N·m.

6.2.5 Required Maintenance Space at the Installation Site

Considering the space needed for the integrated energy storage cabinet:

- The space in front of the cabinet door must be at least 2 m (if battery replacement with a forklift is required, a minimum of 3.3 m is recommended).
- The maintenance space on the left and right sides must be at least 0.6 m.
- The maintenance space behind the cabinet door must be at least 2.5 m.
- Specific installation distances must comply with local construction and installation regulations.



6.3 Structural Installation of the Energy Storage System

6.3.1 Securing the Integrated Energy Storage Cabinets

1. Use an on-site crane (recommended capacity: 5–8 tons) to slowly lift the integrated energy storage cabinet onto the prefabricated foundation. The specific lifting procedures are described in Section 5.2 of this manual.

2. After completing the lifting operation, secure the base of the integrated cabinet with M12 screws (recommended torque: 40 N·m) according to project specifications. As illustrated in Figure 6-3:

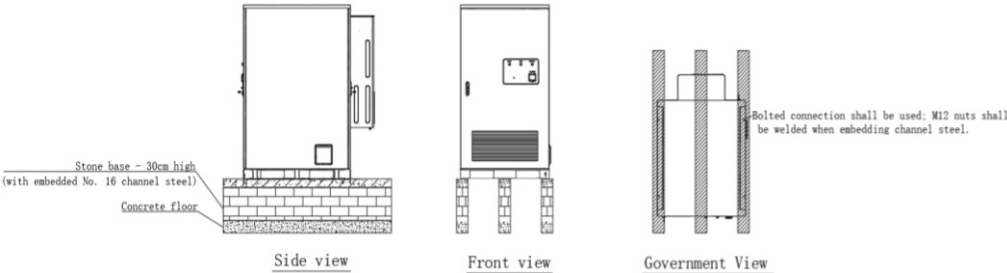


Figure 6-3 – Mounting diagram for energy storage system installation (The actual implementation depends on the project conditions.)

6.3.2 Pre-Wiring Check

Number	Inspection Items	Remedial Measures
1	Are the fasteners tightened?	If any screws are loose, retighten them.
2	Does the spatial environment meet the installation size requirements?	If space is insufficient, redesign before reinstalling.
3	Is the air duct clear and free of obstructions?	Remove any foreign objects; if flow remains obstructed, investigate the cause.

6.3.2 Preparation Before Installation and Wiring

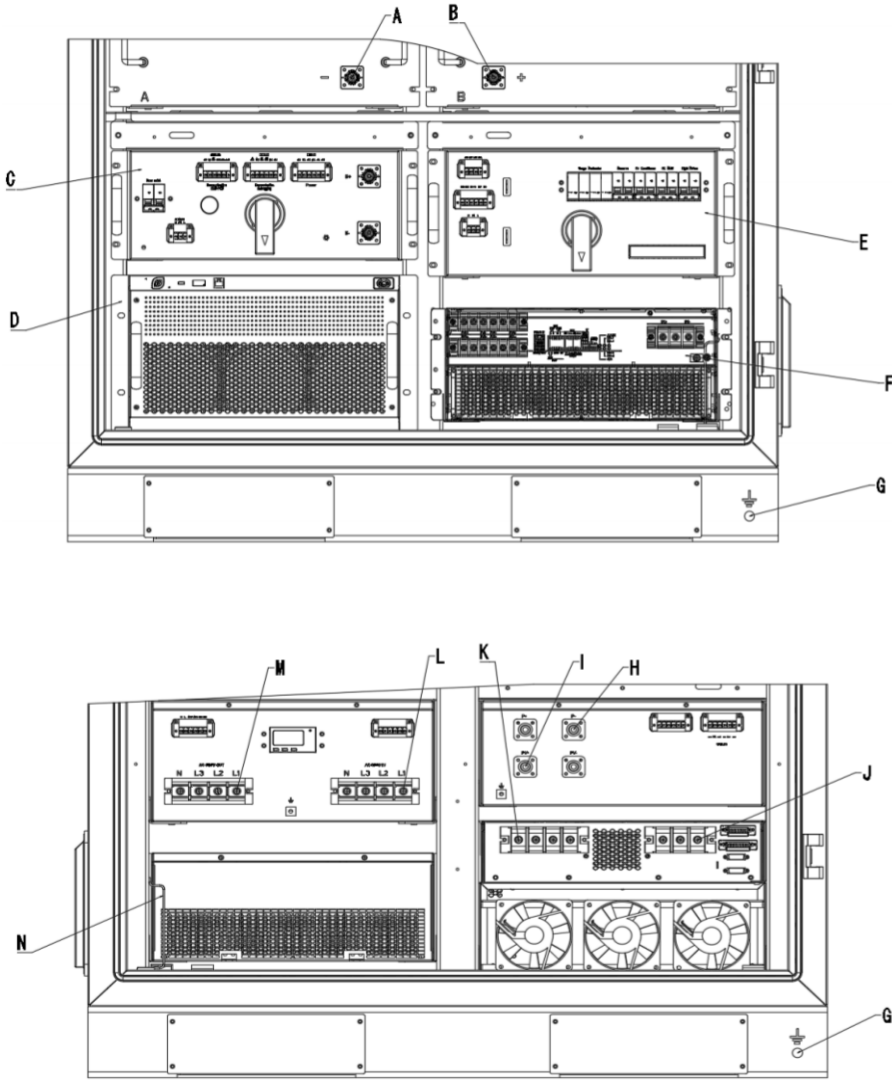
Number	Tool Name	Legend
1	Insulated gloves	
2	Safety glasses	
3	Insulated shoes	

Number	Tool Name	Legend
4	Workwear	
5	Safety helmet	
6	Screwdriver	
7	Wire stripper	
8	Hydraulic clamp	
9	Hot air gun	
10	Multimeter	
11	Torque wrench	
12	marker pen	
13	Standard Fireproof Mastic	

6.4 Electrical Connections for Energy Storage Systems

6.4.1 Connection Point Specifications of the Integrated Energy Storage Cabinet

The integrated energy storage battery cabinet is equipped with a PCS AC cable port and a grounding busbar. Detailed location and functional descriptions are shown in the figure below:

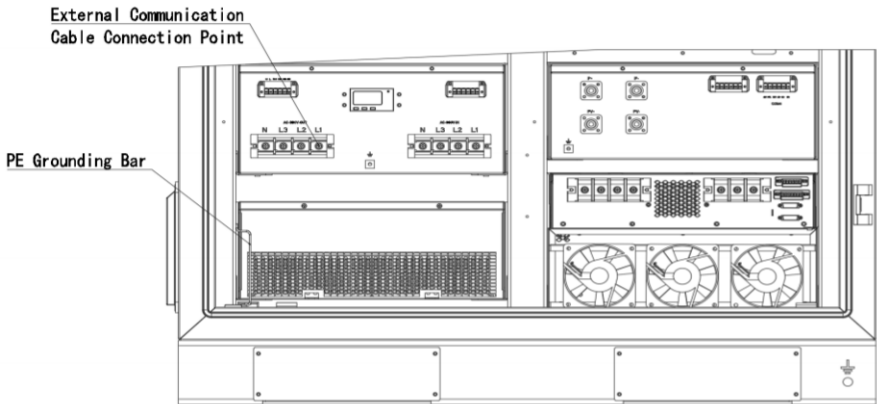


Number	Code Name	Name	Note
1	A	Battery Box Negative Terminal	
2	B	Battery Box Positive Terminal	
3	C	Master Control Panel	
4	D	Power Conversion System	
5	E	Output Distribution Box	
6	F	DC-DC Converter	
7	G	External Grounding of the Cabinet	
8	H	DC Output Interface	
9	I	DC-DC Converter DC Output Interface	
10	J	PCS DC Input Interface	
11	K	PCS AC Output Interface	
12	L	AC Output Interface of Distribution Box	
13	M	AC Input Interface for Distribution Panel	
14	N	Cabinet Grounding Busbar	

6.4.2 Electrical Diagram

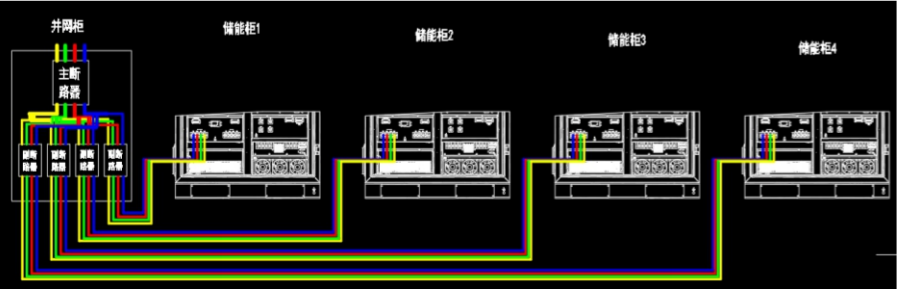
The integrated energy storage battery cabinet includes a connection point for the PCS AC cable as well as a grounding busbar. The detailed position and functional description are provided below:

Number	Description	Recommended Model	Quantity	Note
1	AC Cable (AC Input Cable for Distribution Box)	UL36440.6/1KV 4*50+1*25mm ²	1 set	
2	External Commun- ications (if any)	Shielded Category 6A Ethernet Cable 4G IoT SIM Card	1 set	
3	DC-DC Photovoltaic Connection Point	UL36440.6/1KV 8*10mm ²	1 set	



Location	Port	Instruction
External Commun- ication Cable Connection Location	AC380V-L1 (Bottom-entry or side-entry)	Connected to Busbar/Grid Side L1
	AC380V-L2 (Bottom-entry or side-entry)	Connected to Busbar/Grid Side L2
	AC380V-L3 (Bottom-entry or side-entry)	Connected to Busbar/Grid Side L3
	Neutral Busbar	Connected to Busbar/Grid Side N
	Ground Busbar	Connected to Busbar/Grid Side PE

6.4.2.1 Wiring Procedure for AC Cables and Grounding Cables



General AC Cable Diagram for parallel operation of multiple master and slave units in the energy storage system:

Step 1: Ensure all output circuit breakers in the integrated battery cabinet, high-voltage cabinet, and front/rear distribution boxes are in the open position.

Step 2: Strip the insulation from the cable end. The stripped length should match the depth of the crimp connector opening plus approximately 5 mm.

Step 3: Select the appropriate crimp connectors according to the chosen cable specifications and perform crimping:

- 1)Insert the exposed copper conductor into the connector opening.
- 2)Secure the connector using a crimping tool, performing at least two crimping operations.

Step 4: Install a heat-shrink sleeve:

- 1)Choose a sleeve that matches the cable dimensions and is about 2 cm longer than the crimped terminal.
- 2)Slide the sleeve over the terminal, ensuring it fully covers the crimped area.
- 3)Heat the sleeve with a heat gun to shrink it and ensure a tight fit.

Step 5: Cable connection:

- 1) Select screws, spring washers, flat washers, and nuts compatible with the copper terminal block.
- 2)Connect them to the distribution busbar in the distribution box / network cabinet.
- 3)Secure the connection and tighten to the recommended torque of 34 N·m.

6.4.3 Post-Wiring Verification

After completing the installation, the following checks and measurements must be performed to prevent equipment damage and material loss:

Number	Inspection Items
1	Before measurement, disconnect the battery-side and grid-side switches to ensure the DC and AC sides of the energy storage equipment are de-energized.
2	Verify that the positive and negative terminals between the battery and energy storage equipment are correctly connected, the AC phase sequence is accurate, and all connections are securely fastened. Measure the interphase resistance between the three phases; it should be in the megohm range. If it is in the kilohm range or lower, inspect the circuit.
3	Ensure external control cables, grounding wires, and communication lines are securely fastened.
4	The grounding wire resistance is less than 0.1Ω, and the cable is intact with no damage or cracks.
5	Clear the installation area; no tools or foreign objects should be left behind.
6	Seal cable gaps with fire-resistant putty to prevent small animals from entering.

7. Product Operation

7.1 Powering On the Energy Storage System

7.1.1 Pre-power-up inspection

Ensure that all circuit breakers in the electrical compartment of the integrated battery storage cabinet are in the open position.

- Verify that the series cables between battery packs, and between the packs and the high-voltage cabinet, are properly connected.
- Confirm that all communication and power connectors are securely plugged in.
- Check that the communication and power cable harnesses, as well as the power cables on the front side of the high-voltage cabinet, are properly connected.

7.2 Start-Up Procedure

1. Ensure that the series cable harnesses and communication cable harnesses of the PACK modules are fully connected.
2. Confirm that the main + / – cables and master/slave communication connections of the PACK modules are complete.
3. Close the main switch of the main control cabinet, then rotate the lever of the main cabinet vertically downwards. Check that the main cabinet indicators light up.
4. Verify that the “Standby” LED on the door panel is lit and that battery data is displayed on the EMS screen.
5. Check that the AC input and output connections of the distribution cabinet are properly wired.
6. Rotate the lever of the distribution cabinet vertically downwards.
7. Verify that the “Run” LED on the door panel is lit and that the EMS display shows the AC connection data.



Note

Power storage equipment must be started up strictly according to the above steps. Failure to do so may damage the equipment or cause it to malfunction.

7.3 Shutdown Procedure

Follow these steps:

1. Using the EMS display, issue the “Stop” command; the Operating LED on the door panel will switch to Standby mode.
2. Rotate the lever of the distribution cabinet in the battery storage unit horizontally to the right to turn off the circuit breaker.
3. Rotate the lever of the main control cabinet in the battery storage unit horizontally to the right to turn off the circuit breaker. The control indicator will turn off, and the LEDs on the EMS display and door panel will no longer be illuminated.



Note

- Under normal circumstances, please use the normal shutdown procedure to power down the energy storage equipment.
- In emergency situations, the emergency shutdown must be used to ensure rapid response and protect both the energy storage equipment and peripheral devices.

7.4 Emergency Shutdown Procedure

In an emergency, please follow these steps:

1. Press the external emergency stop switch located on the door of the cabinet. The energy storage system will automatically trip the AC/DC circuit breakers and stop operation.
2. If the energy storage system is operating in external power supply mode, switch off all circuit breakers both on the equipment and on the external power source.



Note

- Warning signs must be posted at the disconnect switch to prevent accidental energization, which could endanger personnel and property.
- When reactivating the energy storage system, ensure all related equipment faults have been resolved.

8. EMS Tracking Information Parameters

8.1 Overview of the Individual Device Page

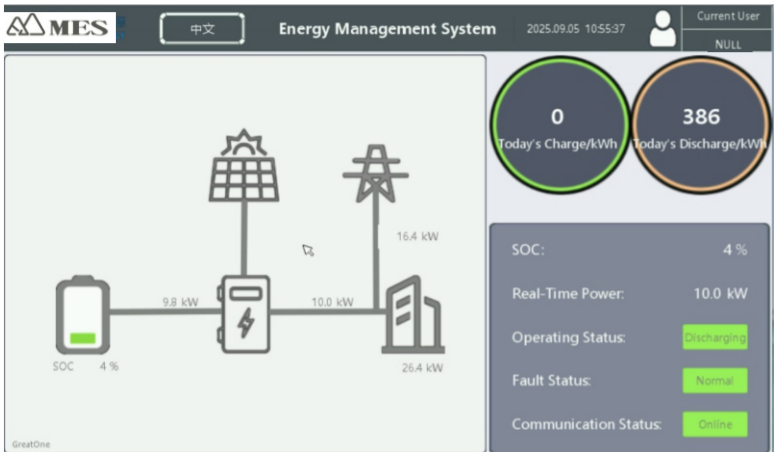


Figure 8.1 – Example of an Individual Device Home Page

1)On the left side of the individual device home page, the system’ s topological diagram is displayed. In the upper right corner, the current daily charge and discharge quantities of the cabinet are shown. In the lower right corner, the cabinet status data is displayed, including: SOC (State of Charge), Real-time power, Operating status, Fault status, Communication status with the equipment.

The top menu bar displays the time and the logged-in user account.
2)By clicking “Energy Management System” in the top menu bar, you can access the next-level equipment menu page.

8.2 Introduction to the Master and Slave Units Home Page in Parallel

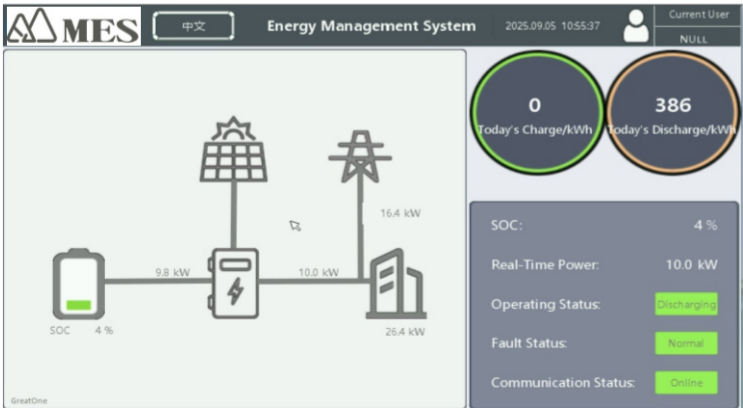


Figure 8.2 Example of the Master Home page

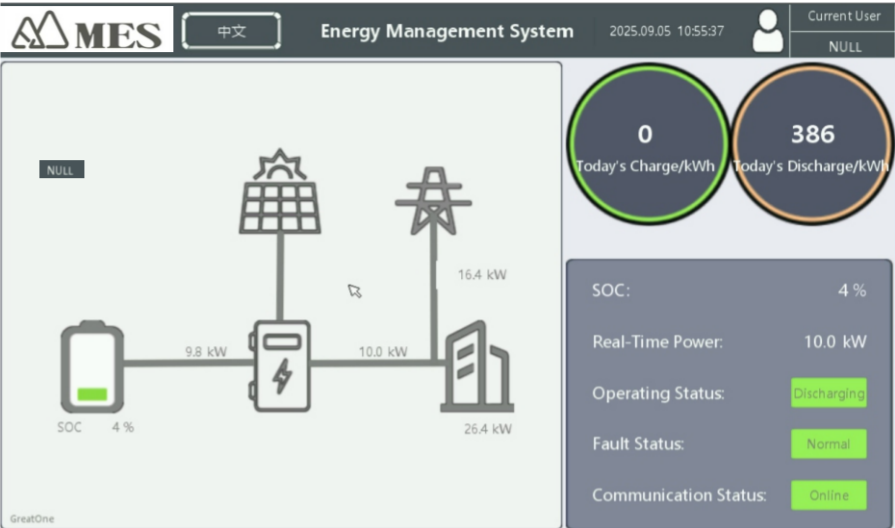


Figure 8.2.1 Example of the Slave Unit Home Page

The layout of the master-slave parallel home page is similar to that of the individual device page.

8.3 Device-level interface

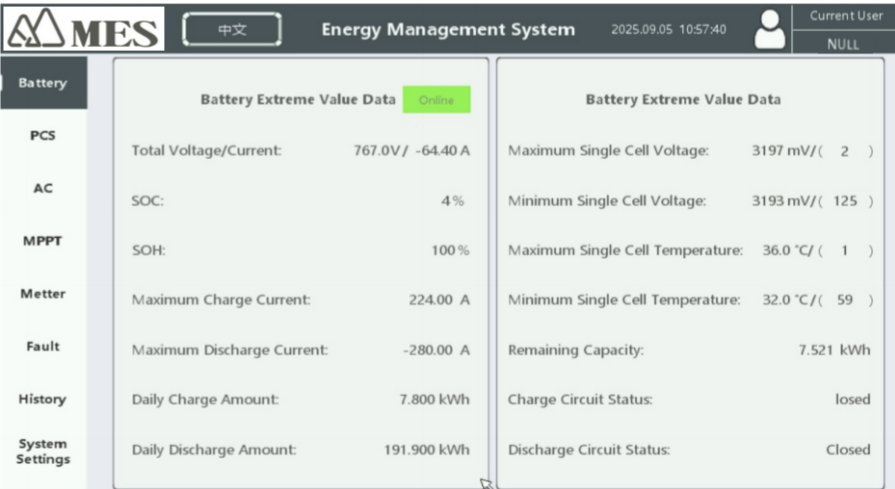


Figure 8.3 Example of Battery Data Interface

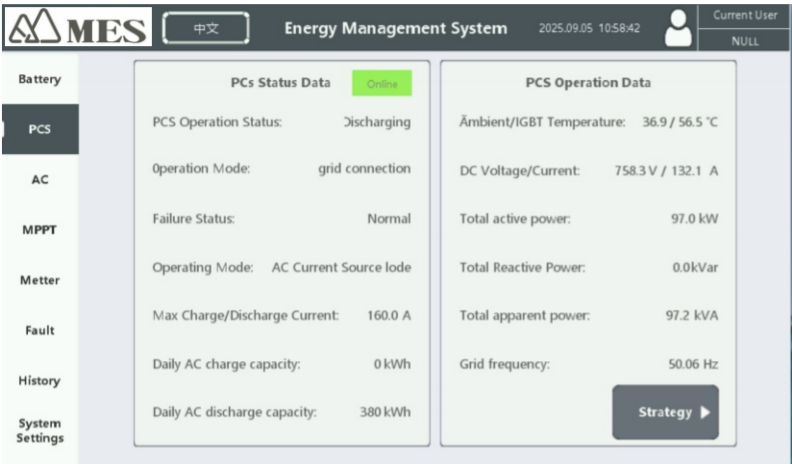


Figure 8.3.1 – Example of PCS Data Interface Diagram

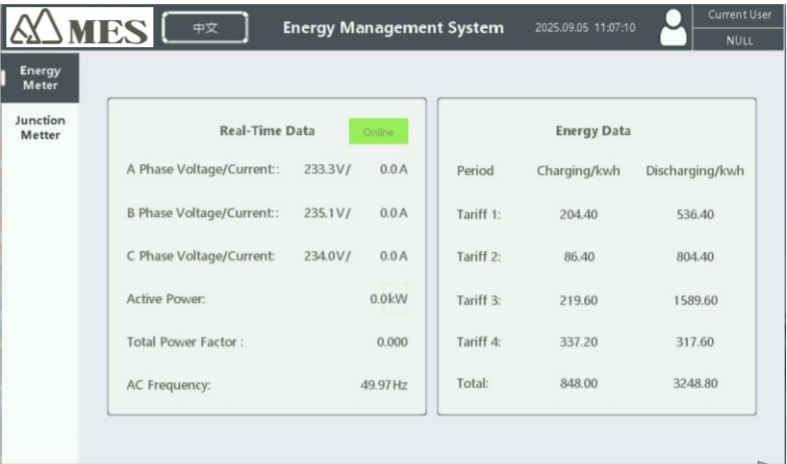


Figure 8.3.3 – Example of Power Meter Data Interface Display

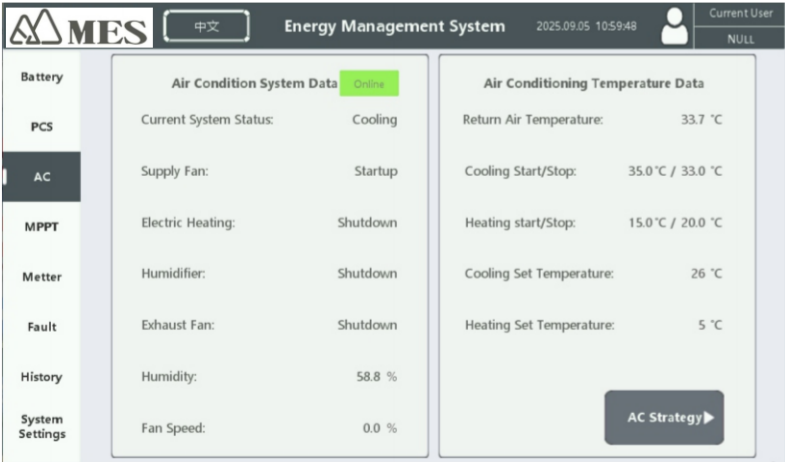


Figure 8.3.2 – Example of HVAC Data Interface Diagram

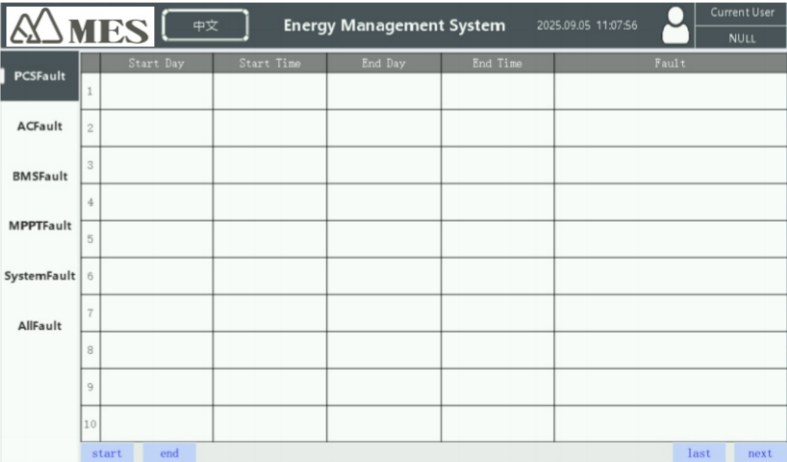


Figure 8.3.4 – Example of Errors / Alarms Interface Display

MES 中文 Energy Management System 2025.09.05 11:10:28 Current User NULL					
Status Record	Start Day	Start Time	End Day	End Time	Status
1	2025/09/05	11:06:41			PCS: Standby
2	2025/09/05	11:06:21			PCS: Insulation Detection Enabled
3	2025/09/05	11:02:50			Cooling Fan Off
4	2025/09/05	11:02:44			Discharging Low Voltage Protection
5					
6					
7					
8					
9					
10					
start end last next					

Figure 8.3.5 – Example of Historical Data Interface

Online Settings

User Management

Screen Settings

Temperature

System IO

Power Parameters

Online Settings

Meter Settings

Master Ip Settings

Trans. Maximum Power: 300.0

Trans. OL Prot Lead Time: 50.0

Fixed Power: 5.0

Discharge Threshold: 5.0

Metering Pt. Demand Val.: 300

Energy Meter: Enter

Anti-Rev. Current Letter: Enter

Metering Meter: Enter

Reactive Power Comp.: Enter

Rated Power/kW: 100.0

Rated Power of Group/kW: 100.0

Local Address: 0

Strategy Selection: 12Strategy

Online Mode: Single Machine

Work Mode: Schedule

Protection Mode: Protection(All)

Data Release: Prohibit

Default IP: 192.168.1.100

Set IP

Figure 8.3.6 Example of System Settings Interface

- 1) “Device Level” Page: Displays data information for the BMS, PCS, chillers, meters, etc. Left Menu Bar: Allows navigation between different pages.
- 2) On the PCS page, clicking “Power Strategy” navigates to the PCS control page and the power strategy page.
- 3)On the chiller page, clicking “Chiller Strategy” navigates to the corresponding control page.
- 4)Clicking “Errors / Alarms” opens the error page; clicking “History” opens the historical records page; clicking “System Settings” opens the system settings configuration page.
- 5)By selecting “History,” you can view both current and historical data, local operation logs, and status records.
- 6)By selecting “System Settings,” you can modify system parameters and view temperature/humidity, fire protection status, various IO states, and display configuration.

8.4 PCS Control & Time Slot Settings & Power Strategy Settings

MES 中文 Energy Management System 2025.09.05 11:15:29 Current User NULL

PCS Control

12Strategy

PCS Settings

96Strategy

Single-cell voltage upper limit protection: 3650 mV

Single-cell voltage lower limit protection: 2700 mV

SOC upper limit protection: 99 %

SOC Lower Limit Protection: 0 %

Active power setting: 0.0 kW

Grid connected

Start

Stop

Fault Reset

Default Period

Figure 8.4.1 – Example of PCS Control Interface

On the “PCS Control” page, you can configure: Protection thresholds for individual cell charge/discharge PCS fan on/off thresholds/ Grid connect/disconnect mode/Error reset/Restore default power strategies

PCS Control	Start Time	End Time	Status	Power (kw)
12Strategy	0:00:00	08:00:00	Charging	-25.0
	08:00:00	12:00:00	Discharging	25.0
	12:00:00	13:00:00	Standby	0.0
96Strategy	13:00:00	17:00:00	Discharging	25.0
	17:00:00	24:00:00	Discharging	10.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0

Figure 8.4.2 Example of “Power Strategy” Interface

- On the “Power Strategy” page, you can configure the start time, end time, and adjustment periods.
- Using the input power, you can adjust charge and discharge power:
 - Positive values → discharge
 - Negative values → charge
 - 0 → standby
 - If no period is defined, the default configuration is standby mode.
 - In case of overlapping periods, the period listed at the top takes priority.

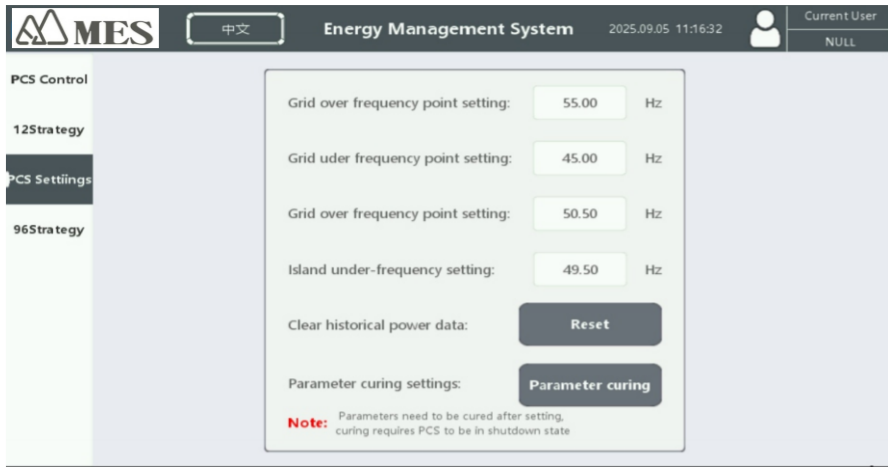


Figure 8.4.3 Example of the pcs Parameter Settings Interface

- 1) Capable of transmitting electrical over frequency points and electrical over frequency points, as well as islanding over frequency points and islanding frequency points; After completing the input parameters, click on 'Parameter' Number solidification "can save input parameters.
 - 2) Click "Reset" to clear the accumulated battery data of the pcs.
- 8.5 Thermal Management System Control Page

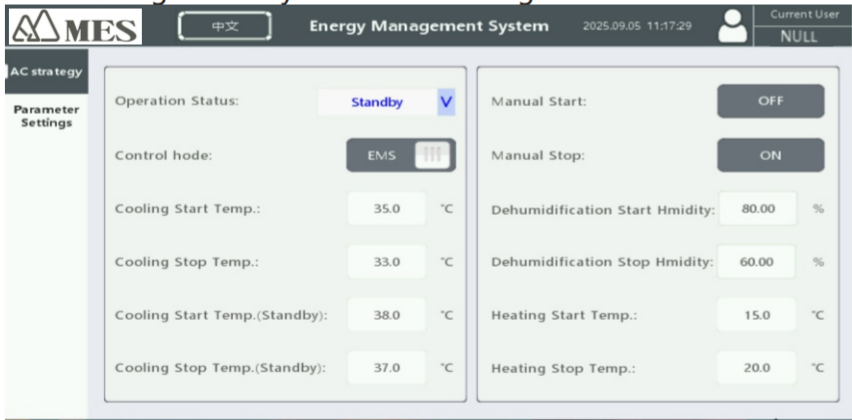


Figure 8.5.1 – Example of HVAC Strategy Interface

- On the “HVAC Strategy” page, you can configure:
- Start/stop temperatures for cooling/heating in operating mode
 - Start/stop temperatures for cooling in standby mode
 - Start/stop temperatures for automatic cycle mode
- Configure the operating mode as Automatic or Manual:
- Automatic mode: The system operates autonomously based on the predefined settings.
 - Manual mode: The operating status is set manually by clicking the On/Off button.

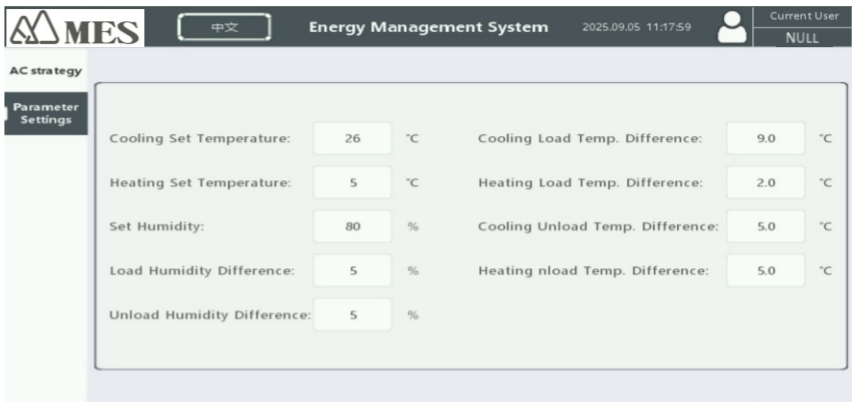


Figure 8.5.2 – Example of Thermal Management Settings Interface

Configure the following parameters: Cooling temperature, Target heating temperature, Target humidity for the dehumidifier, Charge temperature differential, Discharge temperature differential, Charge humidity differential, Discharge humidity differential

8.6 MPPT System Settings Interface

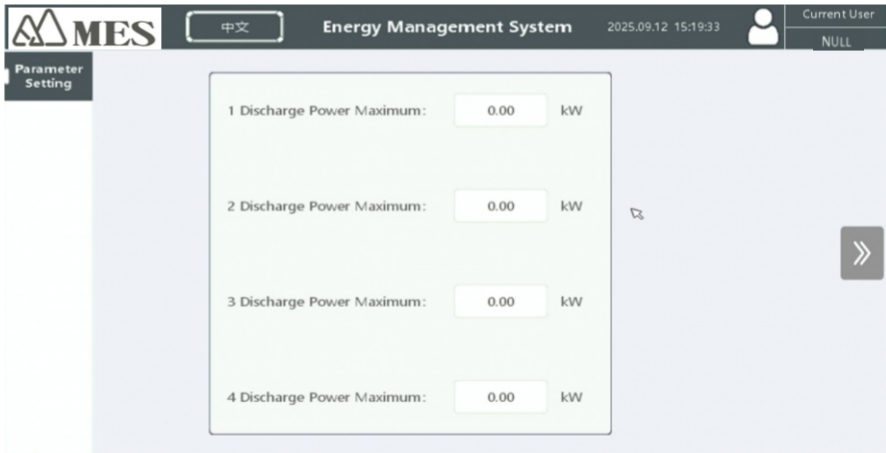


Figure 8.6.1 MPPT System Settings Interface

In manual working mode, the output voltage and current of MPPT can be set, power and other parameters.

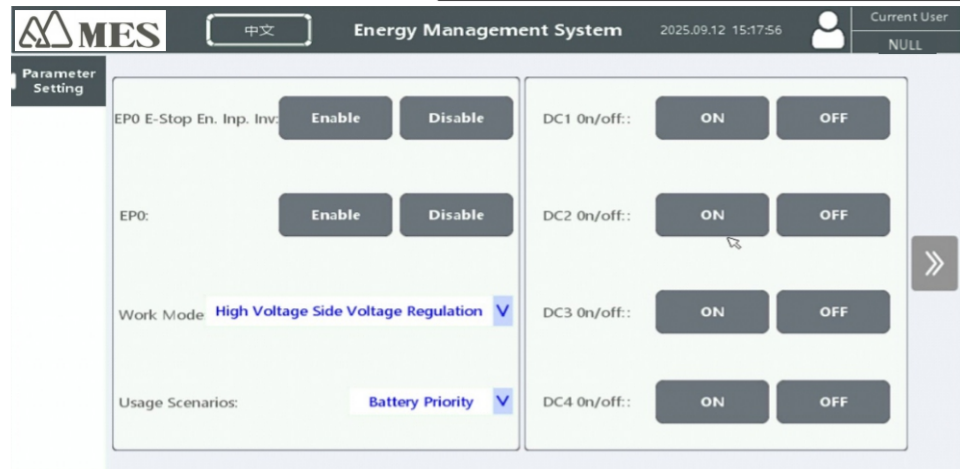


Figure 8.6.2 MPPT System Settings Page In manual or automatic working mode, parameters such as MPPT working scenario and DC power on/off can be set.

8.7 Errors/Alarm & History Logs

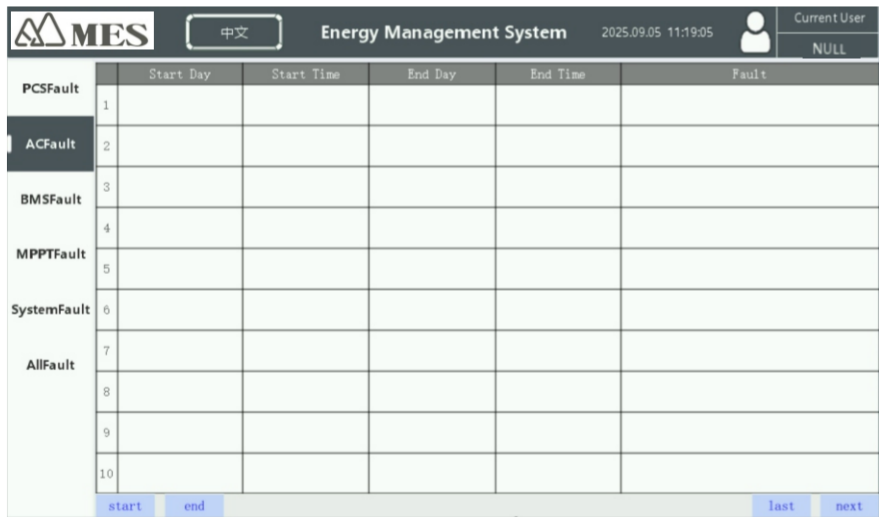


Figure 8.7.1 Example of the Errors/Alarm Interface

- 1) Click on “Errors / Alarms” to access the alert interface and view real-time errors as well as historical data.
- 2)The left-hand menu allows navigation to other equipment error pages.

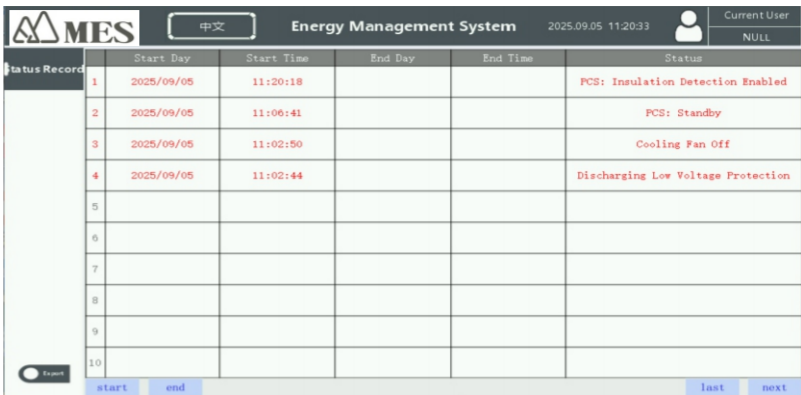


Figure 8.7.2 Example of “Historical Records” Interface

Click on “Historical Records” to access the historical page, where you can view status records,operation records, data records and power.

8.8 System/Online Settings

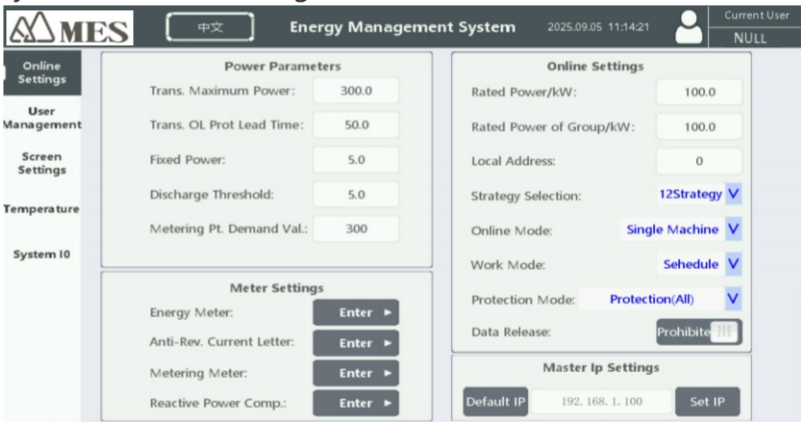


Figure 8.8.1 Example of the Online Settings Interface

Click on “System Settings” to access the “Online Configuration” page, where you can configure:
Power settings, Demand settings, Energy meter ratio, Online settings and IP settings.

- Parameter definitions:
- Maximum transformer power: Maximum output power supported by the transformer connected to the system.
 - Transformer protection buffer power: During charging, if monitoring detects a risk of transformer overload ($P > \text{maximum transformer power} - \text{protection buffer}$), the EMS reduces charging power to avoid overload.
 - Unregulated power: During discharging, if load power fluctuations exceed the unregulated power range, the EMS regulates the PCS output power.
 - Demand trigger power: During discharging, if the load power exceeds the trigger threshold, the storage system provides power up to its maximum output.
 - Energy meter ratio in the ESS: Configures the ratio of the meter inside the storage cabinet.
 - Charge meter configuration: Indicates whether charge meters are present.
 - Charge meter ratio: Configures the ratio for the return meter.

- Unit rated power: Maximum output power of this cabinet.
 - Parallel group rated power: Maximum output power of the system when multiple cabinets are connected in parallel.
 - Device address: Not required for individual operation; for parallel operation, set the master to 0 and slaves to 1, 2, 3, etc.
 - Connection mode: Options include "Local Automatic," "Local Manual," "Master Central Control," and "Slave Central Control" ; depending on individual automatic, manual, or parallel operation.
 - Protection mode: Configurable in four modes:
 1. Discharge backflow protection and transformer overload protection enabled
 2. Discharge backflow protection enabled
 3. Transformer overload protection enabled
 4. Discharge backflow protection and transformer overload protection disabled
 - Communication settings: Disable communication under certain conditions; generally not required.
- Communication settings: Mask communication status under certain conditions; generally not required.

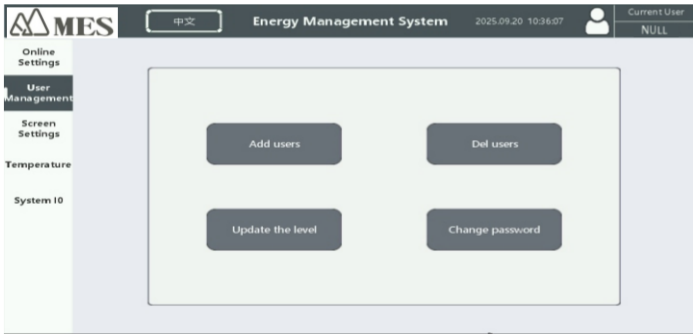


Figure 8.8.2 – Example of User Management Interface

1. Available functions: Add or remove users, modify access levels and Change login passwords

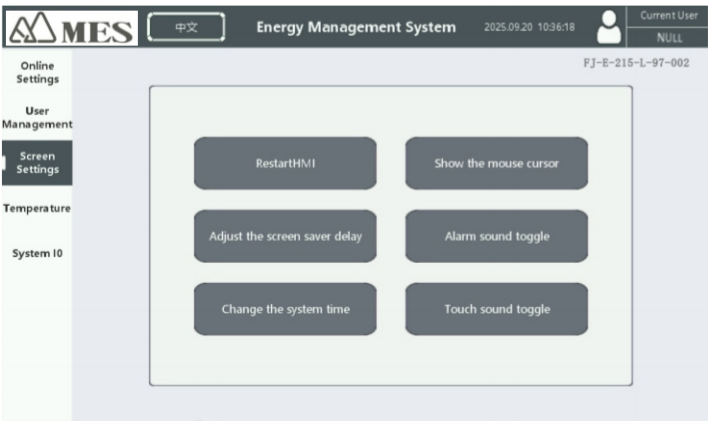


Figure 8.8.3 Example of Screen Settings Diagram

Restart the screen / Adjust the screensaver duration and alarm sound / Set system time / Enable or disable touchscreen sound

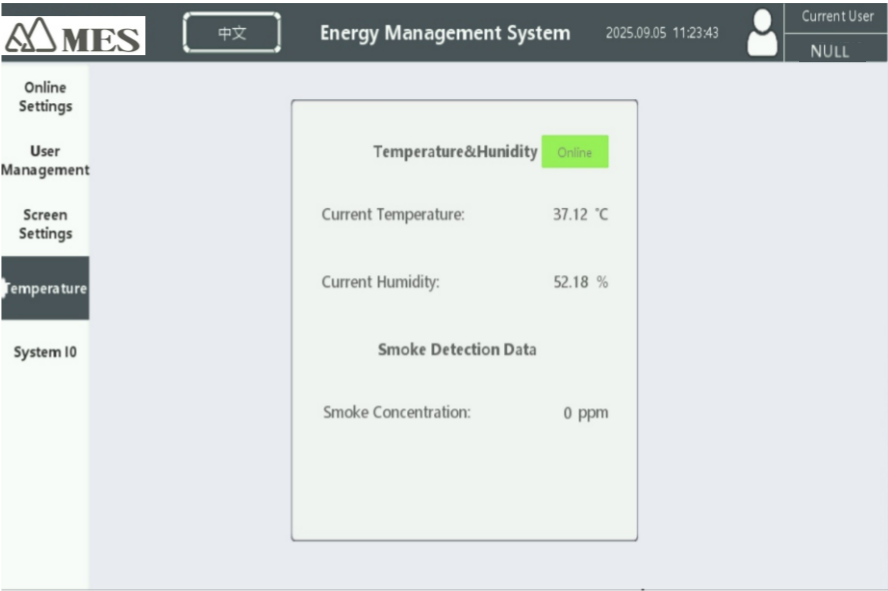


Figure 8.8.4 Example Screen SettingsDiagram

Displays temperature, humidity, smoke detector data, and communication status

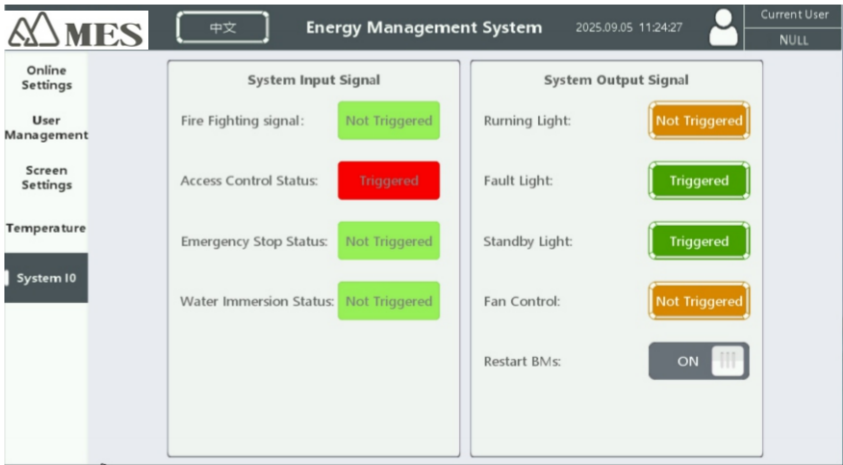


Figure 8.8.5 – Example of System I/O Interface Diagram

- 1) Displays the status of sensors, including: Fire alarm, Access control, Emergency stop, Water input;
2) Configurable operating states, such as: Indicator lights, Fans and BMS restart, etc.

9. Online Configuration
9. 1 IP Configuration

Special Note: IP and online mode settings require a restart to take effect. It is recommended to restart the screen after configuring all required settings and then verify normal operation.

1)Configure BMS IP addresses for the master and slave units:

- Master BMS IP: 192.168.1.200
- Slave 1 BMS IP: 192.168.1.201
- Slave 2 BMS IP: 192.168.1.202 ...

2)Configure the local address and LAN channel IP for master and slave units:

- Master local address: 0
- Slave 1 local address: 1
- Slave 2 local address: 2 ...
- Master LAN channel IP: 192.168.1.200, click "Set IP"
- Slave 1 LAN channel IP: 192.168.1.201, click "Set IP"
- Slave 2 LAN channel IP: 192.168.1.202, click "Set IP" ...

Master connection mode: Master central control

Slave 1 connection mode: Slave central control

Slave 2 connection mode: Slave central control ...

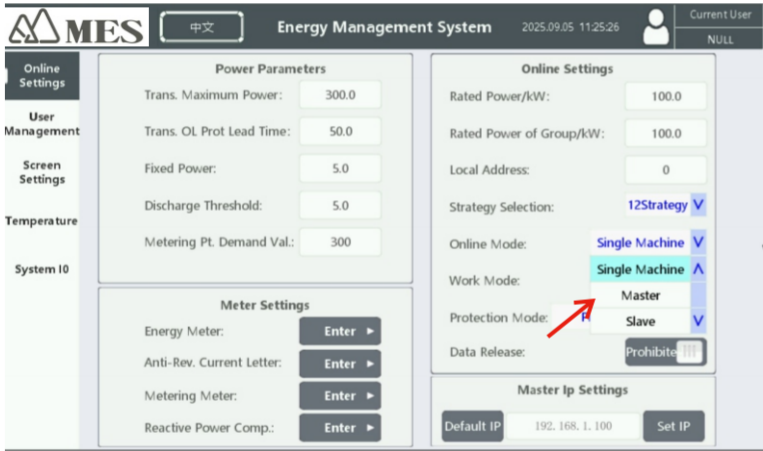


Figure 9.1.1 – Example of Master (Host) Configuration Diagram

Figure 9.1.2 – Example of Slave Configuration Diagram Configure the EMS IP addresses for the master and slave units as follows:

- Master EMSIP: 192.168.1.100
- Slave 1 EMSIP: 192.168.1.101
- Slave 2 EMSIP: 192.168.1.102

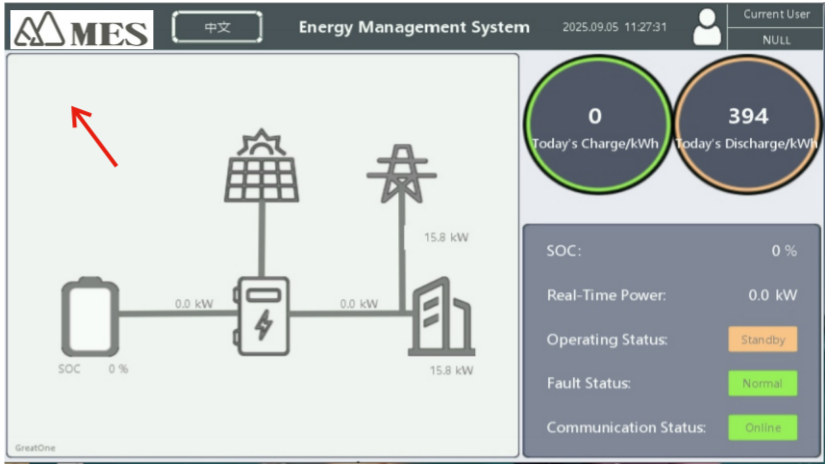
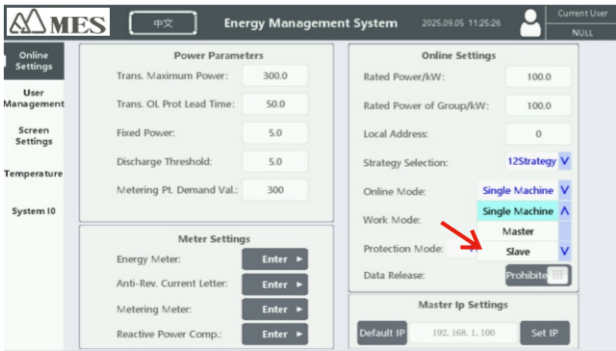


Figure 9.1.3 – Example of Master/Slave IP Configuration

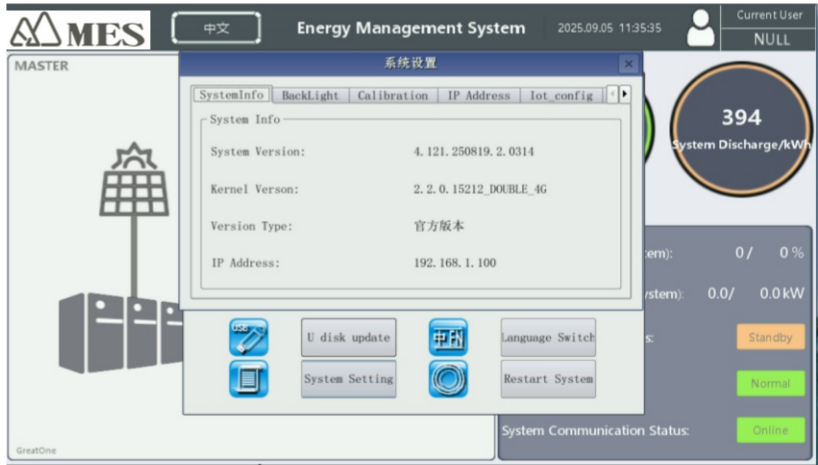


Figure 9.1.4– Example of Slave/Slave IP Configuration

- ① Press and hold the logo on the main screen for 5 seconds.
- ② GO to" System Settings" > " IP Address " to modify the IP address.
- ③ After making changes, select "Restart system" .

9.2 Transformers, Power Meters and Online Configuration

- Set the maximum transformer power to the actual maximum output power of the connected transformer.
- For the transformer protection buffer power, it is recommended to set it between 5% and 10% of the maximum transformer power. The greater the on-site load fluctuations, the higher this value may be.
 - Configure the storage system meter ratio, load meter ratio, presence or absence of a load meter, unit rated power, parallel group rated power, and protection mode according to actual site conditions.

9.3 Power Strategy Configuration

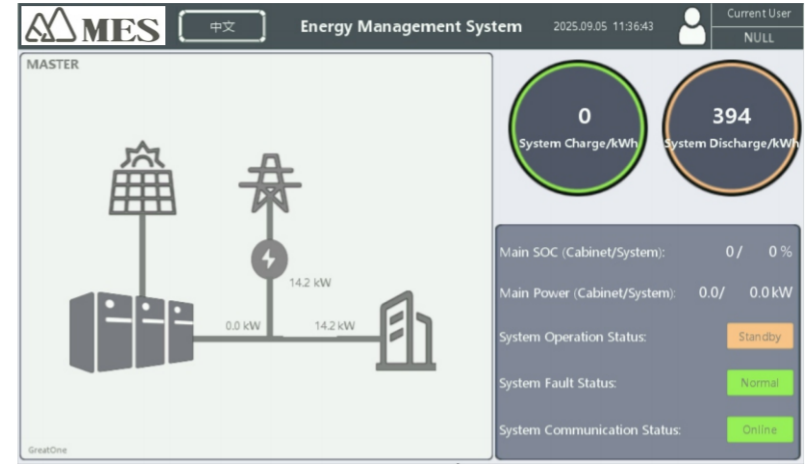
Energy Management System 2025.09.05 11:15:56				
Current User: NULL				
PCS Control	Start Time	End Time	Status	Power (kw)
12Strategy	0:00:00	08:00:00	Charging	-25.0
	08:00:00	12:00:00	Discharging	25.0
PCS Settings	12:00:00	13:00:00	Standby	0.0
	13:00:00	17:00:00	Discharging	25.0
96Strategy	17:00:00	24:00:00	Discharging	10.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0
	0:00:00	0:00:00	Standby	0.0

Figure 9.3.1 Example of PowerStrategy Diagram

- After connecting units in parallel, the power strategy should be configured only on the master unit.
- Slave units do not need to be configured.
 - Set the power according to the total system output after parallel connection.

9.4 Verification of Normal Operation

Figure 9.4.1 – Example of a Master Unit Without Errors



- After paralleling the master units, [Slave Online] should appear normally in the top-left corner.
- The status bar in the bottom-left corner should not any errors or offline states.
- The configured power strategy parameters should operate normally.

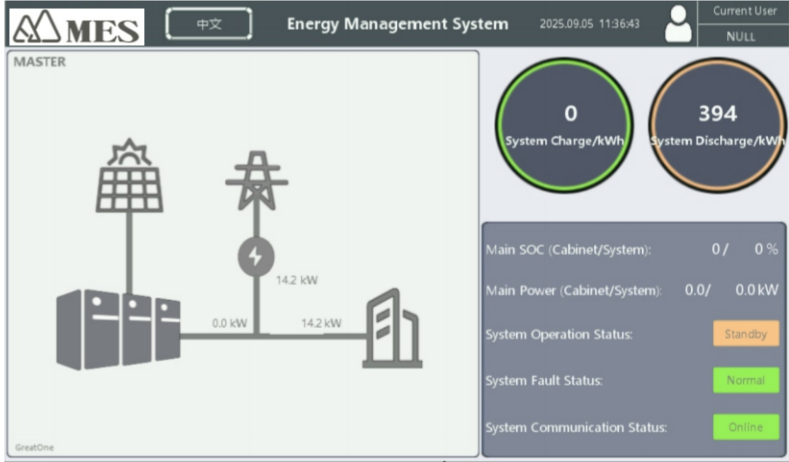
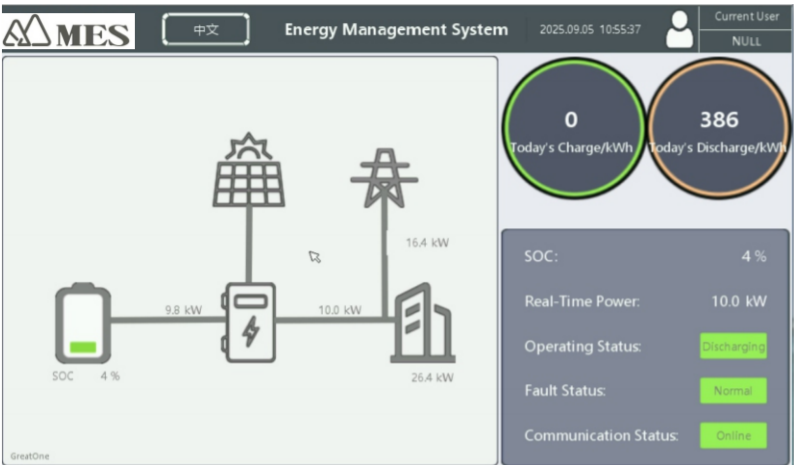


Figure 9.4.2 – Example of a Slave Unit Without Errors

- 1) After synchronizing the slave unit, [Normal Online Status] should appear normally in the top-left corner.
- 2) The status bar in the bottom-left corner should not display any errors or offline states.
- 3) The slave unit should be correctly controlled by the master unit, meaning that the strategies set on the master unit are executed properly by the slave unit.

10. Verification of the Charge/Discharge Process

10.1 Charge Parameters



EMS Standby Page Display

1) On this page,click"Energy Management System" to access the systems settings.

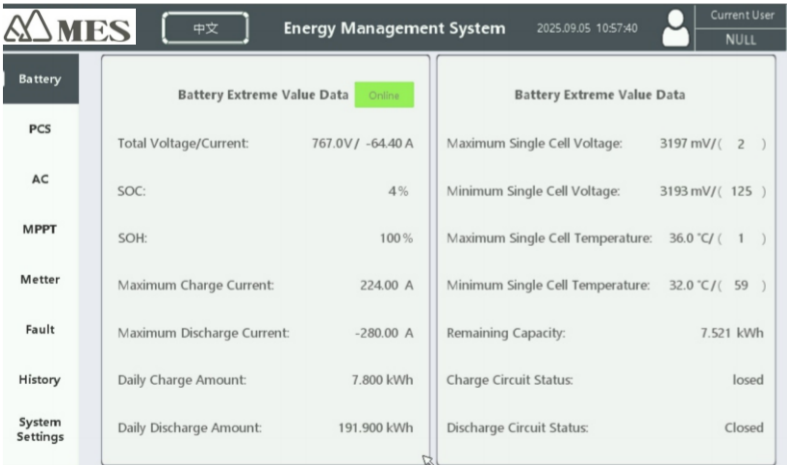


Figure 10.1.1 EMS Information Page Display

2) Click "Work Mode" on the page and select Manual Mode;

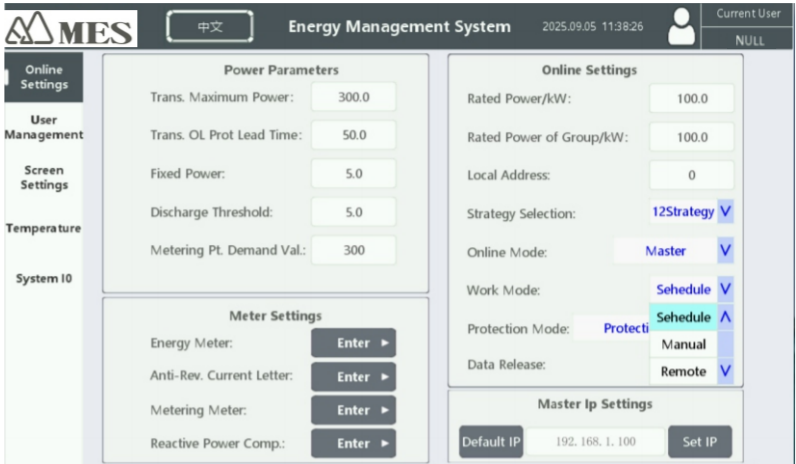


Figure 10.1.2 EMS Operating Mode Selection

3) Click on "Energy Management System" on the page, click on "PCS", and then click on "Power Supply Strategy";

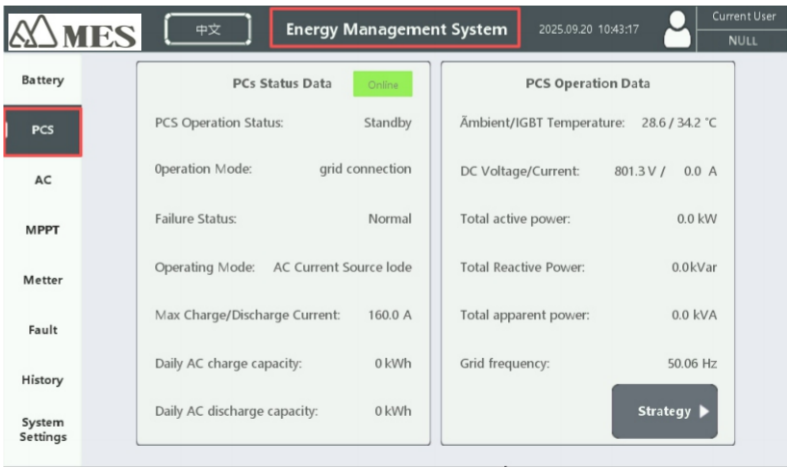


Figure 10.1.3 EMS-PCS Information Page Display

4) Set the active power to “-10” and click “Start” ;

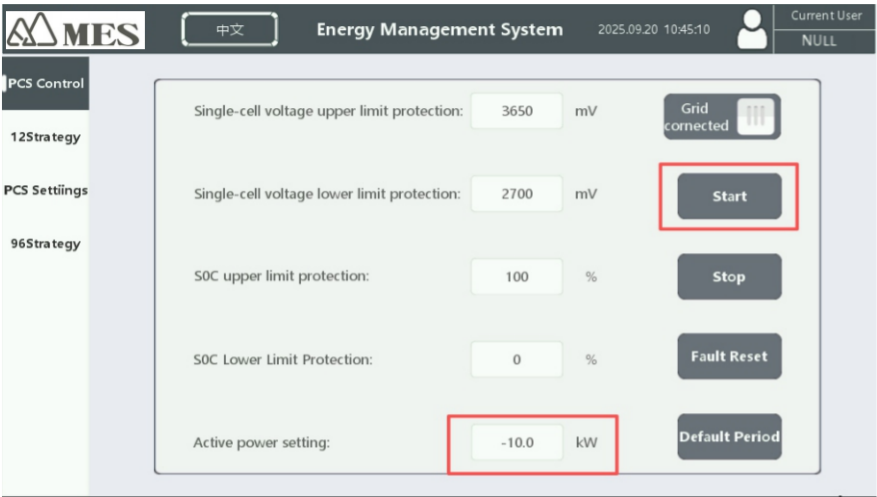
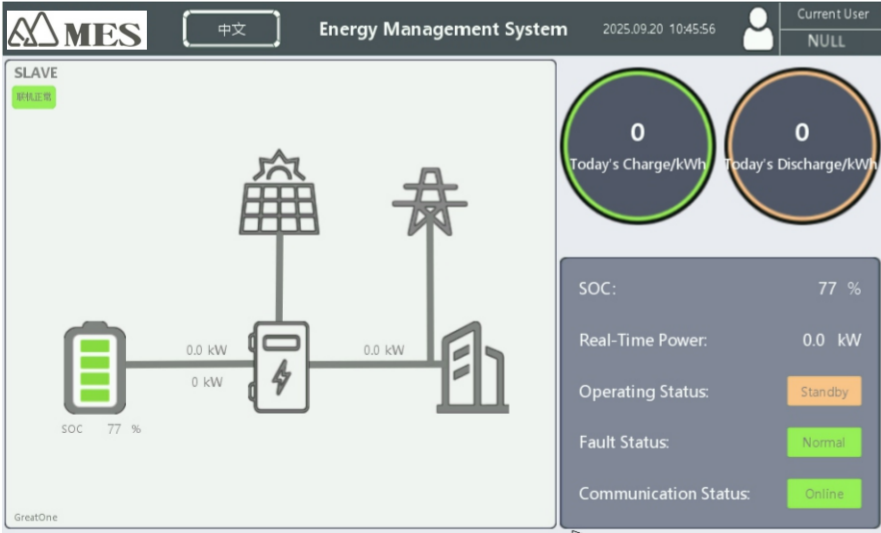


Figure 10.1.4 EMS Charge Process Control Display

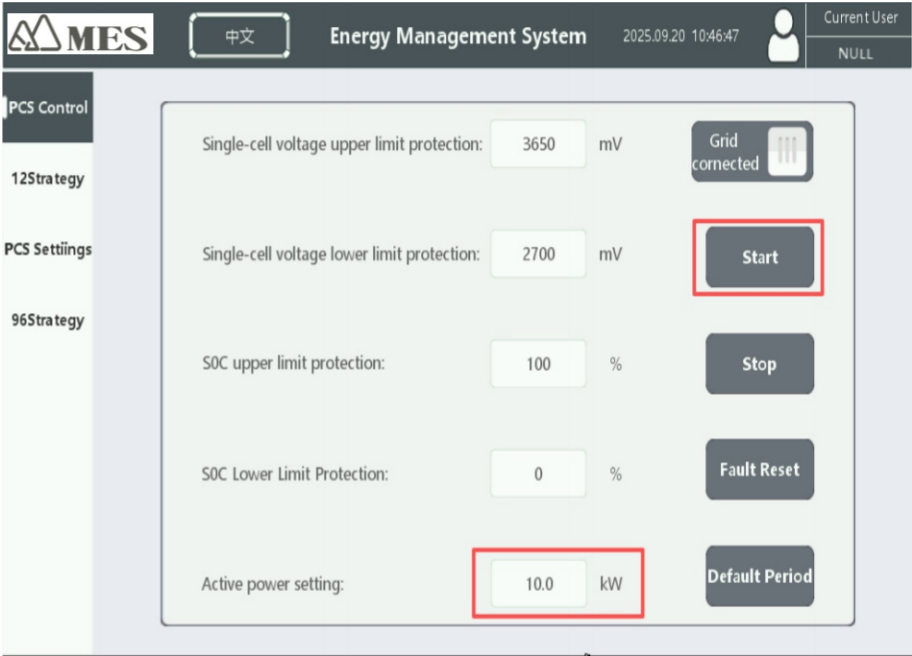
5) On the page, click “Energy Management System” to return to the home page and verify that the charging process is operating normally.



10.2 Discharge Configuration

Repeat the first five steps of the charging process configuration. Set the active power to 10, then click “Start” .

On the page, click “Energy Management System” to return to the home page and verify that the discharge process is operating normally.



11. Cabinet Hole Sealing

After commissioning the charge and discharge processes, it is important to seal the cabinet openings to prevent the intrusion of rodents or insects.



Figure 11-1 : Shows the position of the cable outlet on the right side of the cabinet

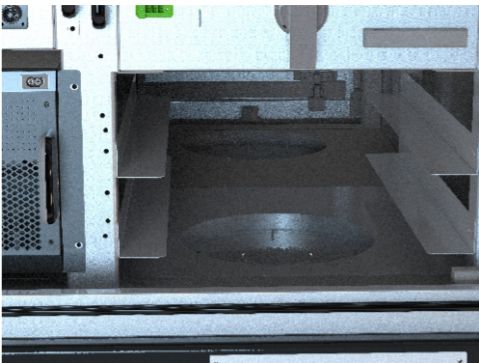


Figure 11-2: Shows the position of the internal cable outlet on the right side.

Recommendation: Use a flexible, organic, and fire-resistant sealant to seal the openings. Apply it around the cable outlets as illustrated to ensure effective protection against moisture and intrusions.



12. Battery System Maintenance Instructions

Glossary:

Number	Terminology	Description
1	Normal operation	Refers to systems that are operational every day
2	Intermittent operation	Refers to a system that operates at irregular monthly intervals and cannot guarantee daily operation.
3	left unused for a long time	Battery systems that have not been activated for more than three consecutive months

12.1 Requirements for System Use

12.1.1 Requirements for Normal System Use

- Perform battery maintenance every 12 months to prevent battery damage.
- Inspect the system every 12 months (see Appendix 1) and keep a record of the inspections.

12.1.2 Requirements for System Use During Long-Term Storage

- Battery SOC (State of Charge) range for storage: 30%–60%. Avoid long-term storage below 15% SOC. For prolonged non-use, immediately disconnect all energy-consuming devices from the network.
- Perform a routine inspection of the energy storage system every three months (see Appendix 1) and maintain inspection records.
- Perform battery maintenance every three months to prevent battery damage.
- Before first use after long-term storage, perform at least one full charge to activate the battery system and restore the battery performance to its optimal state



Long term unused energy storage systems may cause irreversible damage to the battery. Please ensure regular maintenance.

12.2 Precautions During Maintenance

- 1)Before performing maintenance or repair, personnel must first switch the DC breaker in the high-voltage cabinet to the OFF position and ensure the fire protection system is in manual mode.
- 2) After maintenance or repair, make sure the DC breaker is switched ON and the fire protection system is set to automatic mode.
- 3) This energy storage system has a high protection rating and is suitable for outdoor use. However, prolonged operation in harsh environments may cause aging of the storage equipment or damage internal components. Regular maintenance inspections and replacement of worn or damaged parts effectively prolong the system’ s service life and improve internal performance.
- 4)The maintenance intervals provided here are reference values. Actual intervals should be adjusted based on the specific environmental conditions at the project site. In particularly harsh conditions, such as desert areas, maintenance intervals should be shortened.
Internal and external cleaning, as well as anti-corrosion and anti-rust treatments, should be performed more frequently.
- 5)For example, if the energy storage equipment is installed in desert areas, it is recommended to perform a full inspection and cleaning of internal and external surfaces after each sandstorm.
Check the following points. If any of them do not meet the requirements, correct the issue.

Maintenance Cycle	Maintenance Type	Inspection Items	Test Method
Annual inspection	Cabinet body and structural components	System Status and Cleaning	Inspect the following items. If any do not meet requirements, correct immediately: •Check if the enclosure and internal equipment show damage or deformation •Check if internal equipment produces abnormal noise during operation •Check if the temperature inside the enclosure is excessively high •Check if the humidity and dust levels inside the enclosure are within normal ranges.Clean promptly if necessary •Check if the enclosure's air inlets and outlets are blocked
		Warning Sign	Check that warning signs and labels are clearly visible and free from damage or soiling. If damaged, replace them.
Annual inspection	Cabinet body and structural components	Cable Shield Grounding	Check whether the cable shielding layer is in good contact with the insulating sleeve: Is the grounding copper busbar securely fastened in place?
		Lightning protection equipment and fuses	Check whether lightning protection devices and fuses are securely fastened.
		Corrosion condition	Inspect the interior of the cabinet for signs of oxidation or rust.
		Cabinet exterior	Inspect the following items. If any do not meet requirements, correct immediately: Check for flammable objects on top of the cabinet Inspect weld points between cabinet and foundation steel plate for integrity and corrosion (repair required if corrosion reaches ISO 8501-1 Grade C) Inspect the cabinet exterior for damage, paint peeling, or oxidation. Verify that cabinet door locks and other mechanisms operate smoothly. Confirm that sealing strips are securely fastened and free from aging or cracking.
		Inside the cabinet	1) Inspect the interior of the energy storage integrated system for foreign objects, dust, dirt, and condensation. 2) Verify that the external cable outlet seals are intact.
		Air inlet and outlet	Inspect the cleanliness of the intake and exhaust louvers and filters. If necessary, use a vacuum cleaner to remove dust and clean them. Replace the filters regularly based on usage conditions.
		Wiring and Cable Routing	Wait until all internal equipment of the energy storage integrated system is completely de-energized. After 3 minutes, commence inspection work! During inspection, immediately correct any non-conformities discovered. Check whether cable routing is standardized and whether short circuits or similar issues exist. Correct any abnormalities immediately. Verify all cable entry/exit ports on the enclosure are properly sealed. Inspect the interior for water ingress. Check power cable connections for looseness and retighten to the specified torque. Inspect power and control cables for damage, particularly examining the outer sheath where it contacts metal surfaces for signs of cuts or abrasions. Confirm insulation wrapping on power cable terminals is intact and not detached.
		Grounding and equipotential bonding	Check that the grounding connections are correct. Check that the equipotential bonding connections within the energy storage integrated system are correct.

Maintenance Cycle	Maintenance Type	Inspection Items	Test Method
Six Months Inspection	BMS	Secondary BMS Module	1. Before powering on each time, ensure connectors are securely seated with no loose connections; 2. Before powering on each time, verify the power supply voltage falls within the range specified in the datasheet; 3. Before powering on each time, inspect the contactor and fuse (if present) for proper condition; 4. When connecting a CAN card for software operations, confirm the resistance values of the CANH and CANL channels corresponding to the CAN card module are 602 ohms before powering on. Insert the USB cable before powering on.
		Tier 3 BMS Module	1. Keep the screen surface clean at all times and avoid impacts; 2. For long-distance transport, disassemble and pack in a foam-lined cardboard box, then reassemble on-site.
		Current sensors	Current sensors (shunts orThe current sensor Hall), it is required to check and confirm that the sensor is free of rust and dust;
		Wire harness	Wiring harnesses that have not been used for an extended period (over one month) require reinspection to confirm that the wires and connectors show no signs of damage, bent pins, or rust.
		Module Replacement	When replacing parts or performing repairs, timely and thorough communication with qualified personnel is required.
		software maintenance	View Web Setpoints
	Battery	State of Charge (SOC)(Capacity Status) should be maintained between 15% and 40%.	For long-term storage (over 6 months), perform a standard charge-discharge cycle every 6 months.
Seasonal Inspection	PCS	Electrical Fixing and Connection Inspection	1. Grounding connection; 2. Module grounding connection; 3. DC input electrical connection; 4. AC input electrical connection; 5. Communication cable connection; 6. Fan.
		Cleaning and tidying	1. Clean copper strips, terminals, and mesh openings 2. Clean ventilation baffles 3. Clean air ducts and ventilation ducts 4. Inspect fans for abnormalities; check for dust or foreign object blockages in blowers

Maintenance Cycle	Maintenance Type	Inspection Items	Test Method
Seasonal Inspection	PCS	Visual inspection	Check labels; Check latches, stops and hinges
	Battery	SOC Calibration (Maintenance frequency varies based on actual usage scenarios. For daily full charge-discharge cycles, perform calibration once every 3 months. If daily full charge-discharge cycles are unfeasible, perform calibration once every 1 month.)	1. A standard full charge-discharge cycle test is required; the software will automatically calibrate. 2. If this cannot be performed, conduct a standard full discharge test; the software will automatically calibrate. 3. If this cannot be performed, conduct a standard full charge test; the software will automatically calibrate. 4. If this cannot be performed, conduct a standard discharge test. Discharge to below 20%, let it rest for at least one hour, then calibrate via software settings.
Monthly Inspection	BMS	System Alarms and Troubleshooting	View system alarm information and perform corresponding troubleshooting via the SCU display and control screen.
 The maintenance cycles listed above are only recommended values and may be adjusted based on actual planning.			

13. Technical Specifications of Energy Storage Systems

Technical Specifications for Industrial and Commercial Air-Cooled Energy Storage Battery Integrated Cabinet			
Number	Project	Parameters	Note
Battery Specifications			
1	Battery Type	LFP	
2	Auxiliary power supply	220Vac 50Hz	
3	Battery Cell Specifications	3.2V280Ah/314Ah	
4	Maximum charge/discharge power	0.5P	
5	System Grouping Method	1P240S	
6	Rated Energy	215/241KWh	
7	Rated Voltage	768V	
8	Voltage Range	672~864V	
9	Cooling method	Air conditioner	
		AC measurement parameters	
10	Rated AC Power	100kW	
11	Rated Voltage	400Vac	
12	AC Measurement Connection Method	Three-phase five-wire	
13	Rated frequency	50Hz	
14	Total Current Waveform Distortion Ratio	<3%	
15	Cooling method	Smart Fan	
		PV-side parameters	
16	Photovoltaic Interface	4-port interface	
17	Photovoltaic power	120KW	
18	MPPT Voltage Range	200~850Vdc	

Number	Project	Parameters	Note
System Parameters			
19	Ambient temperature	-20~50℃	Derating at temperatures above 40℃
20	Ambient humidity	≤95%RH	No condensation
21	Elevation	≤3000m	
22	Protection Rating	IP54	
23	Storage temperature	-20~45℃	
24	Fire Protection System	Hot-air aerosol (Optional: perfluorohexanone)	
System Parameters			
25	Corrosion Resistance Rating	C3 (EN ISO 12944)	
26	Communication Interface	Ethernet	
27	Communication Protocol	Modbus TCP	
28	External Dimensions (L*W*H)	1160*1400*2100mm	Excluding air conditioner external dimensions
29	Weight	Approximately 2.45 tons	Weight including packaging

Warranty Card

Dear user,thank you for selecting our product,Please fill in and keep the warranty card for better services.

CUSTOMER Information

Name: _____ PhoneNumber: _____

E-mail: _____ CompanyName: _____

Address: _____

State: _____ Zip Code: _____

ProductType: _____

ProductNo.: _____

PurchaseDate: _____

Home Storage Battery After-Sales Standards

Purpose of after-sales service

In order to standardize after-sales service work, meet user needs, ensure that users can maximize efficiency when using our company's products, and improve user satisfaction and trust in products, after-sales service management formulation and work processes are formulated.

Battery pack warranty

The warranty period is 7 years. If any of the following conditions are met within the period and it is not caused by human factors, replacement or return service shall be provided according to regulations.

- 1.Under normal use conditions, the battery pack cannot be restored to normal use after BMS protection.
- 2.Under normal use conditions the battery pack appears abnormally bulging.
- 3.Under normal use conditions, the battery pack leaks.
- 4.Under normal use conditions, check that the battery pack capacity meets the replacement requirements.

Battery replacement period

- 1.From the date of purchase by the user to the end of the replacement period, if the battery meets the requirements in Table 1, the battery will be replaced with a new one;
- 2.From the end of the replacement period to the warranty period, special after-sales service batteries will be replaced if the battery meets the requirements in Table 1.

	Renewal period	Warranty	Warranty
Time	0-12	13-24	25-36
Replacement	months	months<80%	months

Battery after-sales service

- 1.Establish customer files for sold batteries and implement traceability and tracking services.
- 2.When after-sales occurs, solutions will be provided within three hours including remote guidance, return and exchange.

After-sales service of key components

The warranty period for key components including the protective board is 2 years, and the warranty period for non-human problems on the display screen and connectors is one year, If any non-human quality problems occur within one year, they will be replaced free of charge

Information required from customers after-sales

1. Take a photo of the battery label and inverter brand model
2. Shipping date and customer usage period
3. For feedback on fault points, it is best to have videos of abnormal battery operation and wiring.
4. Host computer data (provided by the customer conditionally)
5. If there is no host computer data, battery information(photos or videos) displayed on the battery display can be provided.

Precautions for customer installation and use

Once the battery is in place, install it starting from the bottom to make sure it's smooth. In order to avoid battery failure during installation, If a short circuit occurs, strictly follow the installation sequence of positive and negative, positive and negative. Try to use batteries with close open circuit voltages in the same circuit (the closer the battery voltages are in the same circuit, the more effective the battery life is).When installing batteries, insulated tools should be used to prevent short circuits. When installing batteries, keep a distance of at least 5-10cm between batteries. When two or more batteries are used in series/parallel. the length of the connecting copper bars or cables between the batteries must be kept the same to ensure that their internal resistance are consistent. Discharged batteries must be recharged in time.

Do not store discharged batteries to avoid affecting the battery life. When storing batteries, try to keep them in a cool and dry place. Batteries that have been stored for more than 6 months must be recharged in time.

The final interpretation right belongs to the manufacture.

Appendix 1 Inspection Checklist

Inspection Items	Inspection Method	Yes/No	Abnormal Records
Is the fire suppression system complete	by eye		
Is the fire suppression system within its service life	by eye		
Is the cooling system complete	by eye		
Is the cooling system air duct blocked	by eye		
Is the appearance of the integrated cabinet deformed	by eye		
Is the exterior of the integrated cabinet rusted or damaged	by eye		
Is there moisture inside the integrated cabinet	by eye		
Are the low-voltage wiring harnesses loose or damaged	by eye		
Are the high-voltage wiring harnesses loose or damaged	by eye		
Does the wiring harness interfere with structural components	by eye		
Is the high-voltage connection ablating	by eye		
Are the structural fastening bolts loose or missing	by eye		
Is there a foul odor inside the cabinet	Nose Sniff		
Is there a pungent odor inside the cabinet	Nose Sniff		
Is there a burnt smell at the high-voltage connection points	Nose Sniff		
Is the summary data complete	Monitoring Host Computer		
Is the cell voltage data complete	Monitoring Host Computer		
Is the cell temperature data complete	Monitoring Host Computer		
Are there any abnormal alarms in the alarm panel	Monitoring Host Computer		
Note: If any abnormalities are detected during the inspection, please report them promptly and contact the relevant personnel to arrange for handling!			