Absen Energy

# Low Voltage Household Energy Storage-Unity Series（LV）

# User Manual



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Ruidian Green Energy Technology Co., Ltd.

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# 1 Preface

## Overview

This document primarily introduces the installation, electrical connections, debugging, and troubleshooting methods for the UX-5.1-LPB household energy storage system. Before installing or using the energy storage product, please read this manual carefully to understand safety information and familiarize yourself with the functions and features of the energy storage system.

## Target Audience

The following symbols may appear in this document, with their respective meanings as described:

## Symbol Explanation

The following symbols may appear in this document, with their respective meanings as described:

| Symbol | Explanation |
|---|---|
|   | Indicates a high-risk hazard that may cause death or severe injury if not avoided. |
|   | Indicates a medium-risk hazard that may cause death or severe injury if not avoided. |
|   | Indicates a low-risk hazard that may cause minor or moderate injury if not avoided. |
|   | Conveys safety warnings about equipment or the environment. Failure to avoid may lead to equipment damage, data loss, performance degradation, or other unforeseen consequences. Does not involve personal injury. |
|   | Highlights important/critical information, best practices, and tips. Not a safety warning; does not involve personal, equipment, or environmental hazards. |

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## Revision History

The revision history summarizes updates made in each document version. The latest version includes all updates from previous versions.

| Serial | Version | Content | Date | Remarks |
|---|---|---|---|---|
| 1 | V1.0 | First release | 20251104 | |
| 2 | V1.1 | Second release | 20260325 | Update the images and some of the descriptions. |


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# 2 Safety Precautions

## 2.1 General Safety

### Declaration

Before installing, operating, or maintaining the equipment, read this manual carefully and follow all safety instructions on the equipment and in the manual.

The "Notes," "Cautions," "Warnings," and "Dangers" in this manual do not cover all safety requirements but serve as supplements. The company shall not be liable for any damages caused by violations of general safety operations, design/production/usage standards, or local laws and regulations.

This equipment must be used in environments that meet design specifications; otherwise, equipment failure may occur, and the company shall not be liable for resulting functional abnormalities, component damage, personal injury, or property loss.

Comply with local laws, regulations, and standards during installation, operation, and maintenance. The safety notes in this manual are supplementary to local requirements.

The company shall not be liable in any of the following cases:

- The installation and use environment exceed relevant international, national, or regional standards.
- The equipment operates outside the conditions specified in this manual.
- Unauthorized disassembly, modification, or software code alteration.
- Failure to follow operational instructions and safety warnings in the product documentation.
- Equipment damage caused by abnormal natural environments (force majeure), such as earthquakes, fires, storms, floods, or mudslides.
- Damage caused by the customer’ s non-compliance with transportation and installation requirements.
- Damage due to storage conditions not meeting product documentation requirements.
- Damage to equipment hardware or data due to customer negligence, improper operation, or intentional damage.
- System damage caused by third parties or the customer, including improper relocation, installation, or modification of identification marks contrary to this manual.
- Defects, failures, or damages caused by events beyond the seller’ s control, such as power outages, electrical failures, theft, war, riots, terrorism, or malicious damage.

### General requirements




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The equipment involves high voltage. Improper operation may cause electric shock or fire, leading to death, severe injury, or property damage. Follow these guidelines:

- Adhere to the operational sequences and safety instructions in this manual and related documents.
- Respect warning labels, signs, and protective measures on the equipment.
- Use correct tools and ensure proper tool handling.
- Restrict access to authorized personnel only. Install temporary warning signs or barriers during operations.
- Ensure warning labels and protective measures are visible; do not deface, damage, or obscure them. Replace them immediately if they become unclear.
- Never perform installation, wiring, maintenance, or replacement with the power on.
- Do not clean internal electrical components with water.
- Inspect the equipment for damage (e.g., holes, dents) or loose cable connections.
- Check that internal components are not displaced; unauthorized changes to the equipment's structure or installation sequence are prohibited.
- Do not power on the equipment until installation is complete and verified by a professional.
- Measure the voltage at contact points before touching any conductive surfaces or terminals, and ensure the protective ground wire is reliably grounded to eliminate electric shock hazards.
- Do not open the casing while the system is running.




- Avoid arc welding, drilling, or cutting on the equipment, as these may damage the casing's sealing, electromagnetic shielding, internal components, or cables. Metal debris from such operations may cause electrical short circuits, affecting equipment functionality or causing damage.
- The casing may become hot during operation; do not touch it to prevent burns.
- Immediately terminate operations and report to a supervisor if faults risking personal injury or equipment damage are detected.
- Power off and secure the casing if leaving the work area temporarily during maintenance.




- Comply with local laws, regulations, and standards for transportation, installation, and maintenance.
- Ensure self-provided materials and tools meet local requirements.
- Obtain local power authority approval for grid connection.

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● Clean water, ice, or debris from the casing top before opening the door to prevent foreign objects from entering.

### 🕮Explanation

● Reverse engineering, decompilation, disassembly, or other derivative operations on the equipment software are prohibited. Do not attempt to study the internal structure, obtain source code, or disclose software performance test results by any means.

● Users are advised to use a camera to record detailed installation, operation, and maintenance processes.

## 2.2Personnel Requirements

● Only qualified personnel may operate the equipment (including transportation, installation, wiring, and maintenance), and they must wear safety gear compliant with local requirements.

● Operators must carefully review installation manuals and possess basic knowledge of energy storage systems.

### 🕮 Explanation

Specific qualification requirements shall comply with local regulations and industry standards.

Protective Gear Instructions



● Avoid wearing conductive items (e.g., watches, bracelets, rings, necklaces) during installation and maintenance to prevent electric shock.

● Comply with local laws, regulations, and standards for all operations.

● Familiarize yourself with the system’ s composition and working principles and follow the manual’ s descriptions for operations.

## 2.3 Storage and Installation Environment Requirements

## General Requirements

### 🕮Explanation

● Retain records (e.g., temperature/humidity logs, storage environment photos, inspection reports) confirming compliance with product storage requirements.


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● Long-term storage of the energy storage system is not recommended, as it may cause capacity loss (3%–10% irreversible loss after 12 months at recommended storage temperatures). Operate the system at least once every 3 months.
● Store in a clean, dry place protected from dust, moisture, and corrosive or flammable gases. Do not expose to rain or standing water.
● Do not store the equipment tilted or inverted.

## Energy Storage System Storage Requirements

● Do not remove packaging for long-term storage.
● Avoid arbitrary stacking; ensure the storage surface is flat.
● Do not open the equipment casing during storage.
● Storage temperature: -20°C to +50°C; humidity: 5%RH to 95%RH.

## Battery Pack Storage Requirements

1.Store battery packs indoors in a dry, ventilated area away from direct sunlight, rain, fire, and corrosive gases or radioactive radiation.
2.Total storage and transportation time shall not exceed 6 months from shipment. If exceeded, recharge and calibrate the SOC (minimum 45% SOC). Failure to do so may affect battery performance and service life.
3.Store battery packs according to packaging labels; do not place them upside down or sideways.
4.When packing and stacking battery packs, they should comply with the stacking requirements on the outer packaging.
5.Storage environment requirements:
– Recommended temperature: 15°C–35°C.
– Relative humidity: ≤95%.
– Dry, ventilated, and clean environment.
– Avoid contact with corrosive substances or organic solvents (including gas exposure).
– Keep away from direct sunlight.
– Maintain at least 2 meters from heat sources (e.g., heating equipment).

Warehouse managers shall inspect storage conditions monthly and arrange recharging for overdue battery packs. Follow the "first-in-first-out" principle for inventory.

## Battery Pack Overdue Storage Criteria

In principle, battery packs are not recommended for long-term storage and should be used promptly.


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| Storage Temperature Range | Actual Temperature（T） | Recharge Cycle | Remarks |
|---|---|---|---|
| -10～40℃ | 0℃≤T≤30℃ | 6months | ● No action needed during the cycle; use as soon as possible.<br>● Recharge when the cycle is reached.<br>● Total storage shall not exceed the warranty period. |
| | 30℃＜T≤40℃ | 4months | |

## 🕮Explanation

Storage time is calculated from the last charging date marked on the battery pack’ s outer packaging. Refresh the charging date after recharging and label the next required recharging date (last charge date + 4 months for T>30°C or +6 months for T≤30°C). Total storage shall not exceed the warranty period.

## Installation Environment Requirements

Additional installation requirements include:

● The energy storage system’ s layout must meet local fire distance or firewall standards, including but not limited to GB 51048-2014 Design Code for Electrochemical Energy Storage Stations and NFPA 855 Standard for the Installation of Stationary Energy Storage Systems.

● Do not install the equipment in environments with flammable/explosive gases or fumes, and prohibit any operations in such environments.

● Avoid outdoor installation or operation during thunderstorms, rain, snow, or winds above Beaufort scale 6 (including equipment handling, cabling, signal interface plugging/unplugging, and high-altitude work).

● Maintain a 30mm ventilation space between the radiator and walls to prevent overheating.

● Install the equipment away from water sources (e.g., pipes, air conditioning outlets) to avoid water ingress into the equipment, which may cause malfunctions or short circuits.

● Keep the installation location away from fire sources and flammable/explosive materials.

## High-Altitude Work Requirements

● Wear a safety helmet, safety belt, and waist rope, secured to stable structural components. Avoid attaching them to movable or sharp-edged metal objects to prevent falls.

● Mark danger zones at high-altitude work sites with clear signage and restrict unauthorized access.

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● Do not stack scaffolding, planks, or other debris on the ground below high-altitude work areas. Ground personnel must not stay or pass directly below.
● Prohibit throwing objects from high altitudes or throwing objects upward from the ground. Use ropes, baskets, or lifting equipment for material handling.
● Inspect scaffolding, planks, and work platforms for safety and structural integrity before use; do not overload them.
● Stop high-altitude work during rainy or other risky conditions. Resume only after safety inspections by the company' s safety officer and technicians.
● Install guardrails and signs at openings and edges to prevent falls.
● Secure tools to prevent them from falling.
● Supervisors and safety officers shall immediately correct non-compliant operations and ensure adherence to work standards before allowing continued work.

## 2.4Handling and Transportation Requirements




Batteries must be handled in accordance with local laws and industry standards. Rough handling may cause battery pack short circuits, damage, electrolyte leakage, fire, or explosion.




This product complies with UN38.3 (Section 38.3 of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and is classified as Class 9 hazardous goods.
Shipping Conditions
● Do not ship if the battery pack has been collided, dropped, or shows signs of smoking/fire. Follow emergency procedures instead.
● Inspect the energy storage system before shipping: the casing must be intact, the door closed and locked, and no abnormal odors or smoke present. Reject shipments failing these checks.
Handling and Transportation Guidelines
● Handle with care and protect from moisture. Product specifications are subject to factory dates due to environmental factors (e.g., temperature, storage).
● Transportation Restrictions:
– No rail or air transport.
– Sea transport follows IMDG CODE and International Maritime Dangerous Goods Regulations.
– Road transport follows ADR requirements.
– Comply with regulations of the origin, transit, and destination countries.
● Ensure full transportation monitoring.
● Land vehicle load capacity: Single energy storage system weight ≤124kg.
● Speed limits: 80 km/h on flat roads, 60 km/h on rough roads (local traffic laws take precedence).
● Stacking is prohibited during port and ship transportation.

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Prohibited Actions During Transportation

● Do not drop, hit, invert, or submerge the equipment in water.

Follow emergency procedures if any of the above occur.

## 2.5 Mechanical Safety

### Ladder Safety

● Single-step ladders are prohibited.

● Inspect ladders for integrity and load capacity before use; do not exceed load limits.

● Use wooden or fiberglass ladders for electrical work.

● Priority should be given to using platform ladders with protective barriers for high-altitude operations. During the operation, all four feet must be fixed and the ladder must be supported by someone.

●If a zigzag ladder is used, the rope must be secure and someone must hold the ladder during operation. When packing and stacking battery packs, they should comply with the stacking requirements on the outer packaging.

●Climbing Precautions

Maintain balance and avoid standing above the fourth rung from the top.

Keep the center of gravity within the ladder’ s frame.

### Drilling Safety (Outside Equipment)

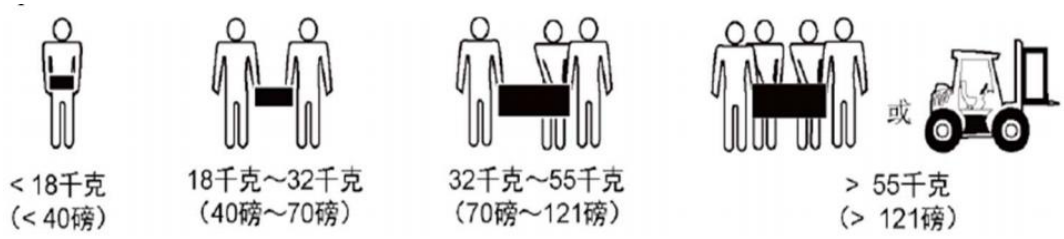
● Choose drilling locations carefully to avoid short circuits.

● Wear goggles and protective gloves; shield the equipment to prevent debris from entering.

● Clean up debris immediately after drilling.

### Heavy Lifting Safety

● Use the recommended number of personnel for lifting and ensure proper load-bearing preparation.（Kg/Pound）




● Wear protective gloves and anti-smash shoes when handling equipment.

● Avoid scratching the casing or damaging internal components or cables during transportation.

●When using a forklift for transportation, the forklift must be positioned in the middle to prevent tipping over. Before moving, please fasten the equipment to the forklift with ropes; When moving, a dedicated person is needed to take care of it.

● Move the equipment slowly to prevent collisions or falls.

## 2.6 Electrical Safety

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## Wiring Requirements

● Prohibit improper operations like dropping cables from vehicles.
● Keep cables away from the equipment’ s air inlets/outlets.
● Bundle similar cables together and separate different cable types by at least 30mm to avoid tangling or crossing.
● Seal cable openings with fireproof mud if leaving the work area temporarily to prevent small animals from entering.
● Maintain at least 30mm distance between cables and heat sources to avoid insulation aging or damage.
● Use cables compliant with local laws and regulations.
● Ensure cable trays and holes have no sharp edges; apply protective covers.
● Protect cables from sharp edges or burrs where they pass through pipes or holes.
● Cables used in the energy storage system must be securely connected, well-insulated, and of appropriate specifications.
● After wiring, secure cables with brackets and clamps. In backfilled soil areas, ensure cables are tightly attached to the ground to prevent deformation from soil pressure.
● For low-temperature construction (below 0°C):
– Install cables at ≥0°C and handle them gently to avoid sheath cracking.
– If cables are stored below 0°C, condition them at room temperature for at least 24 hours before installation.

## Grounding Requirements

● Do not damage grounding conductors.
● Install protective ground wires first during installation and remove them last during disassembly.
● The equipment’ s main grounding body must be permanently connected to the protection grounding grid. Verify proper grounding before operation.
● Equipment grounding impedance must meet GB 50054 and local electrical standards.

## AC/DC Operation Requirements

● Power off the system before installing or removing power cables.
● Confirm power cable label correctness before connection.
● For multi-input equipment, disconnect all inputs and fully power off the system before operations.

## Maintenance and Inspection Safety

1.Disconnect the protection switch for the relevant circuit before connecting or removing cables.
2.Place "Do Not Close" signs on disconnected switches.
3.Use a voltage tester of appropriate rating to confirm the equipment is fully powered off.
4.Shield nearby live components with insulated panels or tape.


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5.Ground the circuit to be serviced before maintenance.




- Reconfirm cable label correctness before connection.
- Fully power off multi-input equipment before operations.
- Remove grounding wires from the serviced circuit after maintenance.




Static electricity from the human body may damage static-sensitive components (e.g., LSI chips) on circuit boards.

- Wear anti-static gloves before touching the equipment, circuit boards, or PSU modules.
- Hold circuit boards or PSU modules by their edges, avoiding direct contact with components.
- Store removed boards or modules in anti-static packaging.

## 2.7 Battery Safety

### Declaration

The company shall not be liable for battery pack damage caused by:

- Customer neglect in recharging, leading to overdue storage and capacity loss or irreversible damage.
- Improper handling (e.g., dropping, mechanical damage, leakage, or rupture due to incorrect connections).
- Over-discharging caused by delayed power-on after on-site installation.
- Customer delays in acceptance leading to battery pack damage.
- Incorrect setting of battery pack operation parameters by the customer.
- Unauthorized changes to battery pack usage scenarios (e.g., connecting extra loads or mixing with other brands/models).
- Direct damage from unsuitable operating environments (e.g., extreme temperatures) or external power parameters.
- Frequent over-discharging due to poor maintenance, on-site capacity expansions, or long-term failure to fully charge.
- Failure to follow supporting equipment manuals for maintenance (e.g., not tightening battery pack terminal screws).
- Theft of battery packs.
- Battery packs beyond the warranty period.

### Basic Requirements

- Do not expose battery packs to high-temperature environments or heat-generating equipment, such as direct sunlight, open flames, transformers, or heaters. Overheating of battery packs may cause fire or explosion.

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● Disassembling, modifying, or damaging battery packs (e.g., inserting foreign objects, immersing in water or other liquids) is strictly prohibited, as it may lead to leakage, overheating, fire, or explosion.

● Lithium-ion/sodium-ion battery energy storage systems pose high fire risks. Consider the following safety hazards before any battery-related operations:

Battery pack electrolytes are flammable, toxic, and volatile.

Thermal runaway of battery packs can generate flammable gases (e.g., CO, HF) and pose explosion risks due to gas accumulation.

● If a battery pack is accidentally waterlogged, immediately stop installation, relocate it to a safe isolation point, and request a replacement spare part promptly.

● Store battery packs in a dry, well-ventilated area free from direct sunlight, rain, infrared radiation, organic solvents, or corrosive gases.

● Battery packs must be stored in a separate warehouse within their original packaging, avoiding mixing with other materials, outdoor exposure, or excessive stacking. Ensure appropriate fire-fighting facilities (e.g., fire sand, fire extinguishers) are available on-site.

● Conduct regular fire safety inspections for energy storage systems at least once a month.

Do not remove battery pack packaging under normal circumstances. If recharging is necessary, have qualified personnel perform it and repack the battery pack afterward.

For outdoor systems, power on within 24 hours after unpacking. If delayed, store the battery pack indoors in a dry, non-corrosive environment.

● Place battery packs according to anti-inversion labels on the packaging to prevent electrode leakage from long-term inverted storage.

● Avoid impacting the energy storage system.

● Transport the system in the specified direction; do not invert or tilt it.

● Use the energy storage system within the temperature ranges specified in this manual.

● Charging is prohibited below the minimum working temperature to avoid internal short circuits caused by low-temperature charging crystallization.

● Dispose of waste energy storage systems in accordance with local laws and regulations. Do not treat battery packs as household waste to prevent environmental pollution.

● Do not use damaged battery packs (e.g., dents or other shell damage). Damaged battery packs may release flammable gases and should not be stored near undamaged products.

● Store damaged energy storage systems in areas free from flammable materials and keep unauthorized personnel away.

● Monitor damaged battery packs during storage to ensure no signs of smoke, fire, electrolyte leakage, or overheating.

## Recharging Requirements

● If the energy storage system has not been charged for more than 6 months, recharge the battery pack. Failure to do so may affect battery pack performance and service life.

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### Battery Pack Short Circuit Prevention

DANGER

- Short circuits in battery packs can generate instantaneous high currents and release large amounts of energy, potentially causing personal injury or property damage.
- When installing or maintaining battery packs, wrap exposed cable terminals with insulating tape.
- Prevent foreign objects (e.g., conductive materials, screws, liquids) from entering the battery pack and causing short circuits.

### Hazard and Toxicity Instructions

DANGER

- Contact between battery pack terminals and other metals may cause overheating or electrolyte leakage. If leakage occurs, immediately move the battery pack away from 火源 (fire sources).
- Vapors generated by burning battery packs may irritate the eyes, skin, and throat.

### Abnormal Battery Pack Handling Procedures

DANGER

In case of electrolyte leakage or unusual odors, avoid contact with the leaked liquid or gas. Keep unauthorized personnel away and contact professional personnel immediately. Professionals should wear protective gear (e.g., goggles, rubber gloves, gas masks, protective clothing) to prevent hazards from electrolyte spills.

Electrolytes are corrosive and may cause skin irritation or chemical burns. If contact occurs:

- **Inhalation**: Evacuate the contaminated area, breathe fresh air, and seek medical help immediately.
- **Eye Contact**: Flush eyes with large amounts of clean water for at least 15 minutes without rubbing, then seek medical help immediately.
- **Skin Contact**: Wash the affected area with soap and water thoroughly and seek medical help immediately.
- **Ingestion**: Seek medical help immediately.


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### Battery Pack Drop Procedures

If a battery pack drops (with or without packaging) but shows no obvious deformation, damage, or unusual odors/smoke/fire:

- **Warehouse**: Evacuate personnel, use mechanical tools to transfer the battery pack to a safe, open area, contact our service engineer, and wait 1 hour while monitoring the battery pack temperature (within ±10°C of room temperature) before further action.
- **On-Site**: Evacuate personnel, close the energy storage system door, transfer the battery pack to a safe, open area using mechanical tools, contact our service engineer, and wait 1 hour before further action.

If a dropped battery pack shows obvious odors, damage, smoke, or fire:

- Evacuate personnel immediately, contact professionals, and call emergency services. Have professionals use fire-fighting equipment to extinguish the fire safely.

Do not reuse a dropped battery pack; contact our service engineer for evaluation.

## 2.8 Maintenance and Replacement




Before removing components from the cabinet, ensure other parts of the casing are secure.
Always have at least two personnel present during energy storage system maintenance.
Cover nearby live components with insulating materials during maintenance.
Do not open the cabinet door during rain, snow, thunderstorms, dust storms, or fog.
Do not touch running fans (e.g., with fingers, components, or tools) until they stop and power is disconnected.
Do not power on the equipment until faults are resolved.
When inspecting live systems, pay attention to hazard labels and avoid standing near the cabinet door.
Wait 15 minutes after powering off (except for battery packs) to ensure the equipment is completely de-energized before operation.
Place "Do Not Close" warning labels on switches disconnected for maintenance.
After replacing power components or changing wiring, manually trigger wiring detection and topology recognition to avoid system anomalies.
After maintenance or replacement, reinstall and secure all casing components promptly.

## 2.9 Emergency Procedures

In case of hazards including but not limited to fire or smoke, prioritize personnel safety and contact our service engineer immediately.


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**When the equipment smokes or catches fire:**

Evacuate immediately.

Do not approach.

Do not disassemble.

Cut off power supply.

**DANGER**

**Recommendations for on-site operators:**

1. In case of fire, evacuate the building/equipment area, sound the fire alarm, and call emergency services immediately, providing product information (e.g., battery pack type, system capacity, battery pack location).
2. Under no circumstances re-enter the burning area or open the energy storage system door. Isolate the site and prevent unauthorized access.
3. After calling emergency services, remotely power off the system (e.g., via the equipment power plug or main household switch) if safe to do so.
4. Provide product information (e.g., battery pack type, system capacity, user manual) to arriving firefighters.
5. After firefighters confirm the fire is extinguished, have professionals handle further procedures in accordance with local regulations. Do not open the system casing privately.
6. Contact our service engineer for post-disaster maintenance evaluation.

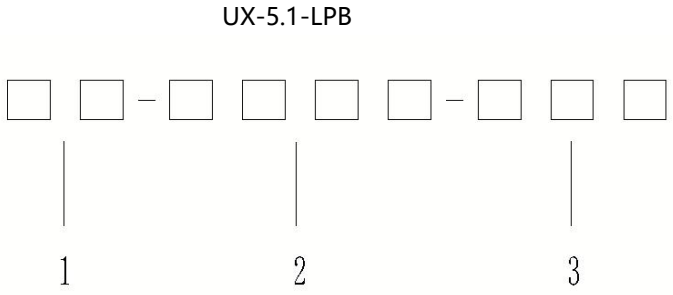
**Recommendations for firefighters:**

1. Refer to product information provided by on-site operators (e.g., battery pack type, system capacity, user manual).
2. Do not open the energy storage casing until internal safety is confirmed.
3. Follow local fire-fighting regulations for extinguishing operations.

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# 3. Product Introduction

## 3.1.Model Explanation




1. **Product Series Code**: UX represents Unit energy storage battery systems.
2. **Battery Capacity**: .5.12kWh (kilowatt-hour).
3. **Product Attribute**: LPB stands for low-voltage battery.
   **Example**: UX-5.1-LPB is a wall-mounted household energy storage system with a capacity of 5.12 kWh and low-voltage battery design.

## 3.2.System Overview

The product consists of 3 main components: the battery system, battery management control system, and backend cloud service system. Combined with a hybrid inverter, it meets diverse user needs such as photovoltaic self-consumption, power selling, and emergency backup.

**Modular Design**: With an IP20 proof rating, the system supports long-term indoor operation.

**Capacity Expansion**: Parallel expansion via a bus box allows connecting up to 16 battery packs, scaling capacity to 81.9kWh.

**Smart Monitoring**: Remote monitoring, real-time control, and OTA (Over-The-Air) upgrades via Wi-Fi connectivity.


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## 3.3.Product Appearance






## 3.4.Basic Parameters

| Item | UX-5.1-LPB |
|---|---|
| Battery Type & Capacity | Lithium Iron Phosphate ($LiFePO_4$), 100Ah |
| Nominal Energy | 5120Wh |
| Usable Energy | 4608Wh（90%DOD） |
| Voltage Range | 44.8~57.6V |
| Charging Current | Rated: 50A, Max: 100A |
| Discharging Current | Rated: 50A, Max: 100A |
| Indication | Indicator Light (SOC and operational status) |


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| | |
|---|---|
| Operating Temperature | Charge: 0–55°C / Discharge: -20–55°C |
| Recommended Temperature | 15–35°C |
| Cycle Life | ≥3000/6000<br>@ (25°C±2°C, 50A charge/discharge, 90% DOD, 70% EOL) |
| Circuit Breaker Type | 1P125A（optional） |
| Cloud Platform Connection | Bluetooth 、Wi-Fi |
| Parallel Mode | Via inverter or parallel connection box |
| Max Parallel Units | 16 |
| Dimensions | 555*440*131mm |
| Weight | 43Kg |
| Communication | CAN2.0 (PCS); RS485 (parallel connection) |
| Address Coding | Automatic |
| proof Rating | IP20 |

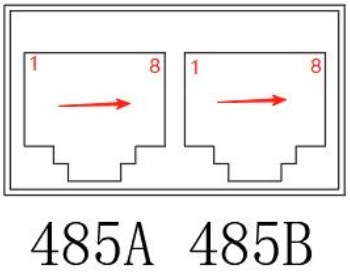
## 3.5.Interface Definition



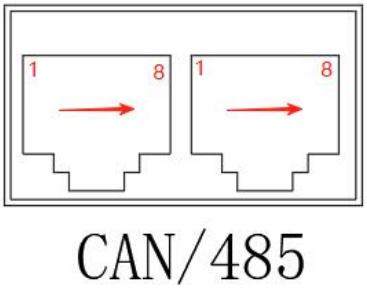

| No. | Item Name | Description |
|---|---|---|
| 1 | DC Switch | Controls the closing and opening of the high voltage of the battery module. This switch integrates a trip control module, which is used to actively disconnect the high voltage of the battery and has the active protection function for system power-off. |
| 2 | Protective Earth (PE) Connection | Used for the ground wire connection of the battery module. |
| 3 | Battery Positive Terminal P+ | It is the positive output terminal of the battery, which is connected to the positive terminal of the inverter's battery side. |
| 4 | RST/Status Operation Light | It serves as the reset button for the battery system, the operation status light of the battery, and the SOC display light of the battery. |


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| No. | Item Name | Description |
|---|---|---|
| 5 | Inverter Communication Port | Used for 485/CAN communication connection with the inverter. |
| 6 | Parallel Operation Communication Port | Used for the parallel connection of battery modules. |
| 7 | Battery Negative Terminal P- | It is the negative output terminal of the battery, which is connected to the negative terminal of the inverter's battery side. |
| 8 | Wi-Fi Antenna | Used to enhance the Wi-Fi signal. |
| 9 | POWER Button | Used to start the power supply of the battery system. |




| RJ45 | 485A | 485B | |
|---|---|---|---|
| **NO.** | **Function** | **Function** | **Remarks** |
| 1 | RS485B | RS485B | parallel communication |
| 2 | RS485A | RS485A | |
| 3 | GND | GND | |
| 4 | GND | GND | |
| 5 | DN_OP+ | UP_IN | Automatic coding signal |
| 6 | GND | GND | |
| 7 | RS485A | RS485A | parallel communication |
| 8 | RS485B | RS485B | |

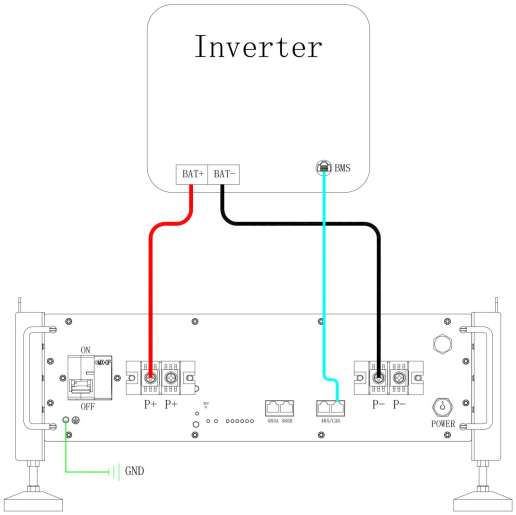



| RJ45 | CAN | 485 | |
|---|---|---|---|
| **NO.** | **Function** | **Function** | **Remarks** |
| 1 | NC | RS485B1 | Inverter 485 Communication |
| 2 | GND | RS485A1 | |
| 3 | NC | GND | |
| 4 | CAN-H | NC | Inverter can Communication |
| 5 | CAN-L | NC | |
| 6 | NC | GND | Inverter 485 Communication |
| 7 | NC | RS485A1 | |
| 8 | NC | RS485B1 | |


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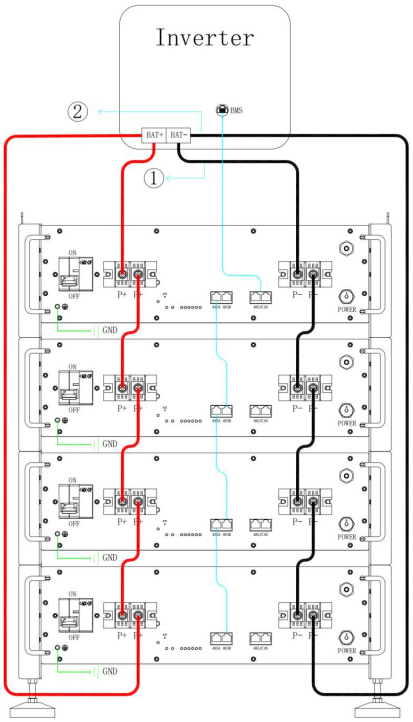
## 3.6.Wiring Diagram

The wiring of a single battery module is shown in the figure. The positive and negative cables connecting this product to the inverter must be of the same length. This solution is only applicable to inverters with a power ≤ 4.4kW. If the inverter power is > 4.4kW, the equipment at the inverter's load end needs to be derated for use.




The wiring for parallel operation of multiple stacked battery modules is shown in the figure. The positive and negative cables connecting this product to the inverter must be of the same length. The communication cables between batteries adopt a daisy-chain connection, supporting the automatic addressing function without the need for manual DIP switches. This wiring method increases system capacity and expands system power through parallel connection of multiple battery modules. If there is only one set of positive and negative output cables to the inverter, it is only applicable to inverters with a power ≤ 4.4kW; if the inverter power is > 4.4kW, the equipment at the inverter's load end needs to be derated for use. If there are two sets of positive and negative output cables to the inverter, it is applicable to inverters with a power ≤ 8.8kW; if the inverter power is > 8.8kW, the equipment at the inverter's load end needs to be derated for use.


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Note: Due to the complex and variable on-site application scenarios of different customers, this product does not provide external inverter connection harnesses. It comes with the required terminal accessories for the product, and customers can purchase wires according to the actual on-site distance for crimping. This wiring method is only applicable to the use of a single battery module.

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## 3.7.Device Indicator Description

### LED Working Status Indication

| Status | Normal | RUN | ALM | Battery Level Indicator LEDs | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L6 | L5 | L4 | L3 | L2 | L1 | |
| | | ● | ● | ● | ● | ● | ● | ● | ● | |
| Standby | Normal | Flashes 1x | Off | According to battery level | | | | | | Standby mode |
| Charging | Normal | Steady On | Off | According to battery level (The highest battery level LED flashes 2x) | | | | | | The highest battery level LED flashes (flashes 2x) |
| Discharging | Normal | Flashes 3x | Off | According to battery level | | | | | | |

### Battery SOC Display Description

| Battery Level (%) | Charging Status (LED Indication) | | | | | | Discharging Status (LED Indication) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L6 | L5 | L4 | L3 | L2 | L1 | L6 | L5 | L4 | L3 | L2 | L1 |
| | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 0%～17% | Off | Off | Off | Off | Off | Flashes 2x | Off | Off | Off | Off | Off | Steady On |
| 18%～33% | Off | Off | Off | Off | Flashes 2x | Steady On | Off | Off | Off | Off | Steady On | Steady On |
| 34%～50% | Off | Off | Off | Flashes 2x | Steady On | Steady On | Off | Off | Off | Steady On | Steady On | Steady On |
| 51%～66% | Off | Off | Flashes 2x | Steady | Steady | Steady | Off | Off | Steady | Steady | Steady | Steady |


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| Battery Level (%) | Charging Status (LED Indication) | | | | | | Discharging Status (LED Indication) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 67%～83% | Off | Flashes 2x | Steady On | On<br>Steady On | On<br>Steady On | On<br>Steady On | Off | Steady On | On<br>Steady On | On<br>Steady On | On<br>Steady On | On<br>Steady On |
| 84%～100% | Flashes 2x | Steady On | Steady On | Steady On | Steady On | Steady On | Steady On | Steady On | Steady On | Steady On | Steady On | Steady On |
| Supplementary Note | Steady On (Full Charge Confirmation) | | | | | | Flashes 3x (Discharging Status Prompt) | | | | | |

## LED Flashing Description

| Flashing Mode | On Duration | Off Duration |
|---|---|---|
| Flash 1x | 0.25s | 3.75s |
| Flash 2x | 0.5s | 0.5s |
| Flash 3x | 0.5s | 1.5s |
| Flash 4x | 1s | 1s |

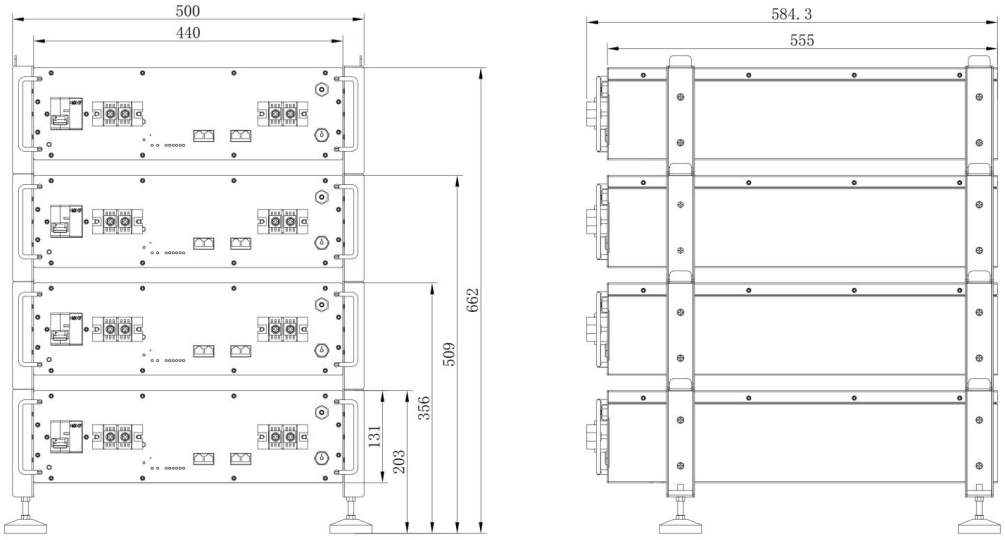
## Power on/off operation:

| operation | condition |
|---|---|
| Power on | First close the circuit breaker, then press and hold the button on the right side of the device for 1 second, and then release the button. |
| Power off | Operate when the device is powered on: first press and hold the button on the right side of the device for 1 second, release it, then open the circuit breaker. |
| Activation | When the BMS (Battery Management System) is in sleep mode, press and hold the reset button for 3 to 6 seconds, then release the reset button. |
| Sleep Mode | When the BMS is in working state, press and hold the reset button for 3 to 6 seconds, then release the reset button. |
| Hardware Reset | When the BMS is in working state, press and hold the specified button for 6 to 10 seconds. After releasing the button, the BMS will perform a hardware reset. |


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# 4. Product Installation

## 4.1. Product Dimensions




## Installation Precautions

1.Reserve at least 300mm of space on the front and sides of the system.

2.To reduce the risk of fire and minimize damage, the walls, ceilings, and floors of the space where the energy storage system is placed should use fire-resistant materials as much as possible. Additionally, portable dry powder fire extinguishers or water-based fire extinguishers should be equipped.

3. During the installation process, please refer to the relevant applicable safety regulations for installation.

## 4.2. Check Packing List

| Serial No. | Name | Description | Unit | Quantity | Remarks |
|---|---|---|---|---|---|
| 1 | Energy Storage Battery System | UX-5.1-LPB | Set | 1 | Standard Configuration |
| 2 | Positive Output Cable | 1000mm Length, Red | Piece | 1 | Standard Configuration |
| 3 | Negative Output Cable | 1000mm Length, Black | Piece | 1 | Standard Configuration |
| 4 | Positive Parallel Output Cable | Length: 150mm | Piece | 1 | Standard Configuration |
| 5 | Negative Parallel Output Cable | Length: 150mm | Piece | 1 | Standard Configuration |
| 6 | Parallel Communication Cable | Network cable with crystal head, Length: 220mm | Piece | 1 | Standard Configuration |
| 7 | PCS Communication Cable | Network cable with crystal head | Piece | 1 | Standard |

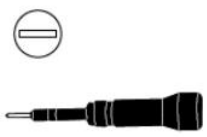
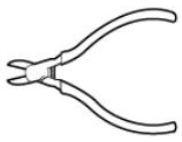

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| Serial No. | Name | Description | Unit | Quantity | Remarks |
|---|---|---|---|---|---|
| | | | | | Configuration |
| 8 | Network Port | Crystal Connector (RJ45 Ethernet Crystal Connector) | PCS | 2 | Standard Configuration |
| 9 | Terminal | Cold-Pressed Terminal (Insulated Ferrule SC25-8, Red Copper, ROHS Compliant) | PCS | 2 | Standard Configuration |
| 10 | Terminal | Cold-Pressed Terminal (Insulated Ferrule SC25-6, Red Copper, ROHS Compliant) | PCS | 2 | Standard Configuration |
| 11 | Self-Stacking Bracket | Self-Stacking Bracket (SGCC, 1684030MM) | PCS | 4 | Standard Configuration |
| 12 | Wall-Mounted Component 001 | Wall-Mounted Component 001 (SGCC, 1304020MM) | PCS | 1 | Standard Configuration |
| 13 | Wall-Mounted Component 002 | Wall-Mounted Component 002 (SGCC, 1304020MM) | PCS | 1 | Standard Configuration |
| 14 | Wall-Mounted Component 003 | Wall-Mounted Component 003 (SGCC, 1252520MM) | PCS | 2 | Standard Configuration |
| 15 | Wall-Mounted Bracket Fixing Screws | Hexagon Socket Expansion Screws (M6*50) | PCS | 4 | Standard Configuration |
| 16 | Self-Stacking Bracket Screws | Cross Recessed Hexagon Combination Screws (M8*12) | PCS | 4 | Standard Configuration |
| 17 | Self-Stacking Bracket & Grounding Screws | Cross Recessed Hexagon Combination Screws (M5*12) | PCS | 9 | Standard Configuration |
| 18 | Product User Manual | Product User Manual | PCS | 1 | Standard Configuration |
| 19 | Certificate of Conformity | Product Certificate of Conformity | PCS | 1 | Standard Configuration |
| 20 | Warranty Card | Warranty Card | PCS | 1 | Standard Configuration |
| 21 | Inspection Report | Shipping Inspection Report | PCS | 1 | Standard Configuration |

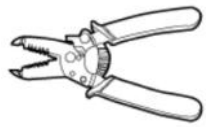
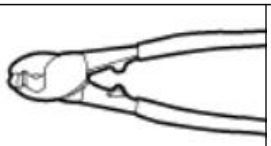
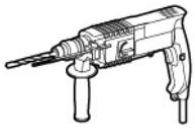
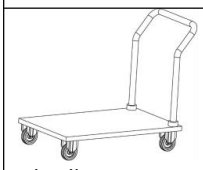
## 4.3.Tool Preparation

The tools listed are for reference only. Actual tools may vary.

Additional tools may be required depending on the installation site. Please prepare accordingly.

| | | | |
|---|---|---|---|
|  Cross insulation torque screwdriver |  One letter insulation torque screwdriver |  steel tape measure |  diagonal pliers |


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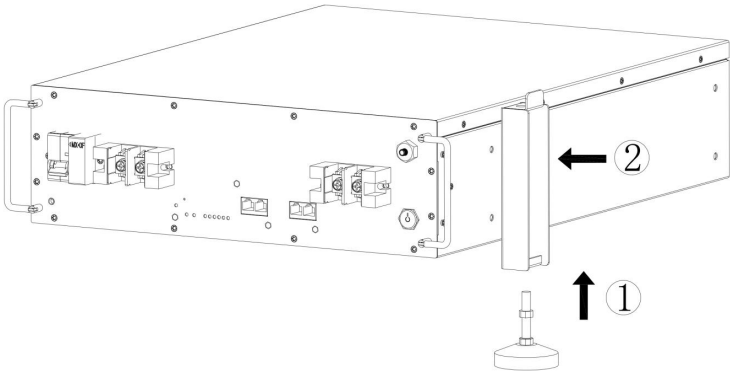
| | | | |
|---|---|---|---|
|  Wire stripper |  wire cutter |  rubber hammer |  Utility knife |
|  Percussion drill |  percussion bit Φ8mm |  multimeter |  marking pen |
|  Level ruler |  Cable tie |  Hot air gun |  Vacuum cleaner |
|  wheelbarrow |  Heat shrinkable sleeve | | |

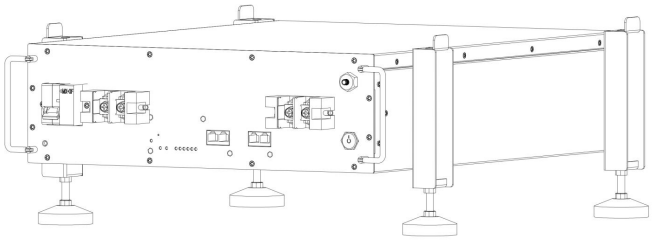
## Personal protective equipment

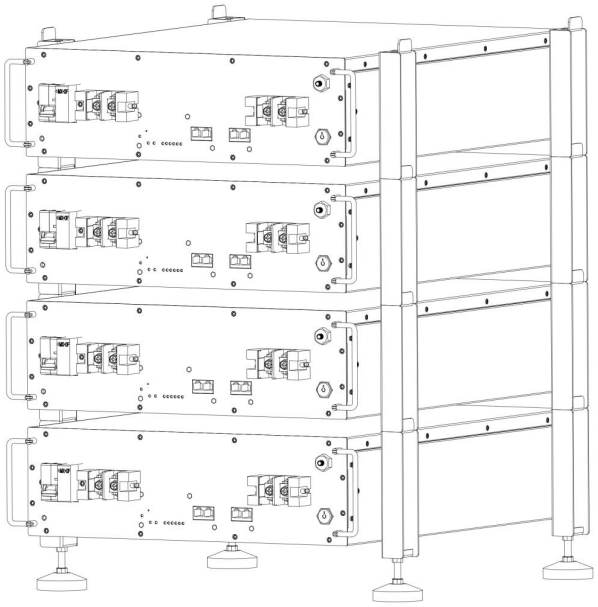
| | | | |
|---|---|---|---|
|  Protective gloves |  insulating gloves |  Protective goggles |  Anti-dust masks |
|  Reflective Vest |  insulating shoes |  safety hat |  safety belt |


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## 4.4. Product installation



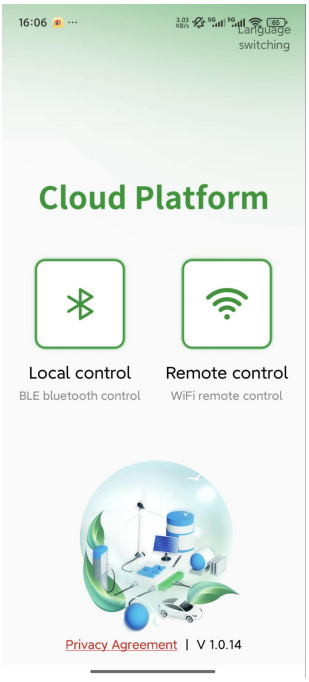





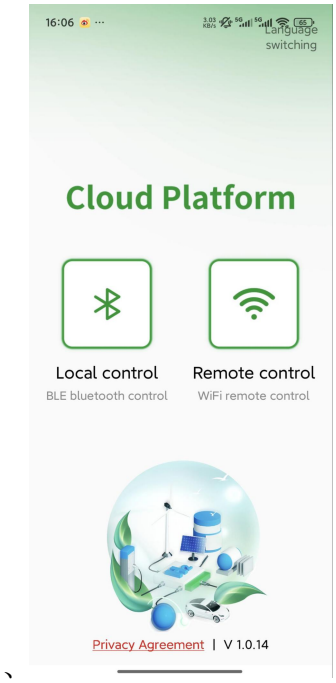
## 5. Product remote monitoring platform

Click on the icon to launch the software and select the cloud platform login method.



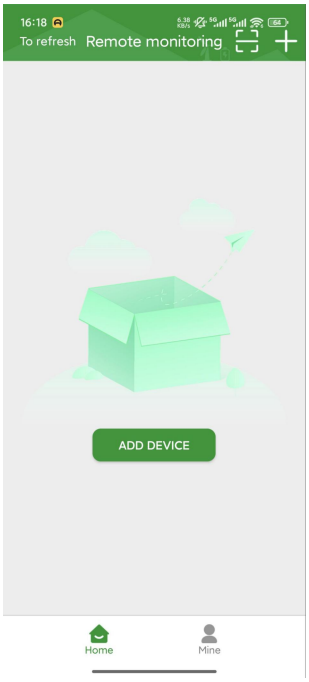



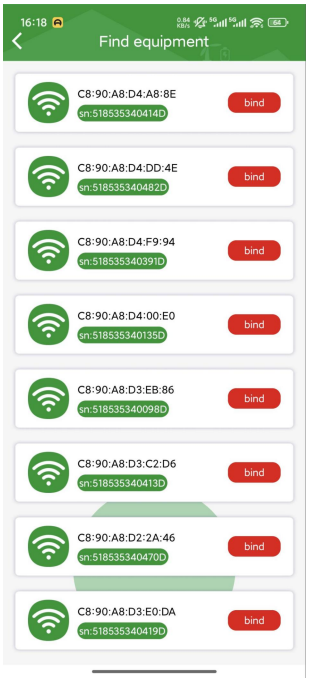

Register an account through email and log in to the software using the account password

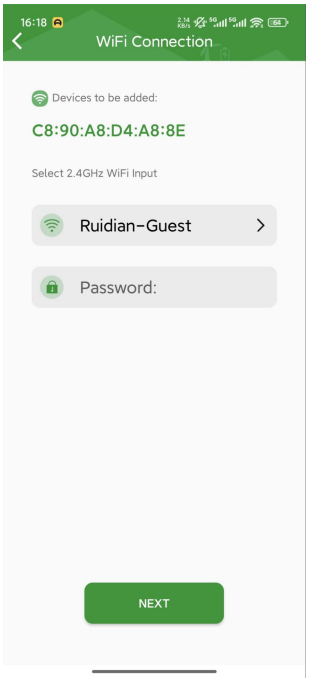


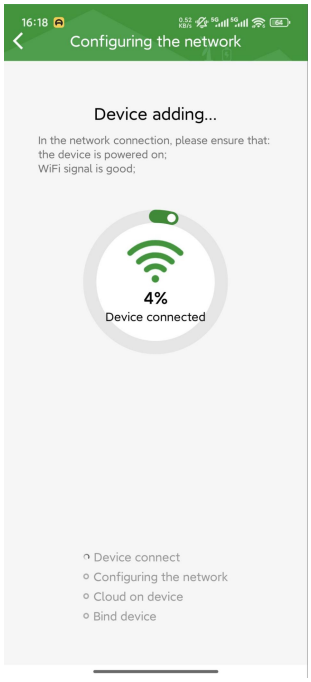

Open your phone's Bluetooth and click on 'Add Device' to discover the device through Bluetooth; Set WiFi connection network and network login password, successfully added device;

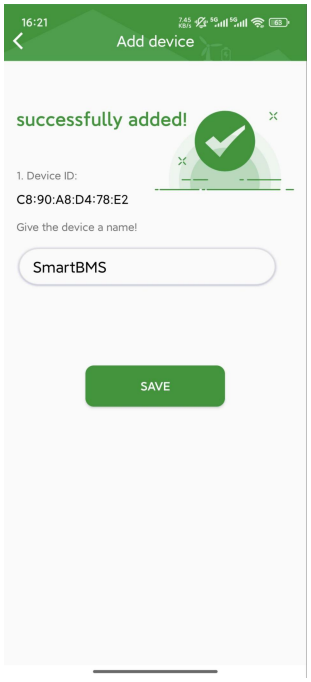
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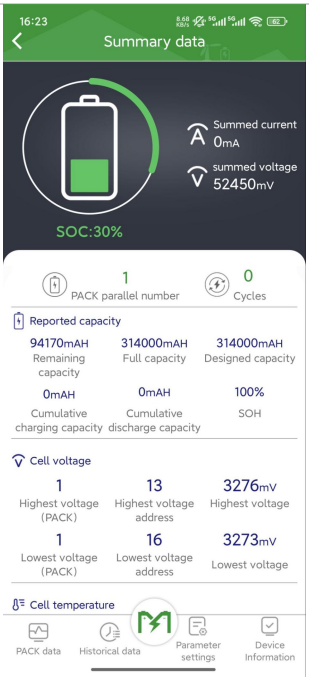



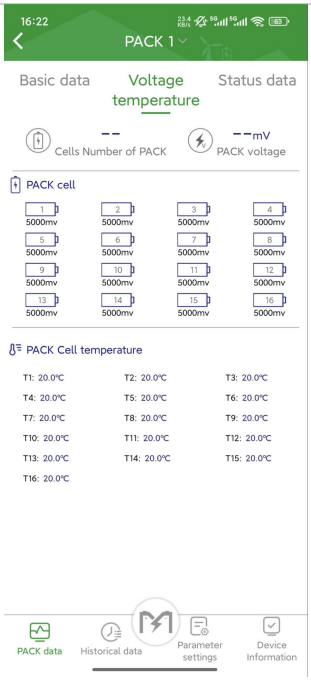



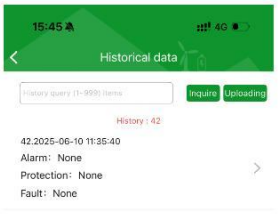

Through the monitoring interface, the operation summary data of the battery energy storage system, as well as the basic data, voltage temperature data, and status data of individual PACKs, can be observed;

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Through the historical data interface, by selecting the number of historical data queries, the historical operation data of the battery energy storage system can be queried, with a maximum of 1000 records;

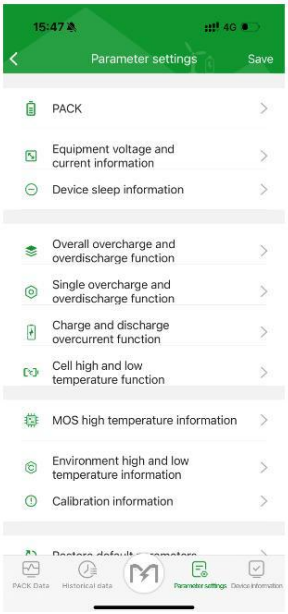


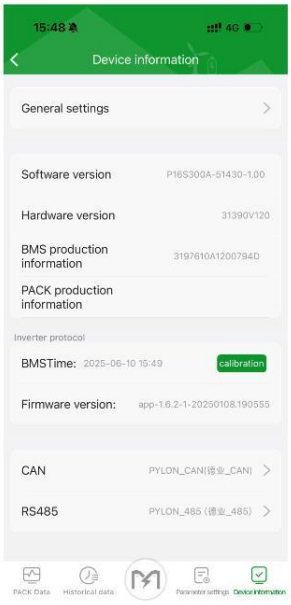



The operating parameters of the energy storage system can be set through the parameter setting interface (arbitrary adjustment of parameters may cause abnormal system operation);

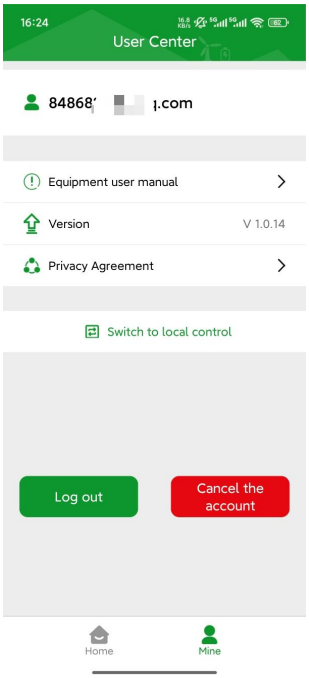
Through the device information interface, the operating mode of the energy storage system can be adjusted, the indicator light and buzzer alarm functions can be turned off, the current limiting function can be set, the system operating time can be calibrated, and the communication protocol of the energy storage system matching the inverter can be adjusted;


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Click on "My" to enter the user center, and then click on the device user manual to view detailed instructions for using the cloud platform.



## 6. Product Maintenance




Please clean the dust on the top radiator and fan surface of the product in a timely manner during routine maintenance, and promptly remove flammable debris around the equipment. It is recommended to clean and maintain the radiator every 3-6 months, with maintenance intervals determined by the level of air pollution and operating time in different regions. When cleaning, please use dry cleaning tools such as cloths or brushes, and do not use organic solvents such as gasoline. Check the battery system at least once a month, and use the app to check if the battery voltage and temperature are normal. Check historical data to determine if there is a serious malfunction. If maintenance is required, please consult a service engineer.

## 7. Alarm information and handling

If an abnormality occurs during the operation of the device, the red indicator light will light up, and many alarms will automatically recover as the battery is charged and discharged, without the need for further processing; If the red indicator light cannot be restored for a long time, the following methods can be used to handle it:

1. According to the power on/off method, restart the equipment. If it can be restored to normal, there is no need to handle it;

2. Check the operating status of the battery system through the cloud based mobile app and contact our after-sales personnel for assistance;


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