

**UPS5000-E-(350 kVA-800 kVA)**

# **User Manual (50 kVA Power Modules)**

**Issue**            12  
**Date**             2020-03-23

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# About This Document

## Purpose

This document describes the UPS5000-E-(350 kVA–800 kVA) in terms of its features, performance specifications, working principles, appearance as well as instructions for installation, and operation and maintenance (O&M). UPS is short for uninterruptible power system.





## Intended Audience


This document is intended for:

- Sales engineers
- Technical support engineers
- System engineers
- Hardware installation engineers
- Commissioning engineers
- Data configuration engineers
- Maintenance engineers

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to

Symbol	Description
	personal injury.
 <b>NOTE</b>	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

## Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

### Issue 12 (2020-03-23)

Adapted the UPS to lithium batteries and updated the monitoring user interfaces.

### Issue 11 (2019-12-20)

Updated the safety information.

### Issue 10 (2019-11-11)

Added SNMP descriptions to the sections about system settings and site configuration.

### Issue 09 (2019-10-16)

Added description that the UPS5000 supports the mobile app function when it is powered on for the first time.

### Issue 08 (2019-08-15)

Updated the monitoring UIs.

### Issue 07 (2019-02-27)

Improved the description of the USB port.

### Issue 06 (2018-10-19)

Update some MDU screenshots.

### Issue 05 (2018-01-08)

Added the instructions for startup over the app.

### Issue 04 (2017-10-30)

Updated the output electrical specifications, power cables, and typical configuration.

### **Issue 03 (2017-04-28)**

Update some MDU screenshots.

### **Issue 02 (2017-02-25)**

Updated the voltage and current data of the monitoring interface card.

### **Issue 01 (2016-10-14)**

This is the first release.

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# 1 Safety Information

## 1.1 General Safety

### Statement

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "CAUTION", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. Huawei will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting equipment malfunction, component damage, personal injuries, or property damage are not covered under the warranty.

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

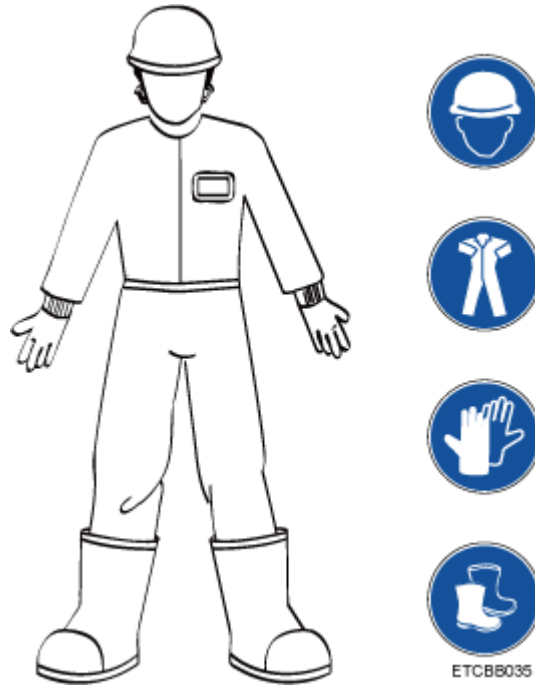
Huawei will not be liable for any consequences of the following circumstances:

- Operation beyond the conditions specified in this document
- Installation or use in environments which are not specified in relevant international or national standards
- Unauthorized modifications to the product or software code or removal of the product
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, and storms
- Damage caused during transportation by the customer
- Storage conditions that do not meet the requirements specified in this document

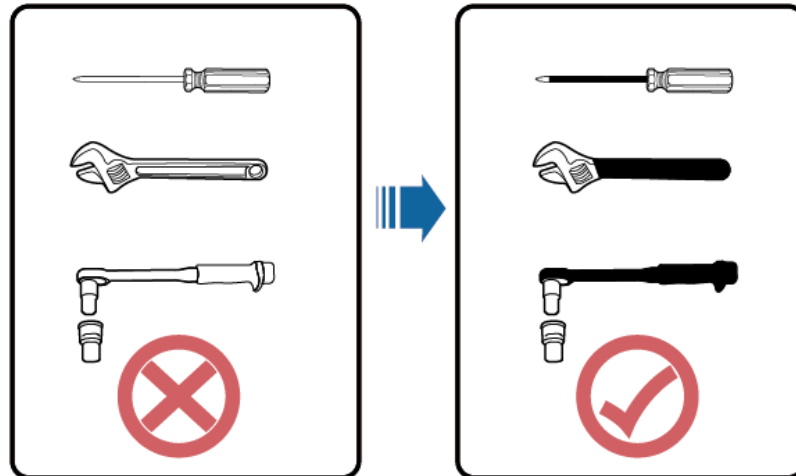
### General Requirements

- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.

- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.

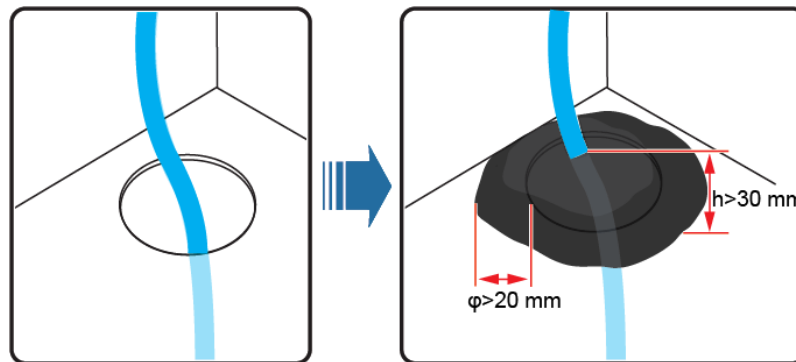


- Follow the specified procedures for installation, operation, and maintenance.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.
- Do not stop using protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. Promptly replace warning labels that have worn out.
- Keep irrelevant people away from the equipment. Only operators are allowed to access the equipment.
- Use insulated tools or tools with insulated handles, as shown in the following figure.



TN01H00005

- All cable holes should be sealed. Seal the used cable holes with firestop putty. Seal the unused cable holes with the caps delivered with the cabinet. The following figure shows the criteria for correct sealing with firestop putty.



TN01H00006

- Do not scrawl, damage, or block any warning label on the equipment.
- Tighten the screws using tools when installing the equipment.
- Do not work with power on during installation.
- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed to an outdoor environment for a long period of time.
- Before operations, ensure that the equipment is firmly secured to the floor or other solid objects, such as a wall or an installation rack.
- Do not use water to clean electrical components inside or outside of a cabinet.
- Do not change the structure or installation sequence of equipment without permission.
- Do not touch a running fan with your fingers, components, screws, tools, or boards before the fan is powered off or stops running.

## Personal Safety

- If there is a probability of personal injury or equipment damage during operations on the equipment, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.

- Do not power on the equipment before it is installed or confirmed by professionals.

## 1.2 Personnel Requirements

- Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
- Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

## 1.3 Electrical Safety

### Grounding

- For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is securely grounded.

### General Requirements

Use dedicated insulated tools when performing high-voltage operations.

### AC and DC Power

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 **DANGER**

Do not connect or disconnect power cables with power on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- 
- If a "high electricity leakage" tag is attached on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the AC power supply; otherwise, electric shock as a result of electricity leakage may occur.
  - Before installing or removing a power cable, turn off the power switch.
  - Before connecting a power cable, check that the label on the power cable is correct.
  - If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
  - A circuit breaker equipped with a residual current device (RCD) is not recommended.
  - A damaged power cable must be replaced by the manufacturer, service agent, or professionals to avoid risks.
  - High voltage operations and installation of AC-powered facilities must be performed by qualified personnel.

## Cabling

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Do not route cables behind the air intake and exhaust vents of the equipment.
- Ensure that cables meet the VW-1 flame spread rating requirements.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- If an AC input power cable is connected to the cabinet from the top, bend the cable in a U shape outside the cabinet and then route it into the cabinet.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
  - Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
  - Cables stored at subzero temperatures must be stored at room temperature for at least 24 hours before they are laid out.
  - Do not perform any improper operations, for example, dropping cables directly from a vehicle.
- When selecting, connecting, and routing cables, follow local safety regulations and rules.

## ESD

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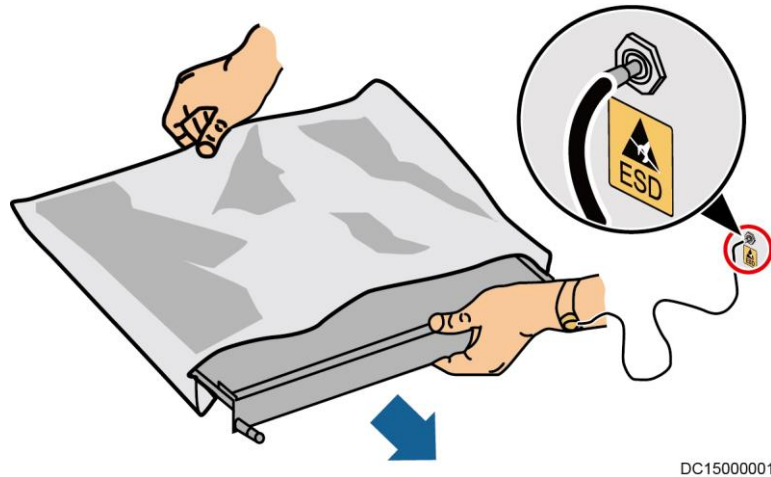
**NOTICE**

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

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- Wear ESD gloves or a well-grounded ESD wrist strap when touching the device or handling boards or application-specific integrated circuits (ASICs).
- When holding a board, hold its edge without touching any components. Do not touch the components with your bare hands.
- Package boards with ESD packaging materials before storing or transporting them.

**Figure 1-1** Wearing an ESD wrist strap



## Neutral-Ground Voltage

It is recommended that the three-phase loads be equalized and the neutral-ground voltage be kept at less than 2 V to meet power distribution requirements.

## 1.4 Installation Environment Requirements

- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the equipment is running.
- Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- If any liquid is detected inside the equipment, immediately disconnect the power supply and contact the administrator.
- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.
- Ensure that the equipment room provides good heat insulation, and the walls and floor are dampproof.
- Install a rat guard at the door of the equipment room.



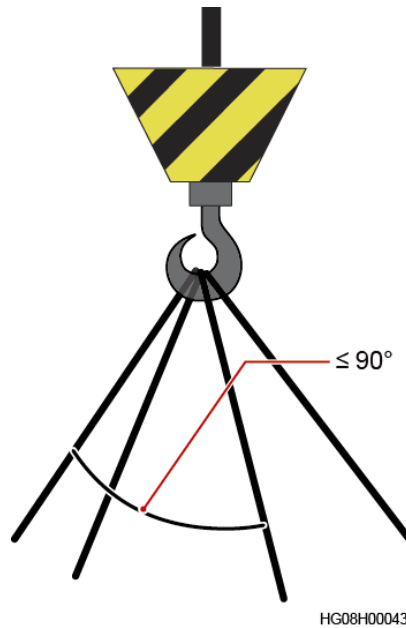
## Installation at Heights

- Working at heights refers to operations that are performed at least 2 meters above the ground.
- Do not work at heights if the steel pipes are wet or other potential danger exists. After the preceding conditions no longer exist, the safety director and relevant technical personnel need to check the involved equipment. Operators can begin working only after obtaining consent.
- When working at heights, comply with local relevant laws and regulations.
- Only trained and qualified personnel are allowed to work at heights.
- Before working at heights, check the climbing tools and safety gears such as safety helmets, safety belts, ladders, springboards, scaffolding, and lifting equipment. If they do not meet the requirements, take corrective measures or disallow working at heights.
- Wear personal protective equipment such as the safety helmet and safety belt or waist rope and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.
- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
- Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
- Ensure that guard rails and warning signs are set at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other sundries on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Inspect the scaffolding, springboards, and workbenches used for working at heights in advance to ensure that their structures are solid and not overloaded.
- Any violations must be promptly pointed out by the site manager or safety supervisor and the involved personnel should be prompted for correction. Personnel who fail to stop violations will be forbidden from working.

## 1.5 Mechanical Safety

### Hoisting Devices

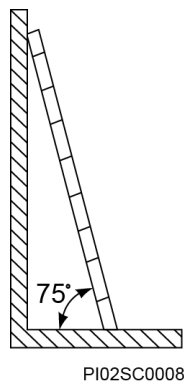
- Do not walk under hoisted objects.
- Only trained and qualified personnel should perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting cables is no more than 90 degrees, as shown in the following figure.



- Do not drag steel ropes and hoisting tools or bump hoisted objects against hard objects during hoisting.

## Using Ladders

- Use wooden or fiberglass ladders when you need to perform live working at heights.
- When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the ladder is securely positioned. The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle rule can be used to measure the angle. Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding.



- When climbing a ladder, take the following precautions to reduce risks and ensure safety:
  - Keep your body steady.
  - Do not climb higher than the fourth rung of the ladder from the top.
  - Ensure that your body's center of gravity does not shift outside the legs of the ladder.

## Drilling Holes

When drilling holes into a wall or floor, observe the following safety precautions:

### NOTICE

Do not drill holes into the equipment. Doing so may affect the electromagnetic shielding of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

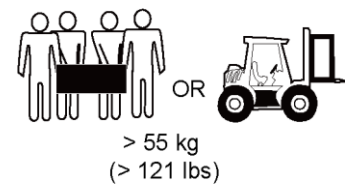
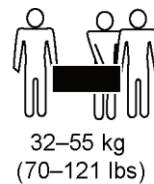
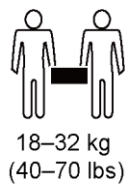
- Obtain the consent from the customer, subcontractor, and Huawei before drilling.
- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

## Moving Heavy Objects

### DANGER

When removing a heavy or unstable component from a cabinet, be aware of unstable or heavy objects on the cabinet.

- Be cautious to avoid injury when moving heavy objects.



NH01H00144

- When moving the equipment by hand, wear protective gloves to prevent injuries.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules (such as power supply units, fans, and boards) that are installed in the equipment because they cannot support the weight of the equipment.
- Avoid scratching the cabinet surface or damaging cabinet components and cables during equipment transportation.
- When transporting the equipment using a forklift truck, ensure that the forks are properly positioned to ensure that the equipment does not topple. Before moving the equipment, secure it to the forklift truck using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Choose railways, sea, or a road with good condition for transportation to ensure equipment safety. Avoid tilt or jolt during transportation.
- Move a cabinet with caution. Any bumping or falling may damage the equipment.

## 1.6 Device Running Safety

The UPS is used for commercial and industrial purposes only. It cannot be used as a power supply for life support devices.

For power supply systems that are critical to significant economic interests or public order, such as the national computing center, military command system, emergency command center, railway signal system and control center, civil aviation and air traffic control center, airport command center, financial clearing center, and transaction center, the Tier 4 or 3 power architecture specified in TIA-942 must be used. That is, two power supplies must be used to supply power to loads.

Ensure that the equipment is used in an environment that meets the product design specifications (including power grid, temperature, and humidity). Otherwise, the equipment may become faulty, and the resulting equipment malfunction and component damage are not covered under the warranty.

The UPS operating environment must meet the requirements for the climate indicator, mechanically active substance indicator, and chemically active substance indicator in ETSI EN 300 019-1 class 3.6.

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#### NOTICE

- This is a category C3 UPS product for commercial and industrial application in the second environment – installation restrictions or additional measures may be needed to prevent disturbances.
- After unpacking the UPS, you are advised to power on the UPS as soon as possible. If you temporarily do not use the UPS, take appropriate measures to prevent moisture, dust, and foreign matter from entering the UPS.
- After unpacking batteries, you are advised to connect the battery supply as soon as possible. If you temporarily do not use the batteries, store them in a dry and clean environment. If batteries are stored for more than 90 days, charge them in time. Otherwise, the battery lifespan may be affected.
- Install the UPS in an area far away from liquids. Do not install it under areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the UPS to prevent short circuits. Ensure that there is no condensation inside the equipment or equipment room.
- If any liquid is detected inside the equipment, immediately disconnect the power supply and contact the administrator.

---

#### DANGER

- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.
- During installation and maintenance, ensure that sundries do not enter the UPS. Otherwise, equipment damage, load power derating, power failure, and personal injury may occur.

---

If the valid mains voltage exceeds 320 V AC, the UPS may be damaged.

A UPS can be used to serve resistive-capacitive loads, resistive loads, and micro-inductive loads. It is recommended that a UPS not be used for pure capacitive loads, pure inductive loads, and half-wave rectification loads. A UPS does not apply to regeneration loads.

Any operation on any electrical device in an environment that has inflammable air can cause extreme danger. Strictly obey the operating environmental requirements specified in related user manuals when using or storing the device.

The UPS can be configured with a backfeed protection dry contact to work with an external automatic circuit breaker, preventing the voltage from flowing back to input terminals over static bypass circuits. If the installation and maintenance personnel do not need backfeed protection, paste labels on external mains and bypass input switches, informing that the UPS is connected to a backfeed protection card. Disconnect the backfeed protection card from the UPS before operating the UPS.

Do not use the UPS in the following places:

- Environments that are close to flammable or explosive materials, dust, corrosive gases or dust, conductive or magnetic dust, abnormal vibration, or collision
- Rooms or outdoor environments where temperature and humidity are not controlled (with high temperature, low temperature, moisture, direct sunlight, or heat sources)
- Non-confined environments near the ocean (0–3.7 km) and indoor or semi-indoor environments where the temperature and humidity are not controllable, such as simple equipment rooms, civil houses, garages, corridors, and direct ventilation cabinets near the sea; or houses with only roofs, railway station platforms, gymnasiums, and aquariums
- Environments that are conducive for the growth of microorganisms such as fungus or mildew
- Environments where rodents (such as mice) and insects exist

## 1.7 Battery Safety

### Basic Requirements

Before operating batteries, carefully read the safety precautions for battery handling and master the correct battery connection methods.

---

** DANGER**

- Do not expose batteries at high temperatures or around heat-generating devices, such as sunlight, fire sources, transformers, and heaters. Excessive heat exposure may cause the batteries to explode.
  - Do not burn batteries. Otherwise, the batteries may explode.
  - To avoid leakage, overheating, fire, or explosions, do not disassemble, alter, or damage batteries, for example, insert sundries into batteries or immerse batteries in water or other liquids.
- 
- Wear goggles, rubber gloves, and protective clothing to prevent skin contact with electrolyte in the case of electrolyte overflow. If a battery leaks, protect the skin or eyes from the leaking liquid. If the skin or eyes come in contact with the leaking liquid, wash it immediately with clean water and go to the hospital for medical treatment.
  - Use dedicated insulated tools.
  - Move batteries in the required direction. Do not place a battery upside down or tilt it.
  - Keep the battery loop disconnected during installation and maintenance.
  - Use batteries of specified models. Using batteries of other models may damage the batteries.

- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. If a battery is disposed of improperly, it may explode.
- The site must be equipped with qualified fire extinguishing facilities, such as firefighting sands and powder fire extinguishers.

---

#### NOTICE

To ensure battery safety and battery management accuracy, use batteries provided with the UPS by Huawei. Huawei is not responsible for any battery faults caused by batteries not provided by Huawei.

---

## Battery Installation

Before installing batteries, observe the following safety precautions:

- Install batteries in a well-ventilated, dry, and cool environment that is far away from heat sources, flammable materials, moistures, extensive infrared radiation, organic solvents, and corrosive gases. Take fire prevention measures.
- Place and secure batteries horizontally.
- Note the polarities when installing batteries. Do not short-circuit the positive and negative poles of the same battery or battery string. Otherwise, the battery may be short-circuited.
- Check battery connections periodically, ensuring that all bolts are securely tightened.
- When installing batteries, do not place installation tools on the batteries.

## Battery Short Circuit

---

#### DANGER

Battery short circuits can generate high instantaneous current and release a great amount of energy, which may cause equipment damage or personal injury.

---

To avoid battery short-circuit, do not maintain batteries with power on.

## Flammable Gas

---

#### NOTICE

- Do not use unsealed lead-acid batteries.
  - To prevent fire or corrosion, ensure that flammable gas (such as hydrogen) is properly exhausted for lead-acid batteries.
- 

Lead-acid batteries emit flammable gas when used. Ensure that batteries are kept in a well-ventilated area and take preventive measures against fire.

## Battery Leakage

---

### NOTICE

Battery overheating causes deformation, damage, and electrolyte spillage.

---

---

### WARNING

When the electrolyte overflows, absorb and neutralize the electrolyte immediately. When moving or handling a battery whose electrolyte leaks, note that the leaking electrolyte may hurt human bodies.

---

- If the battery temperature exceeds 60°C, check for and promptly handle any leakage.
- Electrolyte overflow may damage the equipment. It will corrode metal parts and boards, and ultimately damage the boards.
- If the electrolyte overflows, follow the instructions of the battery manufacturer or neutralize the electrolyte by using sodium bicarbonate (NaHCO<sub>3</sub>) or sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>).

## Lithium Battery

The safety precautions for lithium batteries are similar to those for lead-acid batteries except that you also need to note the precautions described in this section.

---

### WARNING

There is a risk of explosion if a battery is replaced with an incorrect model.

---

- A battery can be replaced only with a battery of the same or similar model recommended by the manufacturer.
- When handling a lithium battery, do not place it upside down, tilt it, or bump it with other objects.
- Keep the lithium battery loop disconnected during installation and maintenance.
- Do not charge a battery when the ambient temperature is below the lower limit of the operating temperature (charging is forbidden at 0°C). Low-temperature charging may cause crystallization, which will result in a short circuit inside the battery.
- Use batteries within the allowed temperature range; otherwise, the battery performance and safety will be compromised.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

## 1.8 Others

- Exercise caution when manually shutting down the UPS inverter for transferring to bypass mode, or when adjusting the UPS output voltage level or frequency. Doing so may affect the power supply to equipment.
- Exercise caution when setting battery parameters. Incorrect settings will affect the power supply and battery lifespan.



# 2 Overview

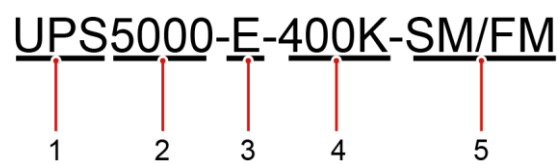
## 2.1 Model Description

This document describes the following UPS models:

- UPS5000-E-400K-SM
- UPS5000-E-400K-FM
- UPS5000-E-500K-SM
- UPS5000-E-500K-FM
- UPS5000-E-600K-SM
- UPS5000-E-600K-FM
- UPS5000-E-800K-SM
- UPS5000-E-800K-FM

[Figure 2-1](#) numerically labels UPS model number details, and [Table 2-1](#) describes these details.

**Figure 2-1** UPS model number



**Table 2-1** Model number details

No.	Item	Description
1	Product category	UPS, short for uninterruptible power system
2	UPS family	5000
3	UPS subcategory	E series
4	Output capacity	<ul style="list-style-type: none"><li>• 400K: The output capacity is 400 kVA.</li><li>• 500K: The output capacity is 500 kVA.</li></ul>

No.	Item	Description
		<ul style="list-style-type: none"><li>• 600K: The output capacity is 600 kVA.</li><li>• 800K: The output capacity is 800 kVA.</li></ul>
5	Configuration type	<ul style="list-style-type: none"><li>• SM: standard configuration</li><li>• FM: full configuration</li></ul>

 **NOTE**

- The UPS5000-E-400K-SM/FM uses 50 kVA power modules. It can expand up to 400 kVA and is compatible downwards to 50 kVA. This document describes the 400 kVA UPS.
- The UPS5000-E-500K-SM/FM uses 50 kVA power modules. It can expand up to 500 kVA and is compatible downwards to 50 kVA. This document describes the 500 kVA UPS.
- The UPS5000-E-600K-SM/FM uses 50 kVA power modules. It can expand up to 600 kVA and is compatible downwards to 50 kVA. This document describes the 600 kVA UPS.
- The UPS5000-E-800K-SM/FM uses 50 kVA power modules. It can expand up to 800 kVA and is compatible downwards to 50 kVA. This document describes the 800 kVA UPS.

## 2.2 Working Principle

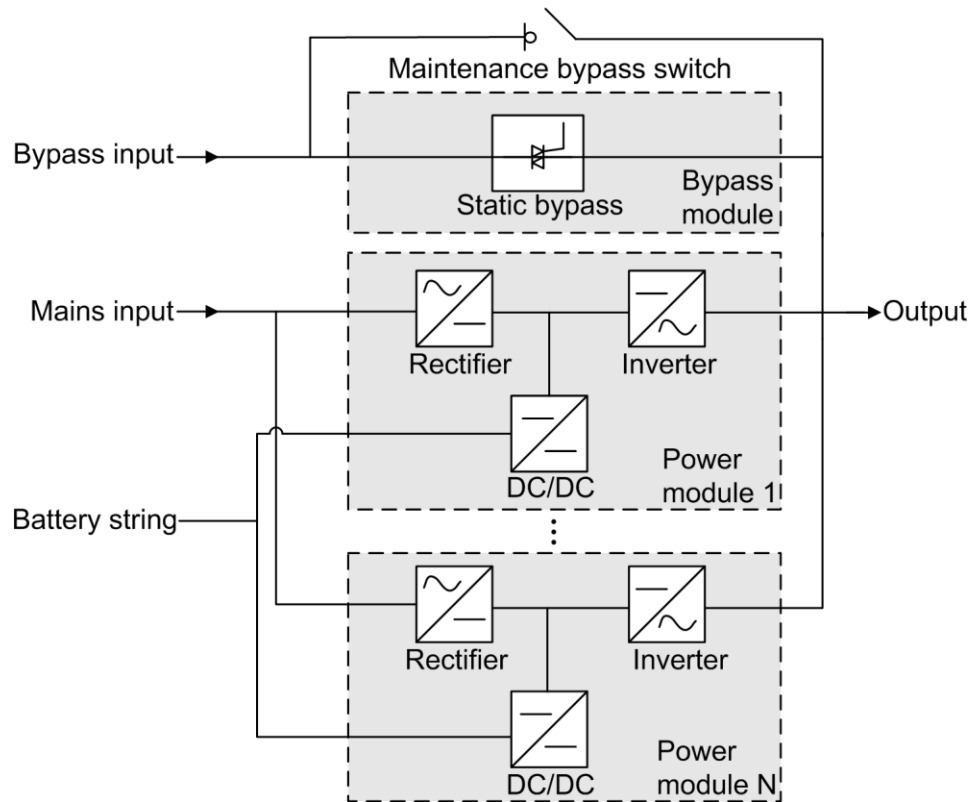
 **NOTE**

- $\rightarrow$  indicates an input mode.
- $\rightarrow$  indicates the energy flow direction.

### 2.2.1 Conceptual Diagram

The UPS5000 is an online product. It uses a modular design, which facilitates maintenance and capacity expansion. The UPS5000 adopts intelligent control. Its power module consists of a rectifier, inverter, and DC/DC converter. The UPS5000 converts inputs into pure high-quality sine wave outputs by using the high-frequency switching technology.

Figure 2-2 UPS conceptual diagram

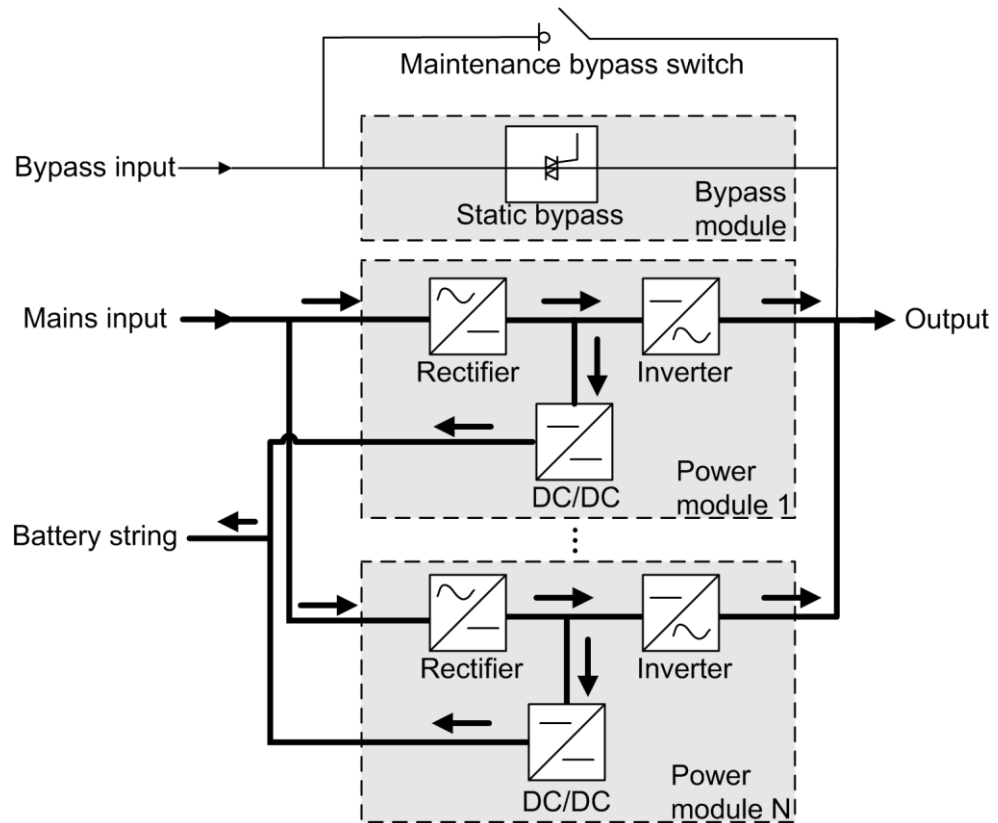


## 2.2.2 Working Modes

### 2.2.2.1 Normal Mode

In normal mode, the rectifier converts AC power into DC power, then the inverter converts DC power into high-precision AC outputs. The conversions protect loads from interference such as input harmonics, glitches, and voltage transients.

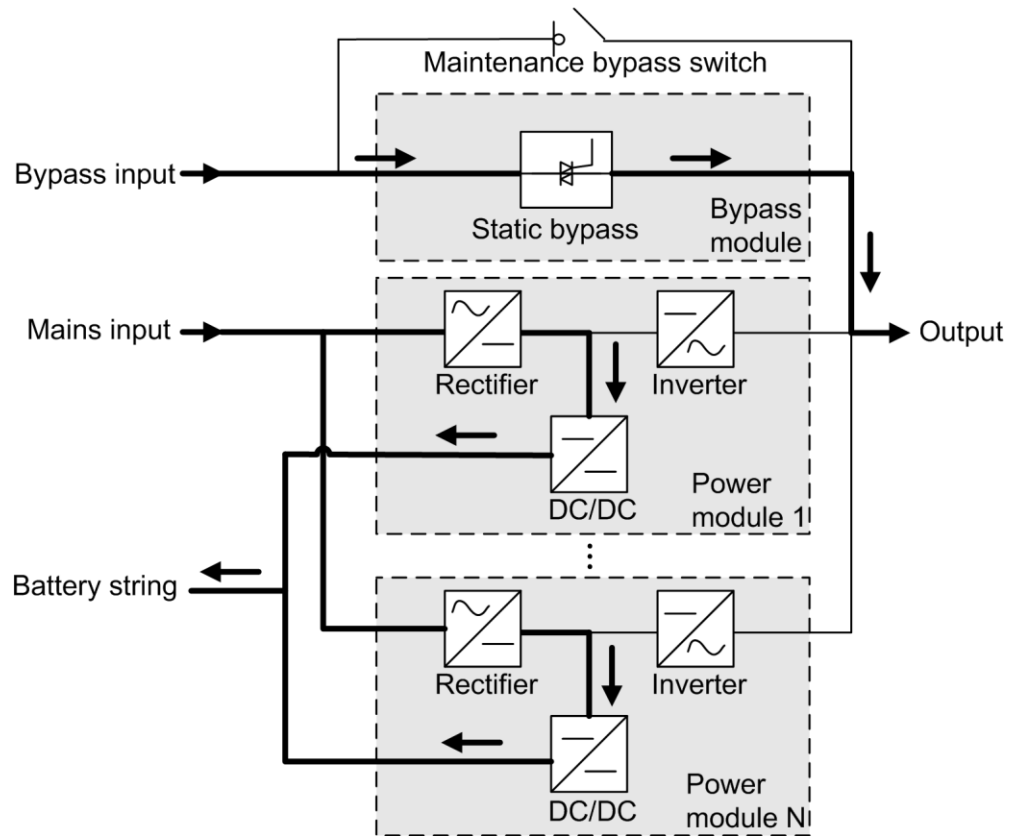
**Figure 2-3** UPS conceptual diagram in normal mode



### 2.2.2.2 Bypass Mode

The UPS automatically transfers to bypass mode upon detecting power module overtemperature, overload, or other faults that may cause the inverter to shut down. The bypass power supply is not protected by the UPS which means it may be affected by mains outage, and incorrect AC voltage or frequency.

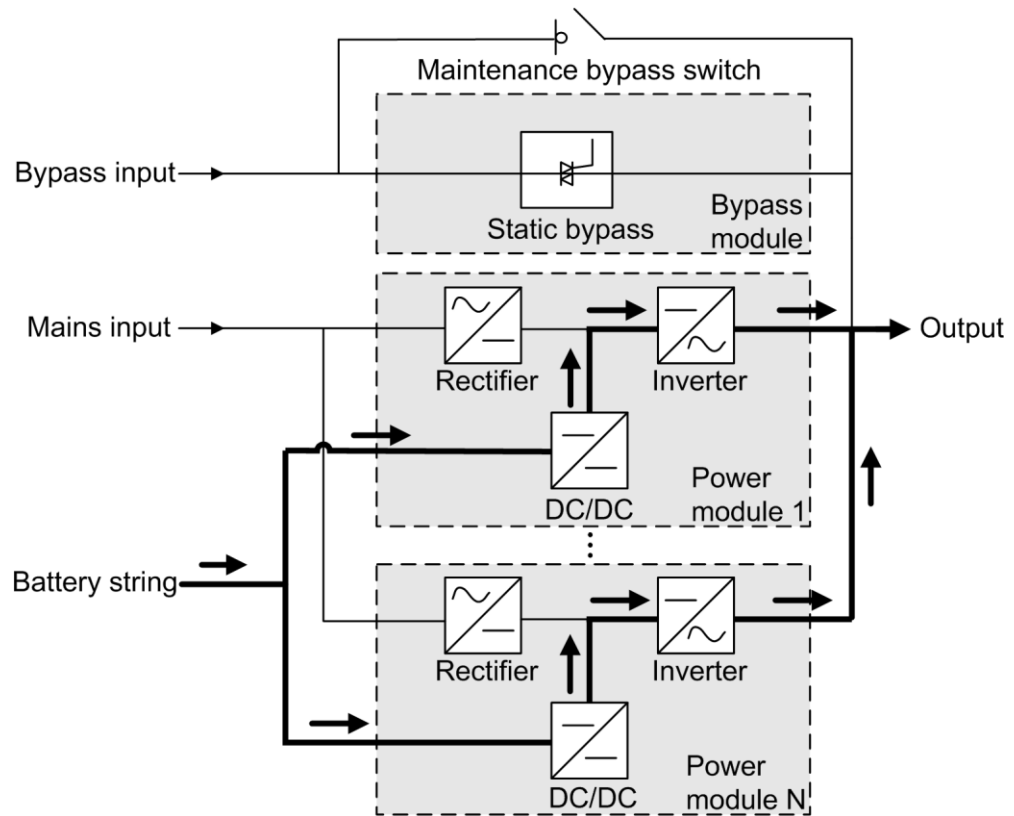
**Figure 2-4** UPS conceptual diagram in bypass mode



### 2.2.2.3 Battery Mode

If the mains input is abnormal or the rectifier becomes abnormal, the UPS transfers to battery mode. The power module obtains DC power from batteries, and the power is converted into AC output by the inverter.

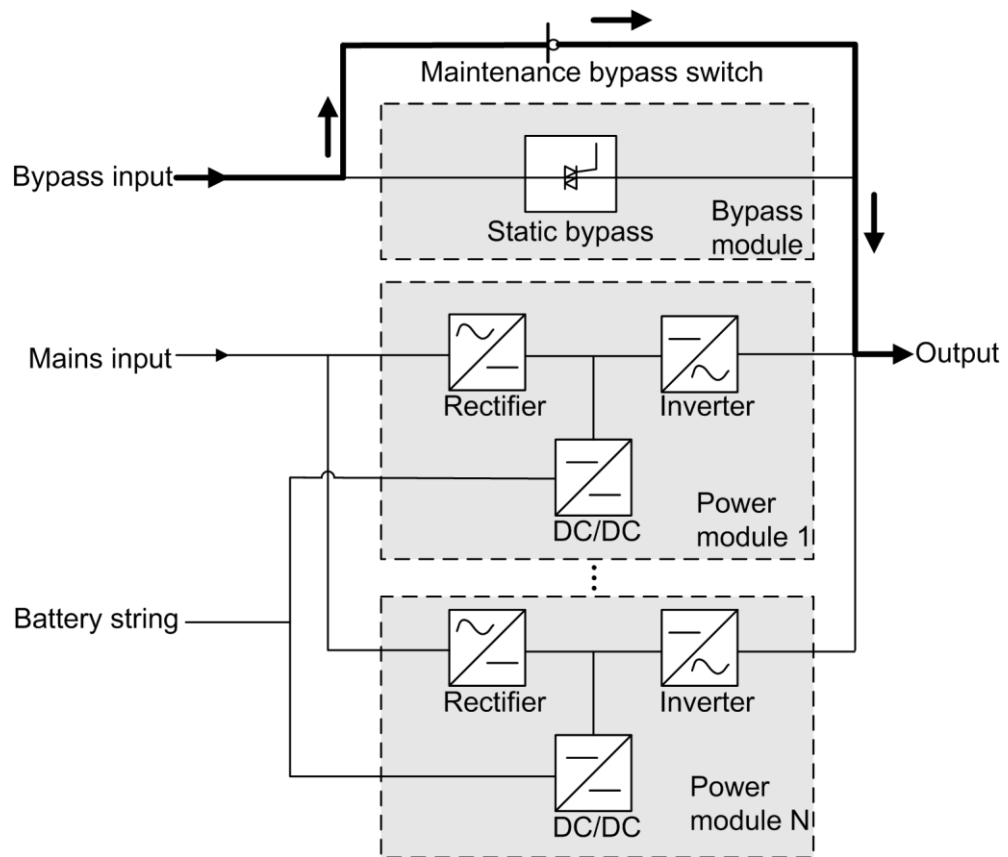
**Figure 2-5** UPS conceptual diagram in battery mode



### 2.2.2.4 Maintenance Bypass Mode

When the UPS works in maintenance bypass mode, the current flows through the maintenance bypass instead of the power module. You can maintain the circuit inside the cabinet.

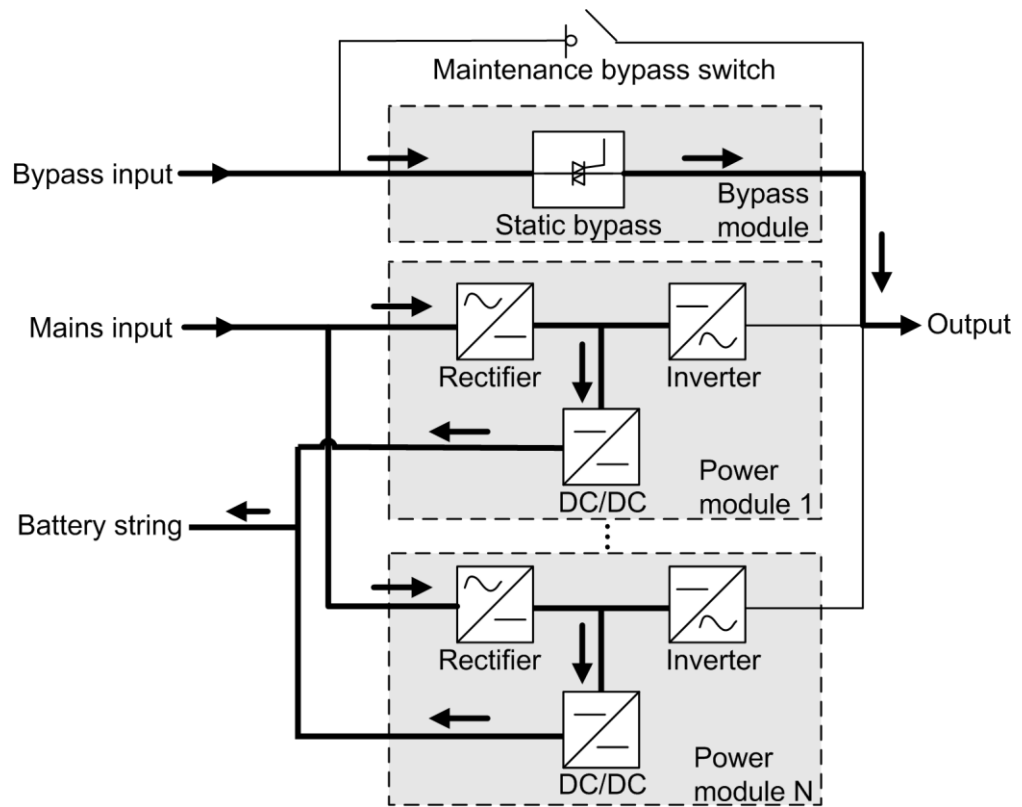
**Figure 2-6** UPS conceptual diagram in maintenance bypass mode



### 2.2.2.5 ECO Mode

The economic control operation (ECO) mode is an economical working mode, which can be configured on the LCD or web user interface (WebUI). In ECO mode, when the bypass input is within the ECO voltage and frequency ranges and other ECO power supply conditions are met, the UPS works in bypass mode and the inverter is in standby state. When the bypass voltage is outside the ECO voltage range, the UPS transfers from bypass mode to normal mode. In bypass mode or normal mode, the rectifier keeps working and charges batteries using a charger. The ECO mode delivers a high efficiency.

**Figure 2-7** UPS conceptual diagram in ECO mode



**NOTE**

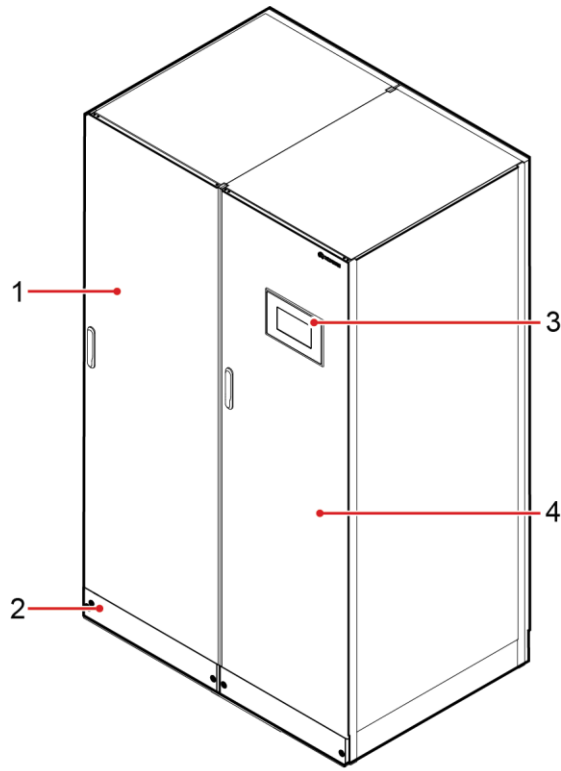
Manual startup is required to ensure that the inverter is in standby state and the power flow has reached the inverter.



## 2.3 Product Introduction

### 2.3.1 Appearance

Figure 2-8 400 kVA/500 kVA UPS



UA13000002

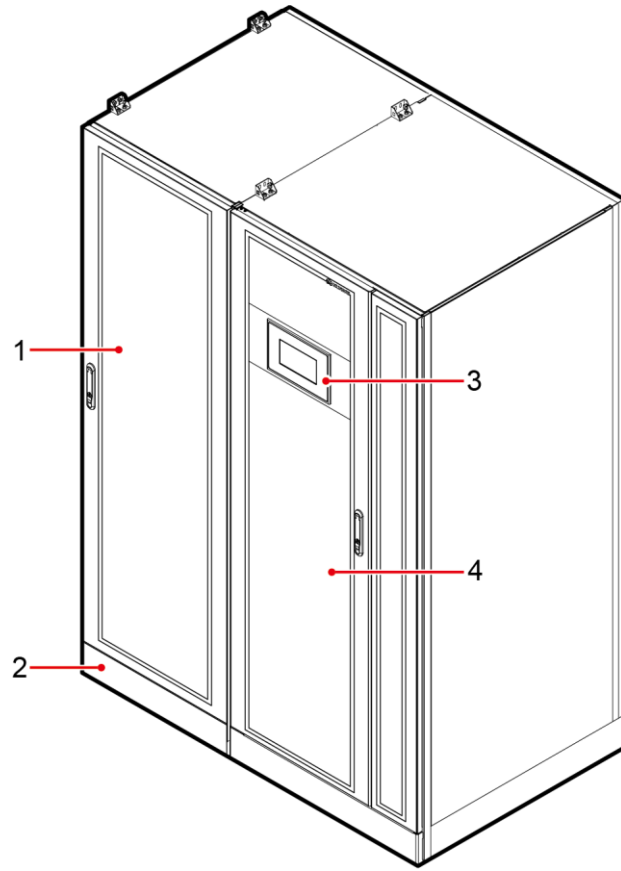
(1) Power cabinet

(2) Anchor baffle plates

(3) Monitor display unit (MDU)

(4) Bypass cabinet

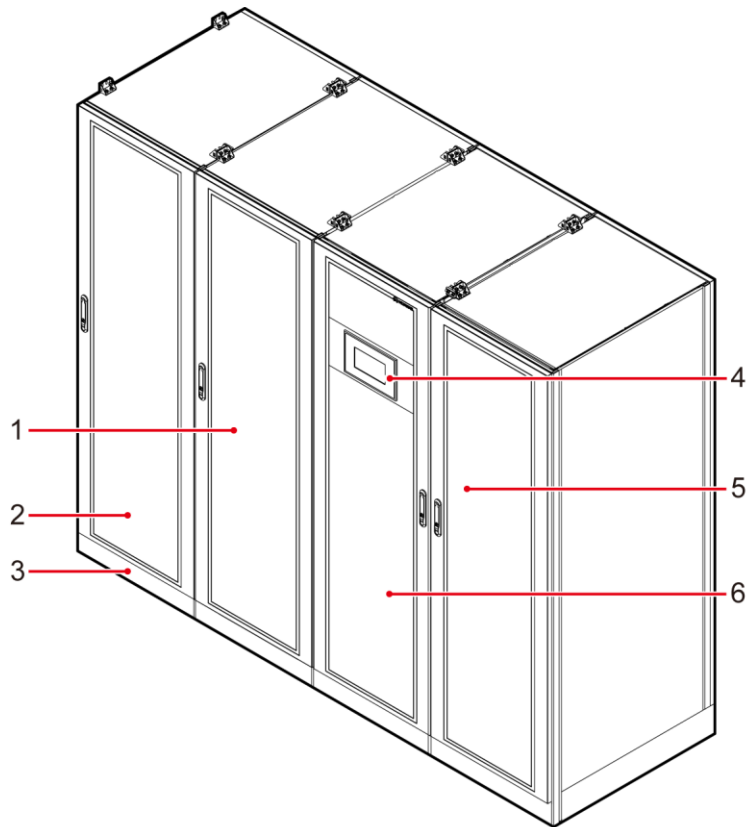
**Figure 2-9** 600 kVA UPS



UA15000157

- (1) Power cabinet      (2) Anchor baffle plates      (3) MDU      (4) Bypass cabinet

**Figure 2-10** 800 kVA UPS

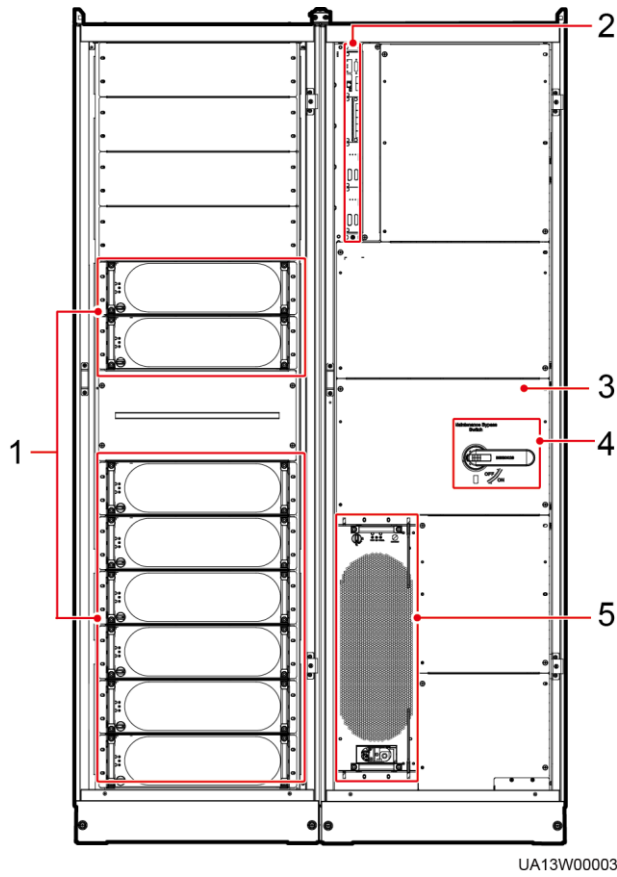


UA15000002

- |                     |                      |                          |
|---------------------|----------------------|--------------------------|
| (1) Power cabinet 1 | (2) Power cabinet 2  | (3) Anchor baffle plates |
| (4) MDU             | (5) Bypass cabinet 2 | (6) Bypass cabinet 1     |

## 2.3.2 Product Structure

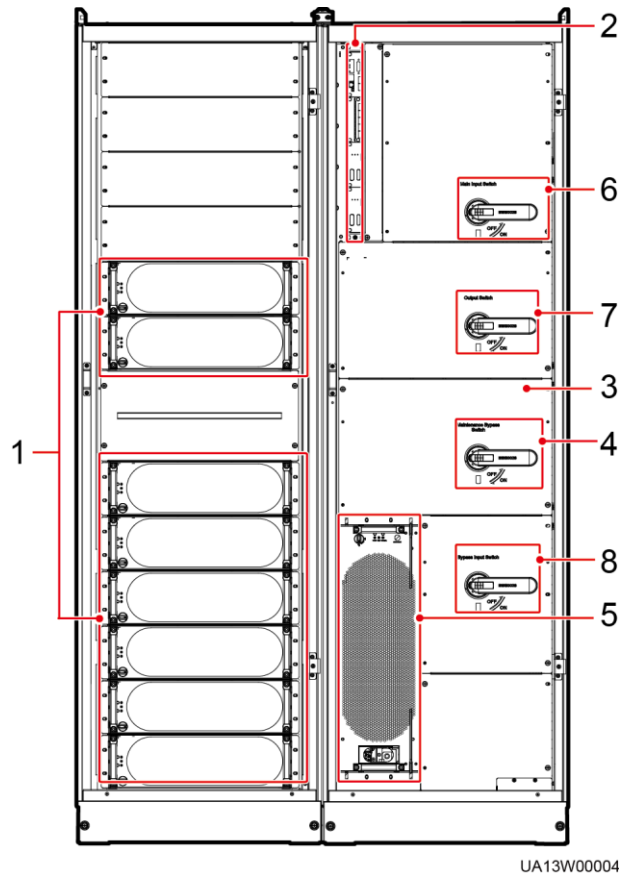
Figure 2-11 Product structure (400 kVA in standard configuration)



UA13W00003

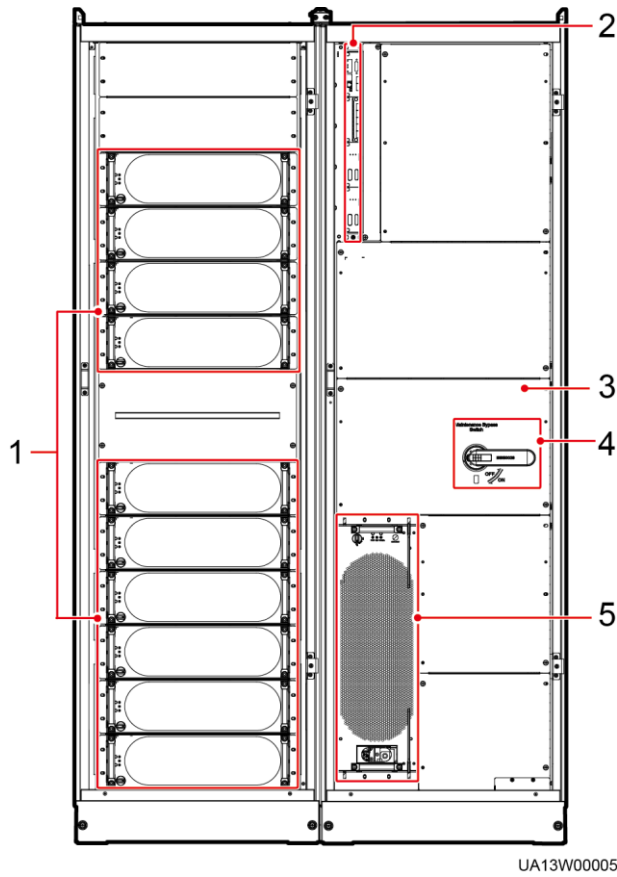
- (1) Power modules                      (2) Control module    (3) Power distribution module cover  
(4) Maintenance bypass switch    (5) Bypass module

Figure 2-12 Product structure (400 kVA in full configuration)



- |                               |                          |                                     |
|-------------------------------|--------------------------|-------------------------------------|
| (1) Power modules             | (2) Control module       | (3) Power distribution module cover |
| (4) Maintenance bypass switch | (5) Bypass module switch | (6) Mains input switch              |
| (7) Output switch             | (8) Bypass input switch  |                                     |

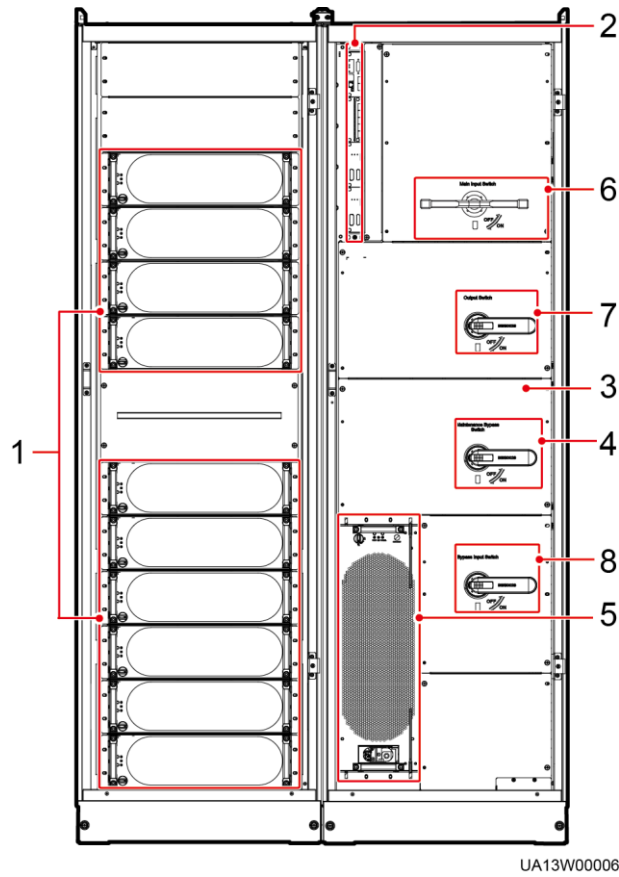
**Figure 2-13** Product structure (500 kVA in standard configuration)



- (1) Power modules                      (2) Control module    (3) Power distribution module cover  
(4) Maintenance bypass switch    (5) Bypass module

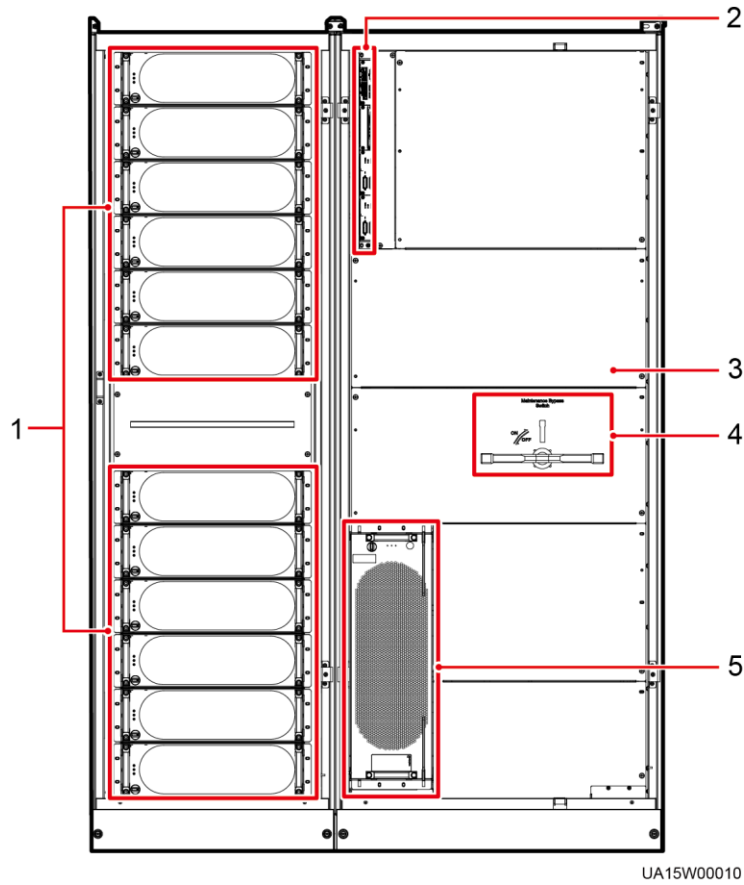
UA13W00005

Figure 2-14 Product structure (500 kVA in full configuration)



- |                               |                         |                                     |
|-------------------------------|-------------------------|-------------------------------------|
| (1) Power modules             | (2) Control module      | (3) Power distribution module cover |
| (4) Maintenance bypass switch | (5) Bypass module       | (6) Mains input switch              |
| (7) Output switch             | (8) Bypass input switch |                                     |

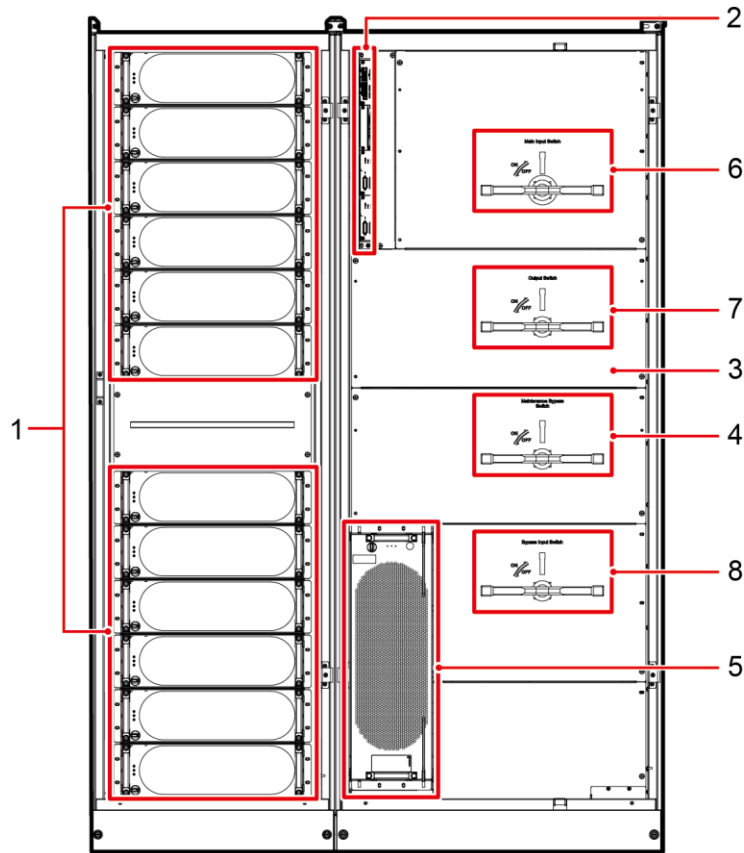
**Figure 2-15** Product structure (600 kVA in standard configuration)



- (1) Power modules                      (2) Control module    (3) Power distribution module cover  
(4) Maintenance bypass switch    (5) Bypass module



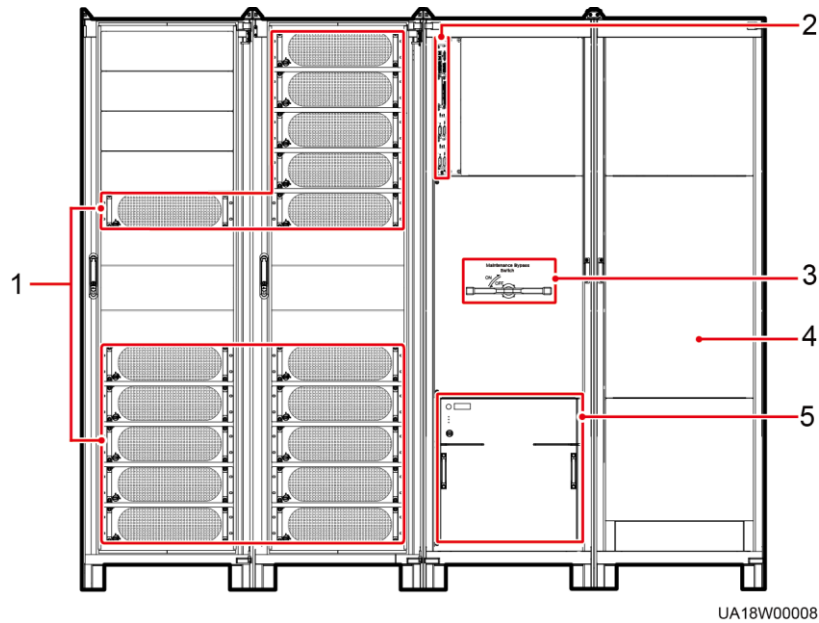
Figure 2-16 Product structure (600 kVA in full configuration)



UA15W00011

- |                               |                         |                                     |
|-------------------------------|-------------------------|-------------------------------------|
| (1) Power modules             | (2) Control module      | (3) Power distribution module cover |
| (4) Maintenance bypass switch | (5) Bypass module       | (6) Mains input switch              |
| (7) Output switch             | (8) Bypass input switch |                                     |

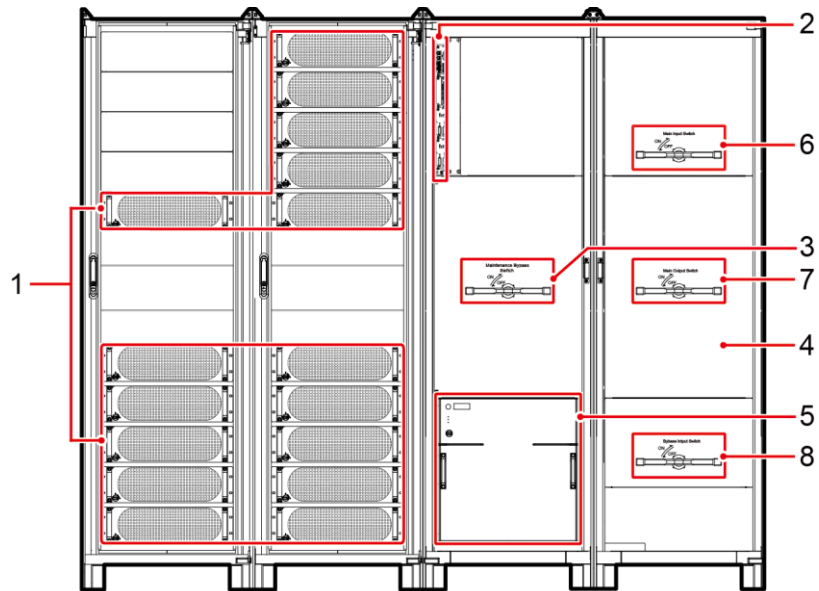
**Figure 2-17** Product structure (800 kVA in standard configuration)



UA18W00008

- (1) Power modules                      (2) Control module    (3) Maintenance bypass switch  
(4) Power distribution module cover    (5) Bypass module

**Figure 2-18** Product structure (800 kVA in full configuration)



UA18W00007

- (1) Power modules                      (2) Control module    (3) Maintenance bypass switch  
(4) Power distribution module cover    (5) Bypass module    (6) Mains input switch cover  
(7) Maintenance bypass switch

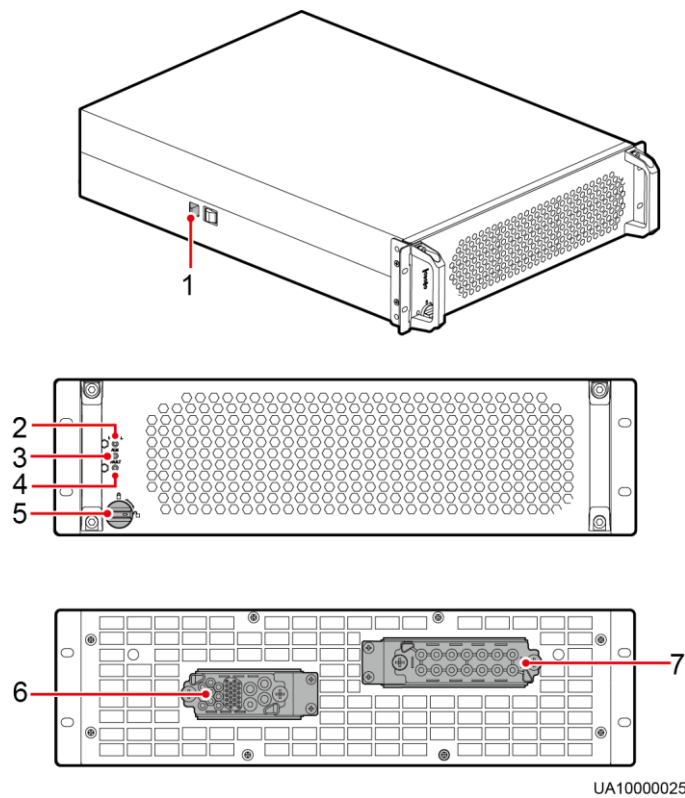
(7) Output switch

(8) Bypass input switch

## 2.3.3 Power Module

### Appearance

Figure 2-19 Power module



- (1) Positioning lock      (2) Run indicator      (3) Alarm indicator      (4) Fault indicator  
(5) Ready switch      (6) Output port      (7) Input port

Table 2-2 Indicator description

Indicator	Color	Status	Description
Run indicator	Green	Steady on	The system is working in inverter mode.
		Blinking at long intervals	<ul style="list-style-type: none"> <li>The inverter is ready and in standby state (blinking at 0.5 Hz, on for 1s and off for 1s).</li> <li>The inverter is not started (blinking at 0.2 Hz, on for 2.5s and off for 2.5s).</li> </ul>

Indicator	Color	Status	Description
		Blinking at short intervals	The module is not configured, the inverter or rectifier software is being upgraded, or the inverter software is being upgraded (blinking at 4 Hz, on for 0.125s and off for 0.125s).
		Off	The rectifier software is being upgraded.
Alarm indicator	Yellow	Steady on	A minor alarm is generated for the inverter or rectifier.
		Off	There is no minor alarm for the inverter or rectifier, or the rectifier software is being upgraded.
Fault indicator	Red	Steady on	A critical alarm is generated for the inverter or rectifier.
		Off	There is no critical alarm for the inverter or rectifier, or the rectifier software is being upgraded.

## Functions

The power module consists of a power factor correction (PFC) rectifier, inverter, and DC/DC converter. The power module performs AC/DC or DC/DC conversion on the mains and battery inputs, and stabilizes the bus voltage. The inverter (DC/AC) converts the inputs into sine wave outputs.

## Specifications

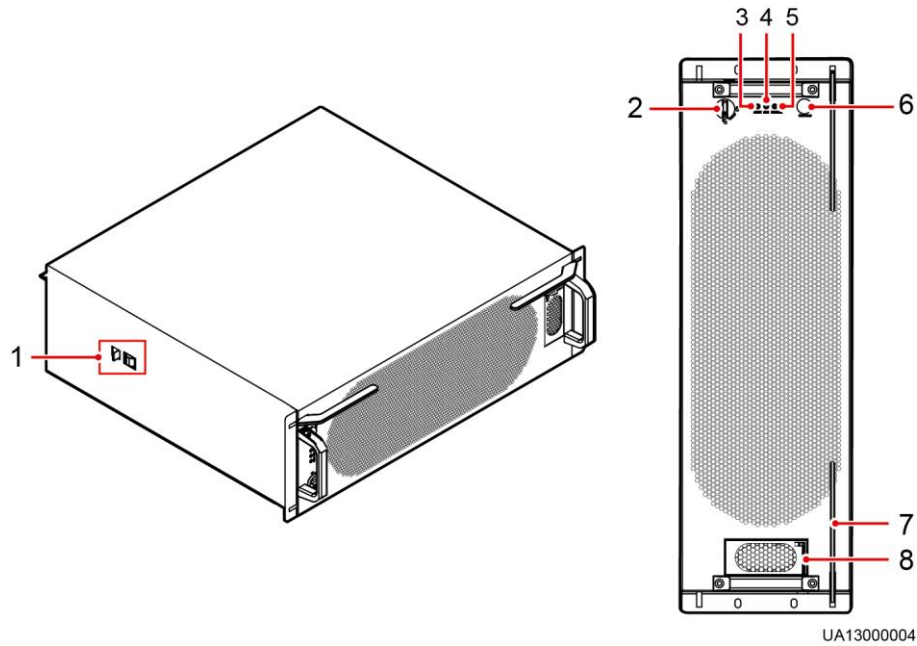
- Dimensions (H x W x D): 130 mm x 442 mm x 620 mm
- Weight: ≤ 35 kg
- Rated output capacity: 50 kVA/50 kW
- Power density: 50 kVA/3 U

### 2.3.4 Bypass Module

#### Appearance

400 kVA/500 kVA/600 kVA bypass module have the same appearance.

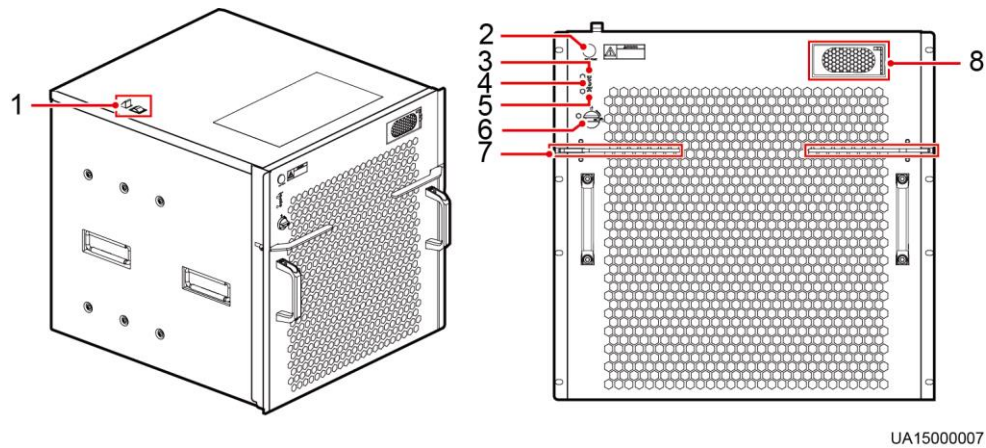
**Figure 2-20** 600 kVA bypass module



- |                      |                       |                     |                            |
|----------------------|-----------------------|---------------------|----------------------------|
| (1) Positioning lock | (2) Ready switch      | (3) Fault indicator | (4) Alarm indicator        |
| (5) Run indicator    | (6) Cold start button | (7) Crowbar         | (8) Auxiliary power supply |

800 kVA bypass module.

**Figure 2-21** 800 kVA bypass module



- |                      |                       |                   |                            |
|----------------------|-----------------------|-------------------|----------------------------|
| (1) Positioning lock | (2) Cold start button | (3) Run indicator | (4) Alarm indicator        |
| (5) Fault indicator  | (6) Ready switch      | (7) Crowbar       | (8) Auxiliary power supply |

**Table 2-3** Indicator description

Indicator	Color	Status	Description
Run indicator	Green	Steady on	The system is working in bypass mode.
		Blinking at long intervals	The bypass has no output (blinking at 0.2 Hz, on for 2.5s and off for 2.5s).
		Blinking at short intervals	The bypass is not configured or the software is being upgraded (blinking at 4 Hz, on for 0.125s and off for 0.125s).
		Off	The bypass software is being upgraded.
Alarm indicator	Yellow	Steady on	A minor alarm is generated for the bypass.
		Off	There is no minor alarm for the bypass, or the software is being upgraded.
Fault indicator	Red	Steady on	A critical alarm is generated for the bypass.
		Off	There is no critical alarm for the bypass, or the software is being upgraded.

## Functions

The bypass module supplies power in the following cases:

If the UPS is set to ECO mode and the bypass voltage is within the specified range, the UPS works in bypass mode.

If the power module overload times out, the UPS transfers to bypass mode.

Both the active and standby ECMs are abnormal.

The system fails to run properly and transfers to bypass mode.

A manual operation is performed to transfer to bypass mode.

## Specifications

- Dimensions (H x W x D)
  - 400 kVA/500 kVA/600 kVA: 600 mm x 200 mm x 600 mm
  - 800 kVA: 500 mm x 480 mm x 550 mm
- Weight
  - 400 kVA/500 kVA/600 kVA: 50 kg

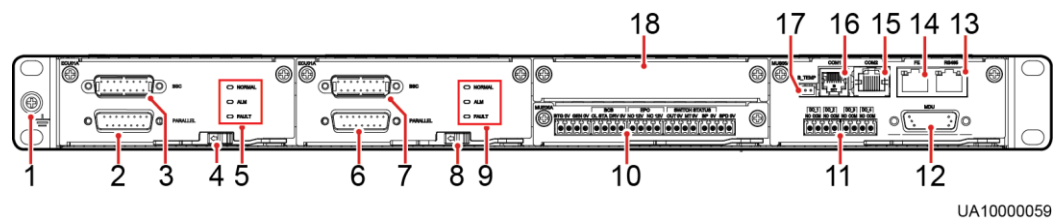
– 800 kVA: 83 kg

## 2.3.5 Control Module

### 2.3.5.1 Overview

In a standard configuration, the control module consists of two ECMs, one dry contact card, and one monitoring interface card (from left to right). The four cards are hot swappable. One subrack is reserved above the dry contact card. A backfeed protection card or dry contact extended card can be inserted into this subrack.

**Figure 2-22** Signal panel on the control module



UA10000059

- |                                      |                                  |                   |                           |
|--------------------------------------|----------------------------------|-------------------|---------------------------|
| (1) Ground terminal                  | (2) Parallel port 1              | (3) BSC port 1    | (4) Ready switch on ECM 1 |
| (5) Indicators for ECM 1             | (6) Parallel port 2              | (7) BSC port 2    | (8) Ready switch on ECM 2 |
| (9) Indicators for ECM 2             | (10) Dry contact card            | (11) Dry contacts | (12) MDU port             |
| (13) RS485 port                      | (14) Fast Ethernet (FE) port     | (15) COM2 port    | (16) COM1 port            |
| (17) Battery temperature sensor port | (18) Optional card subrack cover |                   |                           |

#### NOTE

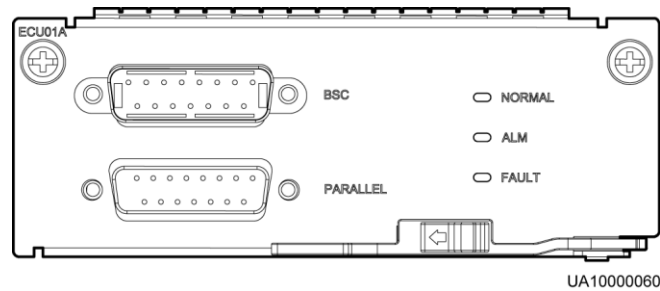
Ports are protected by a security mechanism.

### 2.3.5.2 ECM

#### Appearance

The control module consists of two energy control modules (ECMs) in active/standby mode.

**Figure 2-23** ECM



**Table 2-4** Ports on the ECM

Silk Screen	Description
PARALLEL	The PARALLEL port transmits parallel signals between racks.
BSC	The BSC port is used in a dual-bus system to synchronize output frequencies and phases between UPS systems, ensuring that two buses can switch with each other. BSC cables are hot-swappable.

**NOTE**

For a single UPS, the parallel cable is not needed.

**Table 2-5** Indicator description

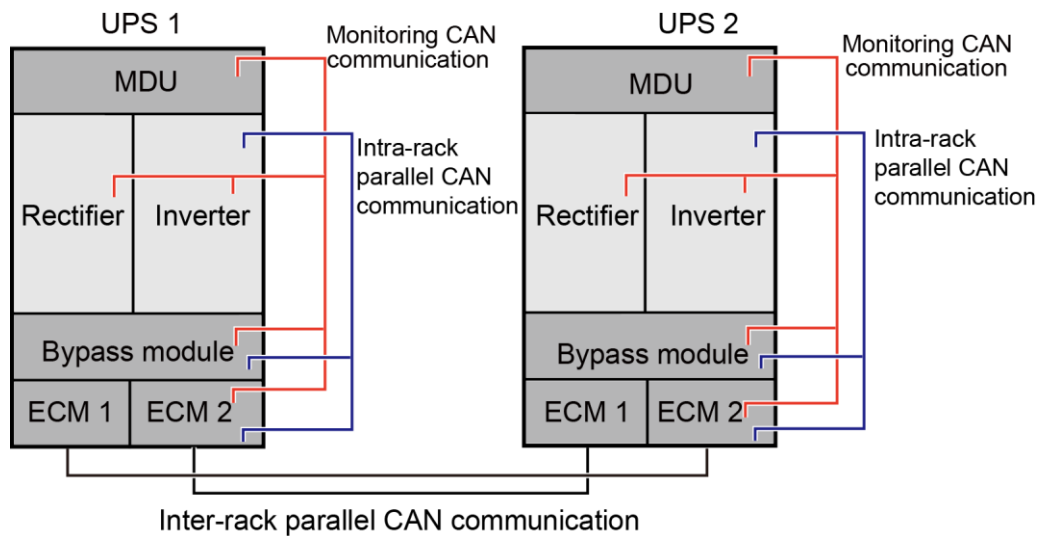
Indicator	Color	Status	Description
NORMAL	Green	Steady on	This ECM is the active ECM.
		Blinking at 0.5 Hz	This ECM is the standby ECM and it is ready.
		Off	This ECM is not ready or the software of this ECM is being upgraded.
		Blinking at 4 Hz	The software of the ECM is being upgraded or not configured.
ALM	Yellow	Steady on	The ECM has a minor alarm, but it does not need to be replaced.
		Off	The ECM has no minor alarm or the software of the ECM is being upgraded.
FAULT	Red	Steady on	The ECM has a critical alarm.
		Off	The ECM has no critical alarm or the software of the ECM is being upgraded.



## Functions

- As a control interface for the entire system, the ECM communicates with each module and provides a bus to communicate with the dry contact card. The ECM ensures equalized output currents between modules so that load power is equally shared.
- Provides module running information for the MDU.
- Controls the running of a single UPS5000 and a parallel system, and reports the UPS5000 status information to other monitoring modules.
- The system provides three types of CAN communication: monitoring CAN communication, intra-rack parallel CAN communication, and inter-rack parallel CAN communication.

Figure 2-24 Logical connections for CAN communication



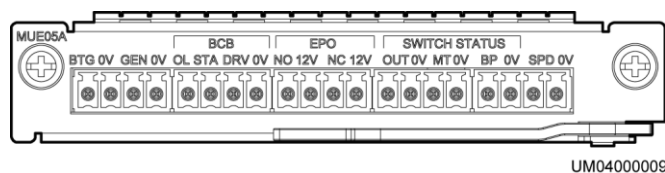
## Specifications

- Hot-swappable
- 1 U high

### 2.3.5.3 Dry contact card

## Appearance

Figure 2-25 Dry contact card



**Table 2-6** Ports on the dry contact card

Silk Screen	Description	Status	Initial Status
BTG	Port for detecting battery grounding faults	<ul style="list-style-type: none"> <li>Connected: battery grounding fault</li> <li>Disconnected: no battery grounding fault</li> </ul>	Disconnected
0V	Port for signal ground		
GEN	Port for detecting diesel generator (D.G.) mode	<ul style="list-style-type: none"> <li>Connected: D.G. mode</li> <li>Disconnected: non-D.G. mode</li> </ul>	Disconnected
0V	Port for signal ground		
BCB_OL	Port for detecting the BCB box	<ul style="list-style-type: none"> <li>Grounded: BCB box connected</li> <li>Disconnected: BCB box not connected</li> </ul>	Grounded
BCB_STA	Port for monitoring the battery switch	<ul style="list-style-type: none"> <li>Connected: battery switch ON</li> <li>Disconnected: battery switch OFF</li> </ul>	Disconnected
BCB_DRV	Controls battery circuit breaker trip. When the voltage is +12 V, the circuit breaker trips.	<ul style="list-style-type: none"> <li>0 V: battery switch not tripped</li> <li>12 V: battery switch tripped</li> </ul>	0 V
BCB_0V	Port for signal ground		
EPO_NO	Emergency power-off (EPO) port	If the normally open (NO) port is connected to the EPO_12V port, EPO is triggered.	Disconnected
EPO_12V	+12 V		
EPO_NC	EPO port	If the normally closed (NC) port is disconnected from the EPO_12V port, EPO is triggered.	Connected
EPO_12V	+12 V		
SWITCH STATUS_OUT	Port for monitoring the UPS output circuit breaker	<ul style="list-style-type: none"> <li>Connected: circuit breaker ON</li> <li>Disconnected: circuit breaker OFF</li> </ul>	Connected
SWITCH STATUS_0V	Port for signal ground		
SWITCH STATUS_MT	Port for monitoring the maintenance circuit breaker	<ul style="list-style-type: none"> <li>Disconnected: circuit breaker ON</li> <li>Connected: circuit breaker OFF</li> </ul>	Disconnected
SWITCH	Port for signal ground		

Silk Screen	Description	Status	Initial Status
STATUS_0V			
SWITCH STATUS_BP	Port for monitoring the bypass input circuit breaker	<ul style="list-style-type: none"> <li>Connected: circuit breaker ON</li> <li>Disconnected: circuit breaker OFF</li> </ul>	Connected
SWITCH STATUS_0V	Port for signal ground		
SPD	Port for monitoring the input AC surge protective device (SPD)	<ul style="list-style-type: none"> <li>Connected: SPD enabled</li> <li>Disconnected: SPD disabled</li> </ul>	Connected
0V	Port for signal ground		

 **NOTE**

- The dry contact interface card takes effect only after it is set on the monitoring system. Set the unused dry contact signal to the unused status.
- Set the EPO port to NO or NC as required.
- When multiple UPSs are paralleled, all dry contact signals to be used need to connect to each UPS.
- Single cables require dual-insulated twisted cables. If the length of a power cable is within 25–50 m, its cross-sectional area must be 0.5 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.

## Functions

The dry contact card allows the UPS to detect and manage the switch status of the battery system (including the external battery switch) and implement remote emergency power-off (EPO).

## Specifications

- Hot-swappable
- 0.5 U high

### 2.3.5.4 Monitoring interface card

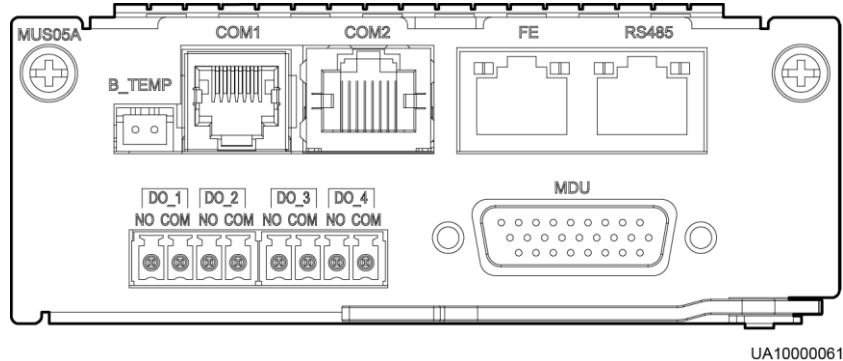
**NOTICE**

- The FE port resembles the RS485 port. Follow the silk screen when connecting communications cables as, if the RS485 port is mistaken for the FE port during cable connection, the WebUI cannot be connected. Conversely, if the FE port is mistaken for the RS485 port during cable connection, RS485 communication fails.
- Dry contact signals take effect after you set them. Disable unused dry contact signals on the monitoring system.
- In a parallel system, ensure that used dry contacts properly connect to each UPS.

The monitoring interface card provides external ports as well as monitoring and control functions for the MDU. The ports include the ambient temperature and humidity sensor port, iBattery port, FE port, battery temperature monitoring port, and network management port.

The MDU monitors the UPS, allows users to set parameters, delivers commands, reports information, and displays the UPS key information and parameters on the LCD.

**Figure 2-26** Monitoring interface card



UA10000061

**NOTE**

DO\_1 to DO\_4 meet the maximum voltage and current requirements of 30 V DC/1 A or 60 V DC/0.5 A.

**Table 2-7** Ports on the monitoring interface card

Port	Silk Screen	Description
DO_1	NO	<ul style="list-style-type: none"> <li>DO_1, DO_2, DO_3, and DO_4 indicate alarm outputs. Their default values are Critical alarm, Minor alarm, Bypass mode, and Battery mode, respectively.</li> <li>It can be set to <b>Disable, Critical alarm, Minor alarm, Bypass mode, Battery mode, Low batt. volt., Low battery SOC, Abnormal mains, Sys maint breaker enable, Sys outp breaker enable, Maint. breaker closed, No power supplied, Mains supplies power, ECO mode, Battery test, and Batt. Volt. Below Thres..</b></li> <li>Configure power segment settings based on backup time.</li> </ul>
	COM	
DO_2	NO	
	COM	
DO_3	NO	
	COM	
DO_4	NO	
	COM	
DB26	MDU	Provides FE, RS485, I2C, and CAN signals.
Battery temperature sensor port	B_TEMP	Connects to an indoor battery temperature sensor.
Southbound communications port 1	COM1	<ul style="list-style-type: none"> <li>Supported protocol: Modbus-RTU.</li> <li>Connects to an ambient temperature and humidity sensor over two wires.</li> </ul>
Southbound communications port 2	COM2	<ul style="list-style-type: none"> <li>Supported protocol: Modbus-RTU.</li> <li>Connects to a southbound device, such as an iBattery.</li> </ul>

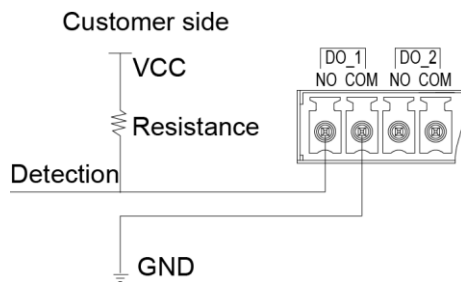
Port	Silk Screen	Description
Network port	FE	<ul style="list-style-type: none"> <li>Supported protocols: Modbus-TCP, HTTPS, and SNMP.</li> <li>Connects to the network port on a PC.</li> <li>Network port for connecting to the web service and for SNMP networking.</li> </ul>
Northbound communications port	RS485	<ul style="list-style-type: none"> <li>Supported protocol: Modbus-RTU.</li> <li>Connects to a northbound network management device or a third-party network management device over two wires.</li> </ul>

**NOTE**

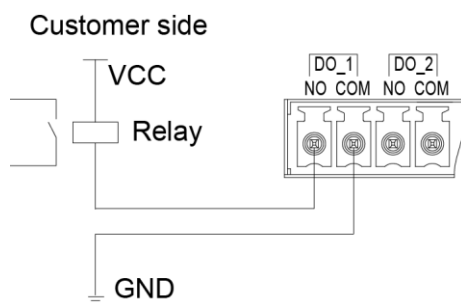
- Signal cables must be double-insulated twisted cables. If the cable length is 25–50 m, the cross-sectional area must be 0.5–1.5 mm<sup>2</sup>.
- RS485 cables and FE cables must be shielded cables.

Figure 2-27 and Figure 2-28 are recommended wiring methods for DO ports.

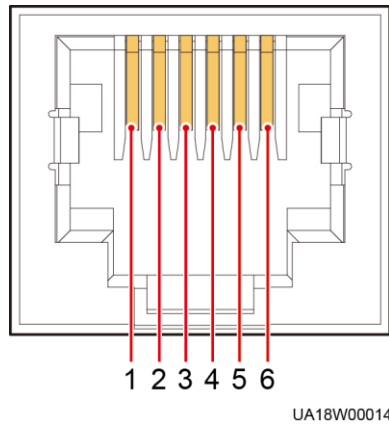
**Figure 2-27** Wiring method 1



**Figure 2-28** Wiring method 2



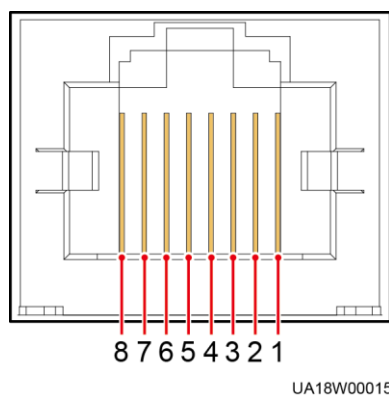
**Figure 2-29** COM1 pins



**Table 2-8** COM1 pin definition

Pin	Description
1	GND
2	N/A
3	RS485-
4	RS485+
5	N/A
6	12V_PORT

**Figure 2-30** COM2 pins

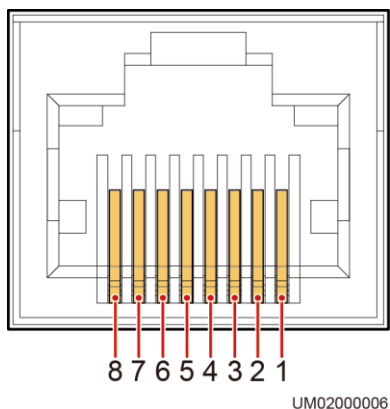


**Table 2-9** COM2 pin definition

Pin	Description
-----	-------------

Pin	Description
1	RS485+
2	RS485-
3	N/A
4	RS485+
5	RS485-
6	GND
7	CANH0
8	CANL0

**Figure 2-31** RS485 pins



**Table 2-10** RS485 pin definition

Pin	Description
1	RS485_T+
2	RS485_T-
3	N/A
4	RS485_R+
5	RS485_R-
6	GND
7	N/A
8	N/A

**NOTE**

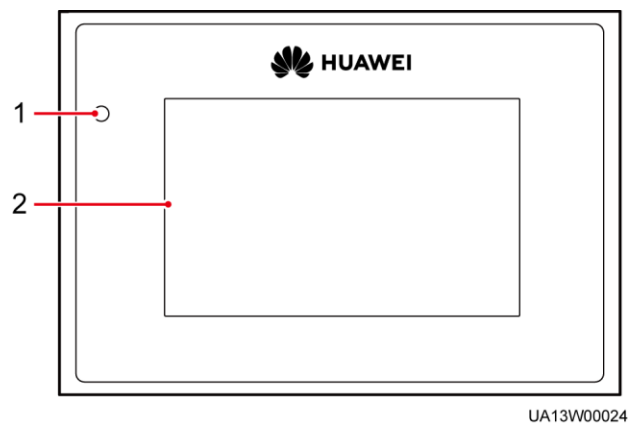
If cables are prepared onsite, follow the three methods below:

- Connect pin 1 and pin 2. Pin 1 connects to RS485+ and pin 2 connects to RS485-.
- Connect pin 4 and pin 5. Pin 4 connects to RS485+ and pin 5 connects to RS485-.
- Connect pins 1, 2, 4, and 5. Twist cables to pin 1 and pin 4 into one cable and then connect it to RS485+. Twist cables to pin 2 and pin 5 into one cable and then connect it to RS485-.

## 2.3.6 MDU

### Appearance

**Figure 2-32 MDU**



(1) Status indicator

(2) LCD touchscreen

**Table 2-11 Status indicator**

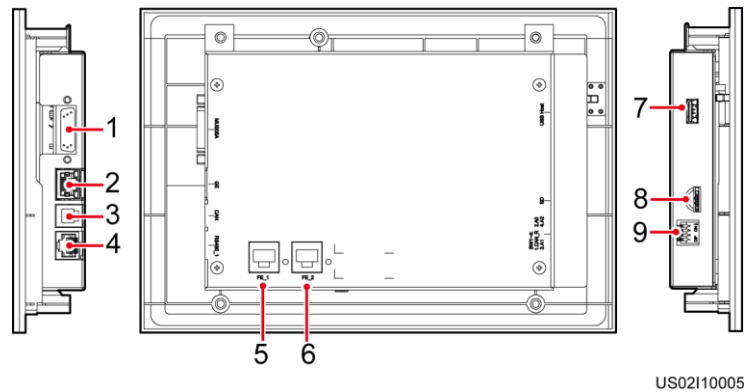
Status	Color	Meaning
On	Red	A critical alarm has been generated, and the buzzer sounds continuously.
	Yellow	A minor alarm has been generated, and the buzzer buzzes at 2 Hz.
	Green	The UPS is running properly or a warning has been generated.
Off	N/A	The MDU is powered off.

**NOTE**

The indicator on the MDU panel is yellow when the bypass supplies power in non-ECO mode.



**Figure 2-33** MDU ports



**Table 2-12** Description of MDU ports

No.	Port Name	Description
1	MUS05A (DB26)	Connects to the MDU and monitoring interface card
2	GE	Network port
3	CAN	Reserved
4	RS485_1	Reserved
5	FE_1	Reserved
6	FE_2	Reserved
7	USB Host	<ul style="list-style-type: none"> <li>After installing the WiFi module, locally connect to the UPS over the Service Expert app. Obtain the initial startup password during deployment. View or obtain UPS running information during preventive maintenance.</li> </ul> <p><b>NOTE</b> Only Huawei service engineers or authorized service engineers are allowed to use the WiFi module. To ensure security, remove the WiFi module immediately after use.</p> <ul style="list-style-type: none"> <li>Insert the USB flash drive, import and export the configuration file, export run logs, and upgrade software.</li> </ul>
8	SD	Reserved
9	DIP switch	Implements specific functions by using the DIP switch and specific buttons; controls the CAN communication build-out resistor in a parallel system

## Functions

The monitor display unit (MDU) allows for general UPS operations, parameter setting, viewing of running status and alarms, and so on.

## Specifications

Dimensions (H x W x D): 175 mm x 264 mm x 40 mm

## 2.4 Typical configurations

Table 2-13 Typical UPS configurations

Configuration	Application Scenario
Single UPS	Supplies power to common loads.
Parallel system	Supplies power to important loads in small- and medium-sized data centers. It features high availability and strong transient overload capability.
Dual-bus system	<p>The dual-bus system is suitable for scenarios where high availability requirements are posed for power supply. The dual-bus system supplies power to important loads in large- and medium-sized equipment rooms and data centers.</p> <p>In addition to common parallel system advantages, the dual-bus system also provides outstanding availability and eliminates bottleneck failures. However, configuration of the dual-bus system is complex.</p>

### NOTE

A 1+1 parallel system is a typical configuration. You can set the number of requisite UPSs and redundant ones on the LCD or WebUI.

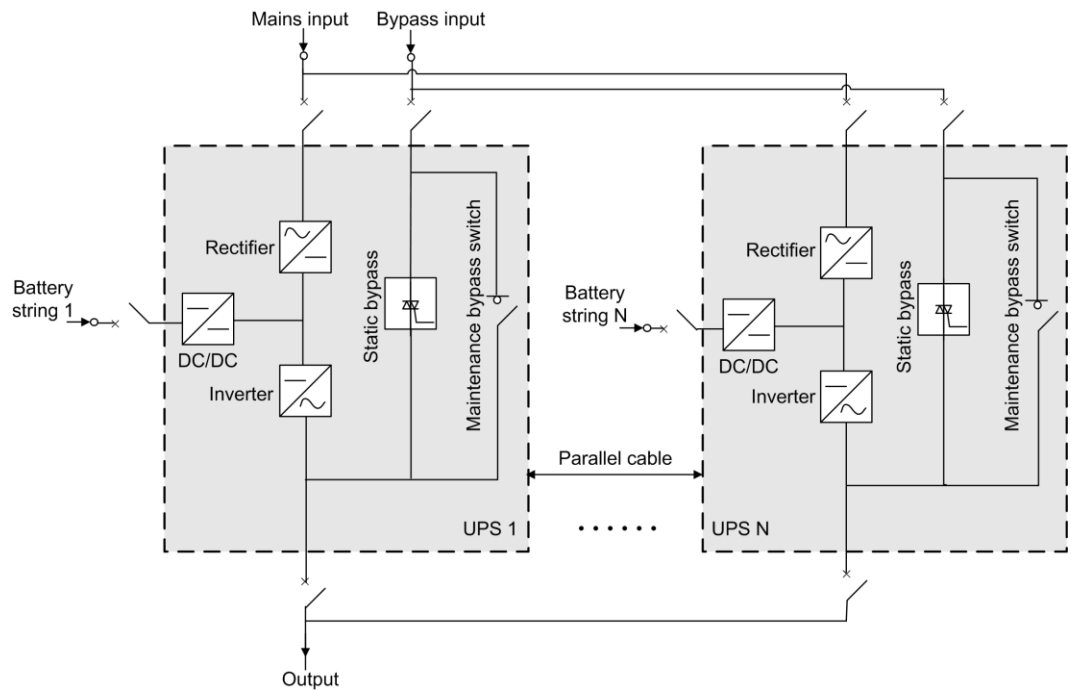
### 2.4.1 Single UPS

This series uses a modular design in which multiple power modules are connected in parallel to deliver a high loading capacity. If a single power module is faulty, the other power modules continue working. When the load power is small, even a single UPS can provide redundant capacity, which ensures high reliability.

### 2.4.2 Parallel System

In a parallel system, the mains input, bypass input, and AC output terminals between cabinets are connected in parallel. Energy control modules (ECMs) on each UPS are connected over parallel cables. The parallel connections synchronize the UPS outputs to supply power to loads. If one UPS fails, the other UPSs continue supplying power to loads.

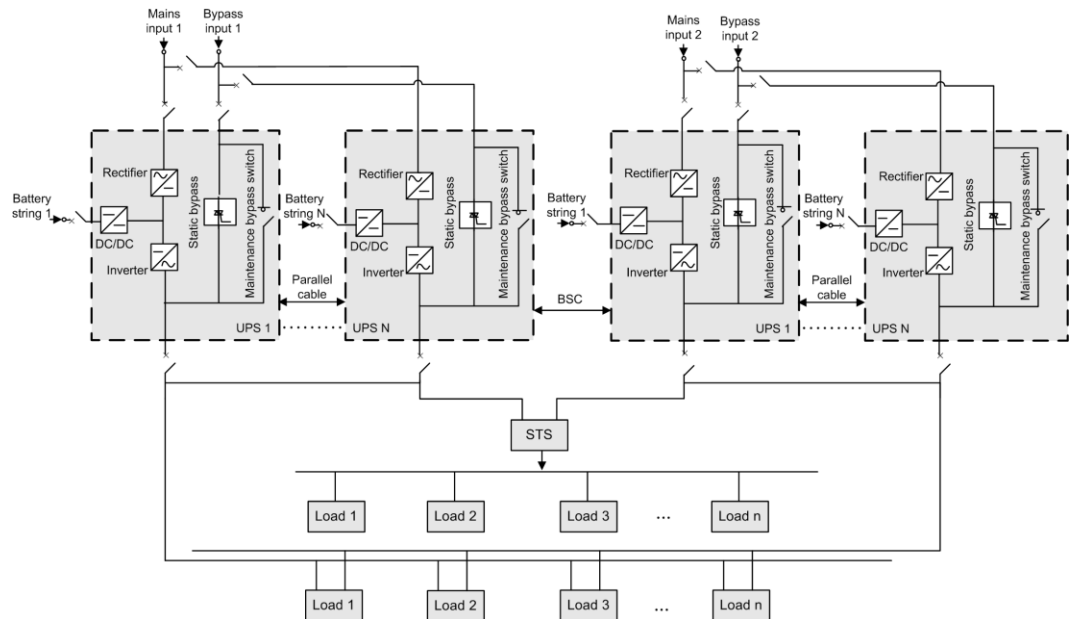
Figure 2-34 Conceptual diagram of an N+X parallel system



### 2.4.3 Dual-Bus System

A dual-bus system consists of two independent UPS systems. Each of these UPS systems in turn consists of one or more UPSs connected in parallel. Of the two UPS systems, one is a master system, and the other is a slave system. This design makes the dual-bus system highly reliable and suitable for loads with multiple input terminals. An optional static transfer switch (STS) can be installed to start the bus synchronization controller (BSC). The UPS systems work in normal mode or bypass mode.

Figure 2-35 Conceptual diagram of a dual-bus system



## 2.5 Optional Components

Component	Model	Function	
BCB-BOX	400 kVA, 500 kVA, 600 kVA	<ul style="list-style-type: none"> <li>PDU8000-0400DCV8-BXA001</li> <li>PDU8000-0630DCV8-BXA001</li> <li>PDU8000-0800DCV8-BXA001</li> </ul>	Controls the connection between battery strings and the UPS, and supports overload, short-circuit protection, and remote trip control.
	800 kVA	<ul style="list-style-type: none"> <li>PDU8000-0630DCV8-BXA001</li> <li>PDU8000-0800DCV8-BXA001</li> </ul>	
BBB-BOX	400 kVA, 500 kVA, 600 kVA	<ul style="list-style-type: none"> <li>PDU8000-1250DCV8-BGA001</li> <li>PDU8000-2000DCV8-BGA001</li> </ul>	Converges the energy of multiple battery strings.
	800 kVA	PDU8000-2000DCV8-BGA001	
Top air-flow cabinet	N/A	Used for top air exhaust and allows the UPS to be installed against a wall.	
iBattery	N/A	Collects battery information, such as battery status data, from the downstream BIM groups through	

Component	Model	Function
		wireless communication and sends the data to the ECC and the third-party network management system (NMS) through COM or PoE ports. For details, see the document delivered with the iBAT.
Antiseismic kit	N/A	Reinforces the cabinet so that the cabinet meets the requirements of 9 degree seismic fortification intensity.
Air filter	N/A	Prevents the UPS from dust and ensure normal operations.
IP21 component	N/A	Prevents water from dropping into the cabinet, protecting the cabinet to IP21.
ECM extended subrack	N/A	Install this subrack when the UPS is equipped with a backfeed protection card and dry contact extended card.
Dry contact extended card	N/A	Provides extended monitoring ports: five routes of relay output ports and five routes of input ports.
Backfeed protection card	N/A	Detects mains and bypass backfeed and provides protection.
Battery grounding failure detector	N/A	Detects current leakage and generates alarms. When equipped with a remote trip switch, the detector protects devices and prevents fire outbreak. Detects battery grounding failures and generates alarms when the ground leakage current exceeds the specified value.
Ambient temperature and humidity sensor	N/A	Monitors the ambient temperature and humidity, and can be applied to batteries.
Battery temperature	N/A	Monitors the battery temperature.
Parallel cable	5 m/10 m/15 m	Connects UPSs in parallel.
BSC cable	5 m/10 m/15 m/60 m	Transmits bus synchronization signals in a dual-bus system.

 **NOTE**

- If an IP21 component is installed, cables cannot be routed from the top of the cabinet.
- The ECM extended subrack does not support onsite installation. If this component is required, inform Huawei before purchasing the UPS to receive pre-installation services.

# 3 Installation

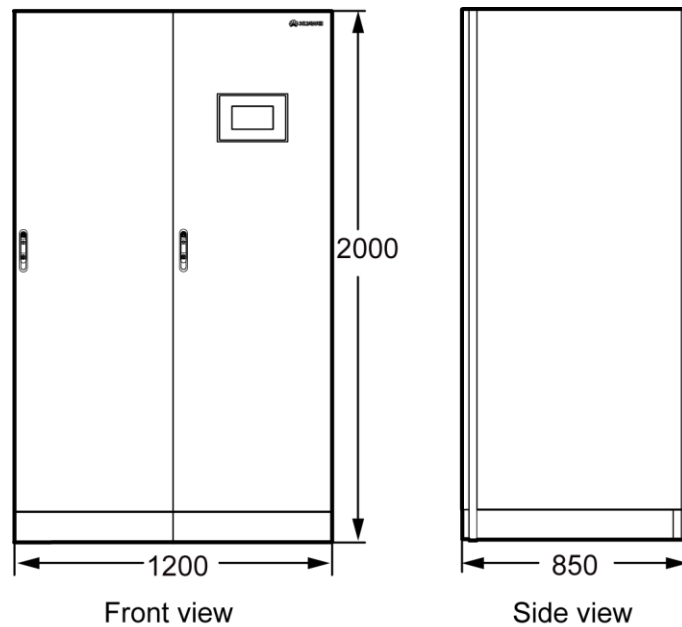
## 3.1 Installation Preparations

### 3.1.1 Site

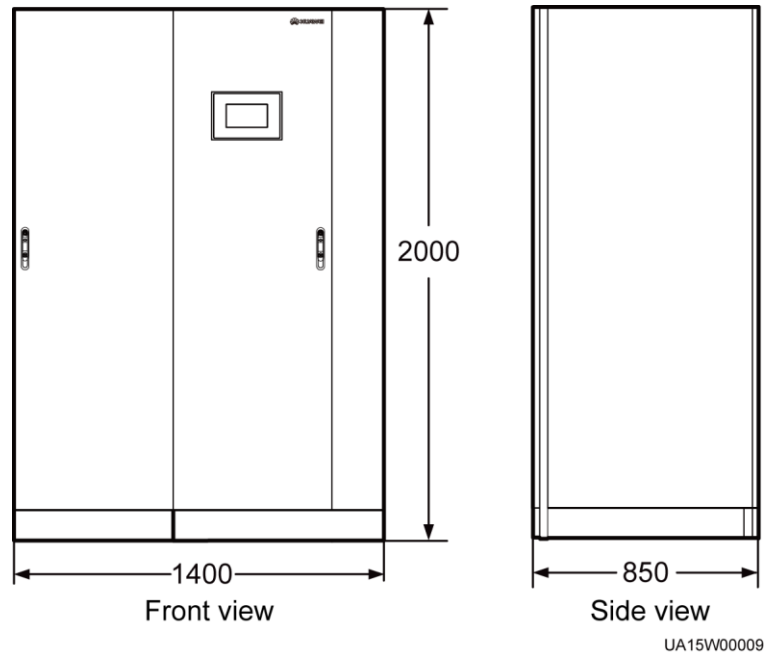
#### 3.1.1.1 UPS Dimensions

Ensure that the floor or installation support can bear the weight of the UPS5000, batteries, and battery racks. The weight of batteries and battery racks depends on the UPS configuration for the site.

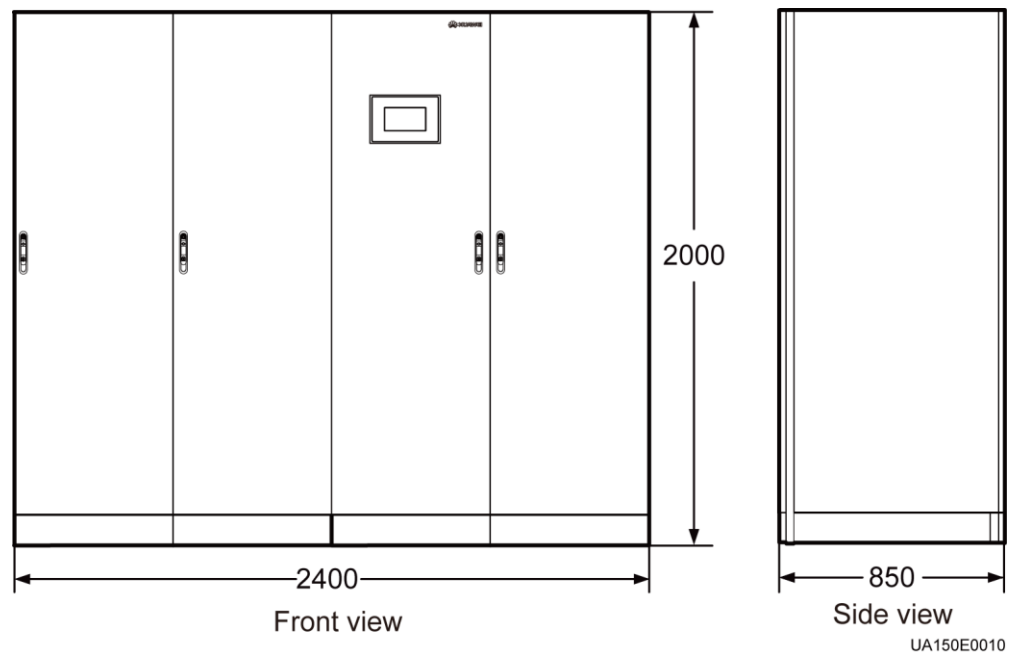
**Figure 3-1** Dimensions (400 kVA/500 kVA, unit: mm)



**Figure 3-2** Dimensions (600 kVA, unit: mm)



**Figure 3-3** Dimensions (800 kVA, unit: mm)



### 3.1.1.2 Installation Environment

- Do not install the UPS in high temperature, low temperature, or damp environments.
- Install the UPS away from water sources, heat sources, and flammable or explosive materials. Keep the UPS away from direct sunlight, dust, volatile gases, corrosive materials, and air dense with salt particles.

- Do not install the UPS in environments with conductive metal scraps in the air.
- The optimal operating temperatures for valve-regulated lead-acid batteries (VRLA batteries) are 20–30°C. Operating temperatures higher than 30°C shorten the battery lifespan and operating temperatures lower than 20°C reduce the battery backup time.

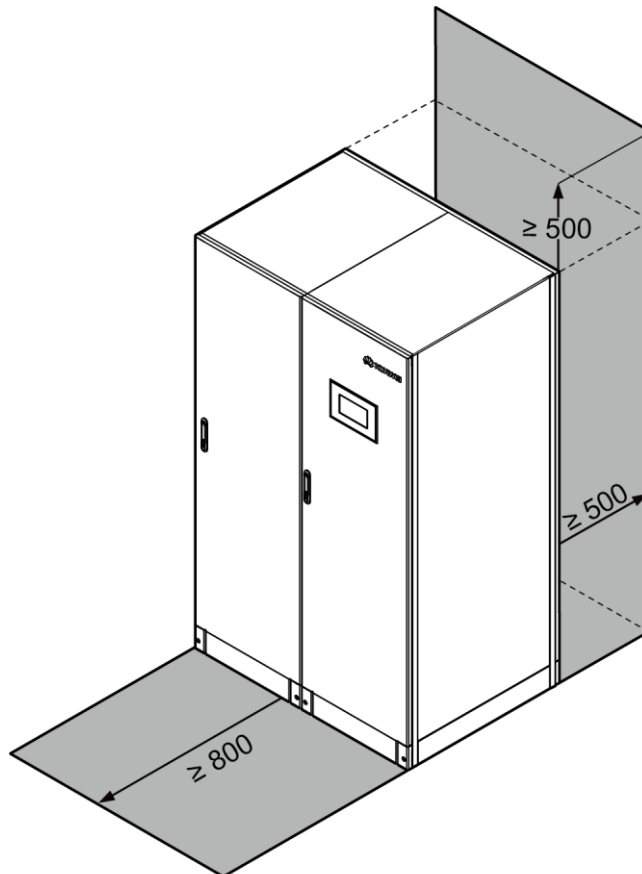
### 3.1.1.3 Installation Clearances

Reserve sufficient clearances around the cabinet to facilitate operations and ventilation:

- Reserve a clearance of at least 800 mm from the front of the cabinet.
- Reserve a clearance of at least 500 mm from the top of the cabinet.
- If a top air-flow cabinet is deployed, the UPS can be installed against a wall and no space needs to be reserved at the rear (except the 800 kVA UPS). If no top air-flow cabinet is deployed, at least 500 mm space should be reserved at the rear for ventilation. If the UPS will be operated from the rear, at least 800 mm space should be reserved for operations.

Figure 3-4 shows the clearances reserved for a 400 kVA cabinet.

Figure 3-4 Reserved clearances (unit: mm)



UA13000095

### 3.1.2 Tools and Instruments


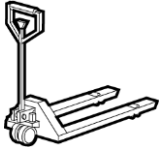


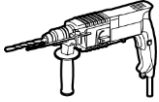
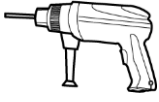
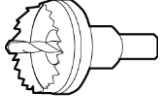

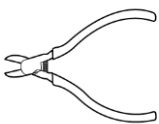
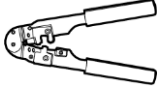
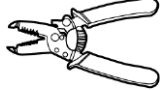

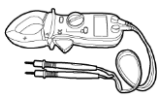




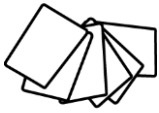

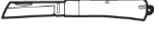


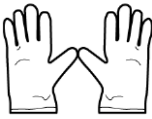



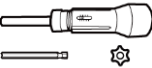
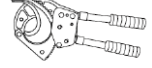



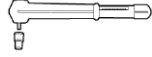
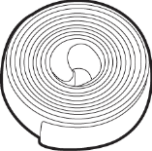

**⚠ CAUTION**

Insulate installation tools to prevent electric shocks.

Prepare the following tools and meters indicated in [Table 3-1](#) for installation.

**Table 3-1** Tools and meters

Tools and Meters			
Electric pallet truck	Manual pallet truck	Ladder	Rubber mallet
			
Hammer drill and drill bit $\Phi 16$	Hand-held electric drill	Alloy hole saw	Heat gun
			
Diagonal pliers	Crimping tools	Wire stripper	Electric hydraulic pliers
			
Clamp meter	Multimeter	Cable tie	Level instrument
			
Polyvinyl chloride (PVC) insulation tape	Cotton cloth	Adjustable torque wrench	Electrician's knife
			
Electrostatic discharge (ESD) gloves	Protective gloves	Insulated gloves	Insulation protective shoes

Tools and Meters			
			
Torque screwdriver	Cable cutter	Brush	Flat-head screwdriver (2–5 mm)
			
Phillips screwdriver (M3/M4/M5/M6/M8)	Insulated torque wrench (M6/M8/M12/M16)	Heat shrink tubing	Insulated adjustable wrench
			

**NOTE**

Table 3-1 lists only the common tools for installation and cable connection. For more dedicated tools required, see the corresponding component manuals. Prepare tools based on site requirements.

### 3.1.3 Power Cables

**NOTICE**

- The UPS can generate large leakage currents. A circuit breaker that provides leakage current protection is not recommended.
- If multiple UPSs are to be connected in parallel, input and output power cables for each UPS should have the same length and specifications.
- The TN-C system is supported when the input N and PE are connected.

Table 3-2 and Table 3-3 list the recommended cross-sectional areas for power cables. Note that the currents listed are measured at a rated voltage of 380 V (line voltage).

**Table 3-2** Recommended cross-sectional areas for power cables (350 kVA–550 kVA)

Item		350 kVA	400 kVA	450 kVA	500 kVA	550 kVA
Mains	Mains input current (A)	622	711	800	889	977

Item			350 kVA	400 kVA	450 kVA	500 kVA	550 kVA
input	Recommended cross-sectional area (mm <sup>2</sup> )	L1	2 x (4 x 185)	2 x (4 x 240)	3 x (4 x 185)	3 x (4 x 185)	3 x (4 x 240)
		L2					
		L3					
		N					
		PE	185	240	240	240	240
Bypass input	Bypass input current (A)		532	608	684	760	836
	Recommended cross-sectional area (mm <sup>2</sup> )	L1	2 x (4 x 185)	2 x (4 x 240)	3 x (4 x 185)	3 x (4 x 185)	3 x (4 x 240)
		L2					
		L3					
		N					
PE	185	240	240	240	240		
Output	Output current (A)		532	608	684	760	836
	Recommended cross-sectional area (mm <sup>2</sup> )	U	2 x (4 x 185)	2 x (4 x 240)	3 x (4 x 185)	3 x (4 x 185)	3 x (4 x 240)
		V					
		W					
		N					
PE	185	240	240	240	240		
Battery input (VRLA battery)	Nominal discharge current (A)		768	877	987	1096	1206
	Maximum discharge current (A)		919	1051	1182	1313	1444
	Recommended cross-sectional area (mm <sup>2</sup> )	+	2 x (3 x 185)	2 x (3 x 240)	3 x (3 x 150)	3 x (3 x 185)	3 x (3 x 240)
		N					
PE	185	240	240	240	240		
Battery input (Smart Li)	Nominal battery discharge current (A)		720	822	925	1028	1131
	Maximum battery discharge current (A)		903	1032	1161	1290	1419
	Recommended cross-sectional area		For details, see IEC-60364-5-52 and SmartLi User Manual.				

**Table 3-3** Recommended cross-sectional areas for power cables (600 kVA–800 kVA)

Item		600 kVA	650 kVA	700 kVA	750 kVA	800 kVA	
Mains input	Mains input current (A)	1066	1155	1244	1333	1422	
	Recommended cross-sectional area (mm <sup>2</sup> )	L1	4 x (4 x 185)	4 x (4 x 240)	4 x (4 x 240)	4 x (4 x 240)	4 x (4 x 240)
		L2					
		L3					
		N					
PE	240	240	240	240	240		
Bypass input	Bypass input current (A)	912	988	1064	1140	1215	
	Recommended cross-sectional area (mm <sup>2</sup> )	L1	4 x (4 x 185)	4 x (4 x 240)	4 x (4 x 240)	4 x (4 x 240)	4 x (4 x 240)
		L2					
		L3					
		N					
PE	240	240	240	240	240		
Output	Output current (A)	912	988	1064	1140	1215	
	Recommended cross-sectional area (mm <sup>2</sup> )	U	4 x (4 x 185)	4 x (4 x 240)	4 x (4 x 240)	4 x (4 x 240)	4 x (4 x 240)
		V					
		W					
		N					
PE	240	240	240	240	240		
Battery input (VRLA battery)	Nominal discharge current (A)	1316	1425	1535	1645	1754	
	Maximum discharge current (A)	1576	1707	1838	1970	2101	
	Recommended cross-sectional area (mm <sup>2</sup> )	+	3 x (3 x 240)	4 x (3 x 185)	4 x (3 x 240)	4 x (3 x 240)	4 x (3 x 240)
		N					
PE	240	240	240	240	240		
Battery input (Smart Li)	Nominal battery discharge current (A)	1234	1336	1439	1542	1645	
	Maximum battery discharge current (A)	1547	1677	1806	1935	2064	
	Recommended cross-sectional area	For details, see IEC-60364-5-52 and SmartLi User Manual.					

 **NOTE**

The rated voltage of the SmartLi is 512 V. The voltage is 408 V at the maximum discharge current.

- When selecting, connecting, and routing power cables, follow local safety regulations and rules.
- If external conditions such as cable layout or ambient temperatures change, perform verification in accordance with the IEC-60364-5-52 or local regulations.
- If the rated voltage is 400 V, multiply the currents by 0.95. If the rated voltage is 415 V, multiply the currents by 0.92.
- If primary loads are non-linear loads, increase the cross-sectional areas of neutral wires 1.5–1.7 times.
- The nominal battery discharge current refers to the current of forty 12 V batteries at 480 V in standard configuration.
- The maximum battery discharge current refers to the current when forty 12 V batteries in standard configuration, that is, two hundred and forty 2 V battery cells (1.67 V/cell), stop discharging.
- The battery cable specifications are selected based on 40 batteries by default and compatible with application scenarios with 30–44 batteries.
- When the mains input and bypass input share a power source, configure both types of input power cables as mains input power cables. The cables listed in [Table 3-2](#) are used only when the following requirements are met:
  - Routing mode: Routing the cables over the cable ladder or bracket in a single layer (IEC60364-5-52 middle E). The distances between cables must be greater than twice the cable diameter.
  - The ambient temperature is 30°C.
  - The AC voltage loss is less than 3%, and the DC voltage loss is less than 1%.
  - 90°C copper flexible cable.
  - The length of the AC power cables of a UPS is no longer than 30 m and DC power cables no longer than 50 m.

**NOTICE**

When you connect power cables, comply with the tightening torque listed in [Table 3-4](#) to ensure secure connections and prevent safety risks.

**Table 3-4** Power cable connector requirements

Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Bolt Length	Torque
Mains input connector	Crimped DT terminals	M16	18 mm	50 mm	120 N·m
Bypass input connector	Crimped DT terminals	M16	18 mm	50 mm	120 N·m
Battery input connector	Crimped DT terminals	M16	18 mm	50 mm	120 N·m

Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Bolt Length	Torque
Output connector	Crimped DT terminals	M16	18 mm	50 mm	120 N·m
Grounding connector	Crimped DT terminals	M12	/	35 mm	47 N·m

**Table 3-5** Recommended input front-end and output back-end circuit breakers

UPS Capacity	Component	Specifications <sup>a</sup>
350 kVA	Mains input circuit breaker	800 A/3P
	Bypass input circuit breaker	630 A/3P
	Output branch circuit breaker	630 A/3P
400 kVA	Mains input circuit breaker	800 A/3P
	Bypass input circuit breaker	630 A/3P
	Output branch circuit breaker	630 A/3P
450 kVA	Mains input circuit breaker	1000 A/3P
	Bypass input circuit breaker	800 A/3P
	Output branch circuit breaker	800 A/3P
500 kVA	Mains input circuit breaker	1000 A/3P
	Bypass input circuit breaker	800 A/3P
	Output branch circuit breaker	800 A/3P
550 kVA	Mains input circuit breaker	1250 A/3P
	Bypass input circuit breaker	1000 A/3P
	Output branch circuit breaker	1000 A/3P
600 kVA	Mains input circuit breaker	1250 A/3P
	Bypass input circuit breaker	1000 A/3P
	Output branch circuit breaker	1000 A/3P
650 kVA	Mains input circuit breaker	1600 A/3P
	Bypass input circuit breaker	1000 A/3P

UPS Capacity	Component	Specifications <sup>a</sup>
	Output branch circuit breaker	1000 A/3P
700 kVA	Mains input circuit breaker	1600 A/3P
	Bypass input circuit breaker	1250 A/3P
	Output branch circuit breaker	1250 A/3P
750 kVA	Mains input circuit breaker	1600 A/3P
	Bypass input circuit breaker	1250 A/3P
	Output branch circuit breaker	1250 A/3P
800 kVA	Mains input circuit breaker	1600 A/3P
	Bypass input circuit breaker	1250 A/3P
	Output branch circuit breaker	1250 A/3P
<p>a: Circuit breakers configured for the 400 kVA UPS are used in circuits with a short-circuit current of less than 35 kA, and those for the 500/600/800 kVA UPS are used in circuits with a short-circuit current of less than 50 kA.</p>		

 **NOTE**

- The input upstream circuit breakers recommended in [Table 3-5](#) are for reference only.
- If multiple loads are connected, specifications for branch circuit breakers must not exceed the recommended specifications.
- The circuit breaker selection principle is to protect loads and cables, and the cascading principle is to realize specific protection.

## 3.1.4 Unpacking

### Context

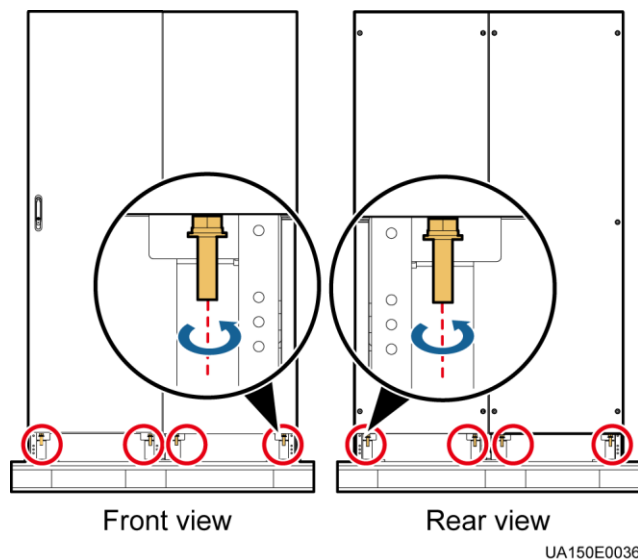
### NOTICE

- Only trained personnel are allowed to move the UPS. Use a pallet truck to transport the UPS box secured to a wooden support to the installation position.
- To prevent the UPS from falling over, secure it to an electric pallet truck using ropes before moving it.
- To prevent shocks or falls, move the UPS gently. After placing the UPS in the installation position, unpack it with care to prevent scratches. Keep the UPS steady during unpacking.
- If the UPS installation environment is in poor condition and the UPS will be stored for a long time after it is unpacked, wrap the UPS with the original plastic coat to prevent dust.

## Procedure

- Step 1** Use a pallet truck to transport the UPS to the installation position.
- Step 2** Remove the UPS outer packing.
- Step 3** Remove the bolts that secure the UPS to the pallet and remove the UPS from the pallet.

**Figure 3-5** Removing the pallet from the UPS



----End

## 3.1.5 (Optional) Splitting the Power Cabinet and Bypass Cabinet (400 kVA, 500 kVA, or 600 kVA UPS)

### Context

- If the door of the power distribution equipment room is not wide enough to move the UPS, you can split the power cabinet and bypass cabinet before the movement.



- The power cabinet and bypass cabinet of the 400 kVA, 500 kVA, and 600 kVA UPS can be split in a similar way. This section describes how to split cabinets of the 400 kVA UPS.

### NOTICE

Put away the removed screws and connecting plates to facilitate future cabinet combination.

Table 3-6 and Table 3-7 list the specifications and number of screws to be removed.

**Table 3-6** Specifications and number of screws (400 kVA or 500 kVA UPS)

Position	Screw Specification	Quantity (PCS)
Soft copper bar	M12x35	26
Battery copper bar component	M8x20	4
Top connecting plate	M6x30	8
Middle connecting plate	M6x30	8
Bottom connecting plate	M12x35	8

**Table 3-7** Specifications and number of screws (600 kVA UPS)

Position	Screw Specification	Quantity (PCS)
Soft copper bar	M12x45 screw assembly	26
Battery copper bar component	M6x30 screw assembly	4
Top connecting plate	M6x20 screw assembly	8
Middle connecting plate	M6x20 screw assembly	8
Bottom connecting plate	M12x35 screw assembly	8

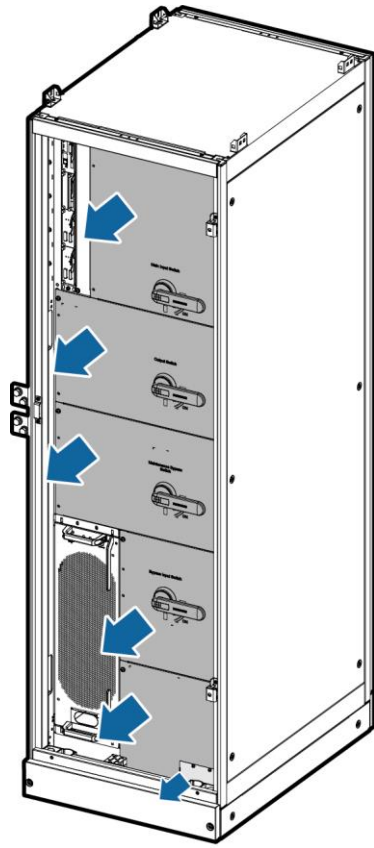
## Procedure

- Step 1** Open the front door of the bypass cabinet and remove the covers of the power distribution subrack.

### NOTE

The covers of the power distribution subrack can be removed from the bypass cabinet only when all switches are OFF.

**Figure 3-6** Removing the covers of the power distribution subrack



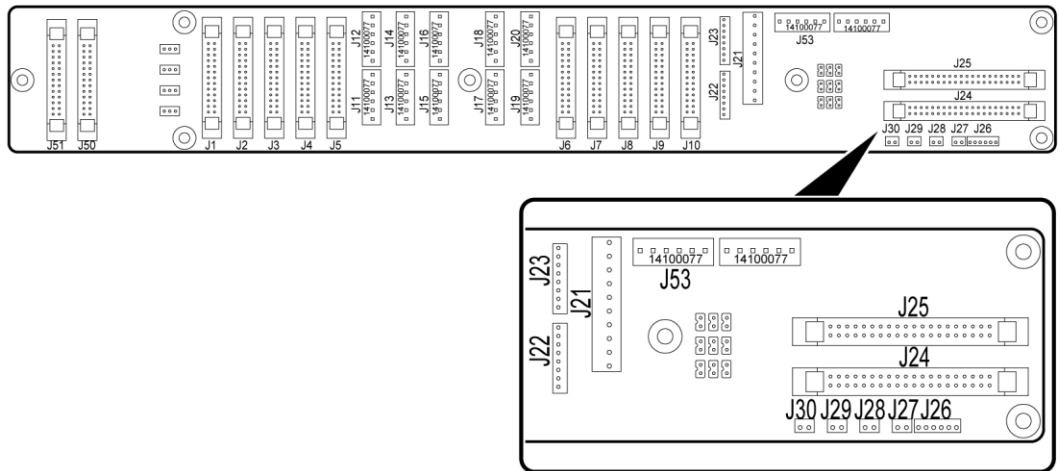
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**Step 2** Remove the rear covers from the power cabinet and bypass cabinet.

**Step 3** Remove the cable terminals that connect the system signal interface board in the power cabinet to the bypass cabinet.

Disconnect cables by referring to [Figure 3-7](#) and [Table 3-8](#), and cut off the cable ties on the disconnected cables.

**Figure 3-7** Silk screens on the system signal interface board in the power cabinet



UA13000071

**Table 3-8** Mapping between cables and ports on the system signal interface board

Bypass Cabinet Cable Name	Label on the Cable to be Connected to the System Signal Interface Board	Port Silk Screen on the System Signal Interface Board in the Power Cabinet	Quantity (PCS)
Bypass module DL37 cable	W301_J21	J21	1
	W303_J24	J24	1
ECM 8-pin cable	W305_J22	J22	1
ECM system monitoring bus	W307_J25	J25	1
CT cable	W309_J26	J26	1
Switch cable	SW1_J27	J27	1
	SW2_J28	J28	1
	SW4_J30	J30	1

**CAUTION**

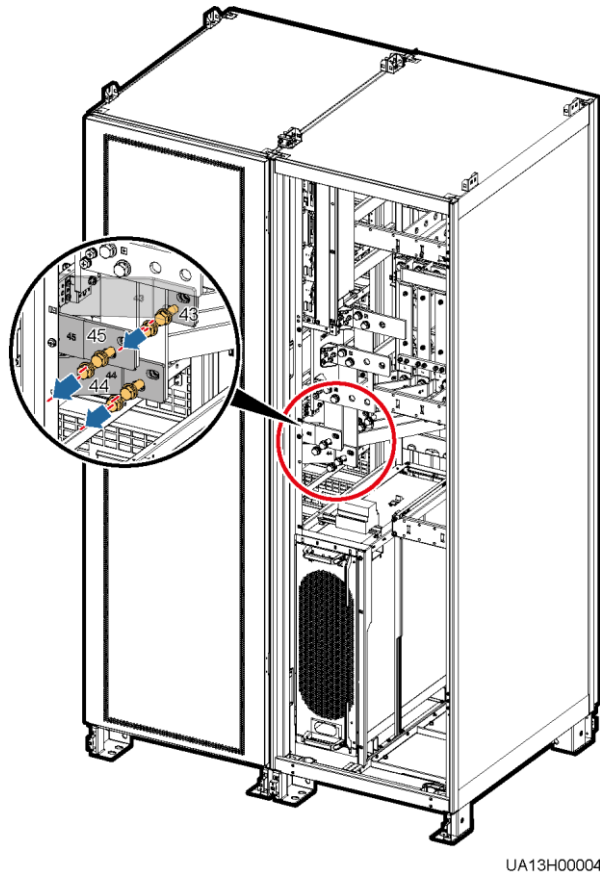
Because the switch extension rod is sharp, exercise caution when removing the connecting copper bars to prevent personal injury.

**NOTICE**

Each copper bar has a number on it. Put away the removed copper bars. When you combine the power cabinet and bypass cabinet, strictly follow the numbers printed on the copper bars.

**Step 4** Remove the soft copper bars numbered 43, 44, and 45.

**Figure 3-8** Removing soft copper bars numbered 43, 44, and 45

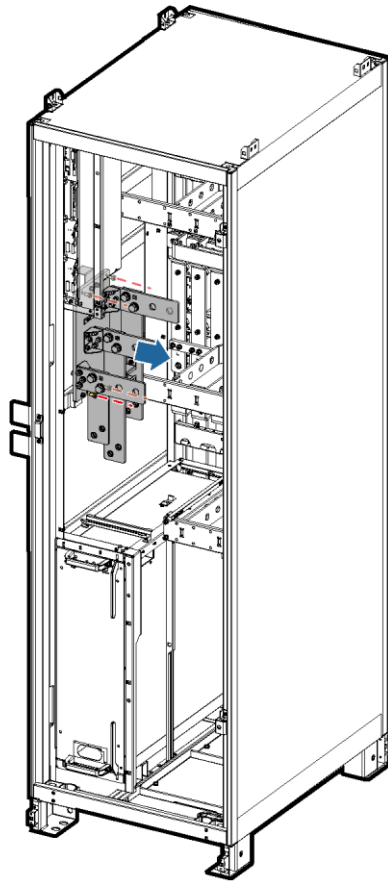


**NOTE**

For a 500 kVA or 600 kVA UPS, remove the soft copper bars numbered 56, 58, and 60.

**Step 5** Remove the battery copper bar component.

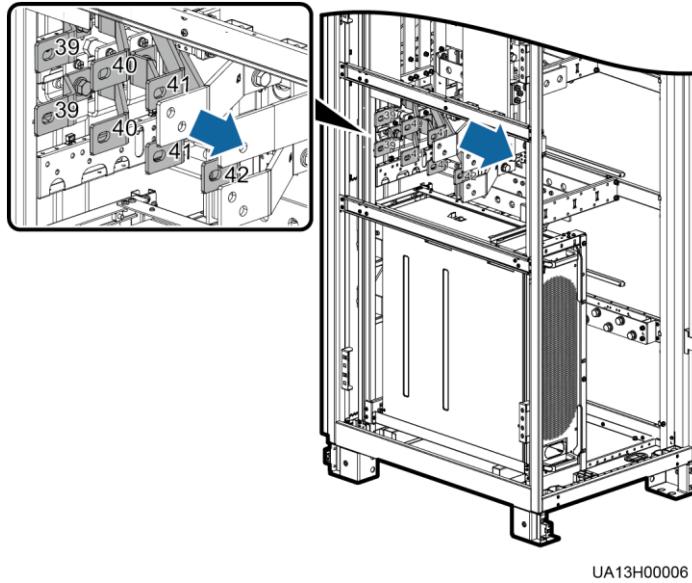
**Figure 3-9** Removing the battery copper bar component



UA13H00005

**Step 6** Remove the soft copper bars numbered 39–42.

**Figure 3-10** Removing soft copper bars numbered 39–42



**NOTE**

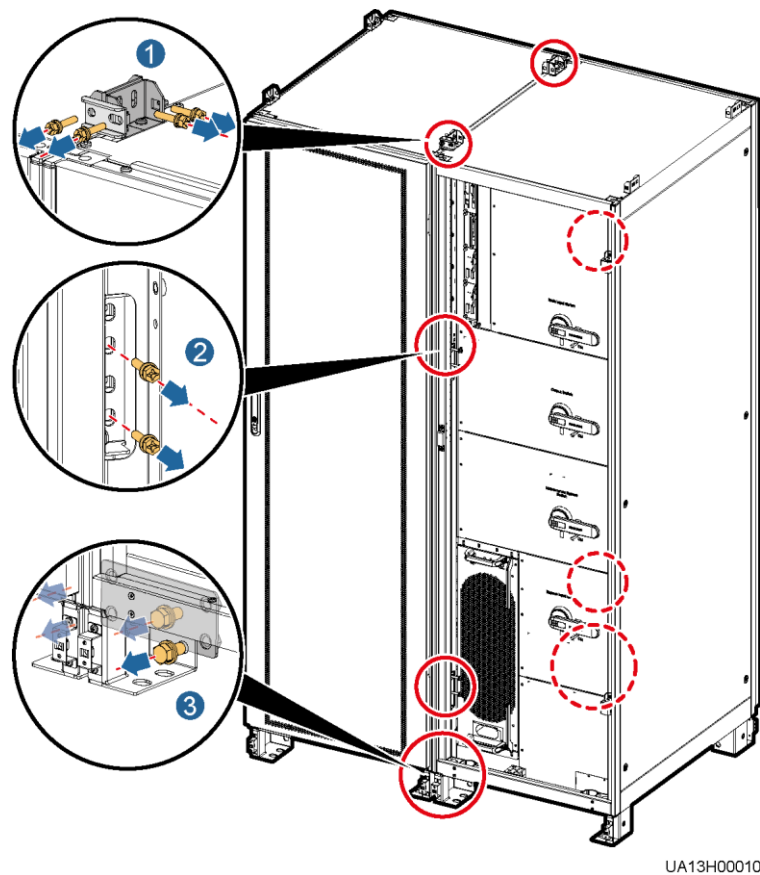
For a 500 kVA or 600 kVA UPS, remove the soft copper bars numbered 48–54.

**Step 7** Remove the top, middle, and bottom connecting plates in sequence from the power cabinet and bypass cabinet.

**NOTICE**

Use a step ladder to remove the top connecting plates as the cabinet is high.

**Figure 3-11** Removing connecting plates



**Step 8** Use a manual pallet truck to transport the power cabinet and bypass cabinet to the installation position. Ensure that the two cabinets align with each other.

----End

### 3.1.6 (Optional) Combining the Power Cabinet and Bypass Cabinet (400 kVA, 500 kVA, or 600 kVA UPS)

#### Procedure

- Step 1** Install the bottom, middle, and top connecting plates for the power cabinet and bypass cabinet based on screw specifications in [Table 3-6](#) and [Table 3-7](#).
- Step 2** Install the removed soft copper bars and battery copper bar components based on their numbers by referring to screw specifications in [Table 3-6](#) and [Table 3-7](#).
- Step 3** Reconnect the removed cables to the system signal interface board in the power cabinet, and bind the cables. For details, see [Table 3-8](#).
- Step 4** Check that the power cabinet and bypass cabinet are combined completely and securely.
- Step 5** After checking that cabinets are combined properly, reinstall the side covers and rear covers.

----End

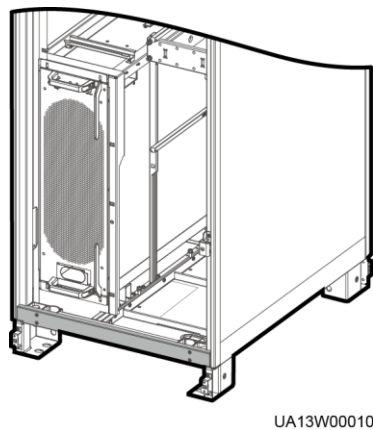
## 3.2 Single UPS Installation

The installation process and cable connection principle of UPSs in standard configuration and UPSs in full configuration are the same. This section uses UPSs in full configuration as an example.

### NOTICE

When you install the UPS and connect cables, do not step on the front door baffle plate and the door support at the bottom of the cabinet to prevent paint flake-off and deformation, as shown in [Figure 3-12](#). Otherwise, the front door will not be properly closed.

**Figure 3-12** Front door baffle plate



### 3.2.1 Installing a UPS (400 kVA, 500 kVA, or 600 kVA UPS)

#### 3.2.1.1 Installing the UPS on the Ground

##### Context

### NOTICE

- Ensure that the installation ground is flat.
- The marking-off template is delivered with the UPS.

##### Procedure

- Step 1** Determine the cabinet installation positions on the ground based on holes in the marking-off template for ground installation.

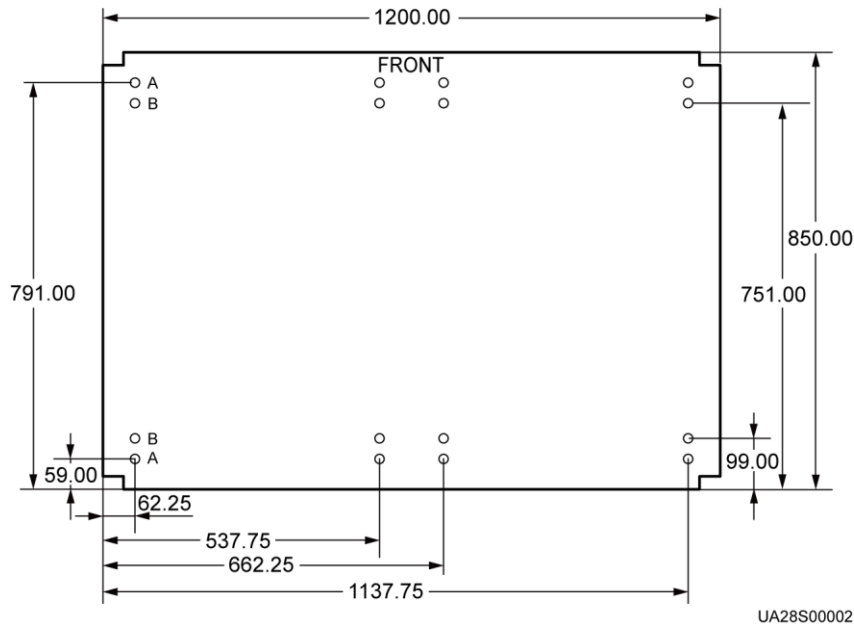
### NOTE

- A: mounting holes on the channel steel

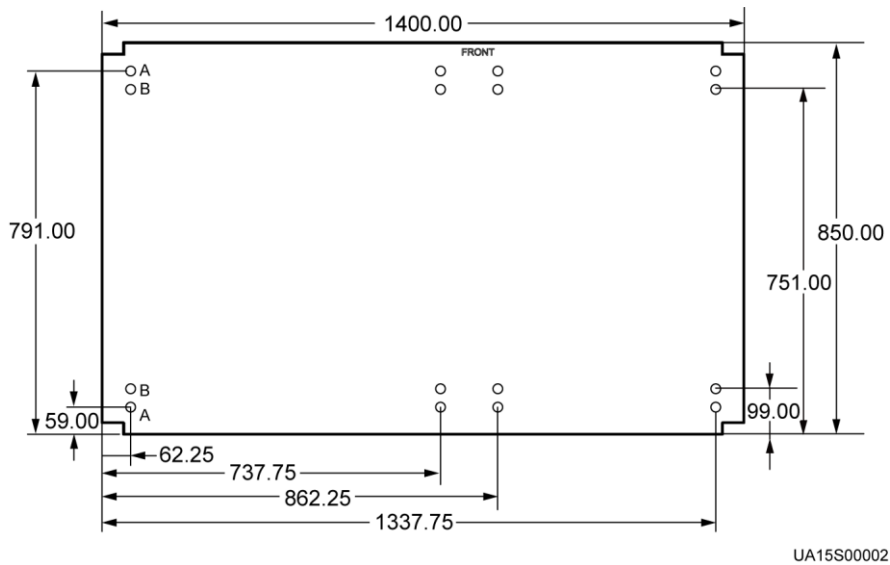


- B: mounting holes on the floor

**Figure 3-13** Mounting hole dimensions for the 400 kVA UPS and 500 kVA UPS (unit: mm)

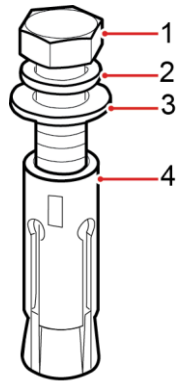


**Figure 3-14** Mounting hole dimensions for the 600 kVA UPS (unit: mm)



**Step 2** Use a hammer drill to drill holes for installing expansion bolts, and install expansion sleeves in the holes. [Figure 3-15](#) shows expansion bolt composition. [Figure 3-16](#) shows how to install an expansion bolt.

**Figure 3-15** Expansion bolt composition



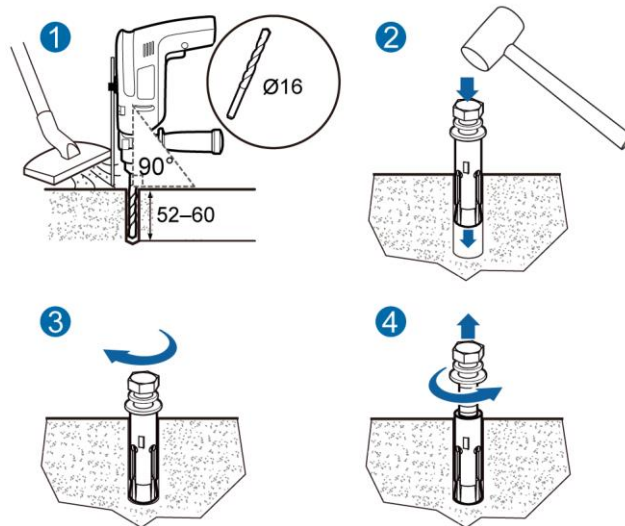
UA10000072

- (1) M12 bolt      (2) Spring washer      (3) Flat washer      (4) Expansion sleeve

**NOTICE**

Knock the expansion bolt into the hole until the expansion sleeve completely fits into the hole. The expansion sleeve must be completely buried under the ground to facilitate subsequent installation.

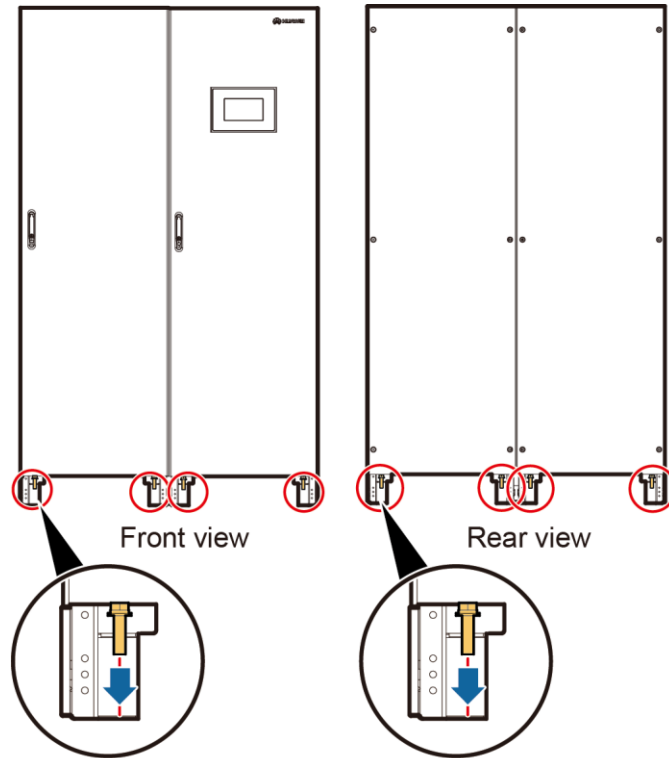
**Figure 3-16** Installing an expansion bolt (unit: mm)



1. Drill holes in the ground by using a hammer drill. The hole depth is 52 mm to 60 mm.
2. Partially tighten the expansion bolt and vertically insert it into the hole. Knock the expansion bolt using a rubber mallet until the expansion sleeve is fully inserted into the hole.
3. Partially tighten the expansion bolt.
4. Remove the bolt, spring washer, and flat washer.

- Step 3** Use a pallet truck to move the cabinet to the installation position.
- Step 4** Secure the cabinet to the expansion bolt holes on the ground using M12x60 expansion bolts. The installation methods for different UPS models are the same. [Figure 3-17](#) shows how to secure a 400 kVA UPS cabinet.

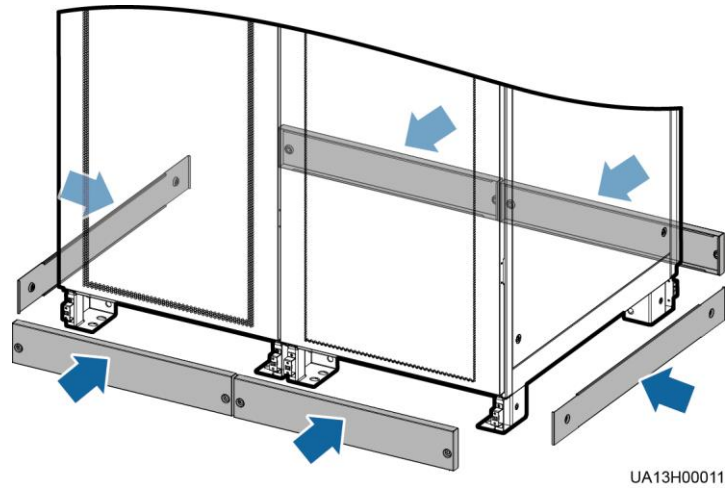
**Figure 3-17** Tightening expansion bolts



UA130E0019

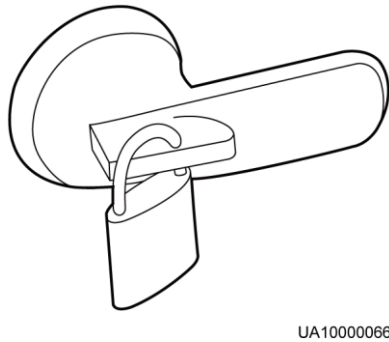
- Step 5** Install the front, rear, left, and right anchor baffle plates. The installation methods for different UPS models are the same. [Figure 3-18](#) shows how to install anchor baffle plates for a 400 kVA UPS cabinet.

**Figure 3-18** Installing the front, rear, left, and right anchor baffle plates

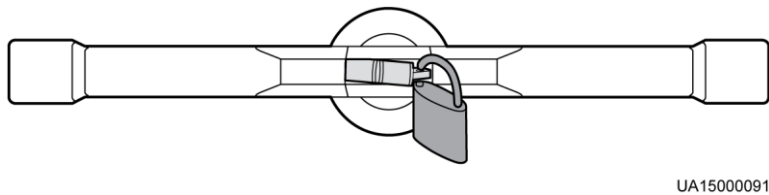


**Step 6** To prevent misoperations, you are advised to install a lock (with the diameter of the valid lock cylinder being 5–10 mm) for the maintenance bypass switch, as shown in [Figure 3-19](#) and [Figure 3-20](#).

**Figure 3-19** Installing a lock for the maintenance bypass switch (400 kVA UPS, 500 kVA UPS)



**Figure 3-20** Installing a lock for the maintenance bypass switch (600 kVA UPS)



----End

### 3.2.1.2 Installing the UPS on Channel Steel

#### Context

#### NOTICE

- Channel steel and expansion bolts for securing the channel steel should be purchased by the customer. The recommended channel steel width is 50 mm or more.
- Ensure that the spacing between external sides of a channel steel is 800 mm. Secure channel steel to the ground by using expansion bolts.
- Cabinet mounting holes must be aligned with channel steel mounting holes, and secure the cabinet to channel steel with bolts.
- Keep the channel steel surface flat.

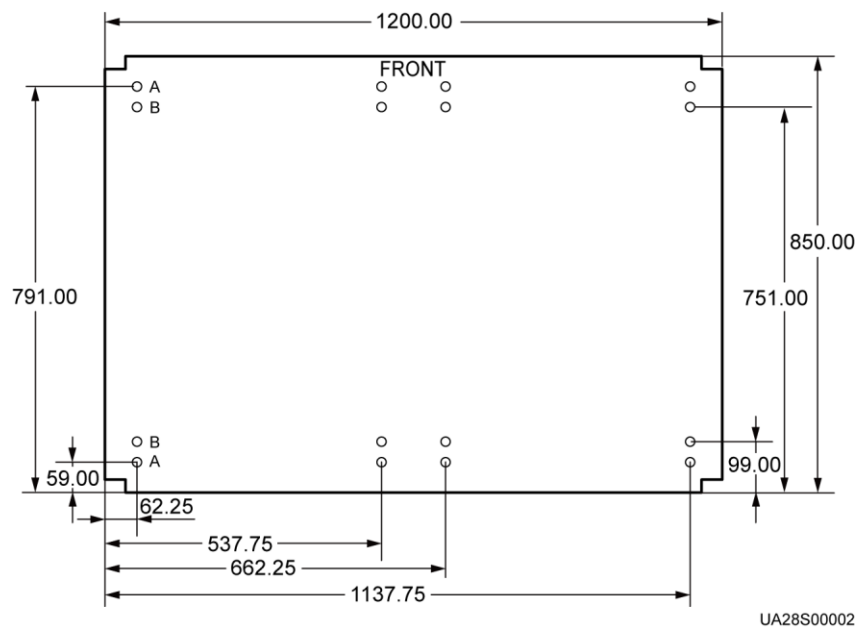
#### Procedure

- Step 1** Determine the cabinet installation positions on the channel steel based on holes in the marking-off template for channel steel installation.

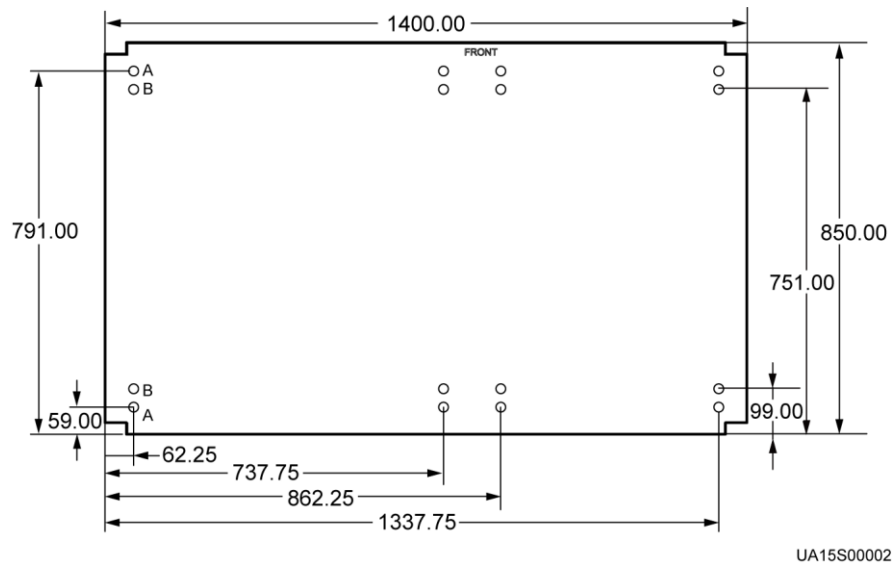
#### NOTE

- A: mounting holes on the channel steel
- B: mounting holes on the floor

**Figure 3-21** Mounting hole dimensions for the 400 kVA UPS and 500 kVA UPS (unit: mm)



**Figure 3-22** Mounting hole dimensions for the 600 kVA UPS (unit: mm)



- Step 2** Drill cabinet mounting holes in channel steel by using a hammer drill.
  - Step 3** Use a pallet truck to move the cabinet to the installation position.
  - Step 4** Use common M12x60 bolts to secure the cabinets into the mounting holes in the channel steel and tighten the bolts.
  - Step 5** Install the front, rear, left, and right anchor baffle plates.
- End

## 3.2.2 Installing a UPS (800 kVA)

### 3.2.2.1 Installing the UPS on the Ground

#### Determining the UPS Installation Position

#### NOTICE

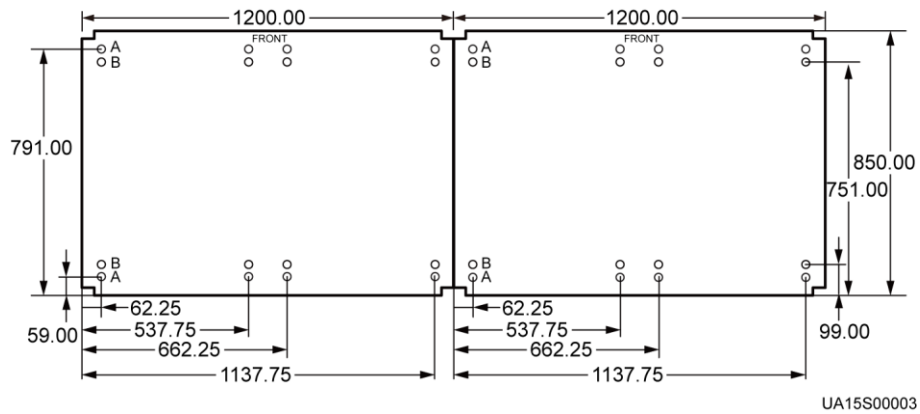
- Ensure that the installation ground is flat.
- The marking-off template is delivered with the UPS.

- Step 1** Determine the cabinet installation positions on the ground based on holes in the marking-off template for ground installation.

#### NOTE

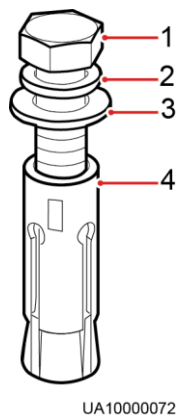
- A: mounting holes on the channel steel
- B: mounting holes on the floor

**Figure 3-23** Hole dimensions (unit: mm)



**Step 2** Use a hammer drill to drill holes for installing expansion bolts, and install expansion sleeves in the holes. [Figure 3-24](#) shows expansion bolt composition. [Figure 3-25](#) shows how to install an expansion bolt.

**Figure 3-24** Expansion bolt composition

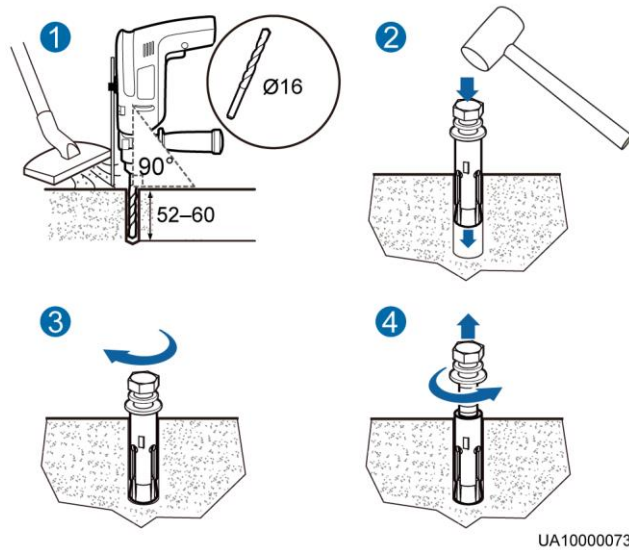


- (1) M12 bolt      (2) Spring washer      (3) Flat washer      (4) Expansion sleeve

### NOTICE

Knock the expansion bolt into the hole until the expansion sleeve completely fits into the hole. The expansion sleeve must be completely buried under the ground to facilitate subsequent installation.

**Figure 3-25** Installing an expansion bolt (unit: mm)



1. Drill holes in the ground by using a hammer drill. The hole depth is 52 mm to 60 mm.
2. Partially tighten the expansion bolt and vertically insert it into the hole. Knock the expansion bolt using a rubber mallet until the expansion sleeve is fully inserted into the hole.
3. Partially tighten the expansion bolt.
4. Remove the bolt, spring washer, and flat washer.

----End

## Combining Power Cabinets and Bypass Cabinets

The power cabinets and bypass cabinets are separately packed for delivery. Before installing the UPS, combine the power cabinets and bypass cabinets. Before combining the cabinets, ensure that the required fittings are complete. [Table 3-9](#) lists the fittings.

**Table 3-9** Fitting list

Mounting Fitting	Number of Fittings	Screw Specifications	Number of Bolts (PCS)	Torque	Remarks
Bottom connecting plate	2	M12x25	8	47 N·m	<ul style="list-style-type: none"> <li>• Fittings are delivered with the UPS. You can see the fittings after unpacking the bypass cabinet.</li> <li>• The two soft copper bars are numbered 52.</li> <li>• If holes are drilled for routing cables at the top of the cabinet, attach grommet strips on the hole edges to protect</li> </ul>
Top connecting plate	2	M6x30	8	3 N·m	
Soft connecting copper bar	2	M12x45	10	47 N·m	
Grommet	N/A	N/A	N/A	N/A	



Mounting Fitting	Number of Fittings	Screw Specifications	Number of Bolts (PCS)	Torque	Remarks
strip					cables.
Middle connecting plate	2	M6x30	4	3 N·m	Installed on the cabinet before delivery.

**Step 1** Use a pallet truck to move the power cabinets and bypass cabinets to the mounting holes for the cabinets with the power cabinets on the left and the bypass cabinets on the right. Align the cabinets.

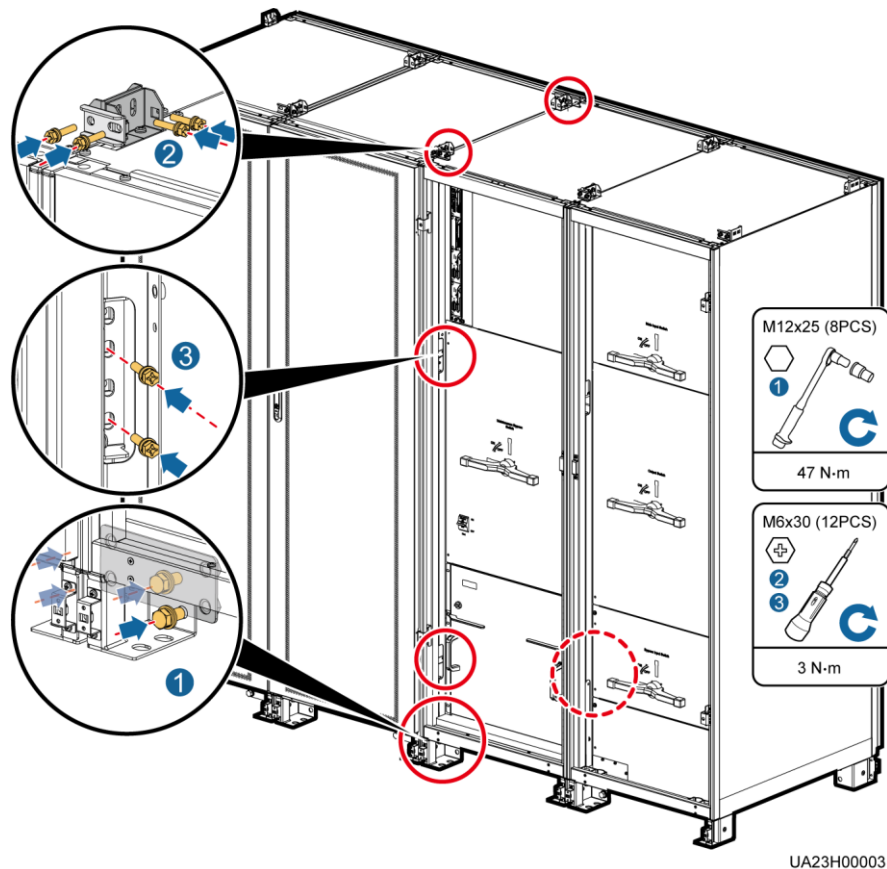
**NOTE**

Use a pallet truck to adjust the position of the bypass cabinets to align the front doors of the bypass cabinets with the front doors of the power cabinets.

**Step 2** Open the front doors of the power cabinets and bypass cabinets.

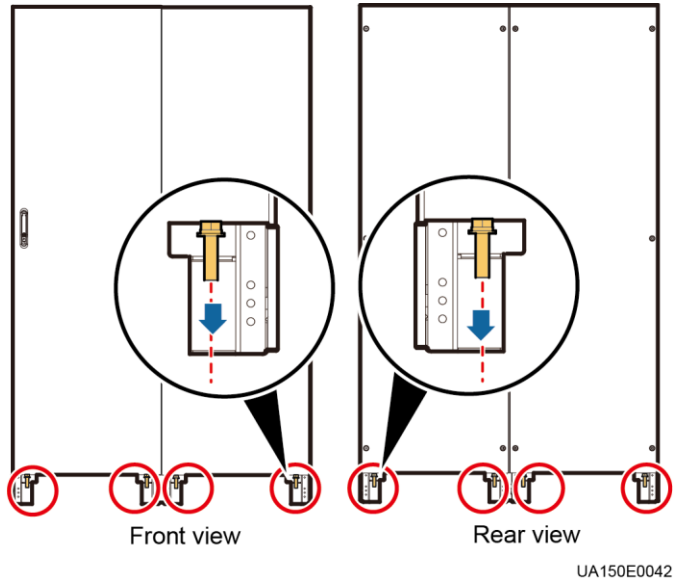
**Step 3** Install the connecting plates between the bypass cabinet and its adjacent power cabinet based on the following sequence: bottom, top, and middle connecting plates.

**Figure 3-26** Installing connecting plates



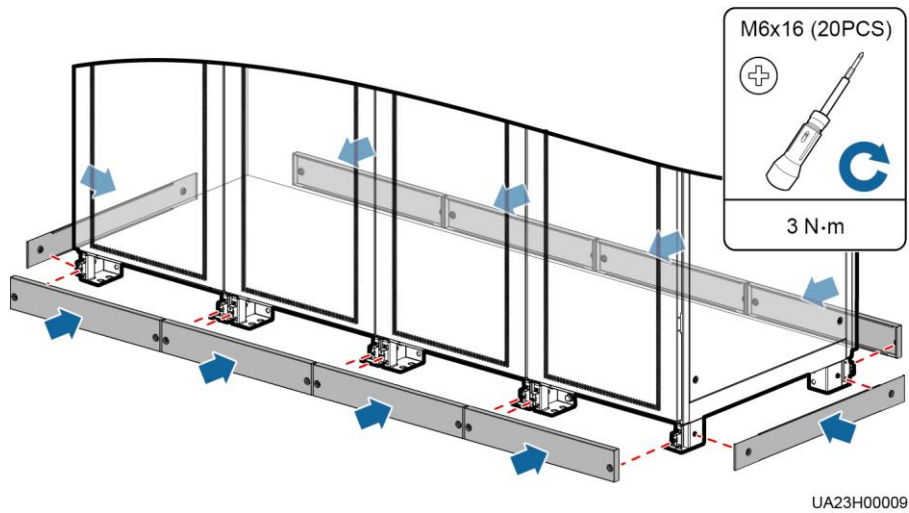
- Step 4** Use M12x60 expansion bolts to secure the cabinets to the expansion bolt holes on the ground. [Figure 3-27](#) shows how to secure the power cabinets.

**Figure 3-27** Tightening expansion bolts



- Step 5** Install the front, rear, left, and right anchor baffle plates.

**Figure 3-28** Installing the front, rear, left, and right anchor baffle plates

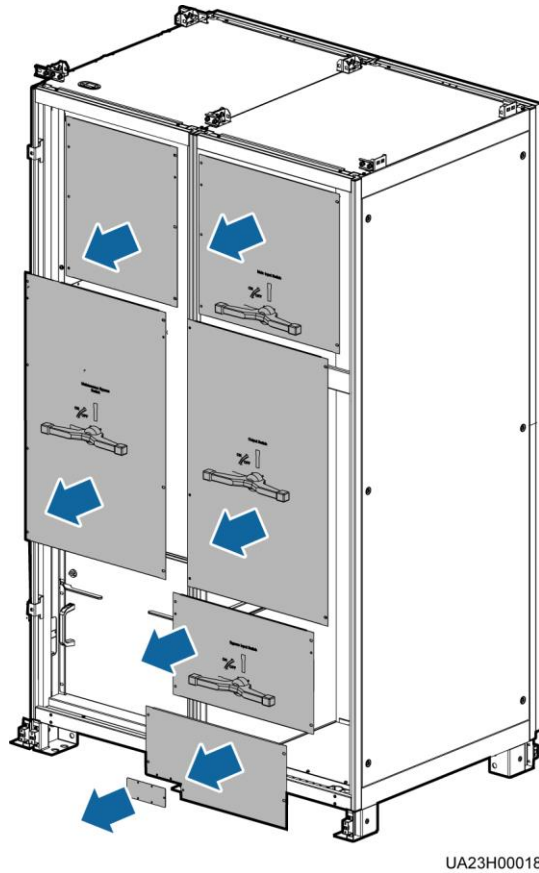


- Step 6** Remove the front covers of the power distribution subrack from the bypass cabinets, as shown in [Figure 3-29](#).

**NOTE**

The front covers of the power distribution subrack can be removed only when all the switches are OFF.

**Figure 3-29** Removing the front covers of the power distribution subrack



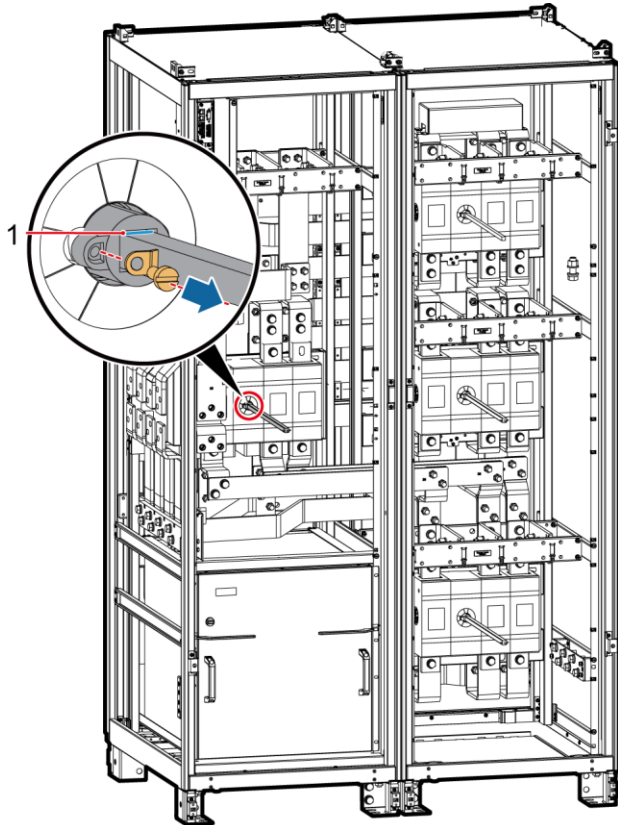
**Step 7** Remove the rear covers from power cabinet 1 and its adjacent bypass cabinet.

**Step 8** (Optional) Remove the extension rod of the maintenance bypass switch from the bypass cabinet.

**NOTE**

- To facilitate cabinet combination, remove the switch extension rod from the left bypass cabinet. The operation of removing the switch extension rod from the right bypass cabinet is optional.
- Put away the removed screws, washers, and switch extension rod which need to be reinstalled after cables are connected.
- When reinstalling the switch extension rod, keep the dowel level, as shown in [Figure 3-30](#). Insert the switch extension rod to the blue mark, put washers, and tighten the slotted screw to reinstall the switch extension rod.

**Figure 3-30** Removing the switch extension rod



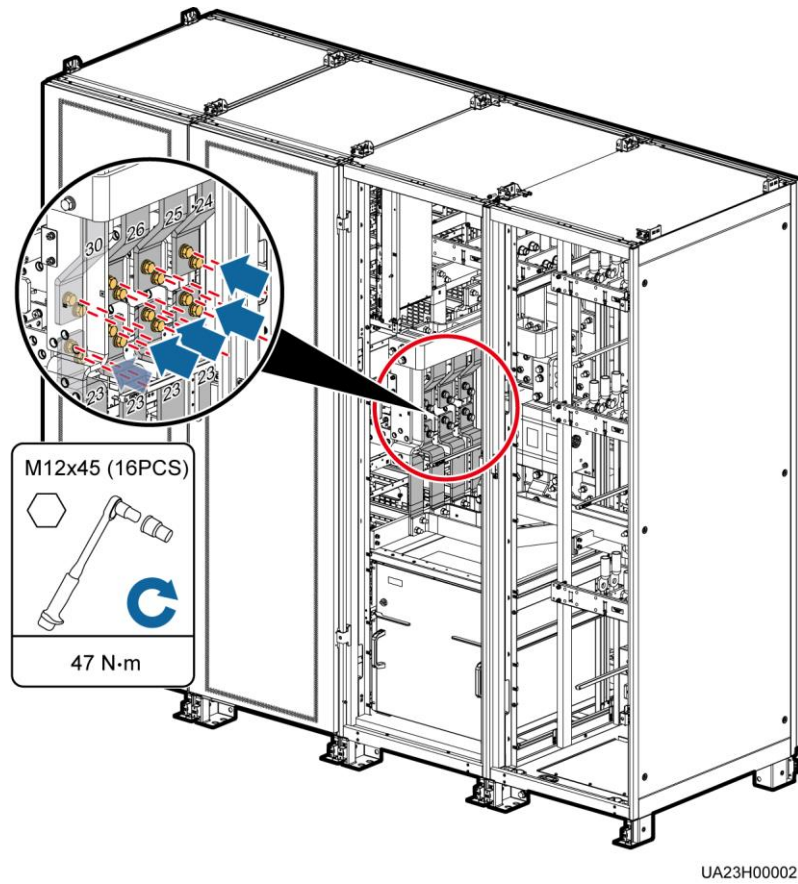
UA23H00004

(1) Blue mark

**Step 9** Install the soft copper bars between power cabinet 1 and its adjacent bypass cabinet.

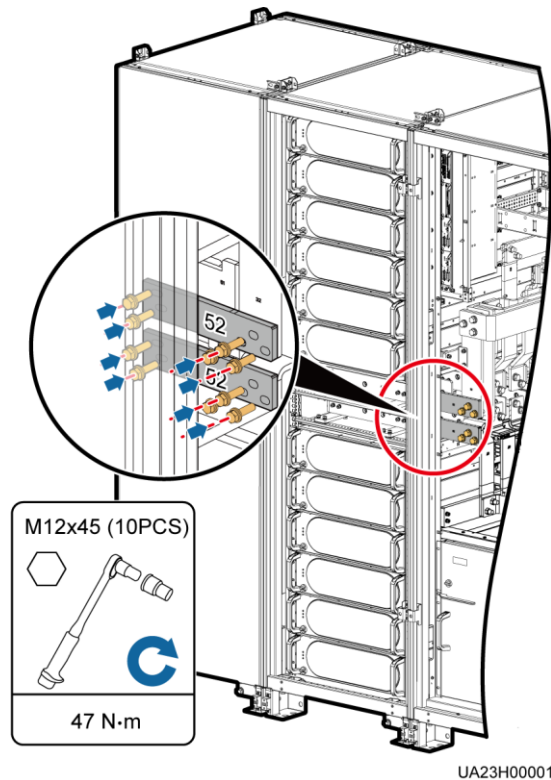
1. Cut off the cable ties bound between holes in soft copper bars numbered 23, 24, 25, 26, and 30.
2. Secure the soft copper bars numbered 23, 24, 25, 26, and 30 using M12x45 screws, as shown in [Figure 3-31](#).

**Figure 3-31** Securing soft copper bars



3. Remove filler panels from power cabinet 1. Take out two soft copper bars numbered 52 from the fittings, and secure them to power cabinet 1 and its adjacent bypass cabinet respectively, as shown in [Figure 3-32](#).

**Figure 3-32** Installing the soft copper bars numbered 52



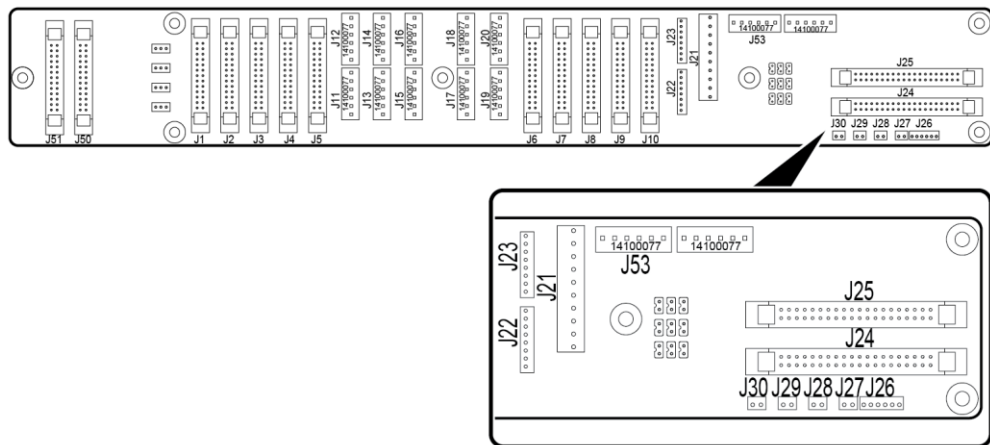
**Step 10** Insert the cable terminals in the bypass cabinets into the corresponding ports on the system signal interface board in power cabinet 1. The system signal interface board is located at the rear of power cabinet 1. It can be seen if the cabinet rear cover is removed.

#### NOTICE

- Cut off the cable ties binding the cables to be connected in the bypass cabinet. When connecting the cables of the bypass cabinet to power cabinet 1, route the cables from the internal side of the column to the system signal interface board of power cabinet 1 so that the rear panels can be reinstalled on the bypass cabinet and power cabinet 1.
- After the cables have been connected, bind the cables to the column of the bypass cabinet and the binding holes on the system signal interface board. Verify that the cables are correctly connected and reinstall the rear panels.

The port silk screens on the system signal interface board in power cabinet 1 are shown in [Figure 3-33](#). The mapping between the cables in the bypass cabinets and the ports on the system signal interface board is listed in [Table 3-10](#). [Figure 3-34](#) shows cable connections for combined cabinets.

**Figure 3-33** Silk screens on the system signal interface board in power cabinet 1



UA13000071

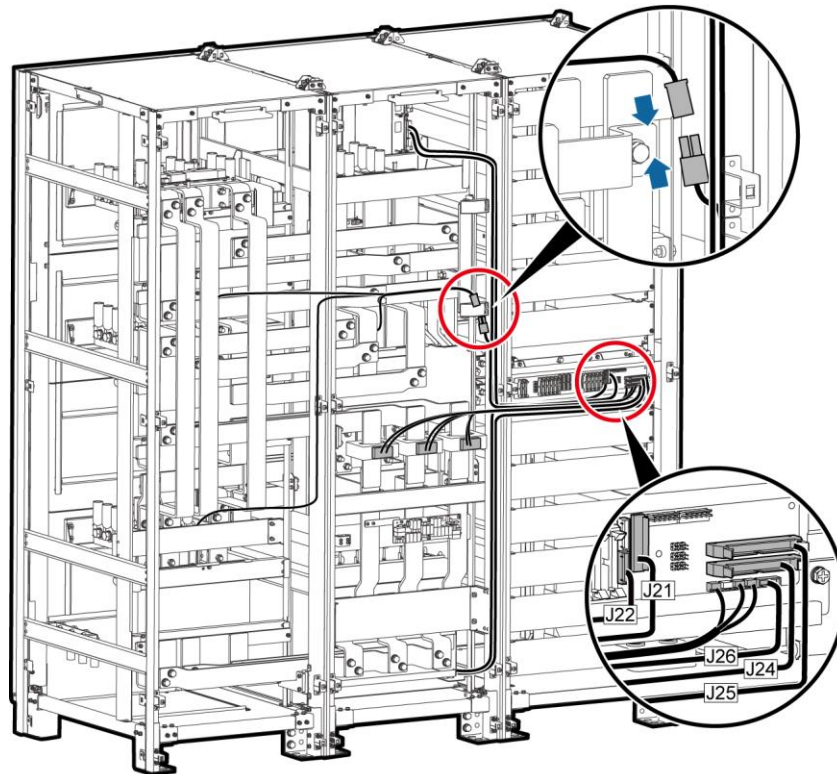
**Table 3-10** Mapping between the cables in the bypass cabinet and the ports on the system signal interface board in power cabinet 1

Bypass Cabinet Cable Name	Bypass Cabinet Cable No.	Silk Screen on System Signal Interface Board in Power Cabinet or Cable No.	Quantity
Bypass module DL37 cable	W301_J21	J21	1
	W303_J24	J24	1
ECM 8-pin cable	W305_J22	J22	1
ECM system monitoring bus	W307_J25	J25	1
CT cable	W309_J26	J26	1
Switch cable	<ul style="list-style-type: none"> <li>Full configuration: 04091625-06</li> <li>Standard configuration: SW1310</li> </ul>	04091626-23	1

**NOTE**

A standard configuration model has only one switch cable (maintenance bypass switch). A full configuration model has three switch cables (output switch, maintenance bypass switch, and bypass input switch). The following figure describes how to connect cables for combined cabinets using a full configuration model as an example.

**Figure 3-34** Connecting cables for combined cabinets



UA15000148

----End

### 3.2.2.2 Installing the UPS on Channel Steel

#### NOTICE

- Channel steel and expansion bolts for securing the channel steel should be purchased by the customer. The recommended channel steel width is 50 mm or more.
- Ensure that the spacing between external sides of a channel steel is 800 mm. Secure channel steel to the ground by using expansion bolts.
- Keep the channel steel surface flat.

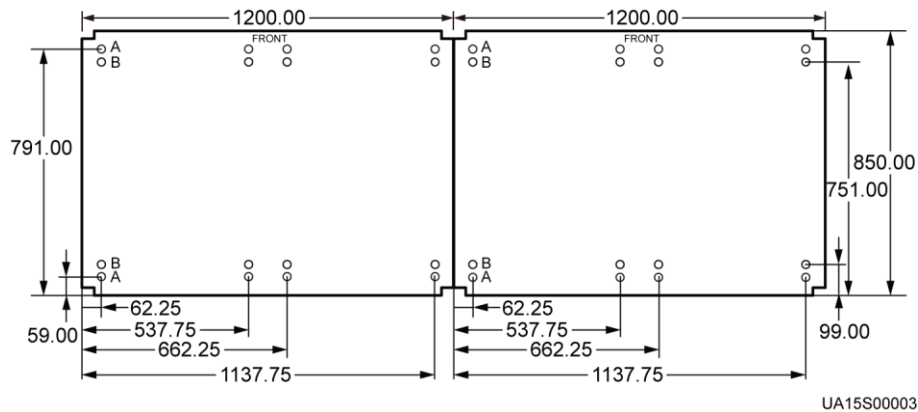
**Step 1** Determine the cabinet installation positions on the channel steel based on holes in the marking-off template for channel steel installation.

#### NOTE

- A: mounting holes on the channel steel
- B: mounting holes on the floor



**Figure 3-35** Hole dimensions (unit: mm)



**Step 2** Drill cabinet mounting holes in channel steel by using a hammer drill.

----End

## Combining Power Cabinets and Bypass Cabinets

**Step 1** The power cabinets and bypass cabinets are combined in the same way for ground installation and channel steel installation.

----End

## Securing the UPS

**Step 1** Use common M12x60 bolts to secure the cabinets into the mounting holes in the channel steel and tighten the bolts.

**Step 2** Install the front, rear, left, and right anchor baffle plates.

----End

## 3.2.3 Installing Batteries

### Context

**⚠ DANGER**

- Before installing batteries, read through the battery safety precautions, obtain the delivered battery installation guide, and install batteries as instructed.
- Place the batteries in a correct way to prevent vibrations and shocks.
- Install the batteries from the lower layer to the upper layer to prevent falling over due to imbalance.

## Procedure

**Step 1** Install a battery rack and batteries.

For details, see the battery installation guide delivered along with batteries.

----End

## 3.2.4 Installing Optional Components

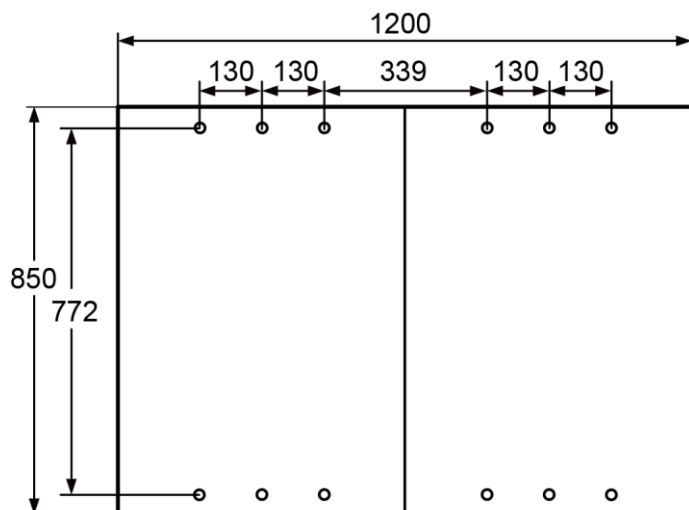
### 3.2.4.1 Installing Antiseismic Kits

**NOTICE**

Install antiseismic kits only when the cabinet is ground-mounted.

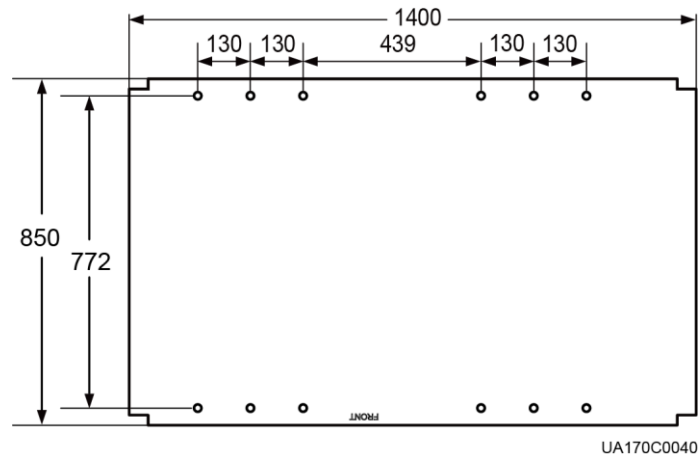
**Step 1** Mark mounting holes on the ground based on the marking-off templates. [Figure 3-36](#) to [Figure 3-38](#) show the dimensions of antiseismic kit mounting holes.

**Figure 3-36** Dimensions of antiseismic kit mounting holes for the 400 kVA UPS and 500 kVA UPS (unit: mm)

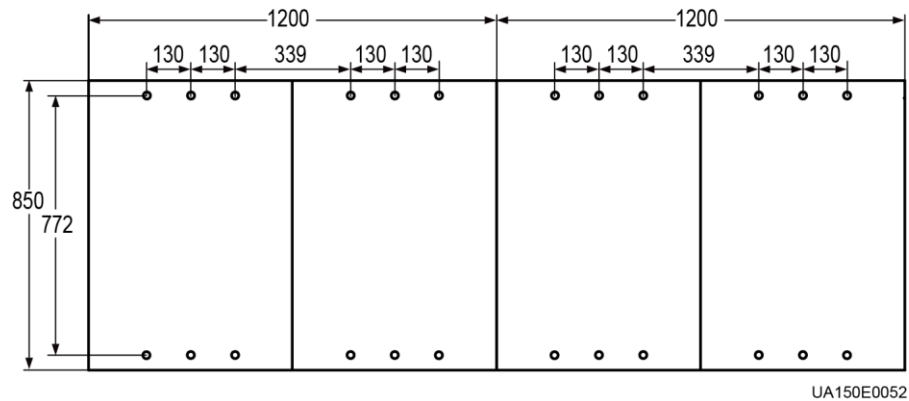


UA130E0042

**Figure 3-37** Dimensions of antiseismic kit mounting holes for the 600 kVA UPS (unit: mm)



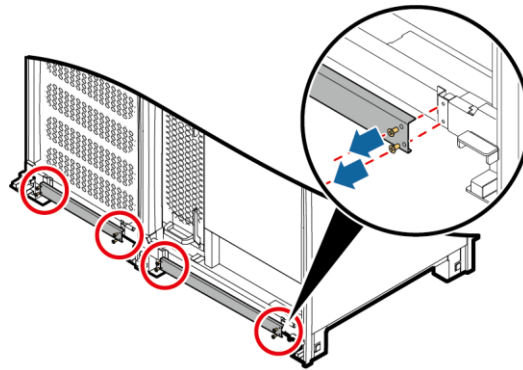
**Figure 3-38** Dimensions of antiseismic kit mounting holes for the 800 kVA UPS (unit: mm)



**Step 2** Drill holes for installing expansion bolts, and install expansion sleeve.

**Step 3** Open the front door of the cabinet and remove the support baffle plates from the front of the cabinet. The methods of removing baffle plates for different UPS models are the same. [Figure 3-39](#) shows how to remove support baffle plates for a 600 kVA UPS. Remove the rear cover.

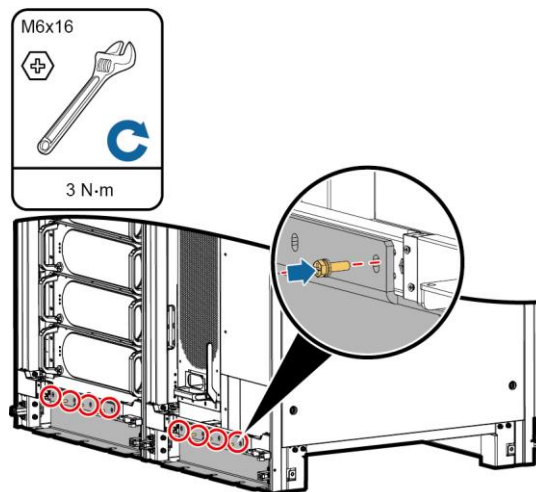
**Figure 3-39** Removing support baffle plates



UA15000186

- Step 4** Secure the antiseismic kits to the front and back of the cabinet using M6 screws. The tightening torque is 3 N·m. The installation methods for different UPS models are the same. [Figure 3-40](#) shows how to install antiseismic kits for a 600 kVA UPS.

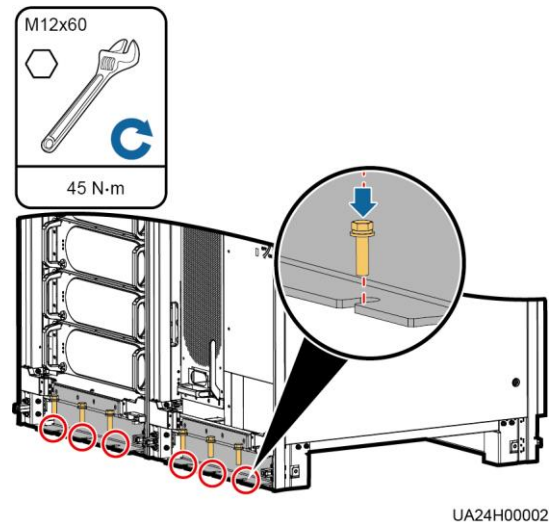
**Figure 3-40** Securing the antiseismic kits to the cabinet



UA24H00001

- Step 5** Adjust the cabinet to ensure that the expansion bolt holes align with the half holes below.
- Step 6** Use expansion bolts to firmly lock the front and rear antiseismic kits to the ground. The installation methods for different UPS models are the same. [Figure 3-41](#) shows how to lock antiseismic kits for a 600 kVA UPS.

**Figure 3-41** Locking the antiseismic kits to the ground



**Step 7** Reinstall the support baffle plates and rear covers in the cabinet.

**Step 8** Install the front, rear, left, and right anchor baffle plates.

----End

### 3.2.4.2 Installing an IP21 Component

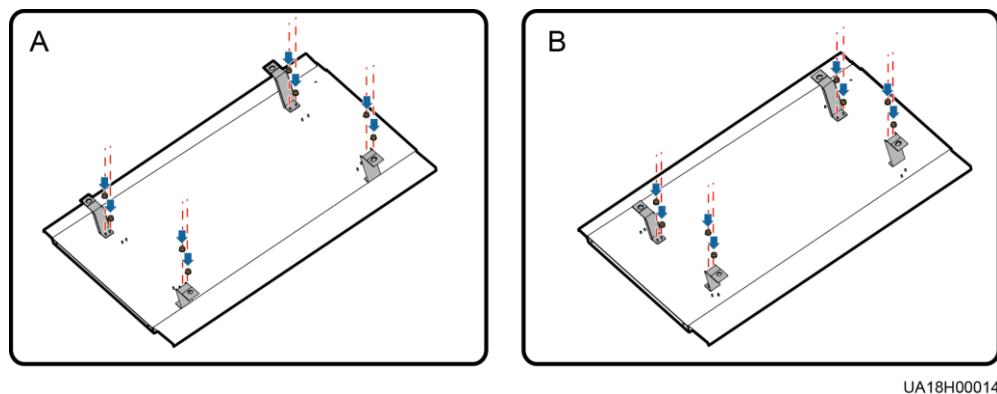
#### Procedure

**Step 1** Install leveling feet at the bottom of the IP21 component, with two long feet on the front and two short feet at the rear.

**NOTE**

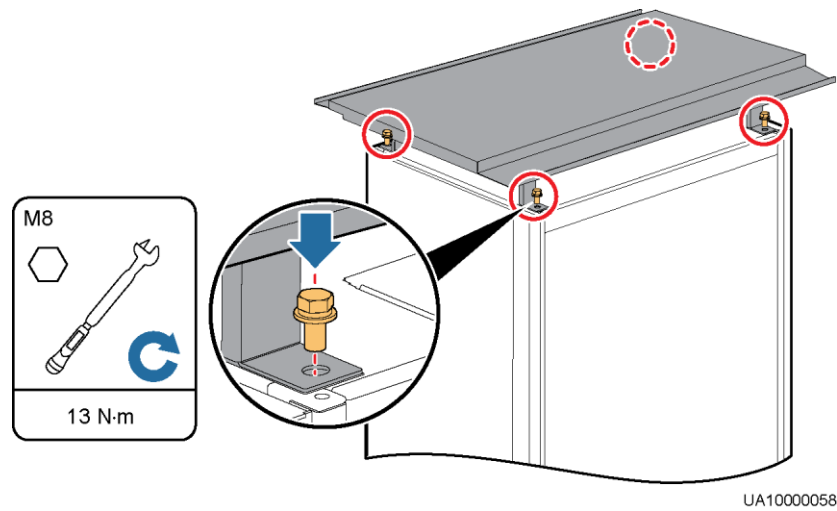
- Refer to the "front" and "back" silk screens on the surface of the IP21 component.
- Select the mounting holes for leveling feet based on the cabinet width onsite.

**Figure 3-42** Installing leveling feet



**Step 2** Secure the IP21 component to the top of each cabinet using four M12 screws.

**Figure 3-43** Installing the IP21 component



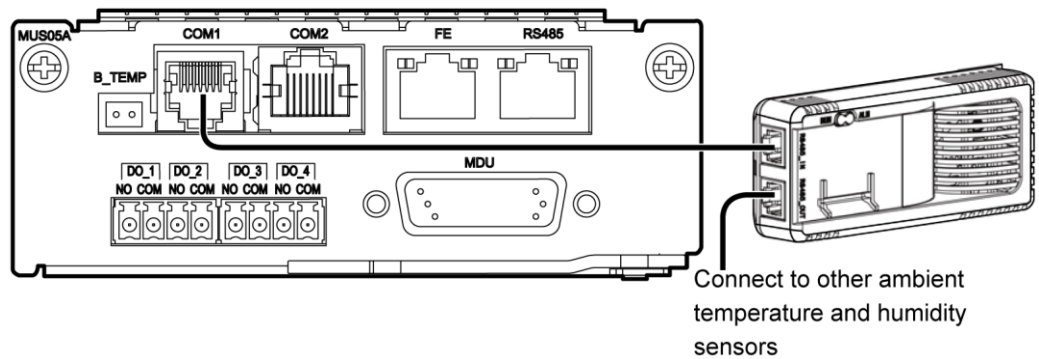
----End

### 3.2.4.3 Connecting an Ambient T/H Sensor

#### Procedure

- Step 1** Connect the RJ11 port on the ambient T/H sensor to the COM1 port on the monitoring interface card.

**Figure 3-44** Connecting a UPS and an ambient T/H sensor



#### NOTE

The ambient T/H sensor can be used as a battery temperature sensor.

----End

### 3.2.4.4 Connecting the BCB Box

Open the cover of the battery circuit breaker box (BCB box), and connect the BCB port on the dry contact card to the control signal port on the BCB box. For details, see *PDU8000-(0125, 0250, 0400, 0630, 0800) DCV8-BXA001 BCB-BOX User Manual*.

---

#### NOTICE

After you install the BCB box, adjust the disconnection protection threshold of the end-of-discharge (EOD) based on backup time to avoid overcurrent disconnection. The default values are as follows:

1. If backup time < 1 h, EOD is 1.67 V/cell.
  2. If  $1 \text{ h} \leq \text{backup time} < 3 \text{ h}$ , EOD is 1.75 V/cell.
  3. If backup time  $\geq 3 \text{ h}$ , EOD is 1.80 V/cell.
- 

### 3.2.4.5 Connecting the BBB Box

Connect the BBB box. For details, see the *PDU8000-(0630, 1250, 2000) DCV8-BGA001 BBB Box User Manual*.

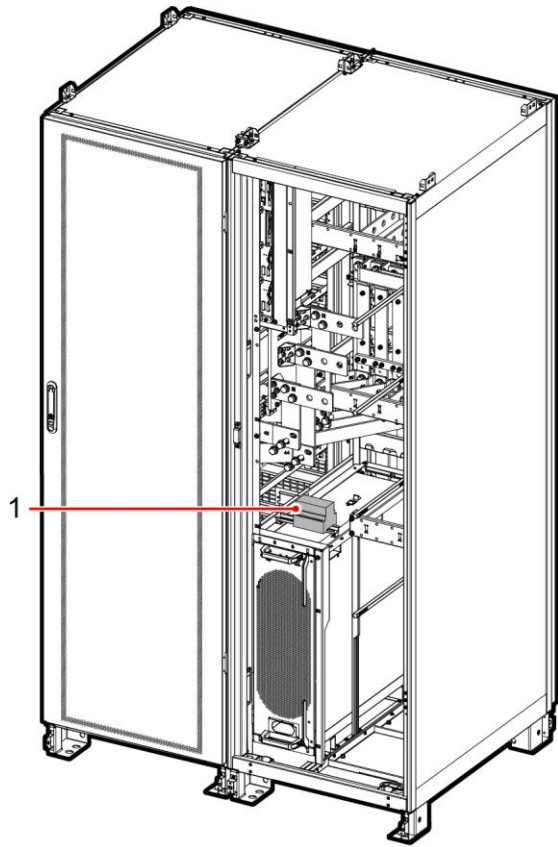
### 3.2.4.6 Installing a Battery Grounding Failure Detector

#### Procedure

- Step 1** Install a battery grounding failure detector.

For the installation method, see *UPS Battery Grounding Failure Detector User Manual*.

**Figure 3-45** Position of a battery grounding failure detector in the 400 kVA, 500 kVA, or 600 kVA UPS

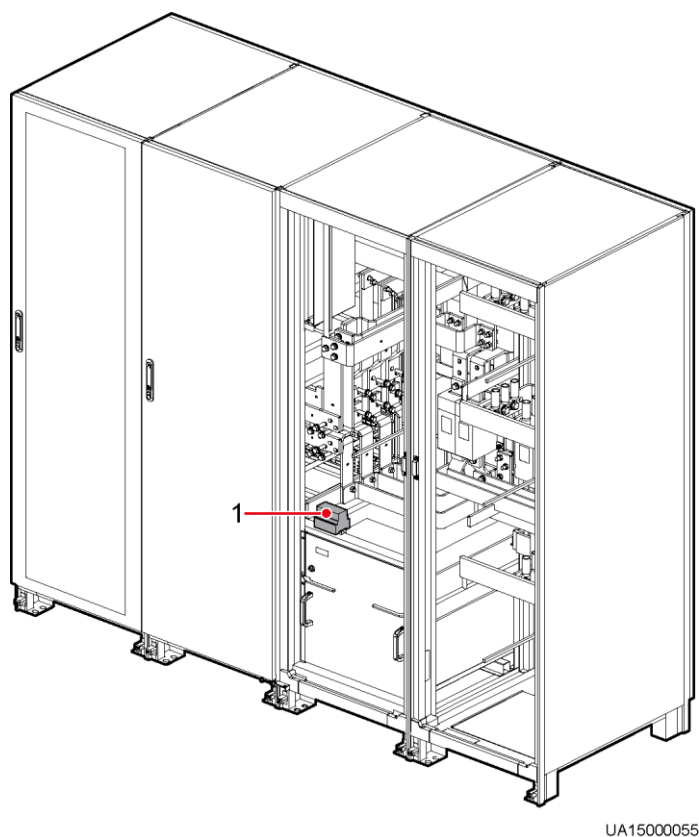


UA13W00011

(1) Battery grounding failure detector



**Figure 3-46** Position of a battery grounding failure detector in the 800 kVA UPS



(1) Battery grounding failure detector

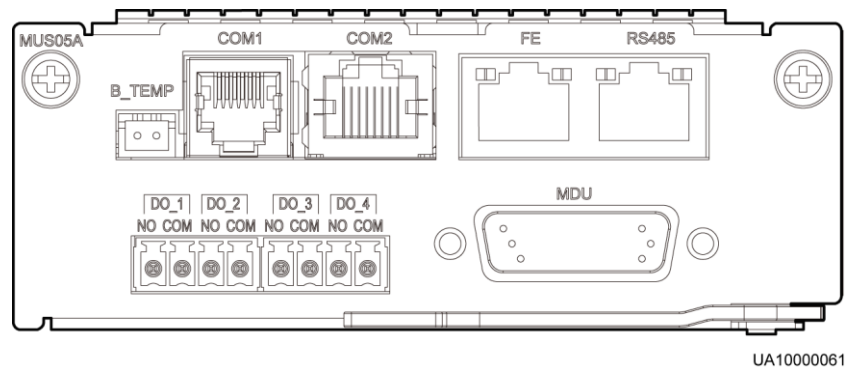
----End

### 3.2.4.7 Connecting the iBAT

#### Procedure

- Step 1** Connect the COM\_OUT port on the CIM of the iBAT to the COM2 port on the monitoring interface card.

Figure 3-47 COM2 port



----End

## 3.2.5 UPS Cable Connection Reference

### Context

---

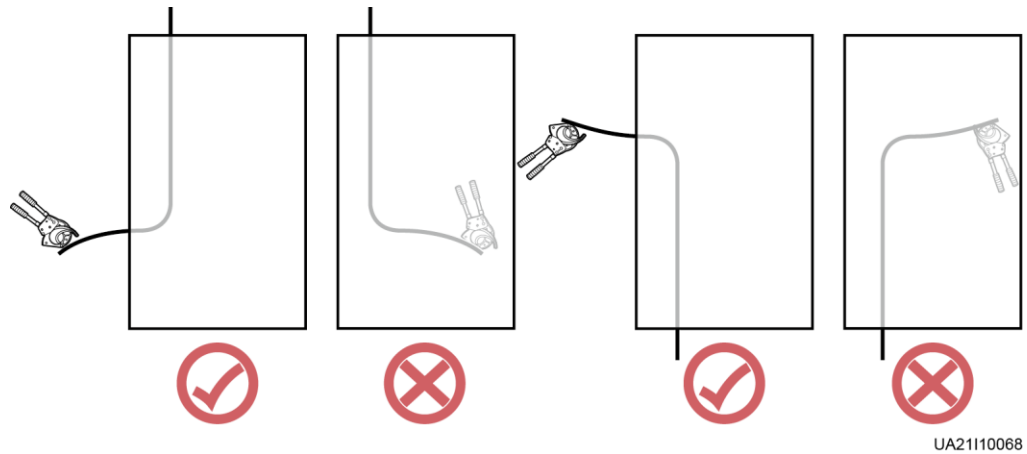
#### WARNING

- Keep away from cabinets when preparing cables to prevent cable scraps from entering the cabinets. Cable scraps may cause ignition during power-on and result in personal injury and device damage.
  - After installing cables, clean the cabinet top, bottom, copper bar wiring positions, and other positions. Ensure that there is no dust or scraps inside and around cabinets.
  - Prepare terminals onsite. The length of the copper wire should be the same as that of the part of the terminal that covers the conductor.
- 

### Procedure

- Step 1** Route a cable into the cabinet and bind it to a nearby beam.
- Step 2** Pull the cable to the copper bar to which the cable is to be connected, determine the cable length, and mark the cable at the position where the cable is to be cut.
- Step 3** Pull the marked cable out of the cabinet, cut the cable from the marked position, strip the cable, and crimp a terminal.

**Figure 3-48** Preparing a cable terminal outside the cabinet



**NOTE**

Choose an appropriate cabling route based on the actual situation. The figure is for reference only.

**Step 4** Connect the cable with a crimped terminal to the corresponding copper bar.

**Step 5** Clean foreign matter inside the cabinet.

----End

### 3.2.6 Routing Cables (400 kVA, 500 kVA, or 600 kVA UPS)

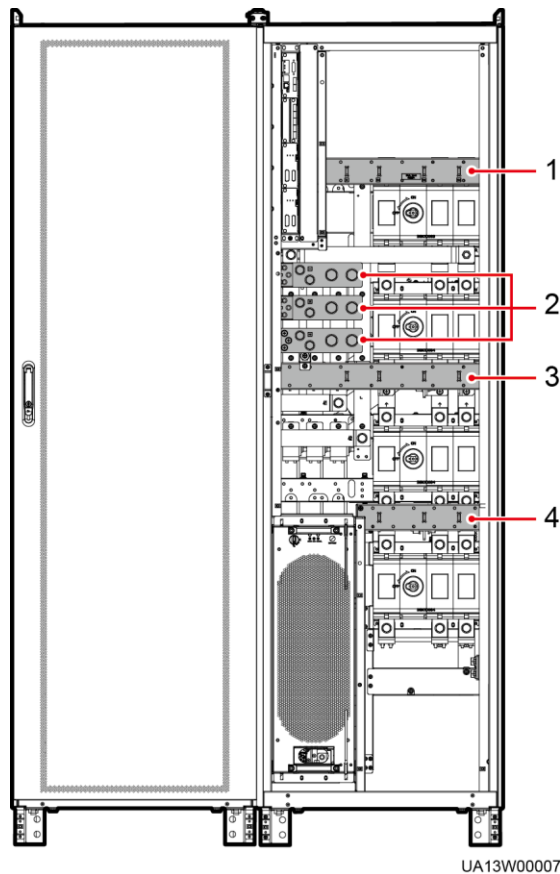
**NOTICE**

- If cables need to be routed through holes, remove cable covers for power cables from the bypass cabinet and drill holes in the covers. After drilling holes, attach grommet strips on the hole edges for protecting cables. Reinstall the covers on the cabinet.
- This section describes cable connections when the mains input and bypass input use different power sources. When they use the same power source, there is no need to remove the copper bars between the mains and bypass input terminals or connect the bypass input power cable.
- Determine the cable cross-sectional area and quantity based on the section "Preparing Power Cables" and site requirements. The figures are for reference only.
- Cables are connected in the same way for the 400 kVA, 500 kVA, and 600 kVA UPS. This section describes how to connect cables for the 400 kVA UPS.

### 3.2.6.1 Top Cable Routing

#### Context

**Figure 3-49** Power distribution module (400 kVA UPS, 500 kVA UPS)



UA13W00007

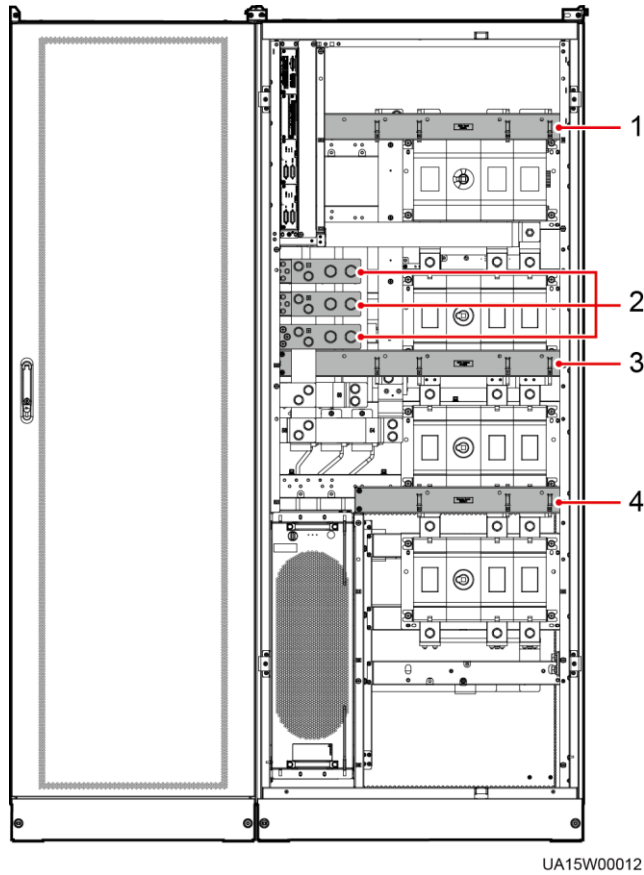
(1) Mains input terminal

(2) Battery input terminal

(3) Output terminal

(4) Bypass input terminal

**Figure 3-50** Power distribution module (600 kVA UPS)



(1) Mains input terminal

(2) Battery input terminal

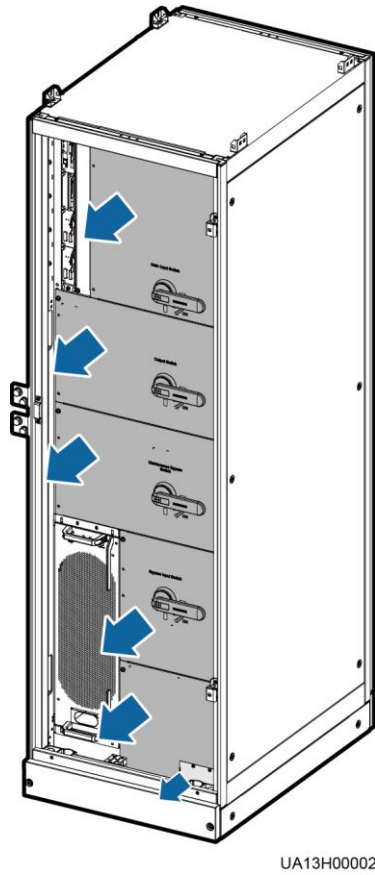
(3) Output terminal

(4) Bypass input terminal

## Procedure

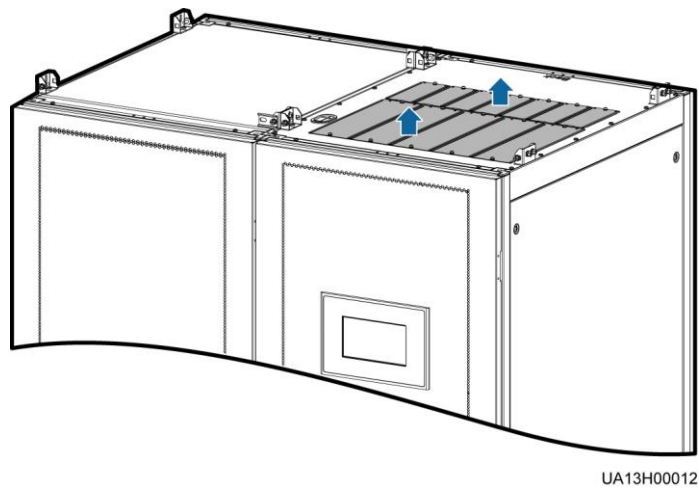
- Step 1** Open the front door of the bypass cabinet and remove the covers of the power distribution subrack.

**Figure 3-51** Removing the covers of the power distribution subrack



**Step 2** Remove the covers from the top of the cabinet.

**Figure 3-52** Removing the top cable covers



**Step 3** Remove the rear cover from the bypass cabinet.

 **NOTE**

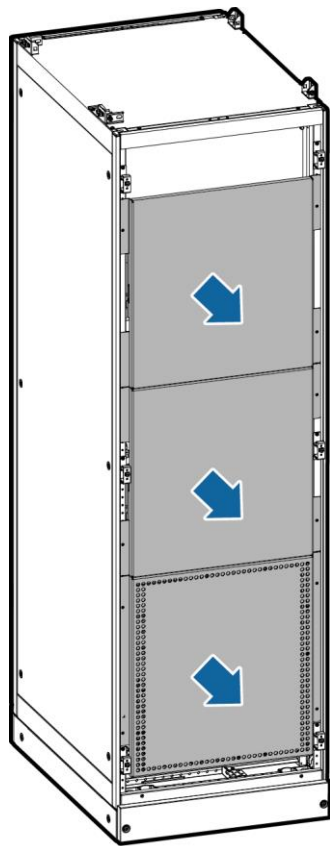
You are advised to remove the side panel from the bypass cabinet before connecting cables.

**Step 4** Remove the copper bars between the mains and bypass input wiring terminals. (Perform this step only when the mains input and bypass input use different power sources.)

 **NOTE**

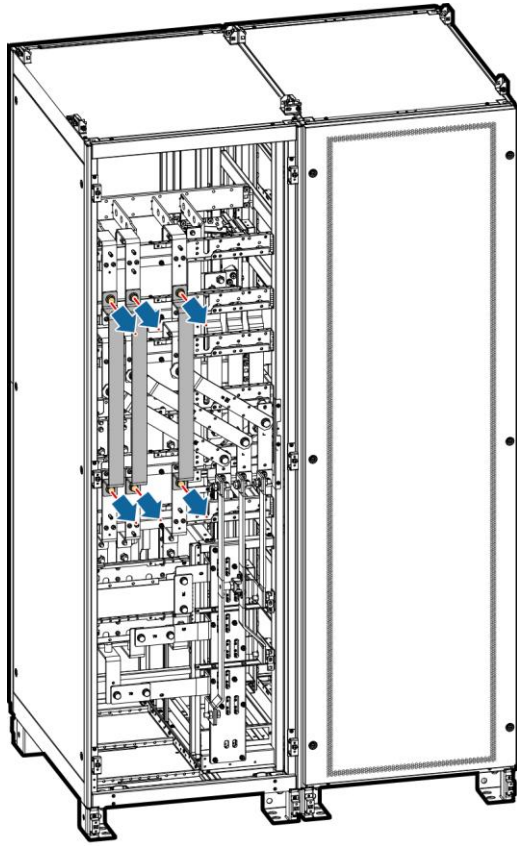
- Properly keep the removed copper bars and bolts.
- (Optional) If copper bar protective covers are installed for the bypass cabinet, remove the protective covers and then the connecting copper bars. The protective covers need to be reinstalled after the connecting copper bars are removed.

**Figure 3-53** Removing the copper bar protective covers at the rear



UA13H00003

**Figure 3-54** Removing the connecting copper bars



UA13H00013

**Step 5** Connect a ground cable to the UPS.

---

**⚠ CAUTION**

If you do not ground the UPS as required, electromagnetic interference, electric shocks, or fire may occur.

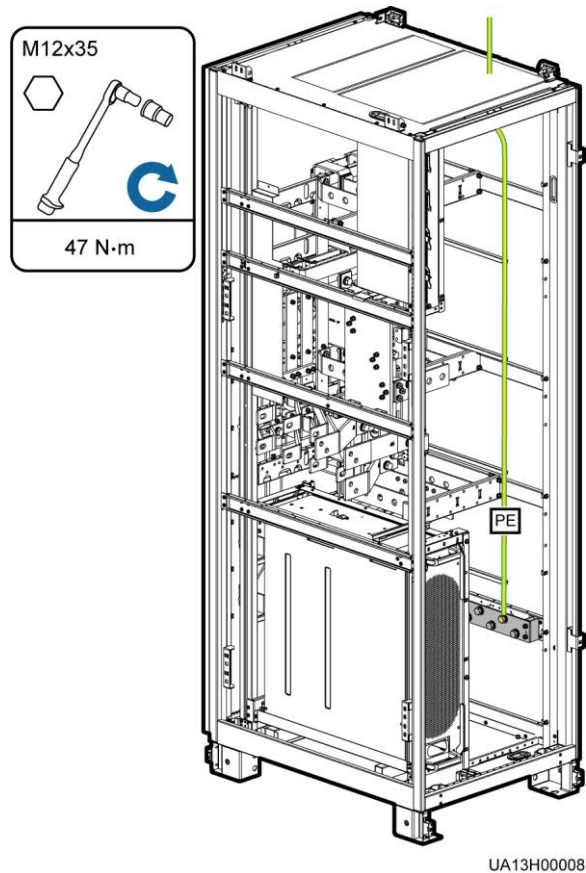
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**NOTICE**

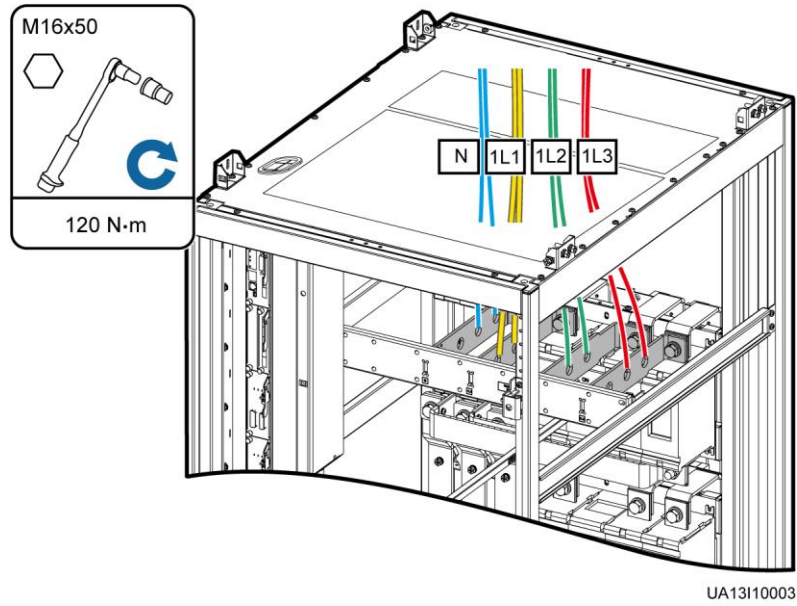
- Connect cables from top to bottom in this sequence: mains input power cables, output power cables, bypass input power cables, and battery input cables.
- When connecting cables, tighten bolts from inside out to secure cables.
- Before cable connections, ensure that all UPS input switches are OFF. Paste warning labels to prevent operation on the switches.
- Connect input power cables to the UPS and then to customer equipment.

**Figure 3-55** Ground cable



**Step 6** Connect the mains input power cables.

**Figure 3-56** Connecting the mains input power cables

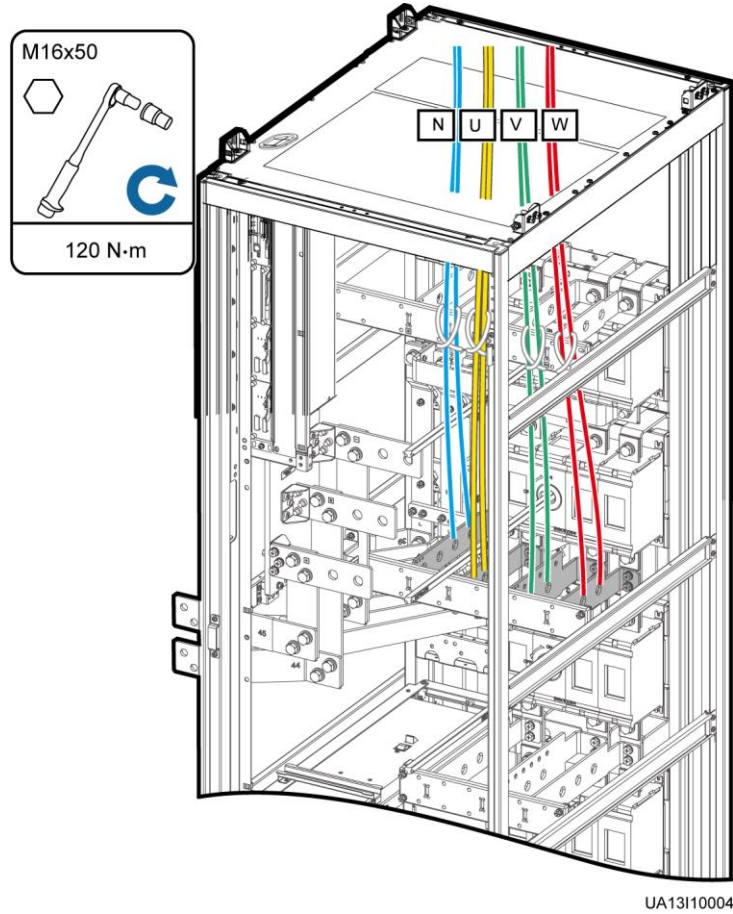


**Step 7** Connect the output power cables.

**CAUTION**

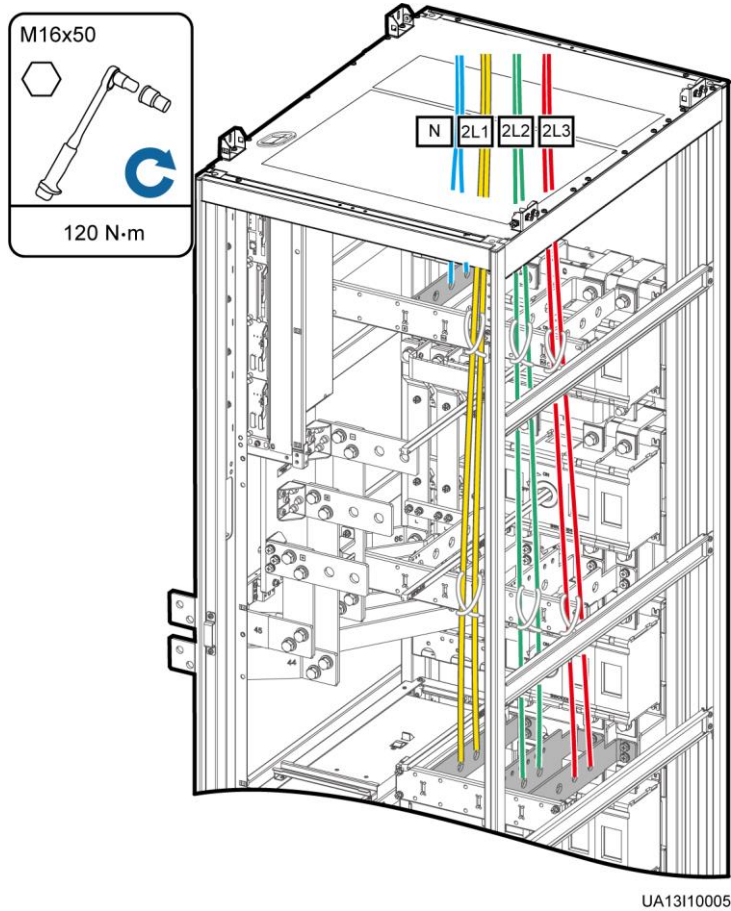
After you connect output power cables, if loads are not ready to be powered, insulate the end of the system output power cable.

**Figure 3-57** Connecting AC output power cables



**Step 8** Connect the bypass input power cables. (Perform this step only when the mains input and bypass input use different power sources.)

**Figure 3-58** Connecting the bypass input power cables

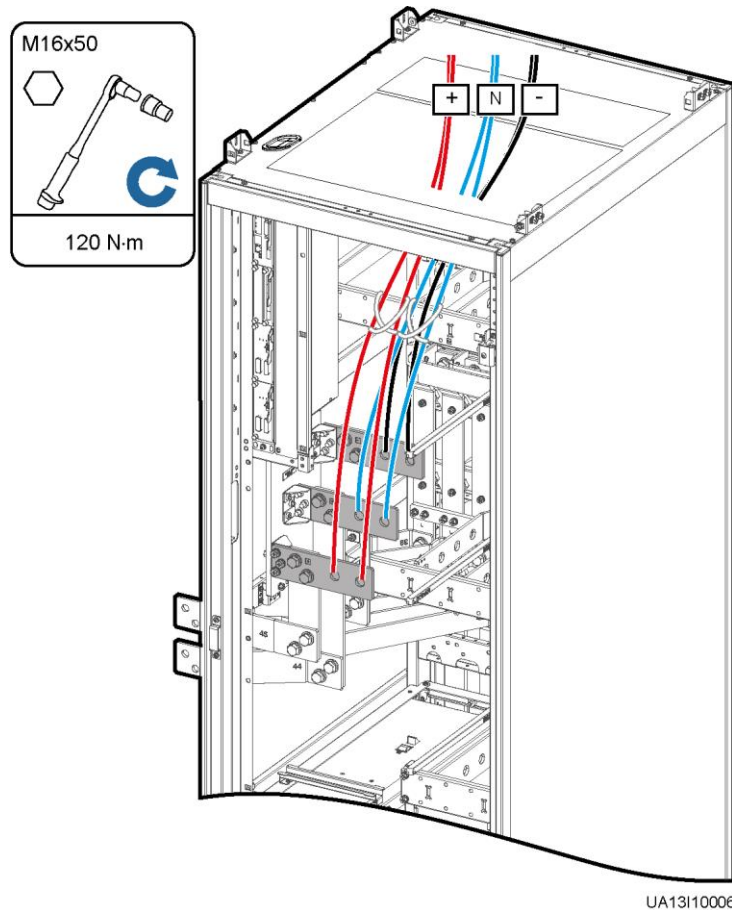


**Step 9** Connect the battery cables.

**⚠ DANGER**

- The battery voltage may result in serious injury. Observe safety precautions when connecting cables.
- Ensure that cables are correctly connected between battery strings and the battery switch, and between the battery switch and the UPS. Avoid inverse connections.

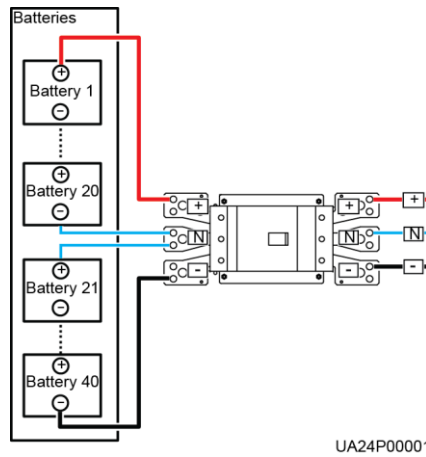
**Figure 3-59** Connecting battery cables



Route a neutral wire from the middle of the positive and negative battery strings.

Take a battery string consisting of 40 batteries for example. The battery neutral wire is routed from the middle of positive and negative battery strings, each consisting of 20 batteries.

**Figure 3-60** Neutral wire



**Step 10** Route signal cables. Bind cables to the cabinet. [Figure 3-61](#) shows the signal cables routed from the top of the cabinet.

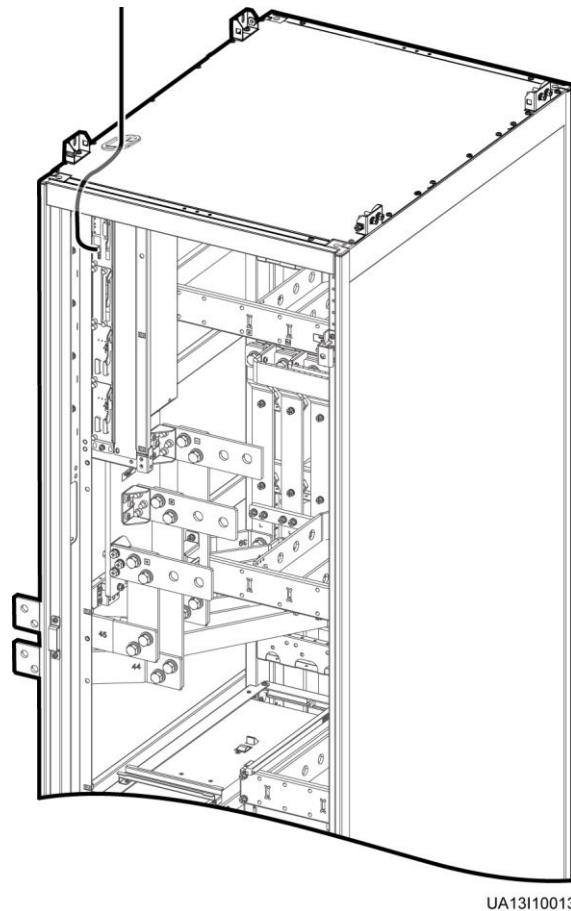
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**NOTICE**

Bind signal cables and power cables separately.

---

**Figure 3-61** Routing signal cables from the top of the cabinet



**NOTE**

The number and colors of signal cables in [Figure 3-61](#) are for reference only.

----End

### Follow-up Procedure

- After connecting cables, reinstall the covers of the power distribution subrack, rear panel, and side panel of the bypass cabinet.
- After connecting cables, check that a certain clearance is reserved between the internal switch (if any) extension pole and power cables to avoid friction.

### 3.2.6.2 Bottom Cable Routing

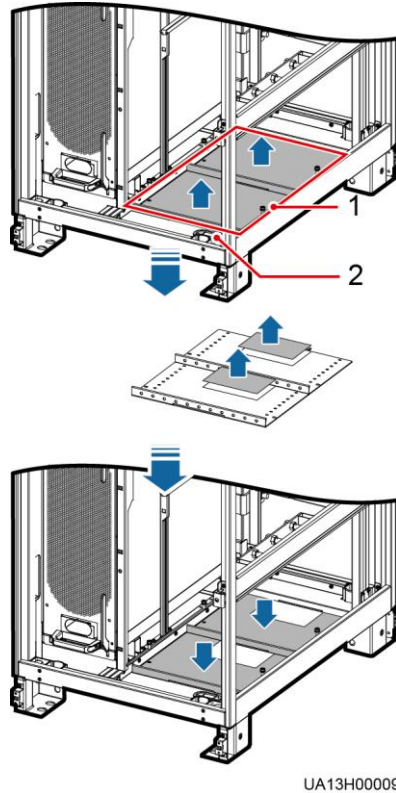
#### Procedure

- Step 1** Open the front door of the bypass cabinet, and remove the covers of the power distribution subrack from the bypass cabinet.
- Step 2** Remove the cable covers from the bottom of the cabinet, drill holes in the covers, attach grommet strips to the hole edges for protecting cables, and reinstall the cable covers.

**NOTE**

The hole size and quantity are for reference only.

**Figure 3-62** Removing the bottom cable covers and drilling holes



(1) Power cable covers

(2) Signal cable hole

**Step 3** Remove the rear cover from the bypass cabinet.

**NOTE**

You are advised to remove the side panel from the bypass cabinet before connecting cables.

**Step 4** Remove the copper bars between the mains and bypass input wiring terminals. (Perform this step only when the mains input and bypass input use different power sources.)

**NOTE**

- Properly keep the removed copper bars and bolts.
- (Optional) If copper bar protective covers are installed for the bypass cabinet, remove the protective covers and then the connecting copper bars. The protective covers need to be reinstalled after the connecting copper bars are removed.

**Step 5** Connect a ground cable to the UPS.



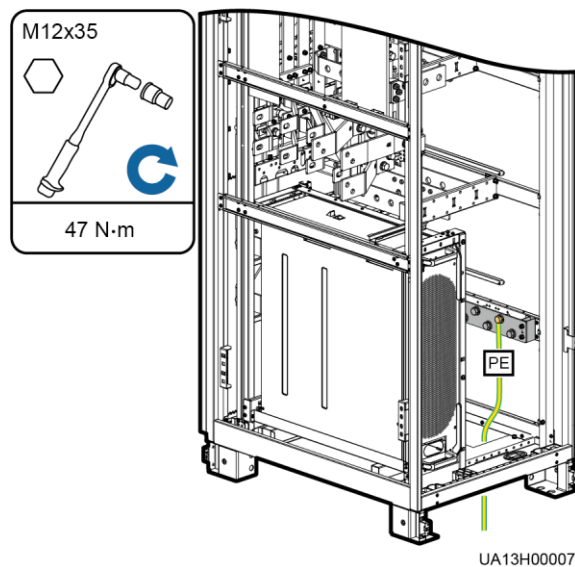
**CAUTION**

If you do not ground the UPS as required, electromagnetic interference, electric shocks, or fire may occur.

**NOTICE**

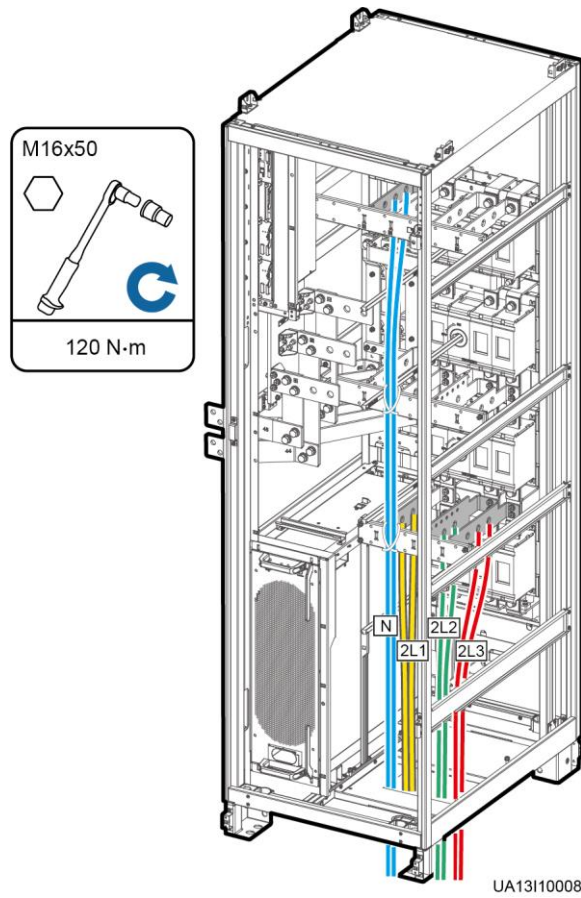
- Connect cables from bottom up in this sequence: bypass input power cables, output power cables, mains input power cables, and battery input power cables.
- When connecting cables, tighten bolts from inside out to secure cables.
- Before connecting cables, ensure that all UPS input switches are turned off. Paste warning labels to prevent others from operating the switches.
- Connect the input power cables to the UPS before connecting power cables to customer equipment.

**Figure 3-63** Grounding



**Step 6** Connect the bypass input power cables. (Perform this step only when the mains input and bypass input use different power sources.)

**Figure 3-64** Connecting the bypass input power cables

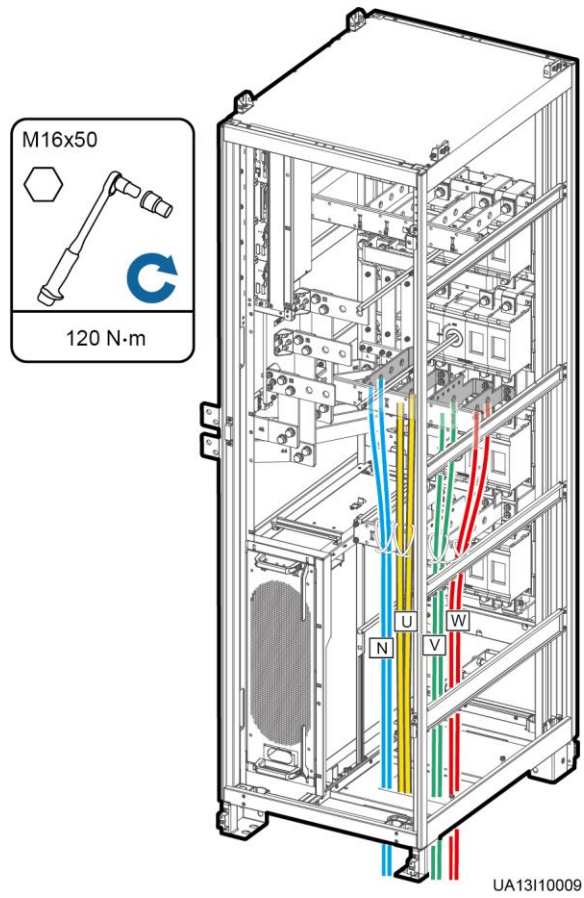


**Step 7** Connect the output power cables.

**CAUTION**

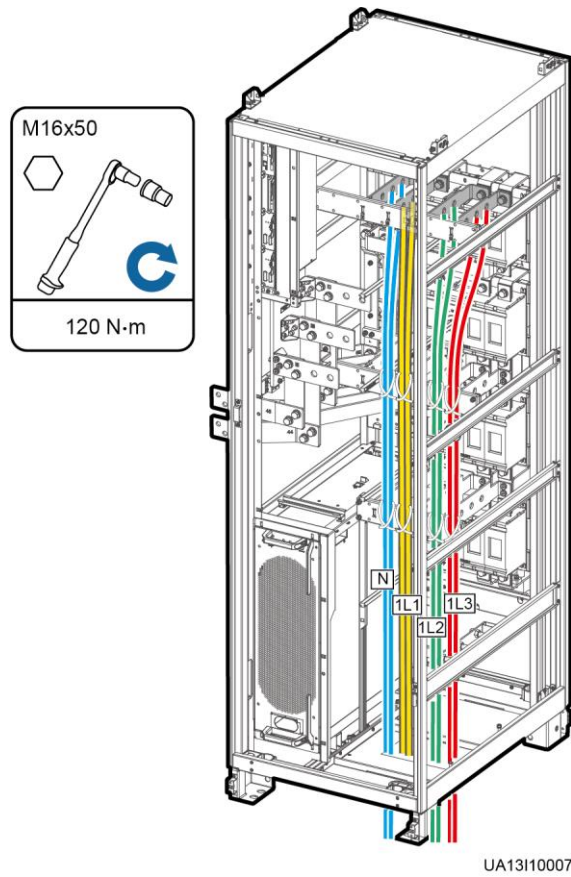
After connecting the output power cables, if loads are not ready to be powered, insulate the terminals of the output power cables.

**Figure 3-65** Connecting output power cables



**Step 8** Connect the mains input power cables.

**Figure 3-66** Connecting the mains input power cables

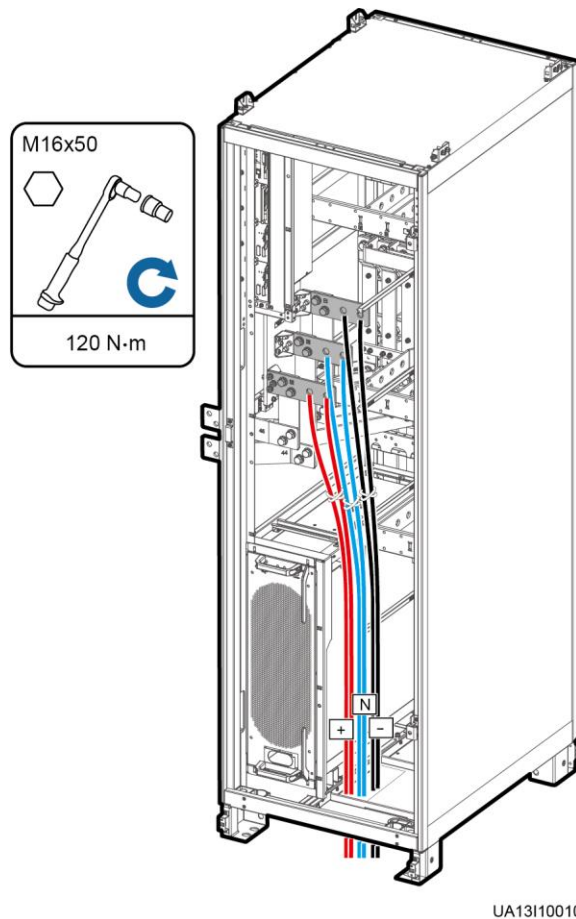


**Step 9** Connect the battery cables.

**⚠ DANGER**

- The battery voltage may result in serious injury. Observe safety precautions when connecting cables.
- Ensure that cables are correctly connected between battery strings and the battery switch, and between the battery switch and the UPS. Avoid inverse connections.

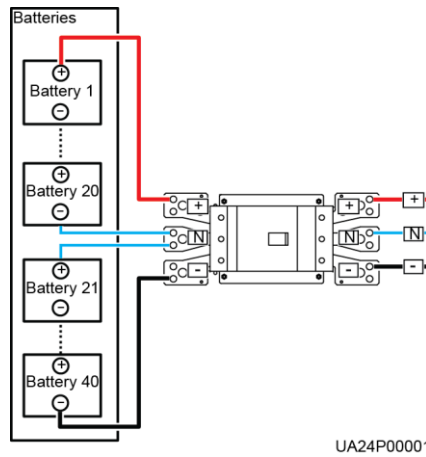
**Figure 3-67** Connecting battery cables



Route a neutral wire from the middle of the positive and negative battery strings.

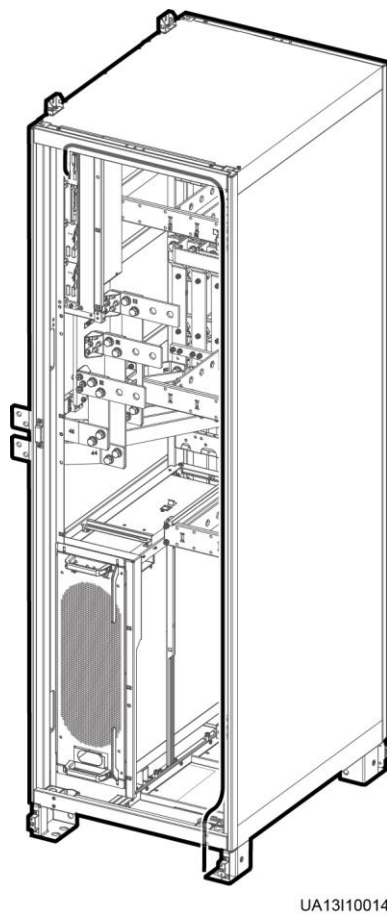
Take a battery string consisting of 40 batteries for example. The battery neutral wire is routed from the middle of positive and negative battery strings, each consisting of 20 batteries.

**Figure 3-68** Neutral wire



**Step 10** Route signal cables. Bind cables to the cabinet. [Figure 3-69](#) shows the signal cables routed from the bottom of the cabinet.

**Figure 3-69** Signal cables routed from the bottom



 **NOTE**

The number and colors of signal cables in [Figure 3-69](#) are for reference only.

----End

## Follow-up Procedure

- After connecting cables, reinstall the covers of the power distribution subrack, rear panel, and side panel of the bypass cabinet.
- After connecting cables, check that a certain clearance is reserved between the internal switch (if any) extension pole and power cables to avoid friction.

## 3.2.7 Routing Cables (800 kVA UPS)

---

**NOTICE**

- This section introduces the dual mains scenario. If single mains is used, you do not need to remove the copper bars between the mains and bypass input terminals or connect the bypass input cable.
  - Determine the cable cross-sectional area and quantity based on the section "Preparing Power Cables" and site requirements. The figures are for reference only.
- 

### 3.2.7.1 Top Cable Routing

#### Context

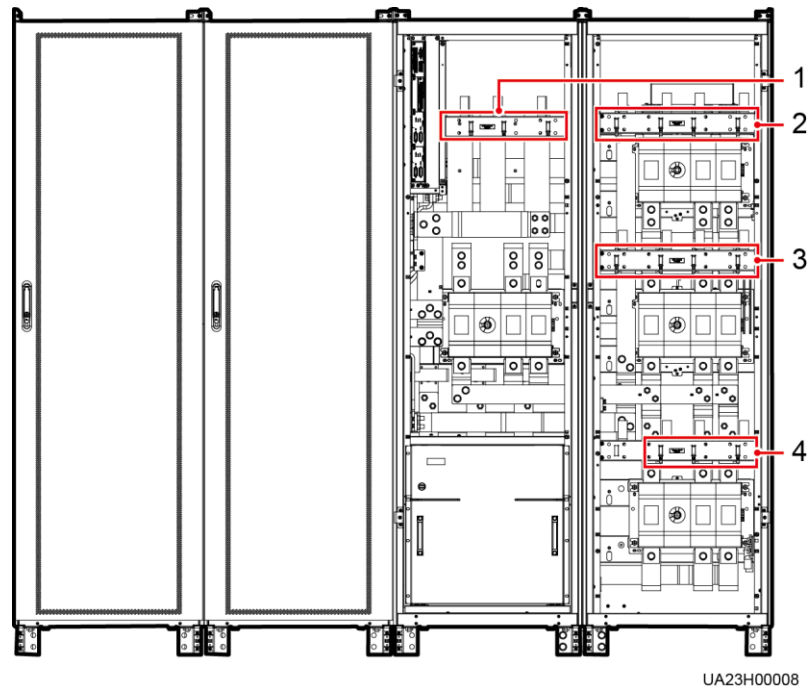
---

**NOTICE**

Route cables for the UPS from inside out and from top down.

---

**Figure 3-70** Power distribution module



UA23H00008

(1) Battery input terminal

(2) Mains input terminal

(3) Output terminal

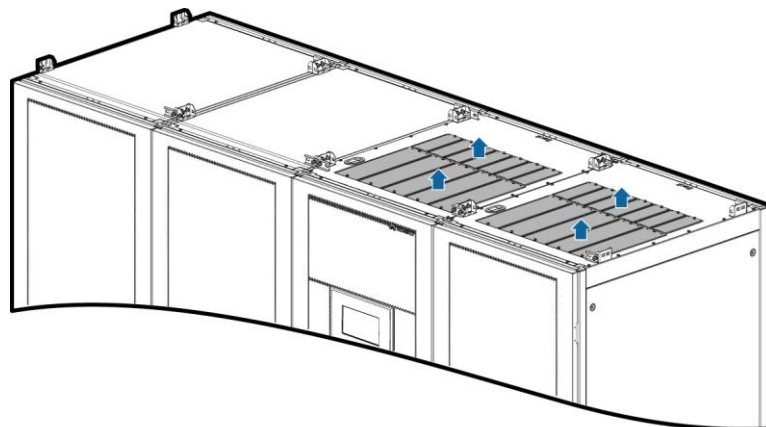
(4) Bypass input terminal

## Procedure

**Step 1** Open the front door of the bypass cabinet, and remove the covers of the power distribution subrack from the bypass cabinet.

**Step 2** Remove the cable covers from the top of the cabinet.

**Figure 3-71** Removing the top cable covers



UA23H00006

**Step 3** Remove the rear cover from the bypass cabinet.



 **NOTE**

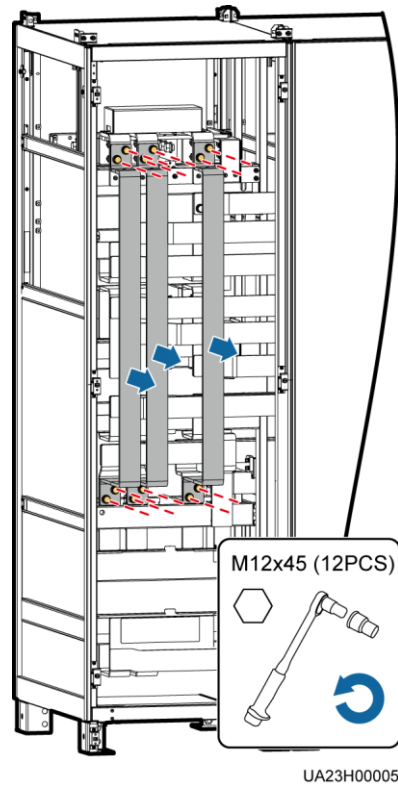
You are advised to remove the side panel from the bypass cabinet before connecting cables.

**Step 4** Remove the copper bars between the mains and bypass inputs. (Perform this step only when the mains input and bypass input use different power sources.)

 **NOTE**

- Properly keep the removed copper bars and bolts.
- (Optional) If copper bar protective covers are installed for the bypass cabinet, remove the protective covers and then the connecting copper bars. The protective covers need to be reinstalled after the connecting copper bars are removed.

**Figure 3-72** Removing the connecting copper bars

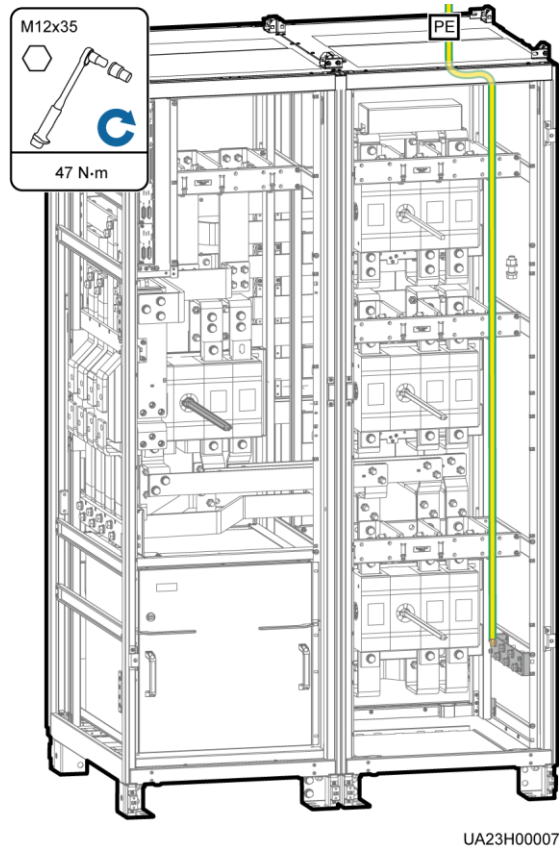


**Step 5** Connect a ground cable to the UPS.

**NOTICE**

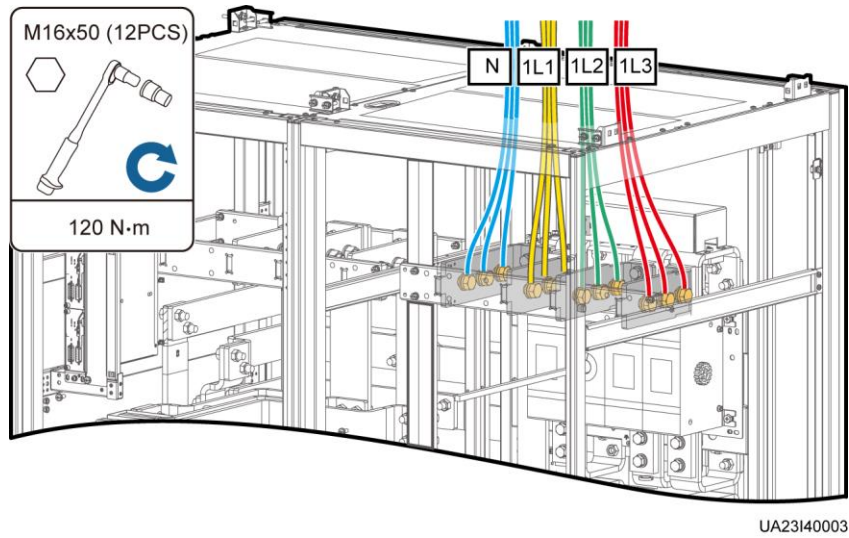
- Before connecting cables, ensure that all UPS input switches are turned off. Paste warning labels to prevent others from operating the switches.
- Connect the input power cables to the UPS before connecting power cables to customer equipment.

**Figure 3-73** Grounding



**Step 6** Connect the mains input power cables.

**Figure 3-74** Connecting the mains input power cables

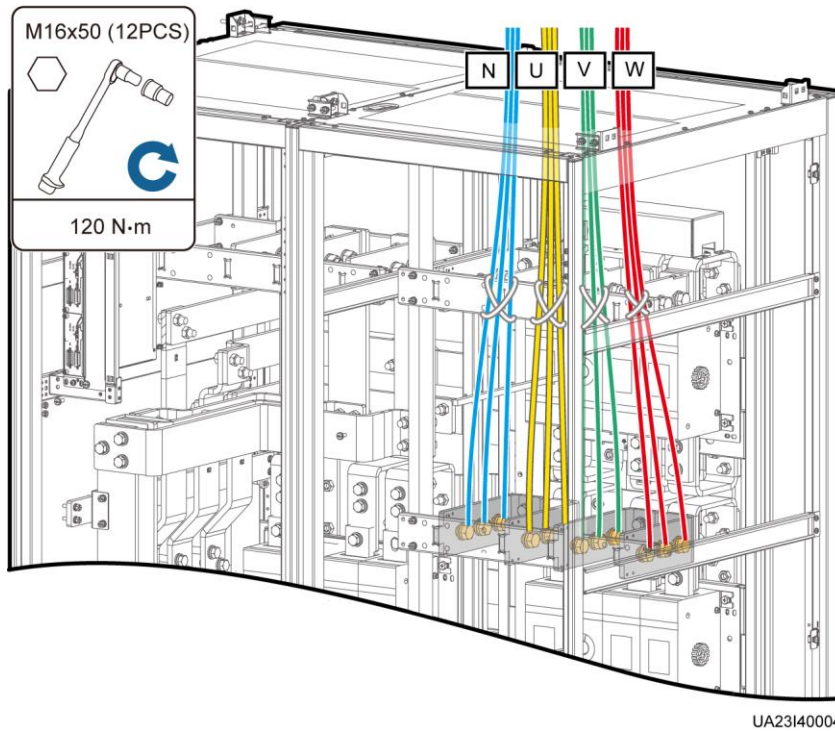


**Step 7** Connect the output power cables.

**CAUTION**

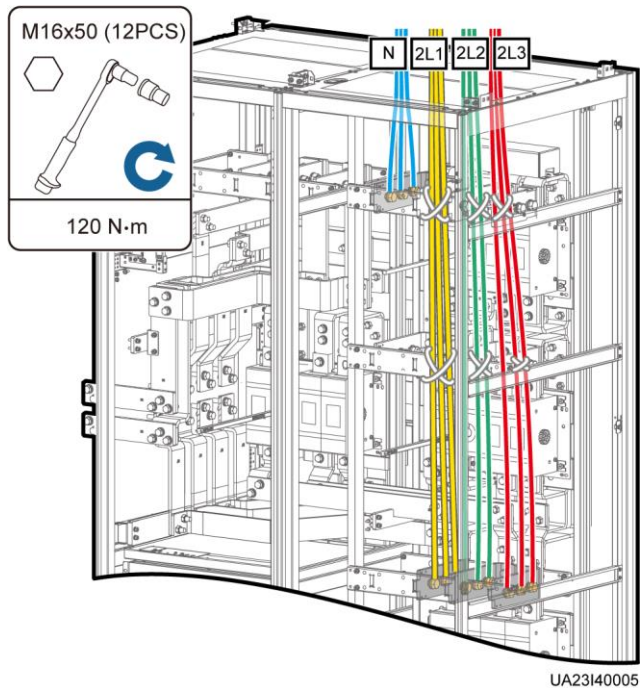
After connecting the output power cables, if loads are not ready to be powered, insulate the terminals of the output power cables.

**Figure 3-75** Connecting AC output power cables



**Step 8** Connect the bypass input power cables. (Perform this step only when the mains input and bypass input use different power sources.)

**Figure 3-76** Connecting the bypass input power cables

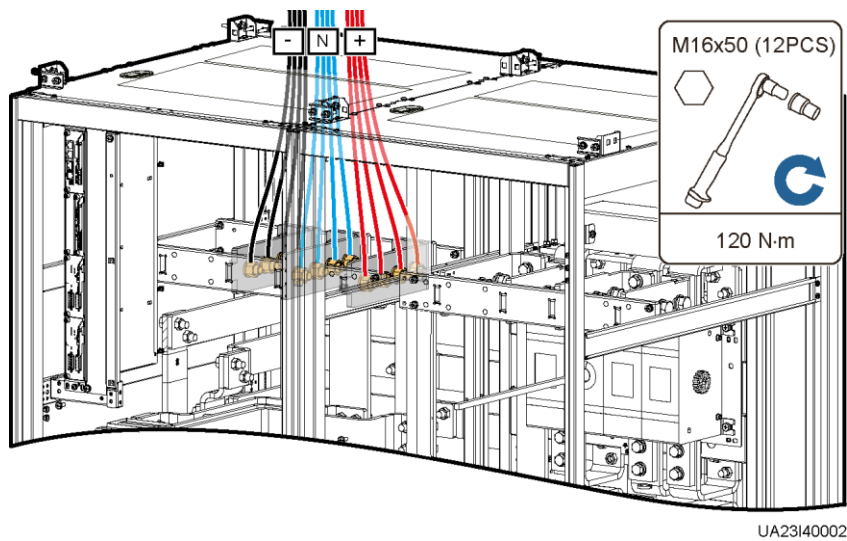


**Step 9** Connect the battery cables.

**⚠ DANGER**

- The battery voltage may result in serious injury. Observe safety precautions when connecting cables.
- Ensure that cables are correctly connected between battery strings and the battery switch, and between the battery switch and the UPS. Avoid inverse connections.

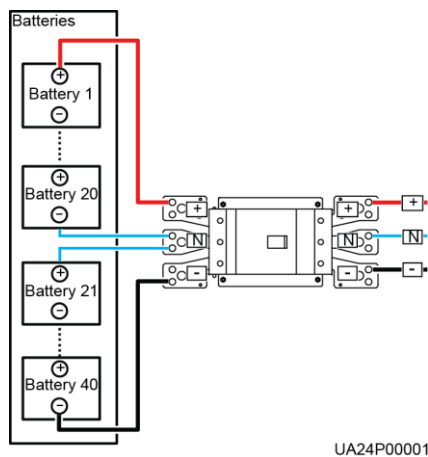
**Figure 3-77** Connecting battery cables



Route a neutral wire from the middle of the positive and negative battery strings.

Take a battery string consisting of 40 batteries for example. The battery neutral wire is routed from the middle of positive and negative battery strings, each consisting of 20 batteries.

**Figure 3-78** Neutral wire



- Step 10** Route signal cables. Bind cables to the cabinet. [Figure 3-79](#) shows the signal cables routed from the top of the cabinet.

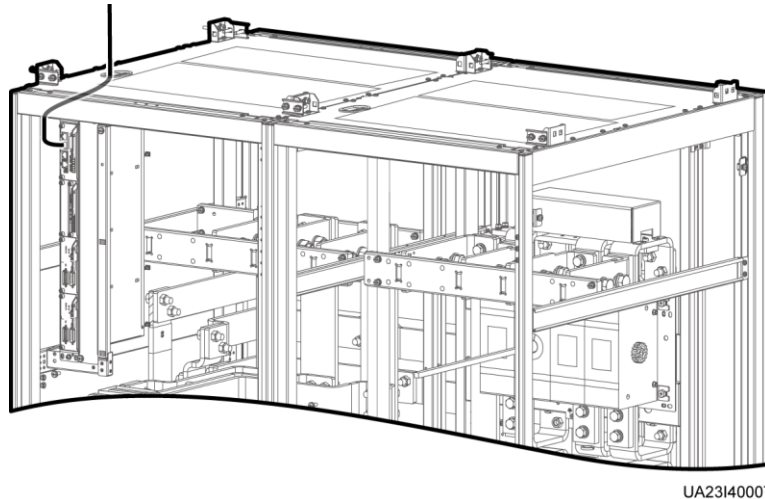
---

**NOTICE**

Do not bind signal cables and power cables together.

---

**Figure 3-79** Routing signal cables from the top of the cabinet



**NOTE**

The number and colors of signal cables in [Figure 3-79](#) are for reference only.

----End

## Follow-up Procedure

- After connecting cables, reinstall the covers of the power distribution subrack, rear panel, and side panel of the bypass cabinet.
- After connecting cables, check that a certain clearance is reserved between the internal switch (if any) extension pole and power cables to avoid friction.

## 3.2.7.2 Bottom Cable Routing

### Context

---

**NOTICE**

Route cables for the UPS from inside out and from bottom up.

---

## Procedure

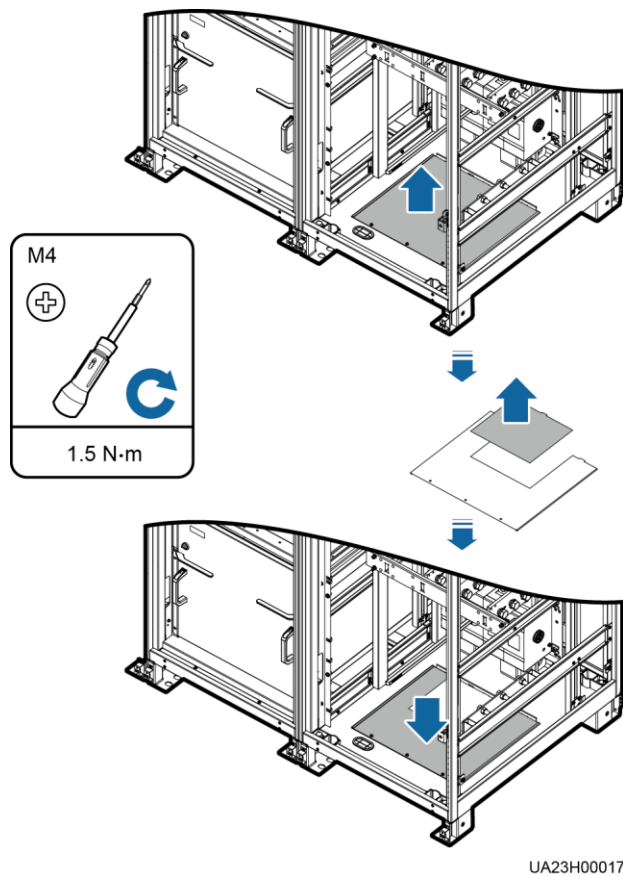
**Step 1** Open the front door of the bypass cabinet, and remove the covers of the power distribution subrack from the bypass cabinet.

**Step 2** Remove the cable covers from the bottom of the cabinet, drill holes in the covers, attach grommet strips to the hole edges for protecting cables, and reinstall the cable covers.

### NOTE

The hole diameter and quantity are for reference only.

**Figure 3-80** Removing the bottom cable covers and drilling holes



UA23H00017

**Step 3** Remove the rear cover from the bypass cabinet.

### NOTE

You are advised to remove the side panel from the bypass cabinet before connecting cables.

**Step 4** Remove the copper bars between the mains and bypass input wiring terminals. (Perform this step only when the mains input and bypass input use different power sources.)

### NOTE

- Properly keep the removed copper bars and bolts.
- (Optional) If copper bar protective covers are installed for the bypass cabinet, remove the protective covers and then the connecting copper bars. The protective covers need to be reinstalled after the connecting copper bars are removed.

**Step 5** Connect a ground cable to the UPS.

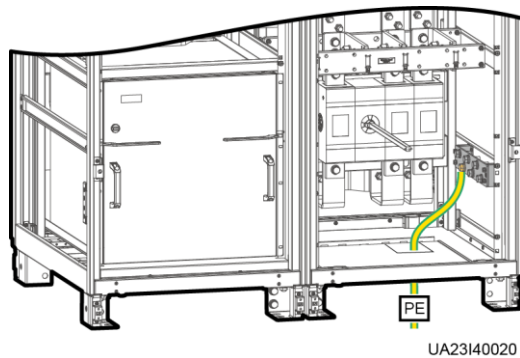
**CAUTION**

If you do not ground the UPS as required, electromagnetic interference, electric shocks, or fire may occur.

**NOTICE**

- Before connecting cables, ensure that all UPS input switches are turned off. Paste warning labels to prevent others from operating the switches.
- Connect the input power cables to the UPS before connecting power cables to customer equipment.

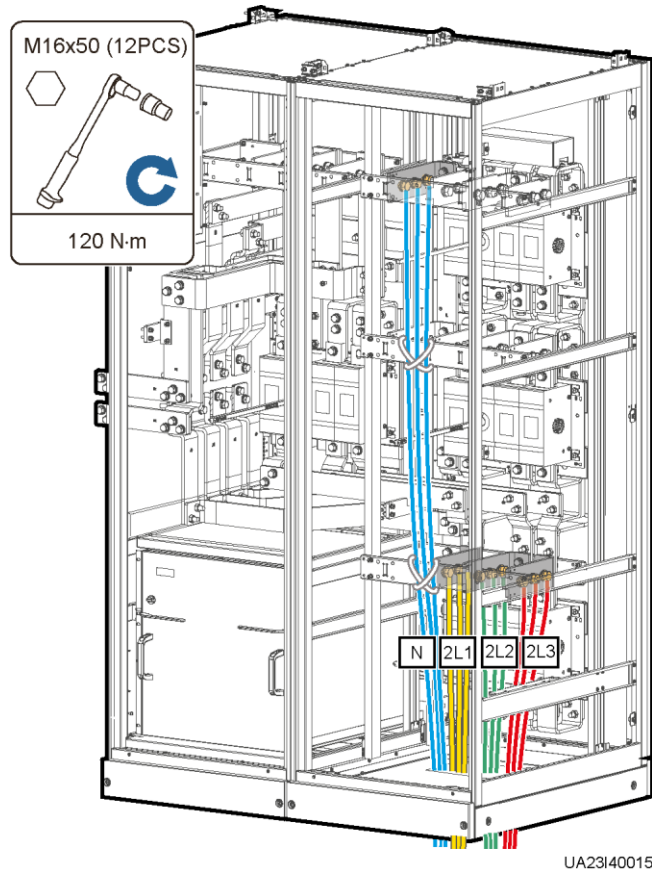
**Figure 3-81** Grounding



**Step 6** Connect the bypass input power cables. (Perform this step only when the mains input and bypass input use different power sources.)



**Figure 3-82** Connecting the bypass input power cables

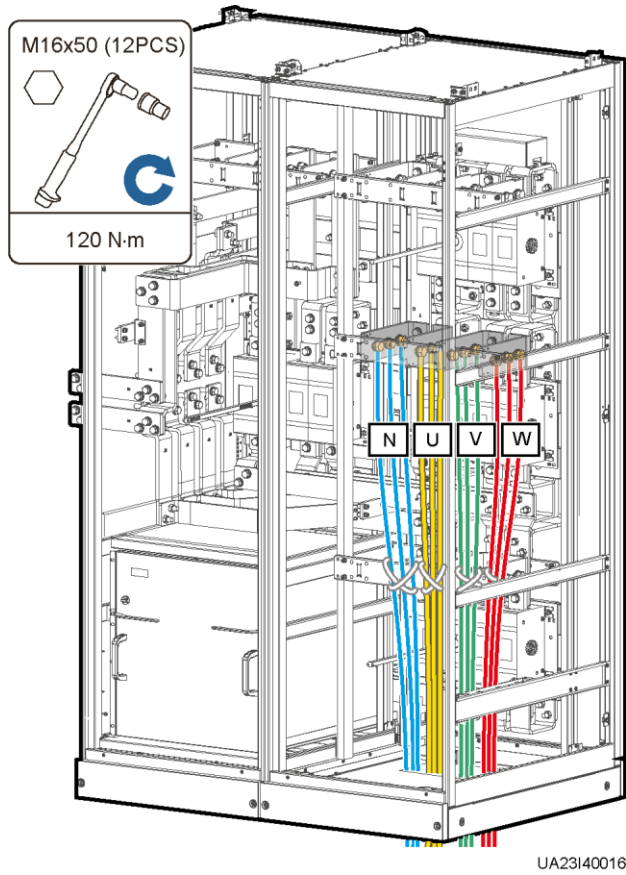


**Step 7** Connect the output power cables.

**CAUTION**

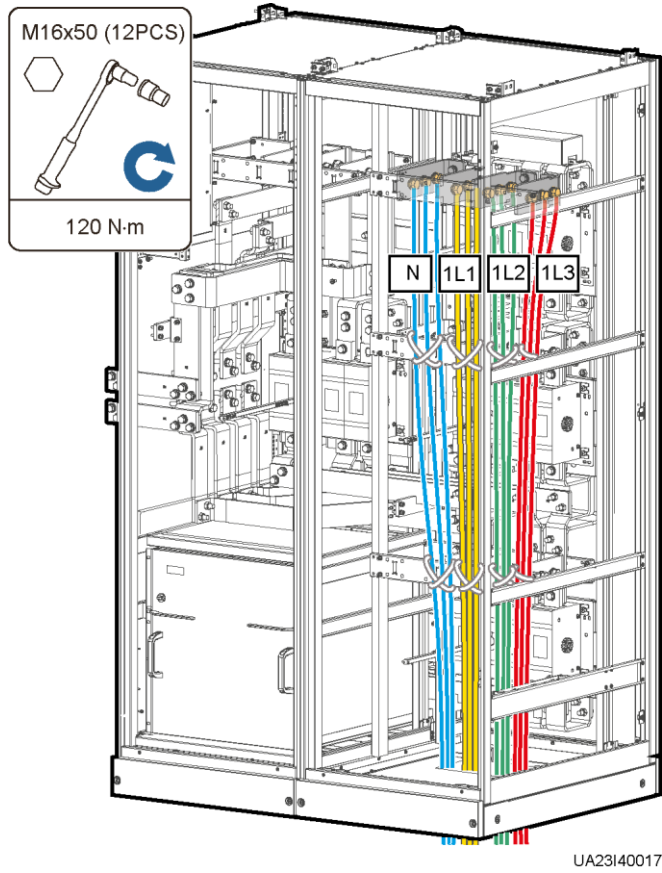
After connecting the output power cables, if loads are not ready to be powered, insulate the terminals of the output power cables.

**Figure 3-83** Connecting the output power cables



**Step 8** Connect the mains input power cables.

**Figure 3-84** Connecting the mains input power cables

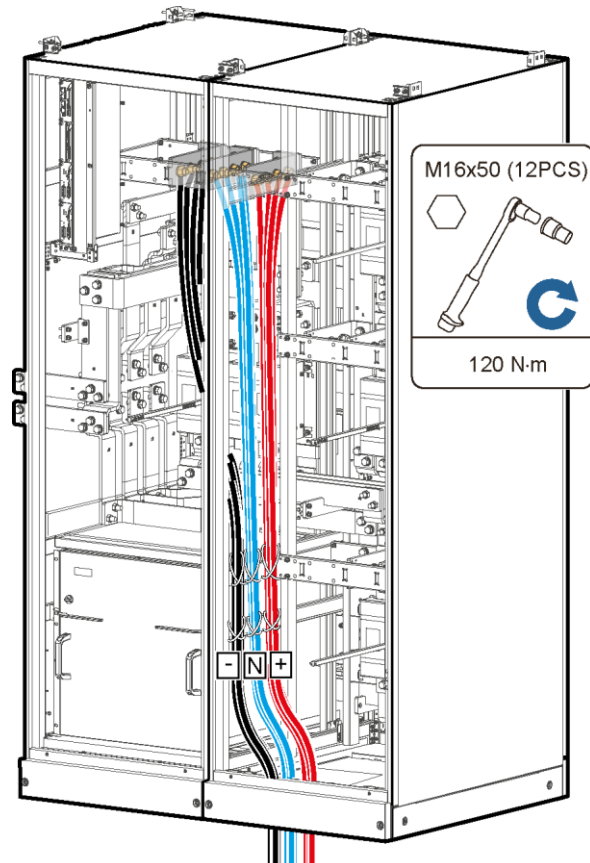


**Step 9** Connect the battery cables.

**⚠ DANGER**

- The battery voltage may result in serious injury. Observe safety precautions when connecting cables.
- Ensure that cables are correctly connected between battery strings and the battery switch, and between the battery switch and the UPS. Avoid inverse connections.

**Figure 3-85** Connecting the battery cables

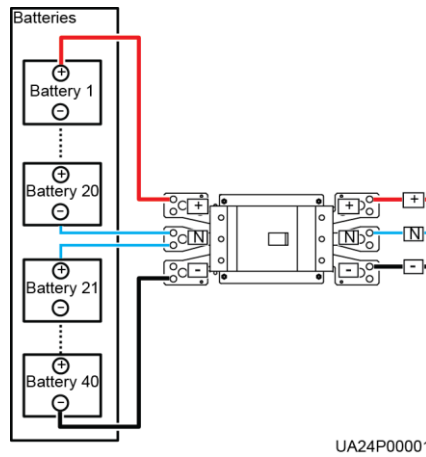


UA23140018

Route a neutral wire from the middle of the positive and negative battery strings.

Take a battery string consisting of 40 batteries for example. The battery neutral wire is routed from the middle of positive and negative battery strings, each consisting of 20 batteries.

**Figure 3-86** Neutral wire



**Step 10** Route signal cables. Bind cables to the cabinet. [Figure 3-87](#) shows the signal cables routed from the bottom of the cabinet.

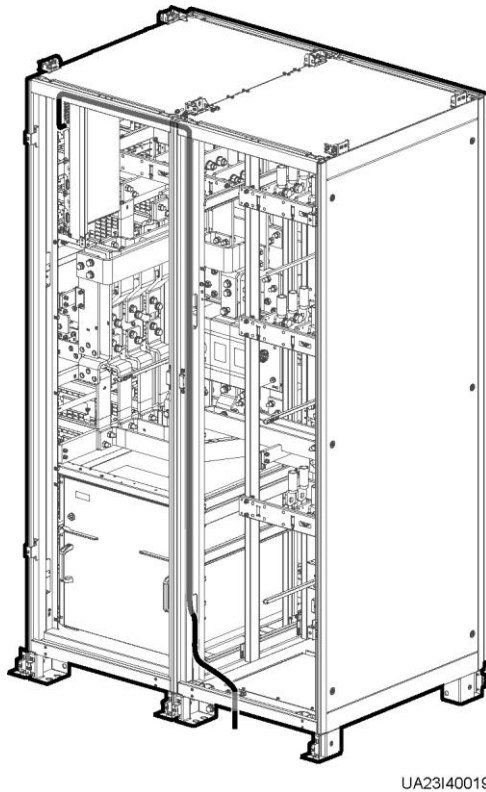
---

**NOTICE**

Do not bind signal cables and power cables together.

---

**Figure 3-87** Signal cables routed from the bottom



UA23I40019

----End

## Follow-up Procedure

- After connecting cables, reinstall the covers of the power distribution subrack, rear panel, and side panel of the bypass cabinet.
- After connecting cables, check that a certain clearance is reserved between the internal switch (if any) extension pole and power cables to avoid friction.

## 3.2.8 Remote EPO

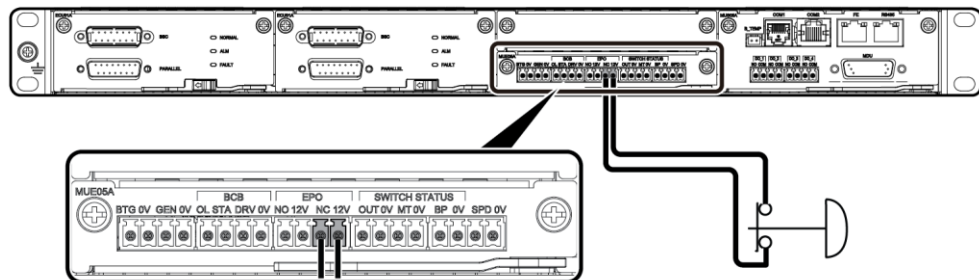
### NOTICE

- Huawei does not provide the EPO switch or cable. If the cable is required, the recommended cable is 22 AWG.
- Equip the EPO switch with a protective cover to prevent misoperations, and cover the cable with protective tubing.
- Triggering EPO will shut down the rectifier, inverter, charger, and static bypass, but does not disconnect the UPS mains input. To power off the UPS completely, open the front-end input switch when triggering EPO.

Connect the requisite EPO switch to UPS dry contacts.

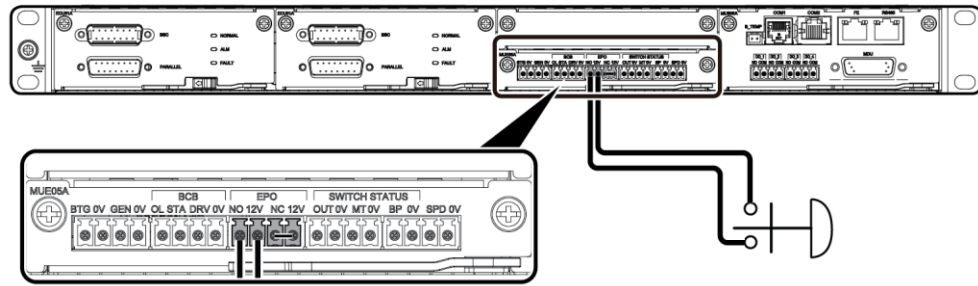
- [Figure 3-88](#) shows the cable connections for an NC EPO switch.
- [Figure 3-89](#) shows the cable connections for an NO EPO switch.

**Figure 3-88** Cable connection for an NC EPO switch



UA10000063

**Figure 3-89** Cable connection for an NO EPO switch



UA10000062

**NOTE**

- When the EPO switch is in the NC state, remove the jumper between EPO\_NC and EPO\_12V before connection. When the EPO switch is turned off, EPO is triggered.
- When the EPO switch is in the NO state, ensure that the jumper is connected between EPO\_NC and EPO\_12V. When the EPO switch is turned on, EPO is triggered.

## 3.2.9 Connecting Communications Cables

### Procedure

- Step 1** Connect the external network management device to the RS485 port of the monitoring interface card.
  - Step 2** Connect the network port on a PC to the FE port of the monitoring interface card.
- End

## 3.3 Parallel System Installation

### 3.3.1 Connecting Power Cables

#### Context

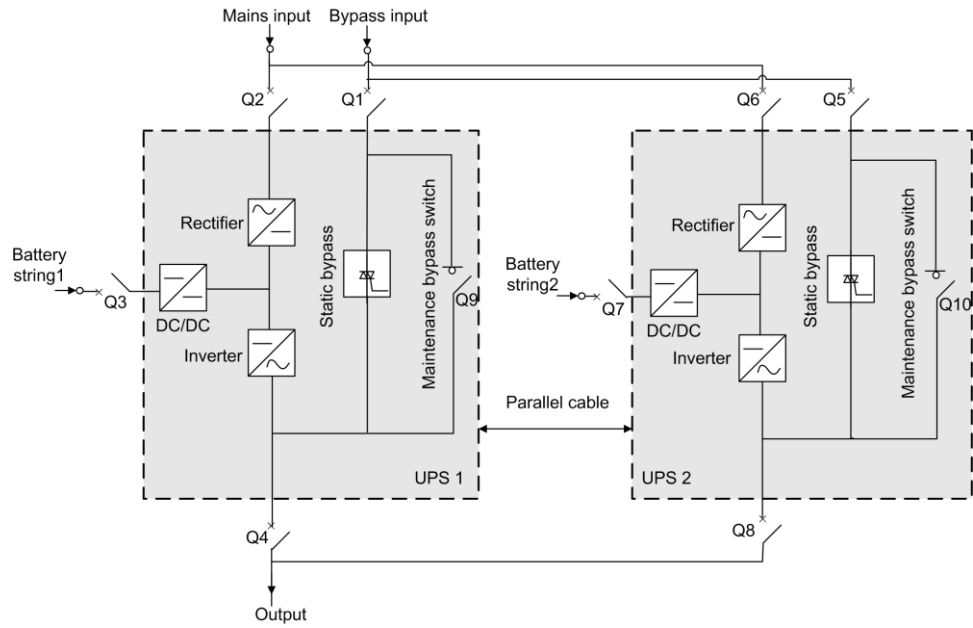
**NOTE**

Power cables are connected in the same way for the 400 kVA, 500 kVA, and 600 kVA UPSs. This section describes how to connect power cables for the 400 kVA UPS.

### Procedure

- Step 1** Ground each UPS in a parallel system separately, and connect power cables and battery cables by referring to [3.2.6 Routing Cables \(400 kVA, 500 kVA, or 600 kVA UPS\)](#) and [3.2.7 Routing Cables \(800 kVA UPS\)](#).
  - Step 2** Choose a parallel mode and connect cables to the parallel system based on site requirements.
- [Figure 3-90](#), [Figure 3-91](#), and [Figure 3-92](#) show the typical conceptual diagram and cable connections for a 1+1 parallel system.

**Figure 3-90** Conceptual diagram of a 1+1 parallel system

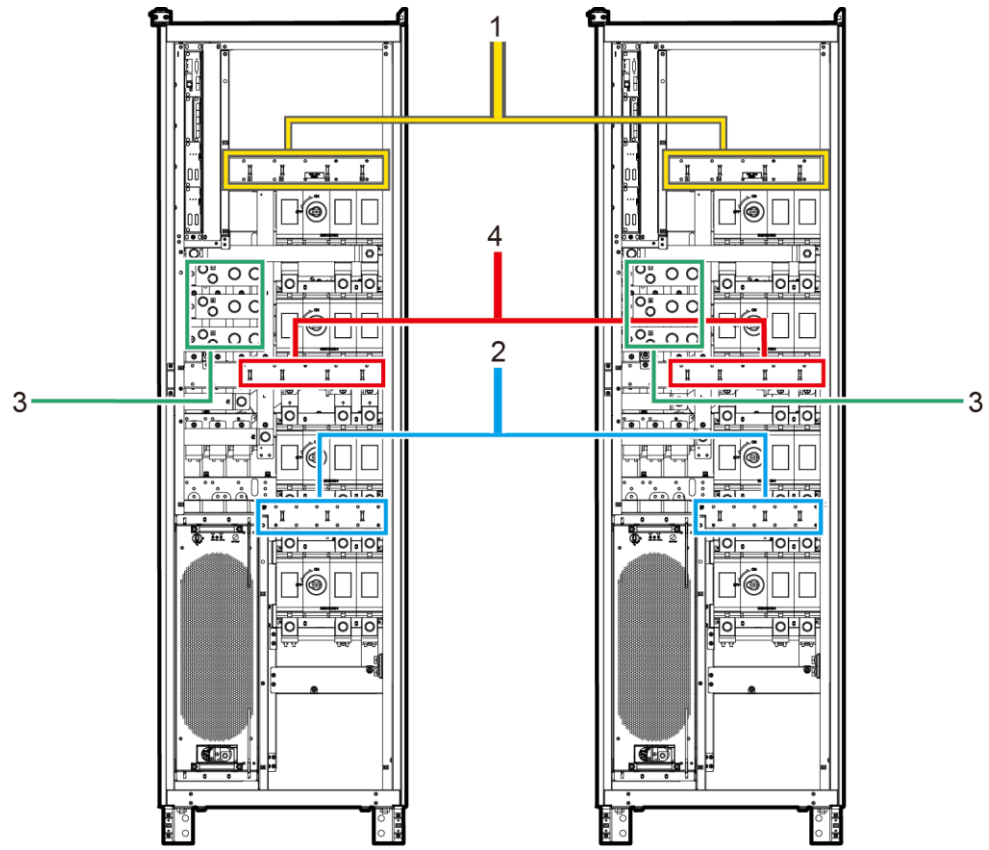


**NOTICE**

Connect power cables according to port silk screen.



**Figure 3-91** Cable connections for a 1+1 parallel system (400 kVA UPS)



UA13110015

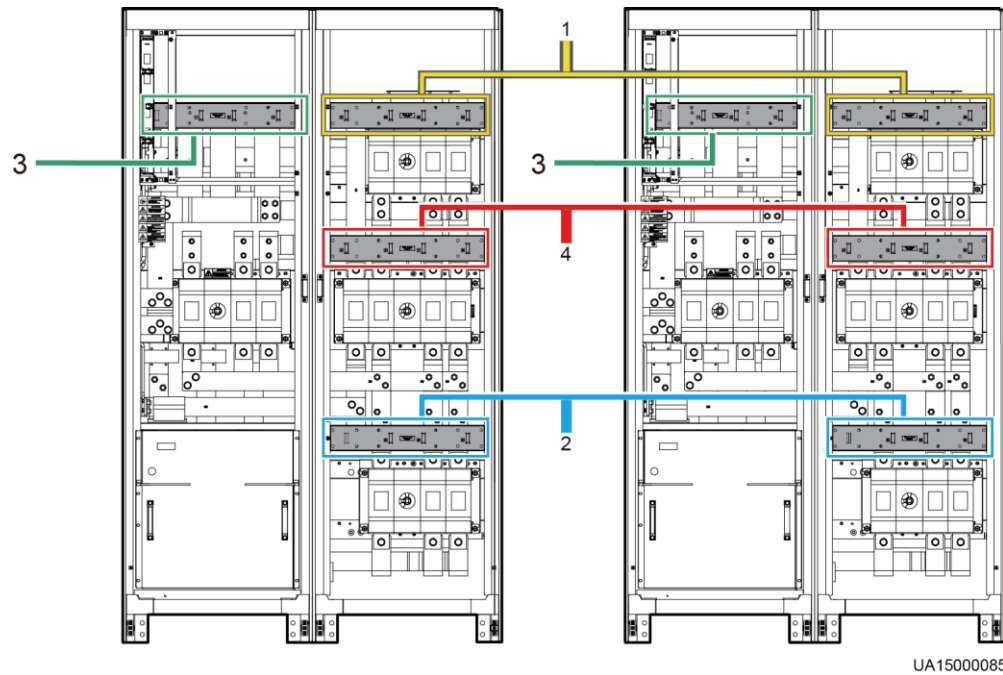
(1) Mains input power cables

(2) Bypass input power cables

(3) Battery cables

(4) Output power cables

**Figure 3-92** Cable connections for a 1+1 parallel system (800 kVA UPS)



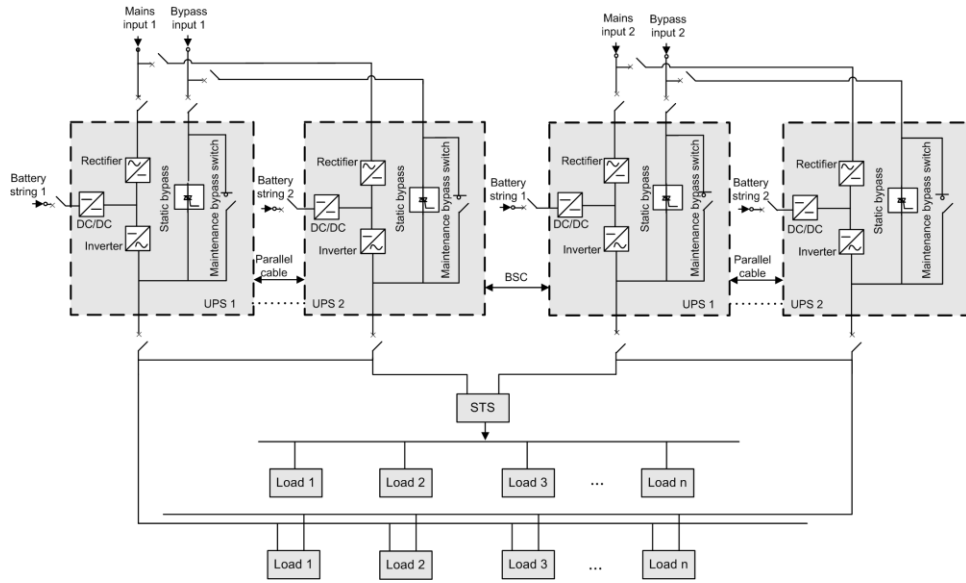
- (1) Mains input power cables
- (2) Bypass input power cables
- (3) Battery cables
- (4) Output power cables

Figure 3-93, Figure 3-94, and Figure 3-95 show the conceptual diagram and cable connections for a bus system consisting of two UPSs.

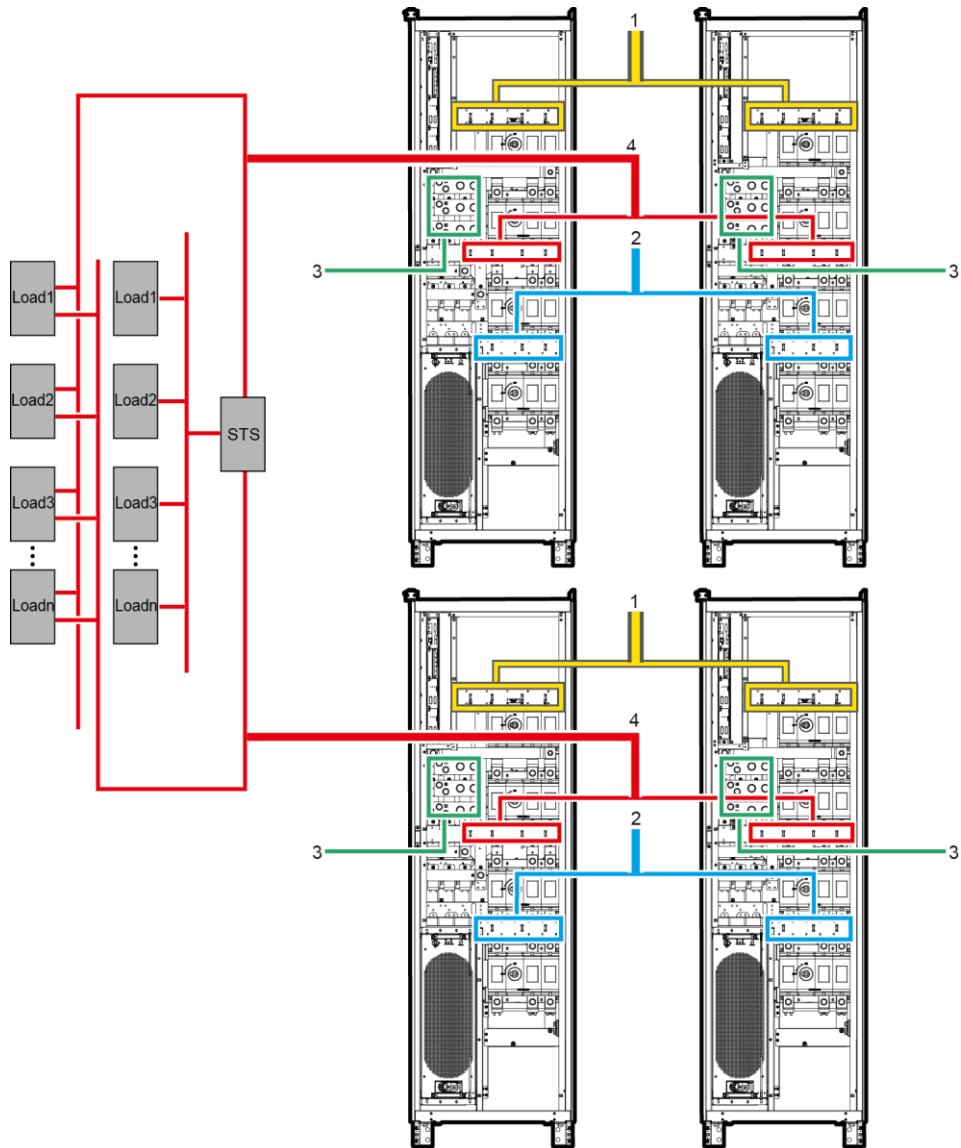
**NOTICE**

The length and specifications of power cables on each UPS must be the same to achieve current equalization in bypass mode. The power cables include bypass input power cables and UPS output power cables.

Figure 3-93 Conceptual diagram of a dual-bus system



**Figure 3-94** Cable connections for a dual-bus parallel system (400 kVA UPS)



(1) Mains input power cables

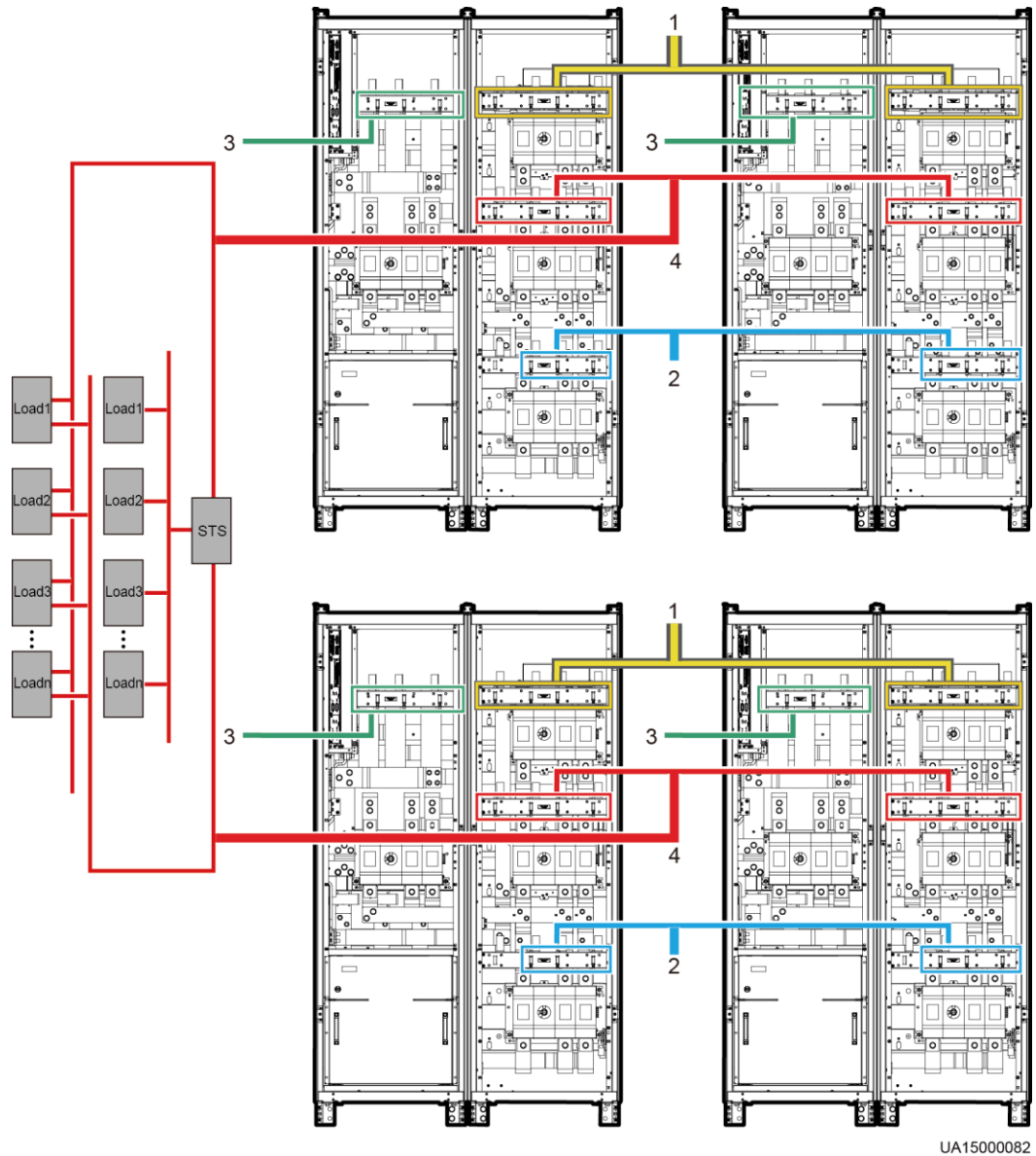
(2) Bypass input power cables

(3) Battery cables

(4) Output power cables

UA13110017

**Figure 3-95** Cable connections for a dual-bus parallel system (800 kVA UPS)



- (1) Mains input power cables
- (2) Bypass input power cables
- (3) Battery cables
- (4) Output power cables

----End

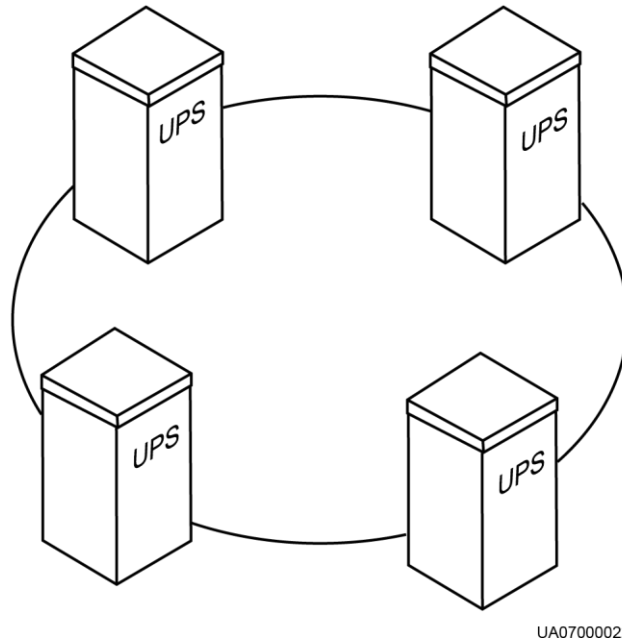
### 3.3.2 Connecting Signal Cables

#### Connecting Signal Cables to a Parallel System

Connect the parallel ports on the UPSs over parallel cables to create a loop.

- [Figure 3-96](#) and [Figure 3-97](#) show the wiring principle for an N+X parallel system.

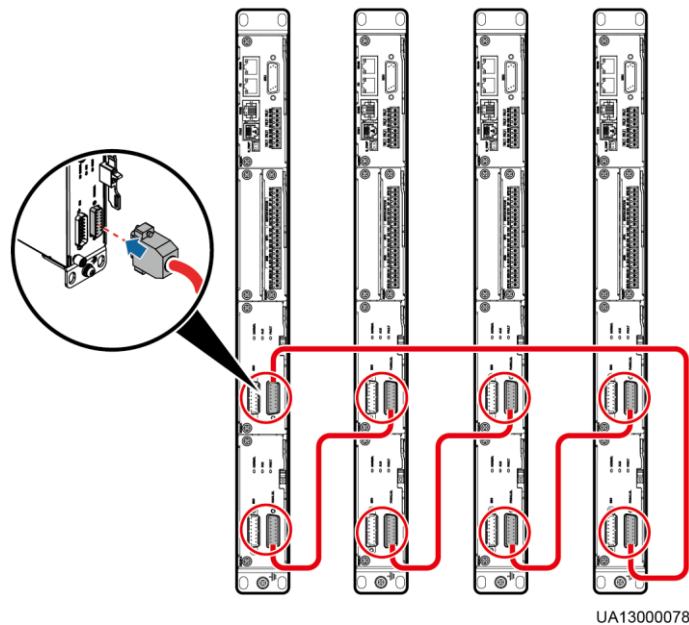
**Figure 3-96** N+X parallel system topology



**NOTICE**

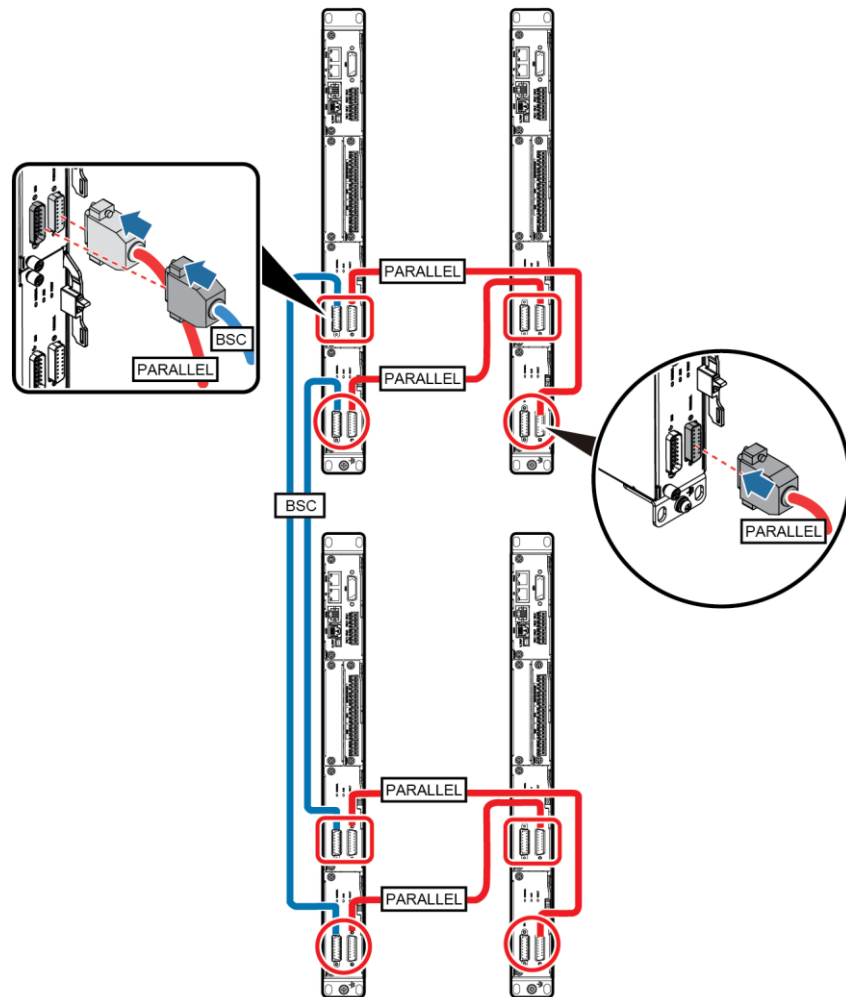
Figure 3-97 shows only the CM, which stands for the UPS.

**Figure 3-97** Signal cable connections of N+X parallel system



- BSC master and slave cables are required in a dual-bus parallel system. Figure 3-98 shows the cable connections for a dual-bus system containing two master systems.

**Figure 3-98** Connecting signal cables to a dual-bus system



UA13000034

## Connecting Other Signal Cables

Connect signal cables for each UPS.

## 3.4 Installation Verification

Table 3-11 lists check items.

### NOTICE

If the check results of listed items 8 and 9 in Table 3-11 do not meet the acceptance criteria, the UPS may be damaged.

**Table 3-11** Installation checklist

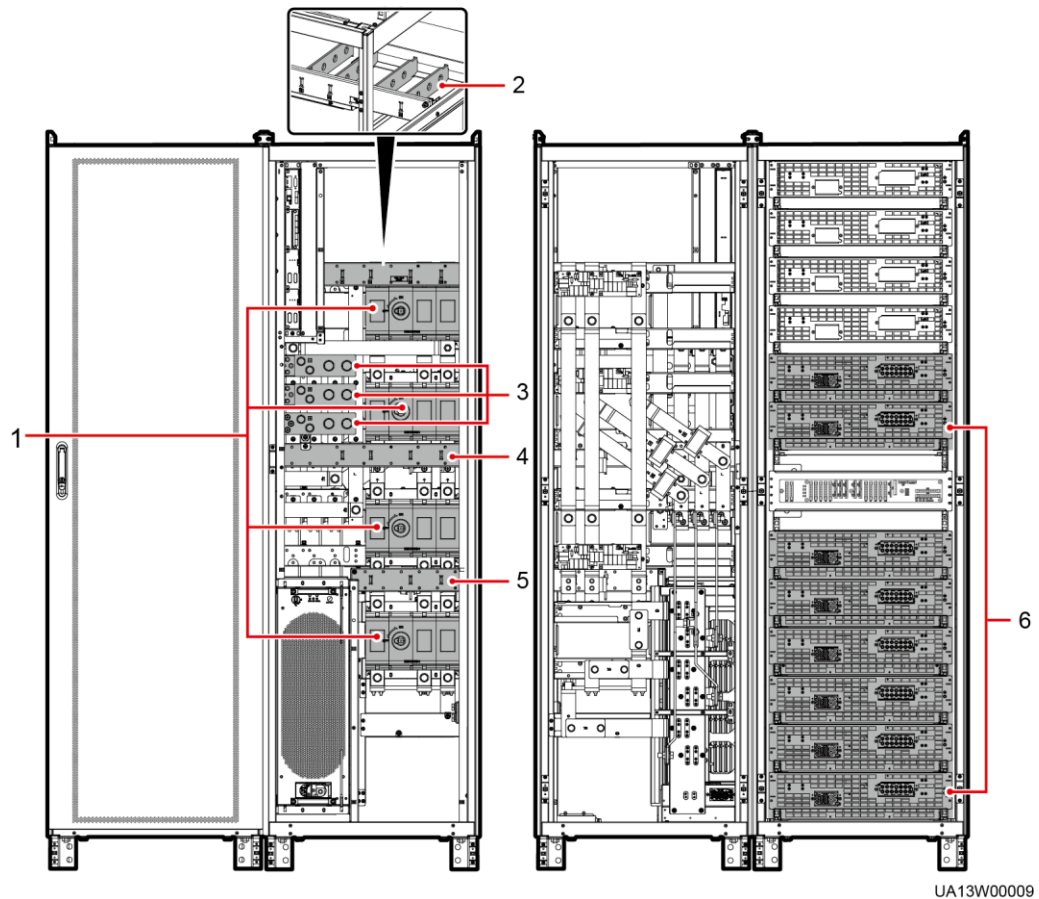
No.	Item	Acceptance Criteria
01	UPS installation	The UPS is securely installed and does not tilt due to vibration.
02	Neat arrangement	The UPS and its adjacent cabinets are neatly arranged and secured with connecting plates.
03	Cable layout	Cables are routed properly and cable routing meets customer requirements.
04	Cable labels	Both ends of a cable are labeled. Labels are concise and easy to understand.
05	Cable ties	Cable ties are secured evenly and no burr exists.
06	Cable connections	The input, output, and battery cables are securely connected. For the cables secured by screws, the spring washers are flattened.
07	Grounding	The resistance between the UPS ground bar and the equipment room ground bar is less than 0.1 ohm.
08	AC phase sequence	For a single UPS, the mains input, bypass input, and output phase sequences are correct. For a parallel system, the phase sequences of each UPS must be consistent.
09	Battery cable connections	The battery strings are correctly connected to the UPS.
10	Foreign matter cleaning inside the cabinet	The inside and outside of the cabinet, and other operating components, are free from conductive dust. <ol style="list-style-type: none"> <li>1. There is no foreign matter (such as copper wires and screws) on the top of the cabinet.</li> <li>2. There is no foreign matter on the copper bar terminals.</li> <li>3. There is no foreign matter around switch terminals.</li> <li>4. There is no foreign matter on the bottom plate of the cabinet.</li> <li>5. There is no foreign matter on the rear module subrack.</li> </ol>



**NOTE**

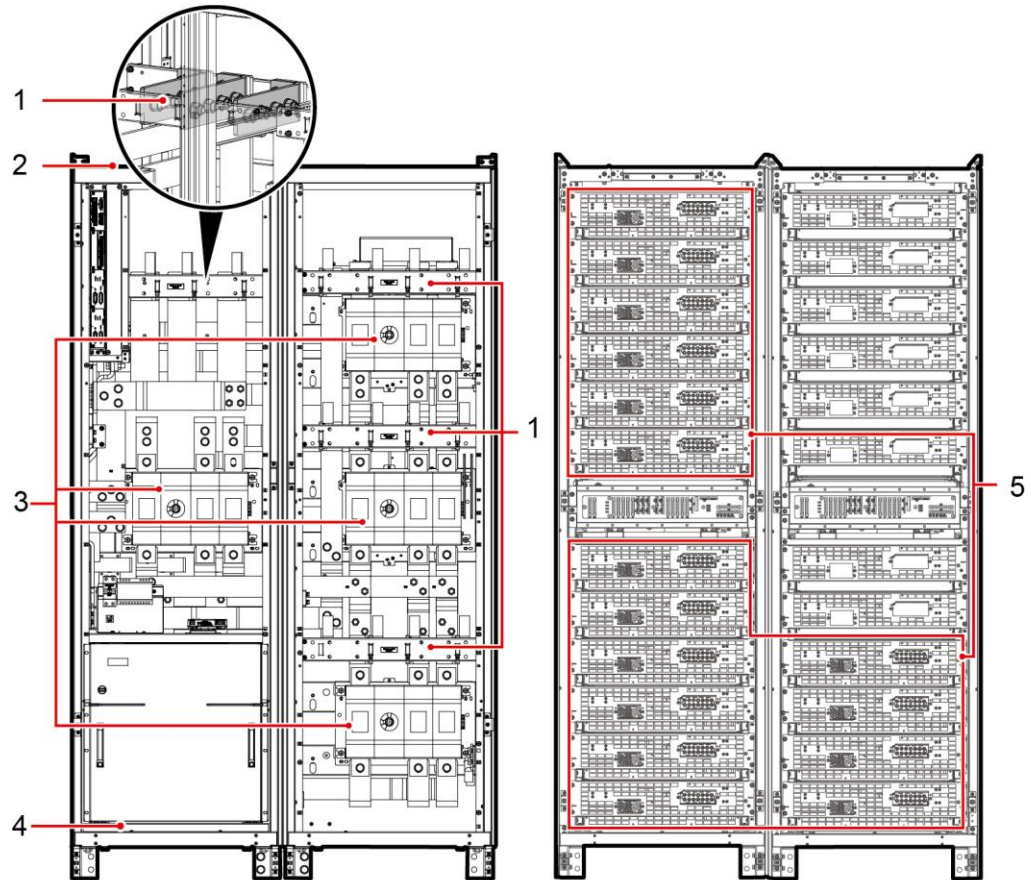
1. In the scenarios where holes are drilled for routing cables or covers are removed for routing cables, after routing cables and checking cable connections, use sealing putty to fill in the gap between the cables and the cabinet.
2. After verifying the installation, reinstall all the covers.
3. Do not remove the dustproof cover before power-on to prevent dust inside the UPS.

**Figure 3-99** Positions to be checked for foreign matter (400 kVA)



- |                              |                                    |                                     |
|------------------------------|------------------------------------|-------------------------------------|
| (1) Switches                 | (2) Mains input wiring copper bar  | (3) Battery input wiring copper bar |
| (4) Output wiring copper bar | (5) Bypass input wiring copper bar | (6) Rear of modules                 |

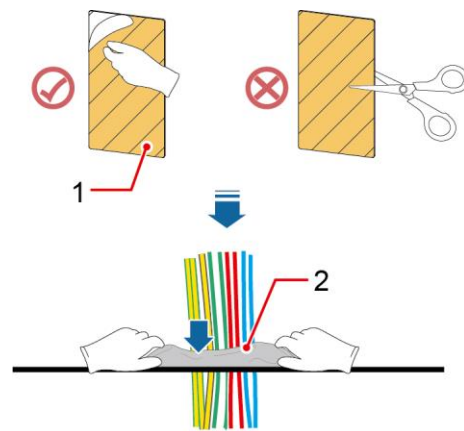
**Figure 3-100** Positions to be checked for foreign matter (800 kVA)



UA23W00010

- (1) Wiring terminal block
- (2) Cabinet top
- (3) Switches
- (4) Cabinet bottom
- (5) Rear of modules

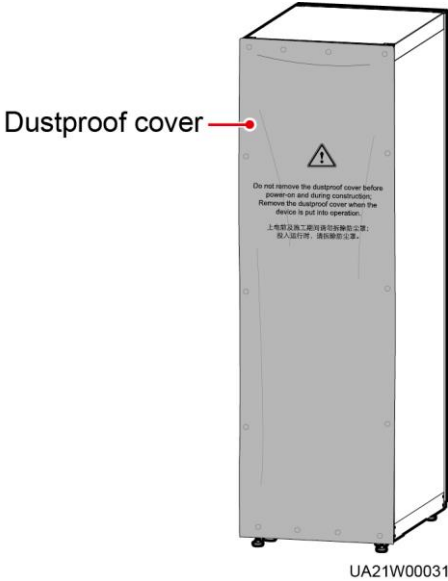
**Figure 3-101** Fill the holes with sealing putty



UA15H00029

- (1) Paper protective film
- (2) Sealing putty

Figure 3-102 Dustproof cover



# 4 User Interface

## 4.1 LCD Interface

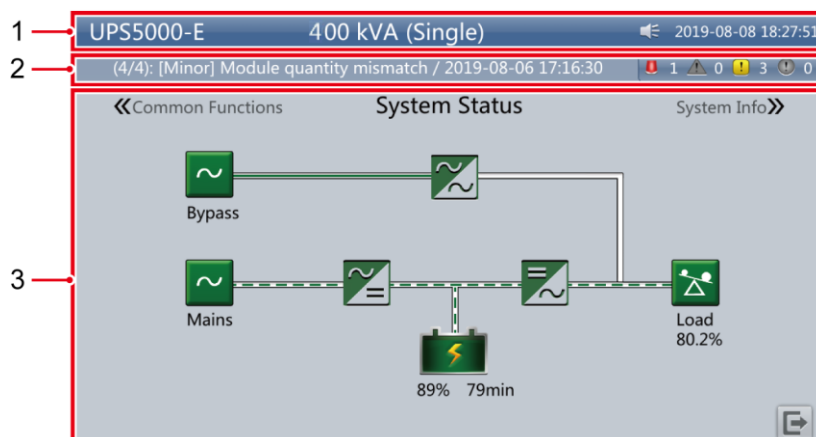
### 4.1.1 Main Menu

#### NOTICE

User interfaces displayed in this document correspond to the MDU version V100R003C01SPC515 and are for reference only.

The LCD screen is divided into three parts: status bar, alarm bar and information area. [Figure 4-1](#) numerically labels functions of the default main screen, and [Table 4-1](#) describes these functions.

**Figure 4-1** Main Menu screen








**Table 4-1** Main screen description

Number	Area	Function
1	Status bar	Displays the UPS model, capacity, configuration, current date and time, USB

Number	Area	Function
		flash drive status, and buzzer status.
2	Alarm bar	Displays active alarms in a scrolling list and the number of active alarms based on severity. Tap the alarm icon area to open the active alarm page.
3	Information area	Displays the power flow as well as key information such as load and battery information. Tap the <b>Bypass</b> , <b>Mains</b> , <b>Battery</b> , and <b>Load</b> icons to view details.

Table 4-2 describes the functions of common buttons.

**Table 4-2** Functions of common buttons

Button	Function
	Returns to the main screen.
	Scrolls the page down.
	Scrolls the page up.
	Returns to the upper-level menu.
	Logs a user out.


## 4.1.2 System Info Screen

On the main screen, tap **System Info**. The **System Info** screen is displayed, as shown in Figure 4-2.

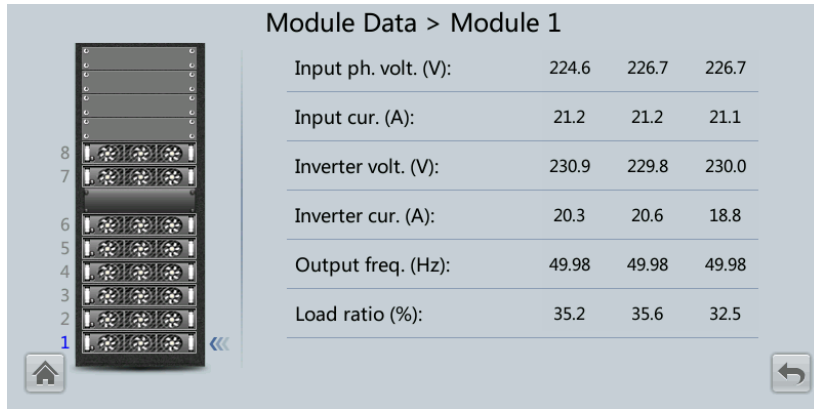
**Figure 4-2** System Info screen



### 4.1.2.1 Module Data Screen

On the **System Info**, tap the UPS picture. On the **Module Data** screen, select a module to view its running data.  indicates the selected module, as shown in [Figure 4-3](#).

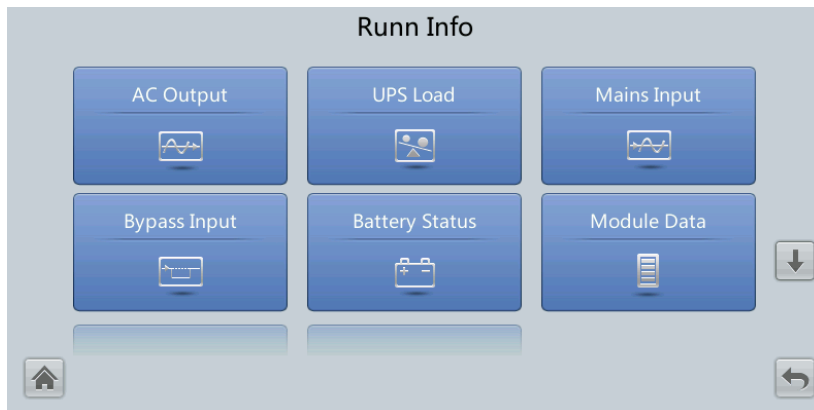
**Figure 4-3** Module Data screen



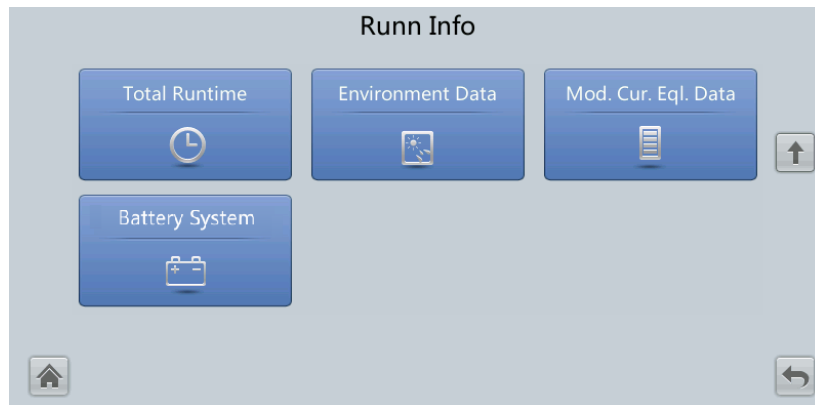
### 4.1.2.2 Running

On the **System Info** screen, tap  to access the **Runn Info** screen.

**Figure 4-4** Running 1



**Figure 4-5** Running 2



**NOTE**

- If the battery type is lead-acid battery and **Number of iBOXs** in **System Info > Settings > iBOX Settings > Basic Param.** is not **0**, **Battery System** is displayed on the **Runn Info** screen.
- Choose **Monitoring > Running Parameter > Output Setting** on the WebUI, if the **Current equal. detection** is set to **Enable**, and the number of inverter modules is greater than or equal to 2, the **Mod. Cur. Eql. Data** is displayed on the **Runn Info** screen.

**Table 4-3** AC output

Item	Description
Phase voltage (V)	AC output phase voltage
Line voltage (V)	AC output line voltage
Phase current (A)	AC output phase current
Frequency (Hz)	AC output frequency
Power factor	Proportion of output active power to output apparent power.

**Table 4-4** UPS load

Item	Description
Active power (kW)	Output active power of each phase on the UPS.
Apparent power (kVA)	Output apparent power of each phase on the UPS.
Reactive power (kvar)	Output reactive power of each phase on the UPS, that is, square root of the difference between the square of output apparent power and the square of output active power.
Load ratio (%)	Load ratio of each phase on the UPS, that is, proportion of actual power to rated power.
Crest factor	Proportion of the peak value of load current to the valid

Item	Description
	value.
Hist. Max. Load Ratio (%)	Historical maximum load ratio of each phase on the UPS.
Hist. Max. Active Power (kW)	Historical maximum active power of each phase on the UPS.
Hist. Max. Apparent Power (kVA)	Historical maximum apparent power of each phase on the UPS.

**Table 4-5** Mains input

Item	Description
Phase voltage (V)	Mains input phase voltage
Line voltage (V)	Mains input line voltage
Phase current (A)	Mains input phase current
Frequency (Hz)	Mains input frequency
Power factor	Proportion of the mains input active power to the mains input apparent power.

**Table 4-6** Bypass input

Item	Description
Phase voltage (V)	Bypass input phase voltage
Line voltage (V)	Bypass input line voltage
Phase current (A)	Bypass input phase current
Frequency (Hz)	Bypass input frequency
Power factor	Proportion of the bypass input active power to the bypass input apparent power.

**Table 4-7** Battery status

Item	Description
Battery Status	Lead-acid battery: The value can be Not connected, Equalized charging, Float charging, Hibernating, discharging, or Not chg. or dis.  Lithium battery: The value can be Not connected, Float charging, discharging, or Not chg. or dis.



Item	Description
Voltage (V)	Voltage of the battery string.
Current (A)	Current of the battery string (the current is + when batteries are being charged and – when discharged).
Temperature (°C) (only for lead-acid batteries)	Battery operating temperature (A battery sensor is required. If the sensor is not installed, N/A is displayed).
Backup time (min)	Battery backup time estimated at the current load.
Remaining cap. (%)	Remaining battery capacity.
SOH	State of health.
Maximum Cell Temperature (°C) (only for lithium batteries)	-
Min Cell Temperature (°C) (only for lithium batteries)	-

**Table 4-8** Total runtime

Item	Description
Bypass runtime (h)	Time for which the UPS runs in bypass mode.
Inv. runtime (h)	Time for which the UPS runs in inverter mode.

 **NOTE**

The value must be an integer. For example:

- If the value is less than 1, the value takes 0.
- If the value is greater than or equal to 1 and less than 2, the value takes 1.


**Table 4-9** Environment data

Item	Description
Ambient temperature (°C)	Temperature measured by the ambient temperature and humidity sensor. (An ambient temperature and humidity sensor is required. If no sensor is connected, the ambient temperature sampled by the bypass module is displayed.)
Ambient humid. (%RH)	Humidity measured by the ambient temperature and humidity sensor. If the sensor is not installed, N/A is displayed.

- **Module Data:** reflects each data of a module.

- Battery System - Battery String Summary: reflects the voltage, current, SOC, and SOH data of each battery string.
- Battery System - Battery String N: reflects the temperature, voltage, internal resistance, current, SOC, and SOH data of a single battery in the battery string.

### 4.1.2.3 Alarms Screen

Tap  on the **System Info** screen to enter the **Alarms** screen.

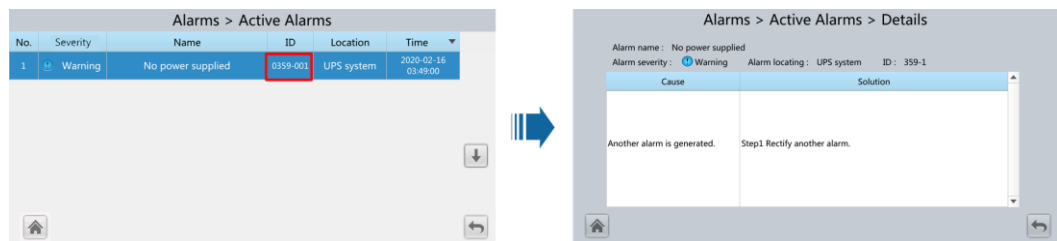
**Figure 4-6** Alarms Screen



### Active alarms

This screen displays alarm information including the severity, name, ID, location, and generation time.

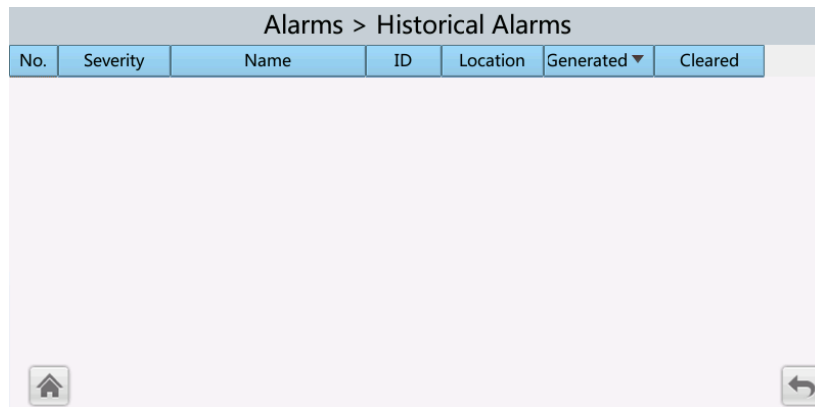
**Figure 4-7** Active alarms



### Historical alarms

This screen displays alarm information including the severity, name, ID, location, generation time, and clear time.

**Figure 4-8** Historical alarms



No.	Severity	Name	ID	Location	Generated	Cleared
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## Buzzer Off

Two buzzer menus are available:

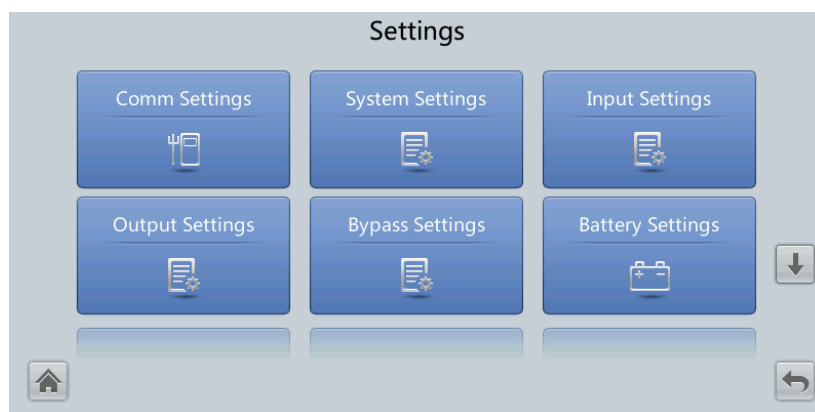
- **Buzzer On**  
If this selection is enabled, when a critical alarm, a minor alarm, or a certain warning is generated the buzzer is activated.
- **Buzzer Off**  
If this selection is enabled, the buzzer is muted.

If the buzzer is enabled, **Buzzer Off** is displayed on the operation screen.

### 4.1.2.4 Settings

On the **System Info** screen, tap  to access the **Settings** screen.

**Figure 4-9** Settings 1



**Figure 4-10** Settings 2

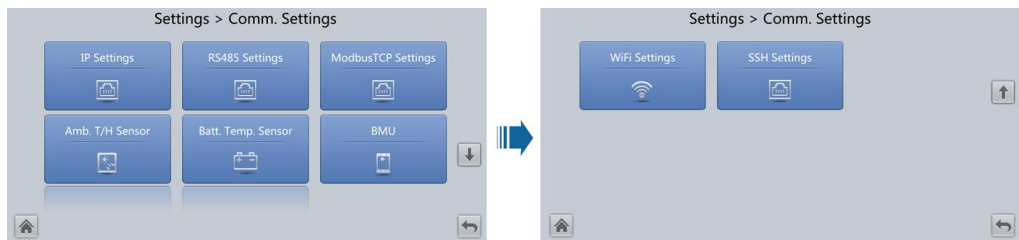


**NOTE**

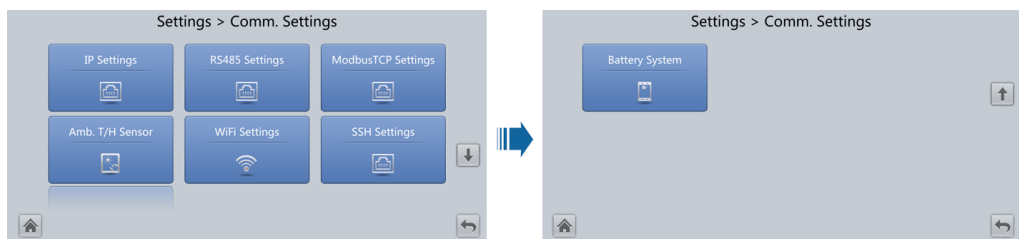
If the battery type is lead-acid battery, **Settings** is displayed on the **iBOX Settings** screen.

## Comm Settings

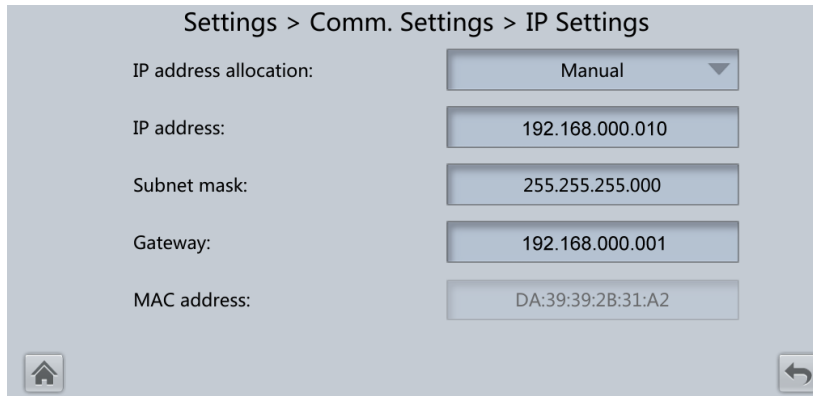
**Figure 4-11** Comm settings (lead-acid battery)



**Figure 4-12** Comm settings (lithium battery)



**Figure 4-13** IP settings



**IP address allocation**

- If the MDU is directly connected to a computer, the IP address can only be allocated manually. The IP addresses of the MDU and computer must be in the same network segment, and must be different.
- If the MDU is connected to a computer through a LAN switch or router with the DHCP function, the IP address can be allocated manually or automatically. Manual allocation is used by default.
  - **Manual:** Check that their IP addresses are two different values on the same network segment. Set the UPS IP address to be in the same subnet as the PC IP address. Perform the bitwise AND operation for the UPS IP address and the PC IP address with the subnet mask respectively. If the operation results are the same, the two IP addresses are in the same subnet.  
 AND operation rule: 1 AND 1 = 1, 1 AND 0 = 0, 0 AND 1 = 0, 0 AND 0 = 0. That is when the corresponding bits are both 1, the result is 1. In other cases, the result is 0.

**Table 4-10** Bitwise AND operation example

N/A	PC IP address (182.98.225.125)	UPS IP address (182.98.225.112)
PC IP address/UPS IP address	10110110.01100010.111000 01.01111101	10110110.01100010.111000 01.01110000
Subnet mask (255.255.255.192)	11111111.11111111.111111 11.11000000	11111111.11111111.111111 11.11000000
Bitwise AND operation result	10110110.01100010.111000 01.01000000	10110110.01100010.111000 01.01000000

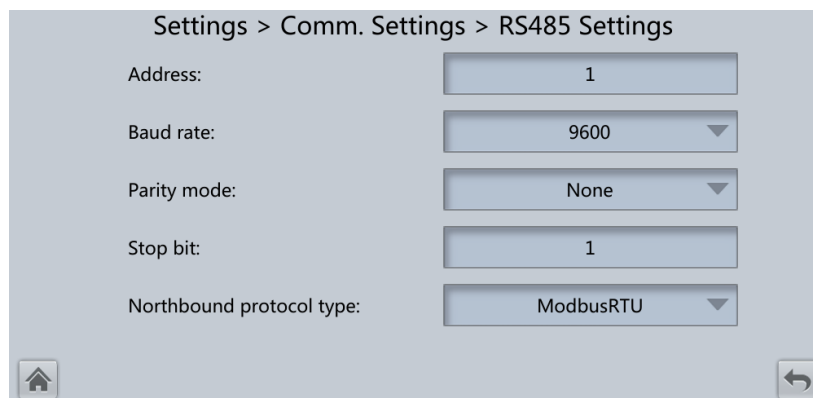
- **Automatic:** The MDU automatically searches for available IP addresses in the connected network. Ensure that the MDU and PC are on the same network segment.

**NOTE**

After you restart the device, **IP address allocation** changes back to **Manual**. The IP address is set to the IP address set previously.

Item	Description	Default Value	Value Range
IP address	Specifies the IP address for the Ethernet. <b>NOTICE</b> Ensure that the UPS IP address is unique on the network segment. Otherwise, the WebUI display function may not function properly.	192.168.0.10	1.0.0.0–223.255.255.255
Subnet mask	Specifies the subnet mask of the Ethernet.	255.255.255.0	0.0.0.0–255.255.255.255
Gateway	Specifies the Ethernet gateway.	192.168.0.1	1.0.0.0–223.255.255.255
MAC address	Defines the physical address of network equipment and is not configurable.	N/A	N/A

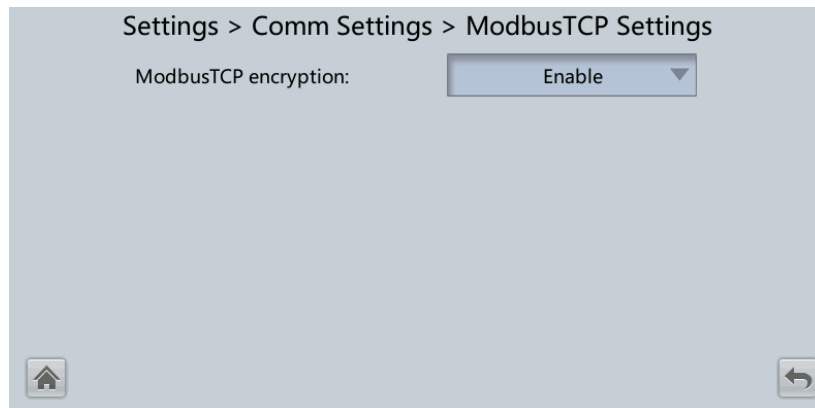
**Figure 4-14** RS485 settings



Item	Description	Default Value	Value Range
Address	This serial port address is allocated by the user.	1	1–254
Baud rate	Select a baud rate to match the user's network management conditions onsite.	9600	9600, 19200, 115200
Parity mode	Verify the validity of RS485 communication characters. When a device node adopts RS485 communication, ensure that the parity modes for the device nodes are set to the same mode.	None	None, Odd, Even
Stop bit	Stop bit in the Modbus communication frame format.	1	1–2

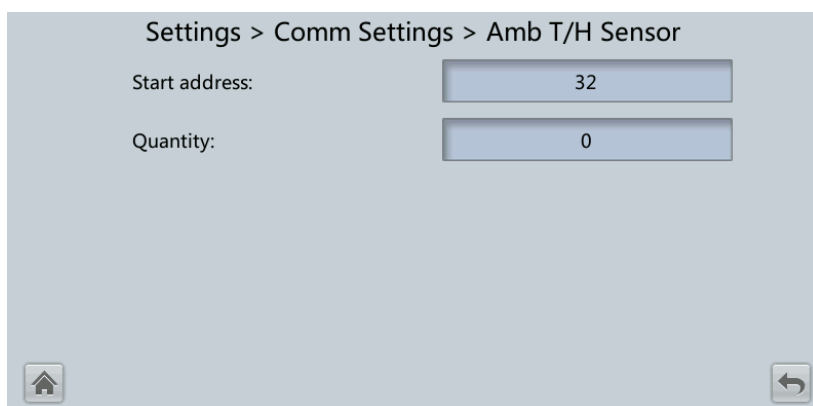
Item	Description	Default Value	Value Range
	When the UPS is connected over the serial port Modbus, set this parameter based on the frame format that the upstream device Modbus supports.		
Northbound protocol type	Set the northbound protocol type.	ModbusRTU	ModbusRTU, YDN

**Figure 4-15** Modbus TCP settings



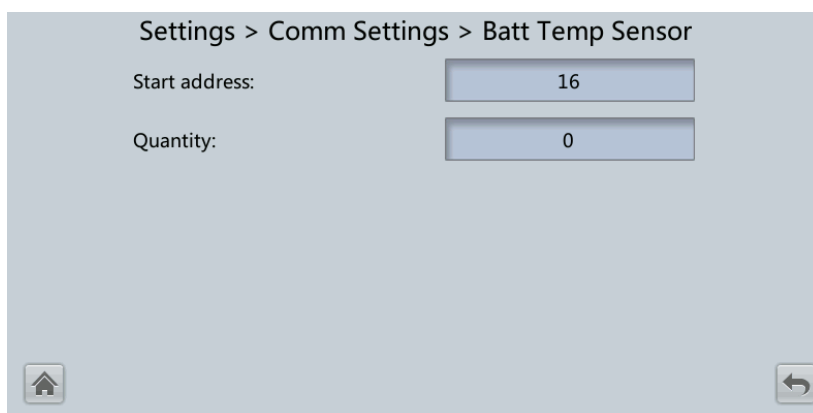
Item	Description	Default Value	Value Range
ModbusTCP encryption	If Modbus TCP is used for communication, communication links do not implement encryption or implement encryption based on the selected encryption mode.	Enable	Disable, Enable

**Figure 4-16** Ambient temperature and humidity sensor



Item	Description	Default Value	Value Range
Start address	N/A	32	32–44
Quantity	Number of cascaded ambient temperature and humidity sensors	0	0–4

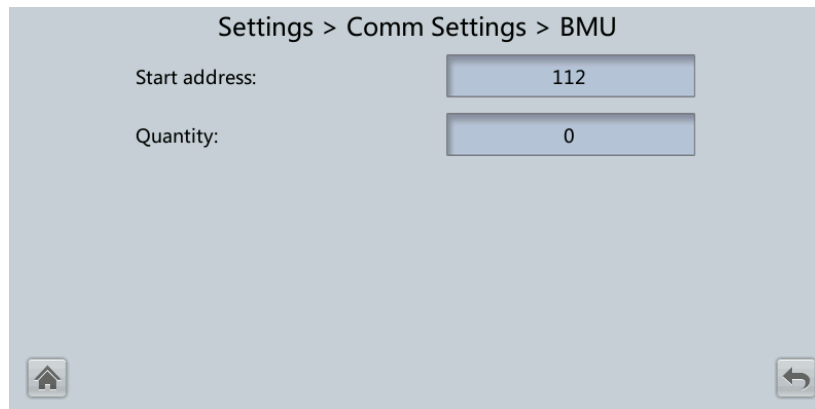
**Figure 4-17** Battery temperature sensor



Item	Description	Default Value	Value Range
Start address	N/A	16	16–28
Quantity	Number of cascaded battery temperature sensors	0	0–4

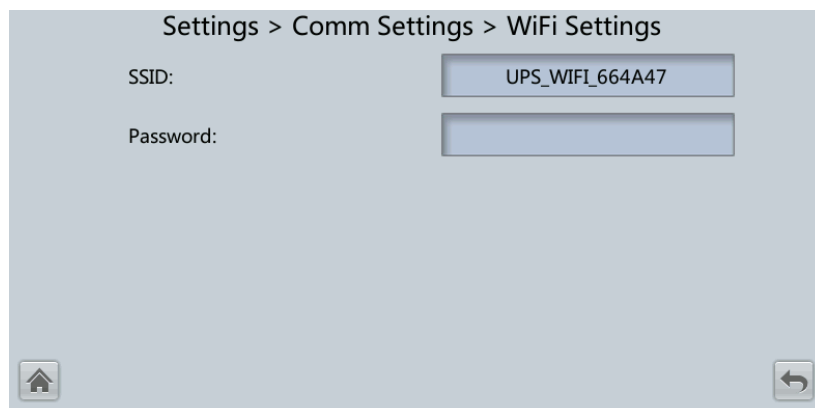


**Figure 4-18** BMU



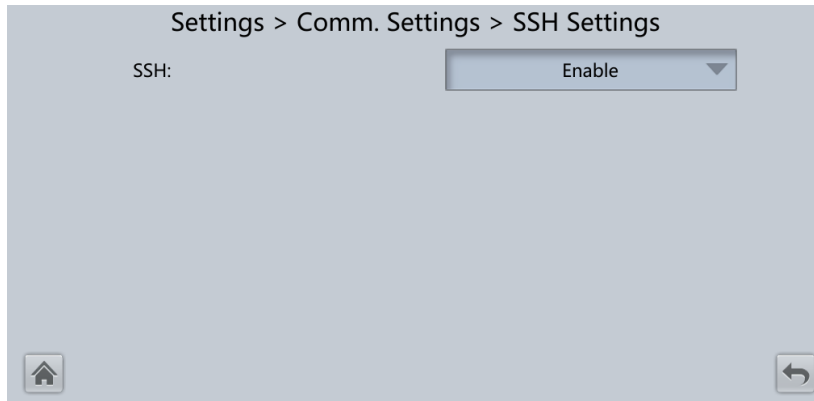
Item	Description	Default Value	Value Range
Start address	N/A	112	N/A
Quantity	Number of cascaded BMUs	0	0–12

**Figure 4-19** WiFi communication settings



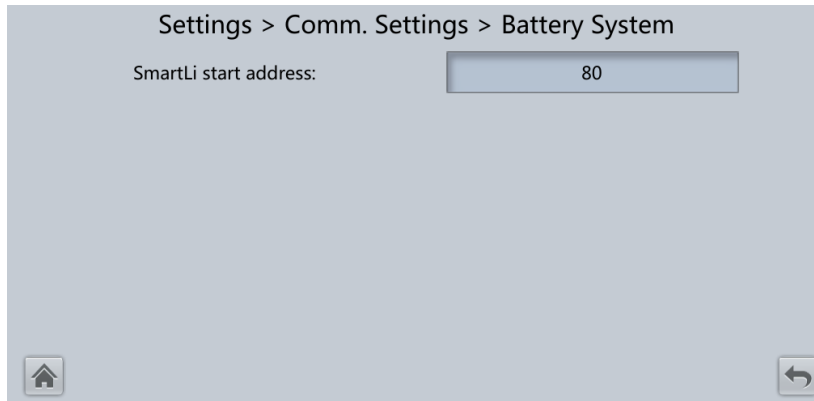
Item	Description	Default Value	Value Range
SSID	When using the mobile app for site setup or inspection, set WiFi SSID after connecting a WiFi module over a USB port to identify the WiFi device to which the mobile phone is connected.	UPS_WIFI + Last six characters of the MAC address	N/A
Password	The password for accessing WiFi.	Changeme	N/A

**Figure 4-20** SSH settings



Item	Description	Default Value	Value Range
SSH	Enables or disables Secure Shell (SSH) login.	Enable	Disable, Enable

**Figure 4-21** Battery system



Item	Description	Default Value	Value Range
SmartLi start address	SmartLi communication address when the UPS queries SmartLi data.	80	-

## System Settings

Figure 4-22 System settings 1

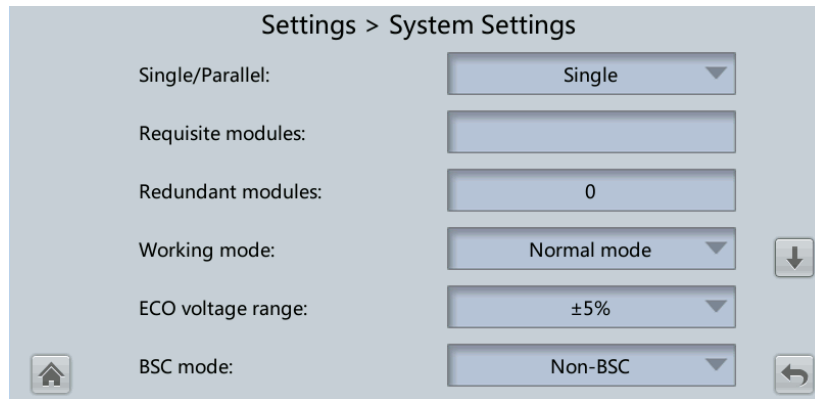
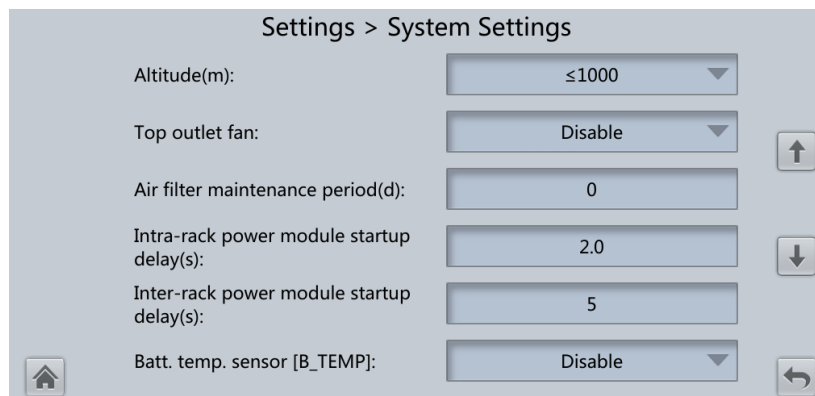


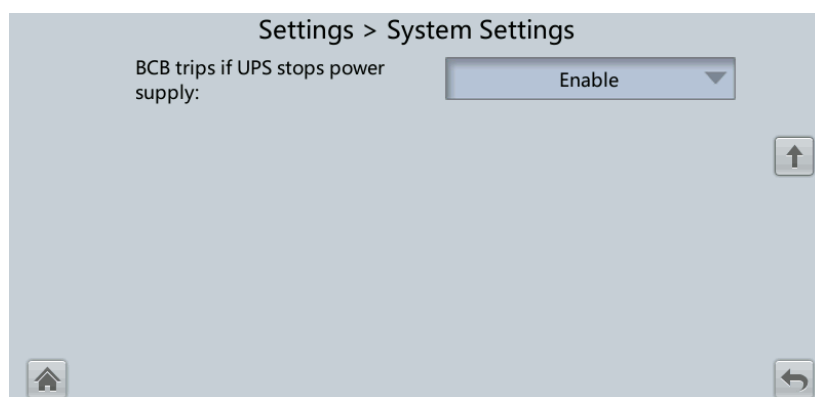
Figure 4-23 System settings 2



### NOTE

If the battery type is lead-acid battery, you can set **Batt. temp. sensor [B\_TEMP]**.

Figure 4-24 System settings 3

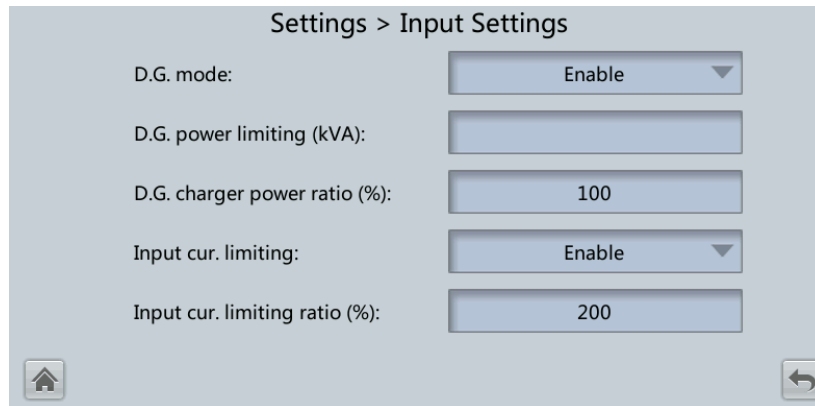


Item	Description	Default Value	Value Range
Single/Parallel	Specifies whether the UPS works in single mode or parallel mode.	Single	Single, Parallel
Requisite modules	Matches the system capacity.	N/A	N/A
Redundant modules	Set this parameter based on load capacity and redundancy requirements.	0	0–19
Working mode	UPS working mode	Normal mode	Normal mode, ECO, Self-load mode, Converter mode
ECO voltage range	In ECO mode, when the difference between the bypass voltage and the rated voltage is greater than this value, the system determines that the ECO voltage is abnormal and transfers to normal mode.	±5%	±5%, ±6%, ±7%, ±8%, ±9%, ±10%
BSC mode	<ul style="list-style-type: none"> <li>Set this parameter to <b>Standard BSC</b> for a dual-bus system.</li> <li>After setting this parameter to <b>Standard BSC</b>, you need to set the two UPS systems in the dual-bus system to <b>BSC master system</b> and <b>BSC slave system</b> respectively in the <b>BSC master/slave system</b> setting. (The two UPS systems cannot be BSC master systems or BSC slave systems at the same time. If you need to change the settings in the future, perform operations under the guidance of maintenance engineers.)</li> </ul> <p><b>NOTE</b> Ensure that the BSC signal cable between the BSC master and slave systems is properly connected and that BSC-related hardware is properly installed.</p>	Non-BSC	Non-BSC, Standard BSC
Altitude (m)	Set this parameter based on the altitude of the place where the rack is used.	≤ 1000	≤ 1000, 1000–2000, 2000–3000, 3000–4000, 4000–5000

Item	Description	Default Value	Value Range
Top outlet fan	Enable this parameter if a top outlet fan is configured. Then the fan running status can be checked.	Disable	Disable, Enable
Air filter maintenance period (d)	Specifies the rack air filter maintenance interval. If it is set to <b>0</b> , there is no reminder.	0	0–365
Intra-rack power module start delay (s)	These two parameters enable the UPS to control the interval that each rack (or module) transfers from battery mode to normal mode, which reduces the impact on the generator or power grid. In the case of battery undervoltage, the system automatically shortens the delay for transferring to normal mode to 1/8 of the normal delay to accelerate the transfer and prevent battery overdischarge. The start delay of a module in a rack varies depending on the rack number and module number. #1 module in rack 1 does not have a start delay.	The default value of this parameter depends on the default number of power modules. The default value is 2.0, 1.0, and 0.5 for 1–5, 6–10, and 10–20 power modules respectively.	0.5–120.0
Inter-rack power module start delay (s)		5	2–120
Batt. temp. sensor [B_TEMP]	The short-distance battery temperature sensor monitors the ambient temperature near batteries, and ensures that batteries work reliably and securely.	Disable	Disable, Enable
BCB trips if UPS stops power supply	Indicates whether the BCB trips when the system stops supplying power and the output power is off.	Enable	Disable, Enable

## Input Settings

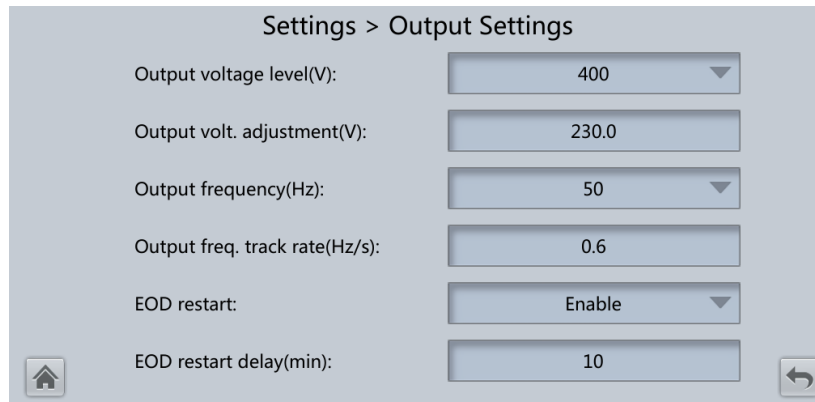
**Figure 4-25** Input settings



Item	Description	Default Value	Value Range
D.G. mode	Set this parameter to <b>Enable</b> when a D.G. connects to the input PDC. The UPS enters the D.G. mode when a D.G. is detected over dry contacts.	Disable	Disable, Enable
D.G. power limiting (kVA)	Set these two parameters to control the valid input current and limiting input current, which prevents load impact and facilitates better cooperation between the UPS and the D.G.	Depends on the actual model.	0 kVA to 5000 kVA
D.G. charger power ratio (%)		0	0%–100%
Input cur. limiting	Specifies whether to enable or disable input current limiting to protect generators.	Disable	Disable, Enable
Input cur. limiting ratio (%)	Limits the input current to protect the D.G.	200%	50%–200%

## Output Settings

Figure 4-26 Output settings

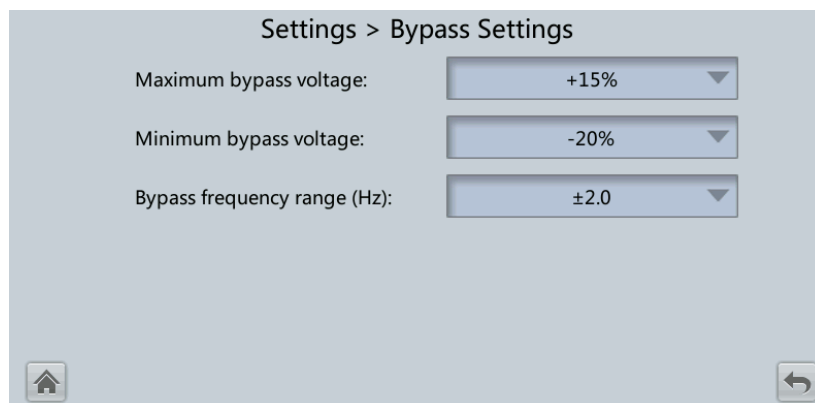


Item	Description	Default Value	Value Range
Output voltage level (V)	Specifies the system output voltage level. This parameter is configurable only after the inverter shuts down. After you change the voltage level, the upper limit of the bypass voltage restores to the default value. (If the voltage level is 380 V or 400 V, the default upper limit is +15%. If the voltage level is 415 V, the default upper limit is +10%.)	400	380, 400, 415
Output volt. adjustment (V)	The output voltage can be slightly adjusted based on the onsite power distribution condition to ensure a minimum difference between the output voltage and the bypass voltage and facilitate uninterruptible power supply when the UPS transfers from normal mode to bypass mode.	The default value is 220.0, 230.0, and 240.0 when the voltage level is 380 V, 400 V, and 415 V respectively.	380 V: 209.0–231.0 400 V: 218.5–241.5 415 V: 228.0–252.0
Output frequency (Hz)	Specifies the system output frequency level.	50 Hz	50 Hz, 60 Hz
Output freq. track rate (Hz/s)	This parameter can be adjusted based on site requirements. If <b>Output freq. track rate (Hz/s)</b> is slow, the inverter frequency is different from the bypass frequency when the bypass frequency changes. If output is overloaded or the inverter is	0.6 Hz/s	0.1 Hz/s to 2.0 Hz/s

Item	Description	Default Value	Value Range
	faulty, an interruption (less than 20 ms) occurs when the UPS transfers from normal mode to bypass mode. If <b>Output freq. track rate (Hz/s)</b> is fast, the inverter frequency is unstable.		
EOD restart	If the mains is not functioning normally, the UPS will transfer to battery mode. When batteries reach the EOD threshold, the bypass is disabled, and <b>EOD restart</b> is <b>Enable</b> , the UPS will restart as soon as the mains resumes.  If <b>EOD restart</b> is disabled, clear the alarm manually or enable the restart function for the UPS.	Enable	Disable, Enable
EOD restart delay (min)	If <b>EOD restart</b> is set to <b>Enable</b> , the UPS starts working after the time set for <b>EOD restart delay</b> when the input recovers from the power failure upon EOD.	10	1–1440

## Bypass Settings

Figure 4-27 Bypass settings



Item	Description	Default Value	Value Range
Maximum bypass voltage	When the difference between the bypass voltage and the rated voltage exceeds the upper threshold for the bypass voltage, the system determines that the	<ul style="list-style-type: none"> <li>When the voltage level is 380 V, the value range is +10%, +15%, +20%, and +25%. The default value is +15%.</li> <li>When the voltage level is 400 V,</li> </ul>	



Item	Description	Default Value	Value Range
	bypass voltage is not normal and that the bypass is unavailable.		the value range is +10%, +15%, and +20%. The default value is +15%. <ul style="list-style-type: none"> <li>When the voltage level is 415 V, the value range is +10% and +15%. The default value is +10%.</li> </ul>
Minimum bypass voltage	When the difference between the bypass voltage and the rated voltage exceeds the upper threshold for the bypass voltage, the system determines that the bypass voltage is not normal and that the bypass is unavailable.	-20%	-10%, -15%, -20%, -30%, -40%, -50%, -60%
Bypass frequency range (Hz)	When the difference between the bypass input frequency and the rated frequency is greater than the specified value, the system determines that the bypass frequency is abnormal, so the bypass is unavailable.	±2 Hz	±0.5 Hz to ±6 Hz

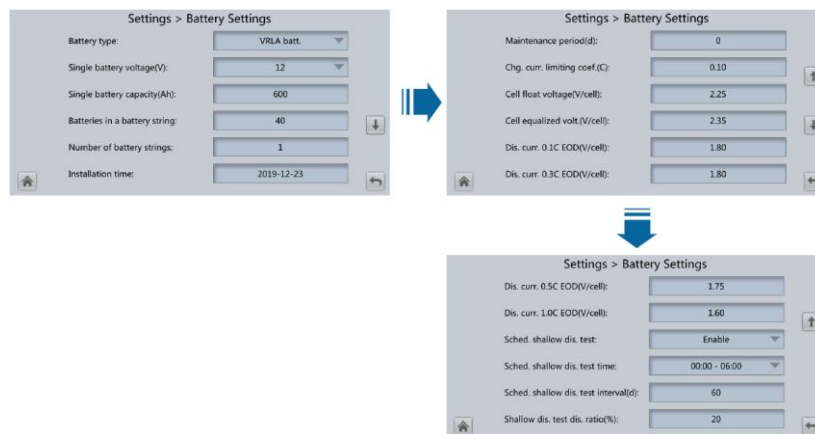
## Battery Settings

### NOTICE

Battery parameter settings impact battery maintenance, battery lifespan, and UPS discharge time. When you set battery parameters, note the following:

- **Battery string sharing** is unavailable when **Single/Parallel** is set as **Single**.
- **Battery string sharing** affects the actual charge current and the estimated discharge time. An incorrect setting will cause a high or low charge current, which may damage the batteries. An incorrect estimated discharge time may cause a data backup fault.
- When you set parameters, ensure the following: **Dis. cur. 0.1C EOD  $\geq$  Dis. cur. 0.3C EOD  $\geq$  Dis. cur. 0.5C EOD  $\geq$  Dis. cur. 1.0C EOD**.
- A cell consists of electrodes and electrolyte, which is the basic unit for the battery. Each cell has a nominal voltage of 2 V. A battery is a module consisting of single or multiple cells in a shell. Each battery has a nominal voltage of 2 V, 6 V, or 12 V.

**Figure 4-28** Battery settings (lead-acid battery)



**Figure 4-29** Battery settings (lithium battery)



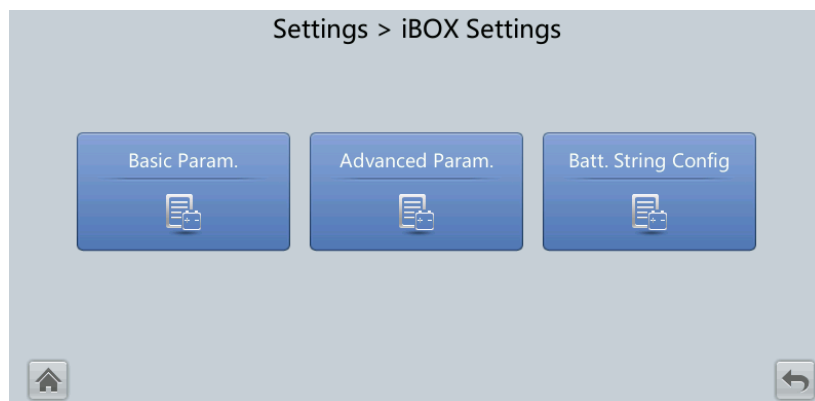
Item	Description	Default Value	Value Range
Battery type	Type of batteries connected to the UPS.	VRLA batt.	VRLA batt., lithium batt.
Battery capacity (Ah)	Capacity of lithium batteries connected to the UPS (the value is automatically obtained).	-	-
Single battery voltage (V)	Specifies the voltage of each battery that is connected in the battery string in series.	12 V	2, 6, 12
Single battery capacity (Ah)	Specifies the capacity of each battery that is connected in the battery string in series.	Depends on the actual model.	5-9999

Item	Description	Default Value	Value Range
Batteries in a battery string	Specifies the number of batteries in a battery string.	The default value depends on the model.	The value range depends on the model.
Number of battery strings	Specifies the number of battery strings connected in parallel.	1	1–4
Installation time	A battery maintenance reminder is displayed when the maintenance time (counted from the installation time) comes.	N/A	N/A
Maintenance period (d)	Specifies the interval for reminding users of battery maintenance.	0	0–365
Cell float voltage (V/cell)	Specifies the battery float charging voltage.	2.25 V/cell	2.23 V/cell to 2.30 V/cell
Cell equalized volt. (V/cell)	Specifies the battery equalized charging voltage.	2.35 V/cell	2.30 V/cell to 2.40 V/cell
Dis. cur. 0.1C EOD (V/cell)	Specifies the EOD threshold when the discharging current is 0.1C, 0.3C, 0.5C, and 1.0C respectively.	1.80 V/cell	1.8–1.9
Dis. cur. 0.3C EOD (V/cell)		1.80 V/cell	1.8–1.9
Dis. cur. 0.5C EOD (V/cell)		1.75 V/cell	1.75–1.85
Dis. cur. 1.0C EOD (V/cell)		1.60 V/cell	1.6–1.75
Sched. shallow dis. test	When certain conditions are met, the charger shuts down, and batteries supply power to loads. The system records the battery discharge data as the reference for battery capacity and lifespan.	Disable	Disable, Enable
Sched. shallow dis. test time	Time for scheduled shallow discharge test.	00:00 - 06:00	00:00 - 06:00, 06:00 - 12:00, 12:00 - 18:00, 18:00 - 24:00
Sched. shallow dis. test interval (d)	Interval for scheduled shallow discharge test.	60	30–90
Shallow dis. test dis. ratio (%)	Set the proportion of the discharge capacity to the total discharge capacity. The value is configurable in any mode.	20%	10%–50%
Cell charge	Charge voltage of lithium batteries (the value is	-	-

Item	Description	Default Value	Value Range
voltage (V/cell)	automatically obtained)		
Chg. cur. limiting coef. (C)	Lithium battery: The charging current limit is a multiple of the battery capacity.	0.50	0.10 to 1.00
	Lead-acid battery: The charging current limit is a multiple of the battery capacity.	0.10	0.05 to 0.15

## iBOX Settings

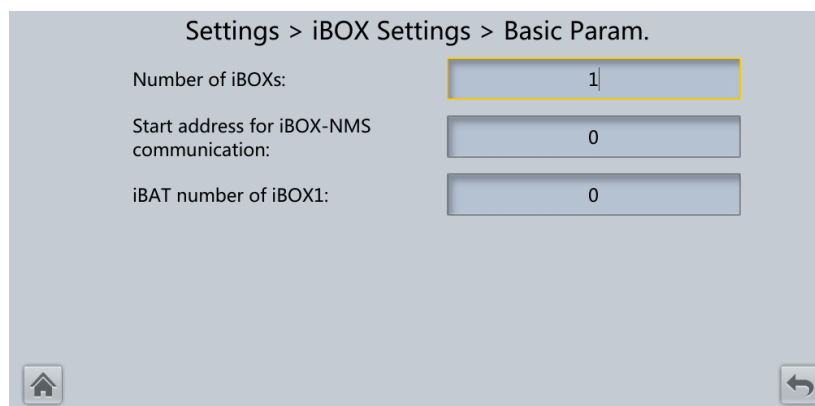
Figure 4-30 iBOX Settings



### NOTE

If the battery type is lead-acid battery and **Number of iBOXs** in **System Info > Settings > iBOX Settings > Basic Param.** is not **0**, **Batt. String Config** is displayed on the **iBOX Settings** screen.

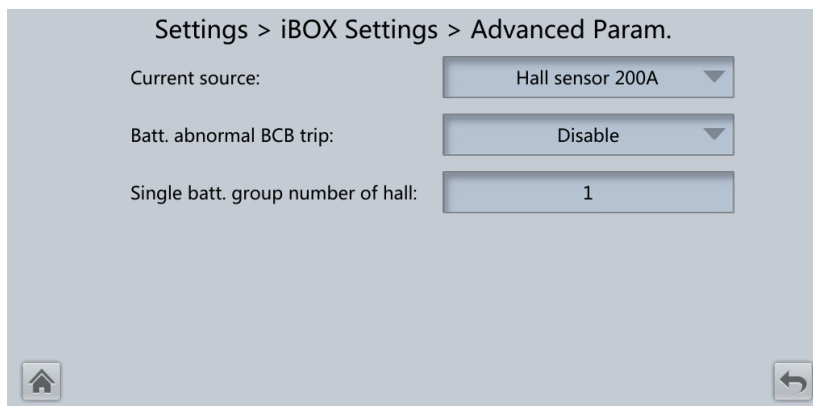
Figure 4-31 Basic Param.



Item	Description	Default Value	Value Range
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Item	Description	Default Value	Value Range
Number of iBOXs	The number of iBOXs connected to UPS.	0	0–6
Start address for iBOX-NMS communication	Specifies the communication address when the northbound device queries iBOX data.	0	0–124
iBOX number of iBATs	Specifies the number of iBATs managed by the iBOX.	0	0–300

**Figure 4-32** Advanced Param.



Item	Description	Default Value	Value Range
Current source	Specifications of the Hall effect sensor used to detect iBOX current.	Hall sensor 200A	Hall sensor 200A, Hall sensor 600A
Batt. abnormal BCB trip	Specifies whether BCB trips when batteries are abnormal.	Disable	Disable, Enable
Single batt. group number of hall	<b>Single batt. group number of hall</b> is equal to the number of Hall effect sensors at the positive or negative terminal of a battery string (Single batt. group number of hall $\geq$ 1).	1	1–8

**Figure 4-33** Batt. String Config



Set the iBOX and iBAT number for each battery string.

## Dry Contact Set

### NOTICE

- Set only the dry contacts that are needed. Otherwise, the UPS may not run properly.
- When a dry contact card is disabled, its dry contact signals are disabled.
- After a dry contact card is enabled, its dry contact signals can be displayed on the LCD.
- Disable all the dry contacts for a dry contact card that is not connected and all the dry contacts that are not used to prevent false alarms.
- ( ) encloses a unit, and [ ] encloses silk screen.

Specify dry contact settings on the following cards:

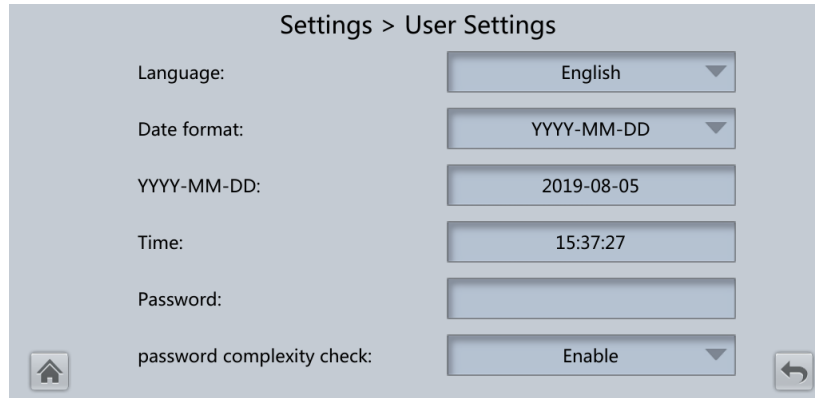
- Dry contact card (MUE05A): provides dry contact signals for the battery grounding failure detector, D.G., BCB box, and PDCs.
- Backfeed protection board (MUE06A): provides backfeed protection signals. This board can be enabled or disabled.
- Monitoring interface card (MUS05A): provides four routes of configurable output dry contact signals.
- Dry contact extended card (MUE07A): provides five routes of input signals and five routes of output signals.

Item	Description
MUE05A connection	Specifies the MUE05A connection status. Independent input signals can be enabled only when this parameter is set to <b>Enable</b> .
Batter ground fault [BTG]	Enable or disable battery grounding fault detection.
D.G. connection [GEN]	Enable or disable D.G. connection detection.
BCB connection [OL]	Enable or disable BCB connection detection.

Item	Description
Battery breaker [STA]	Enable or disable battery circuit breaker status detection.
PDC output breaker [OUT]	Enable or disable PDC output circuit breaker status detection.
PDC maintenance breaker [MT]	Enable or disable PDC maintenance circuit breaker status detection.
BP/SYSMT Switch	If the BP/SYSMT switch is set to <b>Enable</b> , the port has dry contact signal access. Using the port depends on the status of the BP/SYSMT switch.
BP/SYSMT switch function	If the BP/SYSMT switch is set to <b>Enable</b> , this parameter is displayed on the screen. Set this parameter to determine whether the port is used to detect the status of the PDU bypass input switch, or system maintenance switch.
SPD/SYSOUT Switch	If the SPD/SYSOUT switch is set to <b>Enable</b> , the port has dry contact signal access. How a user uses the port depends on the status of the SPD/SYSOUT switch.
SPD/SYSOUT switch function	If the SPD/SYSOUT switch is set to <b>Enable</b> , this parameter is displayed on the screen. Set this parameter to determine whether the port is used to detect the status of the PDU input surge protector, or system output switch.
MUE06A connection	Specifies the MUE06A connection status. If this parameter is set to <b>Enable</b> , the mains and bypass backfeed protection is enabled.
MUS05A DO_1 Action, MUS05A DO_2 Action, MUS05A DO_3 Action, MUS05A DO_4 Action	Controls the status of DO ports on the MUS05A dry contact card.
MUE07A DO_1 Action, MUE07A DO_2 Action, MUE07A DO_3 Action, MUE07A DO_4 Action, MUE07A DO_5 Action	Controls the status of DO ports on the MUE07A extended dry contact card.
MUS05A DO_1, MUS05A DO_2, MUS05A DO_3, MUS05A DO_4	Corresponds to the signal of the output dry contact DO on the MUS05A.
MUE07A DO_1, MUE07A DO_2, MUE07A DO_3, MUE07A DO_4, MUE07A DO_5	Corresponds to the signal of the output dry contact DO on the MUE07A.
MUE07A DI_1, MUE07A DI_2, MUE07A DI_3, MUE07A DI_4, MUE07A DI_5	Corresponds to the signal of the input dry contact DI on the MUE07A.

## User Settings

**Figure 4-34** User settings



Item	Description	Default Value	Value Range
Language	Twelve languages are supported	English	English, Chinese, Spanish, Dutch, French, German, Italian, Polish, Portuguese, Russian, Swedish, Turkish
Password	N/A	000001	N/A
password complexity check	If the password complexity check is disabled, the user password is required to be a string of six to eight digits. If the password complexity check is enabled, the password is required to be a string of 6–20 characters and contain at least two types of characters.	Enable	Disable, Enable

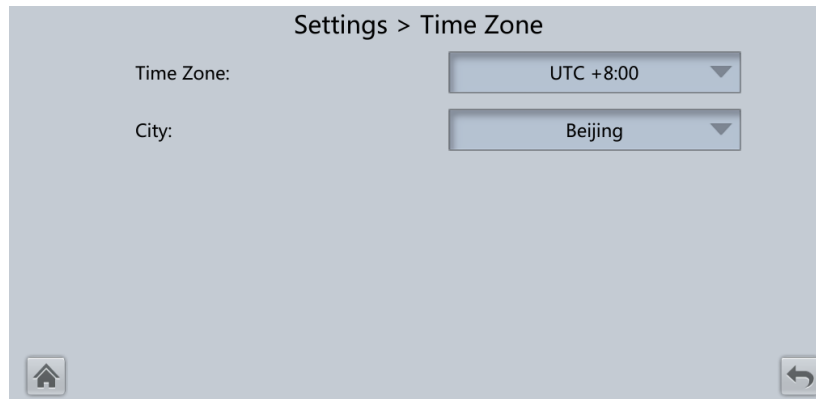
 **NOTE**

Set the date and time as required.



## Time Zone

**Figure 4-35** Time zone



Set the local time zone.

### 4.1.2.5 Maintenance

On the **System Info** screen, tap  to display the **Maintenance** screen.

**Figure 4-36** Maintenance 1

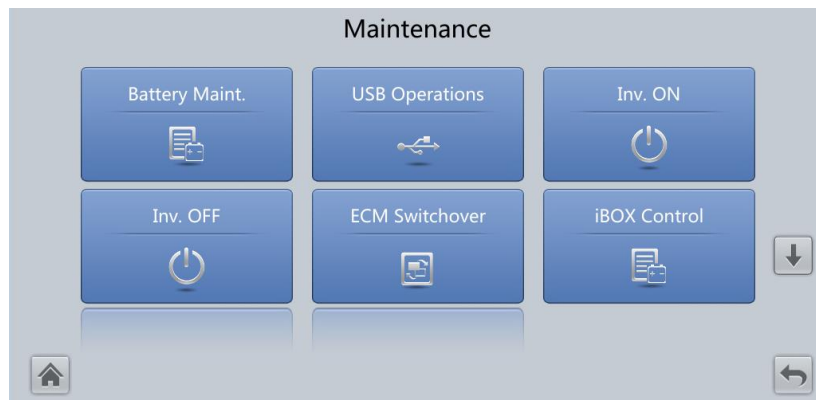
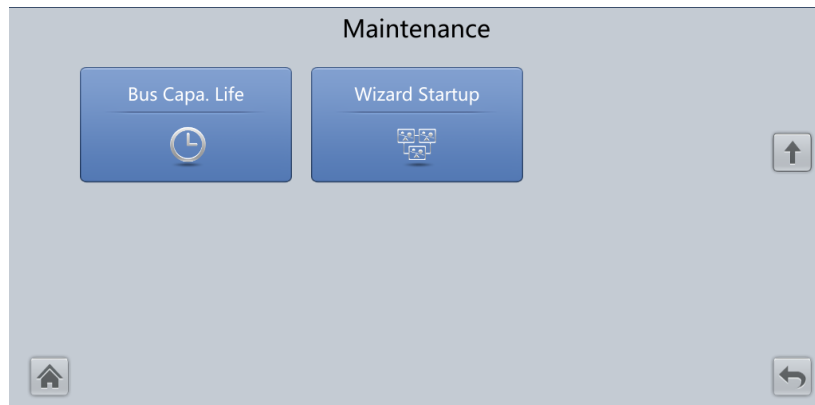


Figure 4-37 Maintenance 2



**NOTE**

- If the battery type is lead-acid battery and **Number of iBOXs** in **System Info > Settings > iBOX Settings > Basic Param.** is not 0, **iBOX Control** is displayed on the **Maintenance** screen.
- Choose **Monitoring > Running Parameter > System Settings** on the WebUI, if the **Bus capa. life** is set to **Enable**, the **Maintenance** is displayed on the **Bus Capa. Life** screen.

## Battery Maint.

**NOTICE**

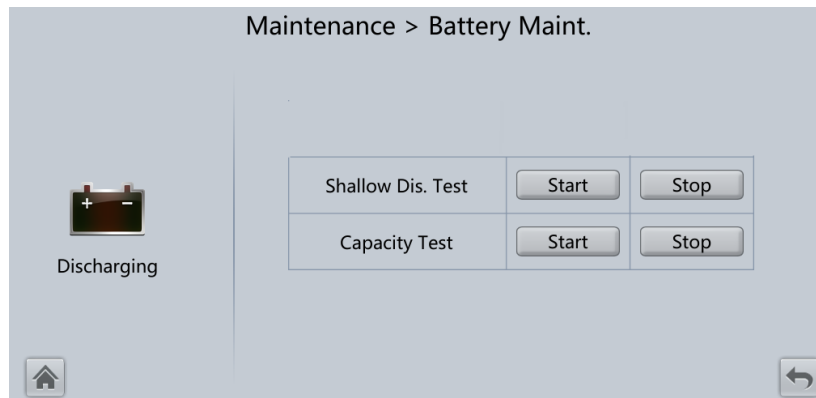
- Perform battery maintenance when no alarm is active on the UPS. Otherwise, the UPS may supply no power.
- A proportion of battery capacity will discharge during battery maintenance. This reduces the discharge time before the next charge.
- Do not perform battery maintenance when a D.G. is connected.

Battery maintenance includes **Forced Equalized Charging**, **Shallow Dis. Test**, and **Capacity Test**.

Figure 4-38 Battery Maint. (lead-acid battery)



**Figure 4-39** Battery Maint. (lithium battery)



Item	Description
Forced Equalized Charging	Forcibly perform equalized charging on batteries.
Shallow Dis. Test	Partially discharge batteries. A shallow discharge test can be conducted to test the battery loop reliability and short-time discharge capacity when the batteries have not discharged for a long time.
Capacity Test	Fully discharge batteries. A deep discharge test is conducted to obtain the battery discharge performance data.

## USB Operations

You can export **Fault Data**, and perform **Upgrade Software**, **BSP Upgrade**, **Export Config.**, and **Import Config.** with USB.

**Figure 4-40** USB Operations



## Starting or Shutting Down the Inverter

Item	Description
Inv. ON	The <b>Inv. ON</b> screen allows you to start the inverter manually.
Inv. OFF	The <b>Inv. OFF</b> screen allows you to shut down the inverter manually.

## ECM Switchover

### NOTICE

- Only professional personnel are allowed to use this function.
- Clear faults before performing ECM active/standby switchover.
- After an ECM is inserted, active and standby switchover is supported only after the ECM is configured and starts working properly (about 30 seconds).

If the ECM to be maintained is still working, perform ECM active/standby switchover on this screen (a dialog box is displayed for you to confirm this operation). After performing active/standby switchover, ensure that this ECM is in standby state (that is, the green indicator is blinking) and then maintain the ECM.

## iBOX control

Reset the specified iBOX and iBAT, and sets the iBAT blinking function or measures the iBAT internal resistance.

Item	Description
Reset	Restart an iBAT or an iBOX.
Blink	Make the red indicator on the iBAT start or stop blinking super fast.
Internal resistance	Measure the battery internal resistance. If the condition for measuring internal resistance is met (batteries are fully charged), you can tap <b>Measure</b> to start measuring the internal resistance of the selected iBAT in an iBOX. <b>NOTE</b> The interval between two measurement operations must be greater than 10 minutes.

## Bus capacitor life forecast

If the service life of a capacitor is about to end, that is, **Module X bus capacitor life (y)** is less than 1.0, contact Huawei technical support to replace the power module.

## Wizard Startup

The wizard startup can be used to test the bypass, mains inverter, inverter/bypass switch, battery inverter, battery charging capability, battery switch tripping and so on.

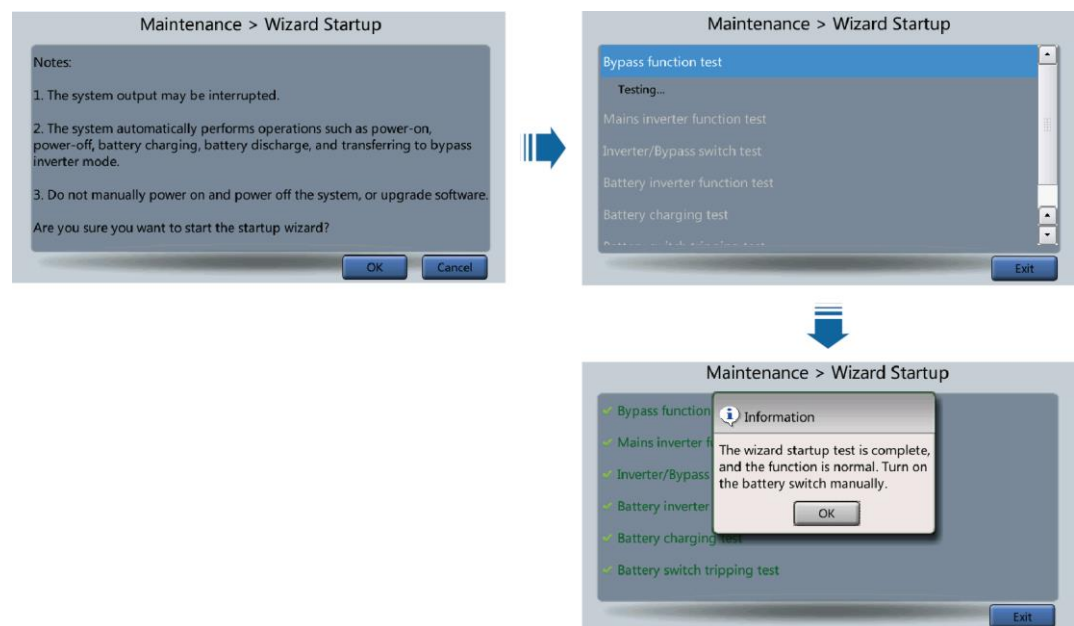
Perform operations as prompted.

### NOTICE

Before starting the wizard, ensure that:

- The system is a single UPS system.
- No minor or critical alarm occurs.
- The UPS works in normal mode with a load ratio fluctuation less than 10%.
- The UPS generates no battery overtemperature, overvoltage, or overcurrent alarm. No generator is connected to the UPS.
- The mains, batteries, charger, and discharger are normal. No overload alarm is generated.
- SOC > 30%

Figure 4-41 Wizard startup



### NOTE

On the **Settings > Dry Contact Set** screen, set **MUE05A connection** to **Enable**, and set **BCB connection [OL]** to **Enable**. Wizard-based startup can be used to test the battery switch tripping function.

### 4.1.2.6 About Screen

On the **System Info** screen, tap **About** to view the UPS model, manufacturer name, monitoring version and power version, as shown in Figure 4-42. To view version details, tap **Version Info**.

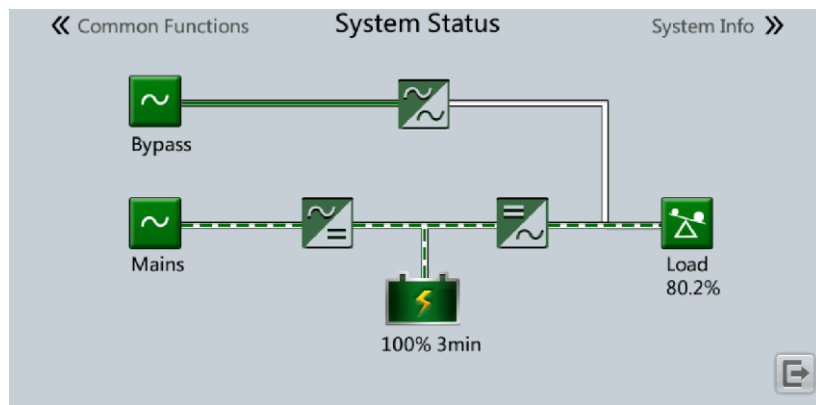
Figure 4-42 About screen



### 4.1.3 System Status

On the **System Status** to view the mains input, bypass input, load, and battery information.

Figure 4-43 System status



## 4.1.4 Common Functions

Figure 4-44 Common functions 1

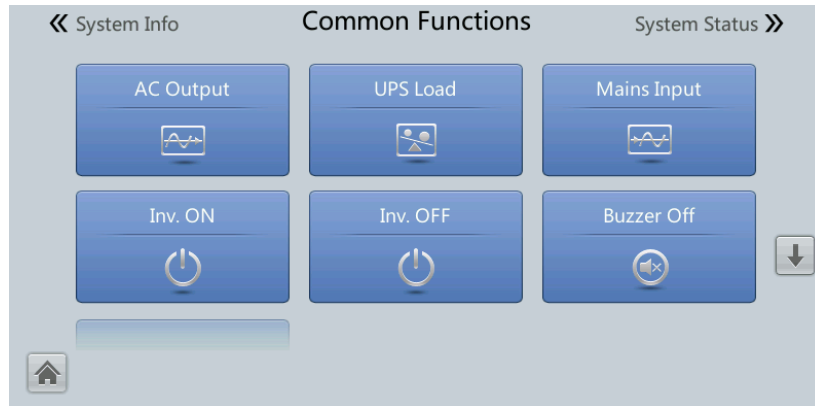
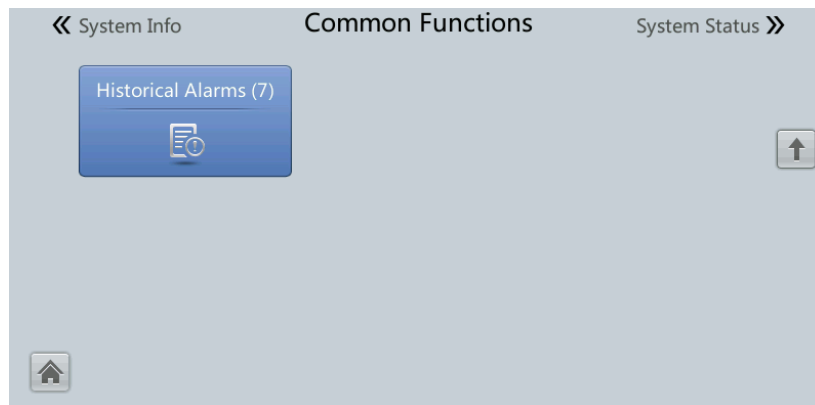


Figure 4-45 Common functions 2



## 4.2 WebUI

### NOTE

User interfaces displayed correspond to the MDU version V100R003C01SPC515 and are for reference only.

### 4.2.1 Login

#### Context

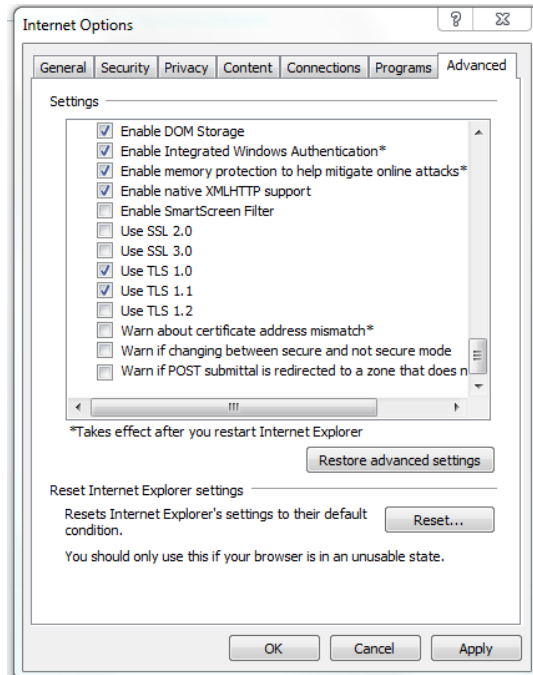
Internet Explorer 11 is used as the example browser.

The system supports Internet Explorer 11 and Firefox 31.0.

## Procedure

- Step 1** Open the browser and choose **Tools > Internet Options**.
- Step 2** On the **Advanced** tab page, ensure that **Use TLS 1.0**, and **Use TLS 1.1** are selected and click **OK**.

**Figure 4-46** Settings in the Internet Options dialog box



- Step 3** Enter **https://UPS IP address** in the address box of the browser, select a language, set **User name** and **Password**, and click **Login**.

### NOTE

The preset UPS IP address is 192.168.0.10. You can set the UPS Ethernet IP address on the LCD or WebUI. The value range is 1.0.0.0–223.255.255.255.

**Table 4-11** User description

Default User	Preset Password	User Rights
admin (system administrator)	Changeme	Performs all operations on the LCD and WebUI, including system running information browsing, system information exporting, parameter setting, system control, system configuration, and system maintenance.
operator (common user)	Changeme	Only browses the system running information, exports system information, starts/shuts down the inverter, rectifies faults, and controls the buzzer. Other control and maintenance functions that may affect system operation are invisible and parameters cannot be set.



Default User	Preset Password	User Rights
browser (browsing user)	-	Only browses the system running information.

**NOTE**

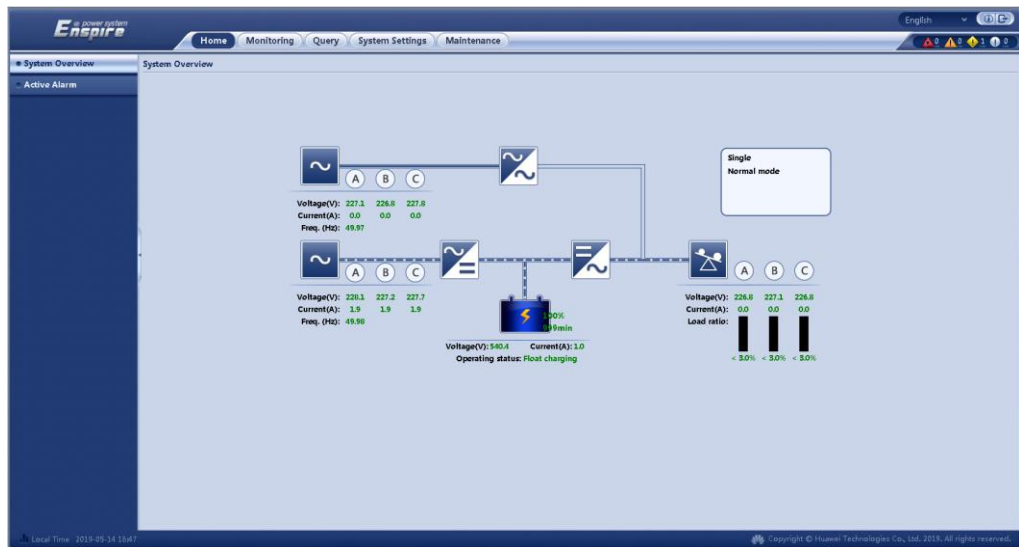
- If an incorrect password is entered five consecutive times, the account will be logged out for 5 minutes.
- After a user logs in to the WebUI, if another user logs in with the same user name, the current account will be logged out.
- It is advised to change the password after the first login using **User Mgmt.** on the **Config.** page to prevent unauthorized access.

----End

## 4.2.2 Home

On the **Home** page, you can view the information about **System Overview** and **Active Alarm**.

Figure 4-47 Home



Item	Description
System Overview	View the operation status of the mains input, bypass input, battery and AC output of the system.
Active Alarm	View the active alarms of the system.

## 4.2.3 Monitoring

Figure 4-48 Monitoring



Item	Description
UPS system	View <b>Running Information</b> of the UPS, set <b>Running Parameter</b> for the UPS, and perform the <b>Running Control</b> operation on the UPS.
Bypass	View the bypass input <b>Running Information</b> and set <b>Running Parameter</b> .
Module Summary	Query the module <b>Running Information</b> and set <b>Running Parameter</b> .
ECM Summary	Set <b>Running Parameter</b> for the ECM.
Battery System	View the battery <b>Running Information</b> and set <b>Running Parameter</b> .
Battery String Summary	<b>NOTE</b> If <b>Number of iBOXs</b> is not <b>0</b> and the battery type is lead-acid battery, <b>Battery String Summary</b> is displayed on the <b>Monitoring</b> screen. Set parameters for the iBOX and iBAT connected to each battery string.

### UPS system

Table 4-12 System settings

Item	Description	Default Value	Value Range
High ambient temperature alarm threshold (°C)	An alarm is generated when the ambient temperature reaches or exceeds the threshold specified by this parameter.	55	40–60
Low ambient temperature alarm threshold (°C)	An alarm is generated when the ambient temperature is lower than the threshold specified by this parameter.	–10	–20 to 0
EPO detection	Indicates whether to enable emergency power-off (EPO). EPO is performed only when this parameter is enabled and the EPO switch is triggered.	Enable	Disable, Enable

Item	Description	Default Value	Value Range
	When <b>EPO detection</b> is changed from <b>Disable</b> to <b>Enable</b> , check that the EPO cable is connected correctly.		
Bus capa. life	If this parameter is set to <b>Enable</b> , the UPS detects the bus capacitor lifespan.	Disable	Disable, Enable
Paral. sys. hibernate	When customer loads are light, enable parallel hibernation to alternate modules in hibernation mode, which can prolong their service life and improve the system efficiency.	Disable	Disable, Enable
Module cycle hiber. period (d)	Indicates the rotation interval of modules in hibernation mode. The default value is 30, which means that the hibernating module is rotated every 30 days.	30	1–100
D.G. ECO bypass supply	Indicates whether ECO bypass is allowed to supply power in D.G. mode. When the D.G. is connected to the dry contact signal GEN: <ul style="list-style-type: none"> <li>If this parameter is set to <b>Enable</b>, the system can enter ECO bypass mode when the D.G. supplies power to the bypass and the ECO function is enabled.</li> <li>If this parameter is set to <b>Disable</b>, the system is not allowed to enter ECO mode when the D.G. supplies power to the bypass.</li> </ul>	Enable	Disable, Enable
RAM verification	Enable or disable the memory check function. If this parameter is set to <b>Enable</b> , the control chip RAM working status is checked regularly. If this parameter is set to <b>Disable</b> , regular check is disabled.	Disable	Disable, Enable
Collect real-time site waveform	If this parameter is set to <b>Enable</b> , one waveform can be stored manually.	Disable	Disable, Enable
Fan life	Indicates the life detection for fans in the power modules and bypass module.	Enable	Disable, Enable
BCB trips in case of EOD	If this parameter is set to <b>Enable</b> , the BCB will trip in case of EOD.	Enable	Disable, Enable

**Table 4-13** Input settings

Item	Description	Default Value	Value Range
Input adaptability	Input adaptability mode 1: It is applicable to the normal power grid and DGs, and DGs that are sensitive to the output reactive component.	Mode 2	Mode 1, Mode 2

Item	Description	Default Value	Value Range
	Input adaptability mode 2: It is applicable to the normal power grid and DGs, and input power sources with high internal resistance.		

**Table 4-14** Output settings

Item	Description	Default Value	Value Range
Zero display with no load output	If this parameter is set to <b>Enable</b> , the output current is displayed as 0 when no load is output. The output load rate is displayed as 3%. When this parameter is set to <b>Disabled</b> , the output current and output load rate are not adjusted to zero.	Enable	Disable, Enable
Calib. output current if no load	If this parameter is set to <b>Enable</b> , the current at no load will be calibrated once automatically. This function can be used only when the UPS carries no load.	Disable	Disable, Enable
Output interruption transfer time (ms)	Set this parameter based on the output interruption time acceptable to loads.	0	0 ms, 40 ms, 60 ms, 80 ms, 100 ms, 120 ms
Max. BPM transfer times	Cross currents occur during the transfer between bypass mode and normal mode, which impacts the system. This parameter specifies the number of transfers between bypass mode and normal mode within 1 hour, which ensures system security.	5	1–10
Current equal. detection	Monitors the current differences between racks or modules. If this parameter is set to <b>Enable</b> , the <b>Mod. Cur. Eql. Data</b> can be viewed on the running information screen.	Disable	Disable, Enable
Inverter async. alarm	Specifies whether an <b>Inverter asynchronous</b> alarm can be displayed on the LCD when the inverter cannot track the bypass frequency change. Normal power supply is not affected no matter whether this parameter is set to	Disable	Disable, Enable

Item	Description	Default Value	Value Range
	<b>Enable or Disable.</b>		
Bus overvoltage recovery	Specifies whether to automatically clear the alarm and restart the power module when the rectifier or inverter shuts down due to a bus overvoltage alarm. If <b>Bus overvoltage recovery</b> is set to <b>Enable</b> , the bus overvoltage alarm is automatically cleared, and the rectifier and inverter automatically start when the bus voltage recovers (less than 420 V) within <b>Bus overvolt. recovery time</b> . When <b>Bus overvoltage recovery</b> is set to <b>Disable</b> , the bus overvoltage alarm cannot be automatically cleared, and the rectifier and inverter cannot automatically start.	Enable	Disable, Enable
Bus overvolt. recovery time	If <b>Bus overvoltage recovery</b> is set to <b>Enable</b> , the bus overvoltage alarm is automatically cleared, and the rectifier and inverter automatically start when the bus voltage recovers (less than 420 V) within <b>Bus overvolt. recovery time</b> .	5s	5s, 1 min, 5 min, 10 min
Capacitor failure detection	If <b>Capacitor failure detection</b> is set to <b>Enable</b> , the power module (power unit) performs inverter capacitor fault detection based on the settings of <b>Capacitor failure detection upper limit</b> and <b>Capacitor failure detection lower limit</b> . If the power module determines that the inverter capacitor is faulty, it shuts down the inverter to prevent the fault from expanding.	Disable	Disable, Enable

**Table 4-15** Bypass settings

Item	Description	Default Value	Value Range
BPM mode upon BPM	Specifies whether to start bypass mode when overtemperature	Enable	Disable, Enable

Item	Description	Default Value	Value Range
overtemp.	occurs.		
Lightload BPM cur. eql. detect	Enable or disable the light load bypass current imbalance alarm. If this parameter is set to <b>Enable</b> , the load is light (less than 30% load), and the load rate of a certain rack is less than 10%, the system will generate a bypass current imbalance alarm and cannot enter the ECO mode. If this parameter is set to <b>Disable</b> , the preceding detection is not performed. Whether the bypass current is imbalanced does not affect the ECO bypass mode.	Enable	Disable, Enable

## Battery System

### NOTICE

Battery parameter settings impact battery maintenance, battery lifespan, and UPS discharge time. When you set battery parameters, note the following:

- Retain default settings for **Chg. cur. limiting coef.** and **Cell float voltage**. Only professional maintenance personnel are allowed to change the settings.
- When you set parameters, ensure the following: **Chg. cur. limiting coef.** > **Transfer-to-equalized charging cur. coef.**
- **Single batt. float chg. voltage deviation alarm thres.** and **Single batt. dis. voltage deviation alarm thres.** are used to check whether the batteries in each battery string have the same charge voltage and discharge voltage. When a value exceeds the specified range, an alarm is generated. The calculation formula is (Charge/Discharge voltage – Average voltage)/Average voltage x 100%. The charge/discharge voltage and average voltage are obtained from the BMU. If the BMU is not configured, these two parameters do not need to be set.

Item	Description	Default Value	Value Range
Float volt. temp. comp.	If this parameter is set to <b>Enable</b> , the float voltage is calibrated based on the battery temperature when a battery temperature sensor is connected. The parameter is configurable in any mode.	Enable	Disable, Enable
Float volt. temp. comp. coef.	Calibration coefficient during float voltage temperature compensation.	3.3	0.0–6.0

Item	Description	Default Value	Value Range
(mV/(°C·cell))			
Float Chg temp. comp. center (°C)	Indicates the reference temperature during temperature compensation of the float charging voltage.	25	20–30
Automatic equalized charging	If this parameter is set to <b>Enable</b> , the UPS automatically changes the battery management status to equalized charge based on the charge current and float charge time.	Enable	Disable, Enable
Transfer-to-equalized charging cur. coef. (C10)	The battery enters equalized charge state when the battery current exceeds this parameter value.	0.05	0.02–0.08
SOC to start equalized charging (%)	If the SOC is lower than the specified value, batteries start equalized charging.	70	0–100
Scheduled equalized charging interval (d)	After batteries transfer from equalized charging to float charging, if the batteries do not discharge, equalized charging starts only after the float charging time reaches <b>Equalized charging protection interval</b> .	60	30–180
Equalized charging protection interval (d)	After equalized charging is complete, scheduled equalized charging starts when the non-equalized charging time exceeds <b>Scheduled equalized charging interval</b> .	7	0–15
Forced equalized charging protection time (h)	When batteries are continuously under float charging or hibernation, enable forced equalized charging. When the forced equalized charging time reaches the value of this parameter, batteries automatically transfer to float charging mode.	18	12–24
Max. batt. dis. time (h)	Set the maximum battery discharge time. When the discharge time reaches this value, the UPS powers off. The battery discharge time can be set only to 0 hours or a value only in the range of 16–48 hours. If the time is set to 0 hours, battery	24	0–48

Item	Description	Default Value	Value Range
	discharge protection is not implemented.		
Undertemp. alarm thresh. (°C)	Battery temperatures can be monitored in a timely manner. If a battery overtemperature alarm is detected, the charging current limit decreases to 0.03 CA. Battery charging stops if a battery overtemperature protection alarm (when the temperature reaches the high temperature threshold plus 3°C) is generated.	-5°C	-20°C to +5°C
Overtemp. alarm thresh. (°C)		50°C	35°C to 55°C
Single batt. float chg. voltage deviation alarm thres. (%)	<b>Single batt. float chg. voltage deviation alarm thres. (%)</b> and <b>Single batt. dis. voltage deviation alarm thres. (%)</b> are used to check whether the cells in each battery string have the same charge voltage and discharge voltage. When a value exceeds the specified range, an alarm is generated.  The calculation formula is (Charge/Discharge voltage – Average voltage)/Average voltage x 100%.	10	5–30
Single batt. dis. voltage deviation alarm thres. (%)		20	10–30
Batt. charging capacity mismatch	After this function is enabled, an alarm is generated if the configured battery capacity exceeds the charging capacity of the rack.	Disable	Disable, Enable
Batt. mode shut	In battery mode, the UPS can automatically power off according to the preset shutdown delay time. If the parameter is disabled, this function is not available.	Disable	Disable, Enable
Bat mode shut delay (s)	Shutdown delay in battery mode.	7200	0–7200
Backup time warning	An alarm is generated if this parameter is set to <b>Enable</b> and the backup time is less than the warning threshold.	Disable	Disable, Enable
Backup time warning thresh. (min)	Backup time warning threshold.	5	3 to 30



Item	Description	Default Value	Value Range
Remain. cap. warning	An alarm is generated if this parameter is set to <b>Enable</b> and the remaining capacity is less than the warning threshold.	Disable	Disable, Enable
Remain. cap. warn. thresh. (%)	Remaining capacity warning threshold	20	5–50
Intelligent hibernation	If this parameter is set to <b>Enable</b> , the intelligent battery hibernation function is enabled.	Disable	Disable, Enable
Class 1 grid hiber. time (d)	Hibernation time for class 1 power grids.	13	0–30
Class 2 grid hiber. time (d)	Hibernation time for class 2 power grids.	6	0–15
Thres. of low batt. SOC over dry contact (%)	If an output dry contact is set to <b>Low battery SOC</b> , and the battery SOC is lower than this threshold, the output dry contact will output signals.	75	5–80
Thres. of low batt. volt. over dry contact (V/cell)	Lead-acid battery: If an output dry contact is set to <b>Batt. Volt. Below Threshold</b> , and the battery voltage is lower than this threshold, the output dry contact will output signals.	1.70	1.70–2.10
	Lithium battery: If <b>Batt. Volt. Below Threshold</b> is set for an output dry contact and the minimum electrochemical voltage is lower than the threshold, the output dry contact will output signals.	2.80	2.60–3.20

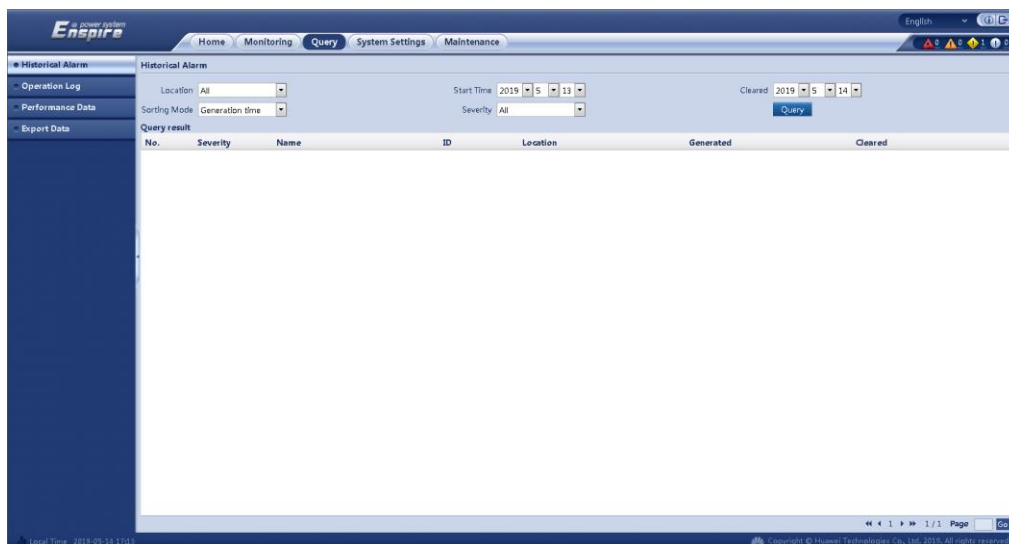
## Battery String Summary

Item	Description
No. of iBOX	Number of an iBOX connected to the UPS.
iBAT start No.	Start number of an iBAT connected to the iBOX.
iBAT end No.	End number of an iBAT connected to the iBOX.

## 4.2.4 Query

On the **Query** page, you can query **Historical Alarm**, **Operation Log**, and **Performance Data**, and perform **Export Data**.

Figure 4-49 Query



Item	Description
Historical Alarm	View historical alarm information for systems or devices.
Operation Log	Query and export <b>Cap. test logs</b> and <b>Common test logs</b> .
Performance Data	Query the performance data of related components of the system.
Export Data	Export <b>Historical Alarm</b> , <b>Active Alarm</b> , <b>Operation Log</b> , and <b>Performance Data</b> .

## 4.2.5 System Settings

Figure 4-50 System settings (lead-acid battery)

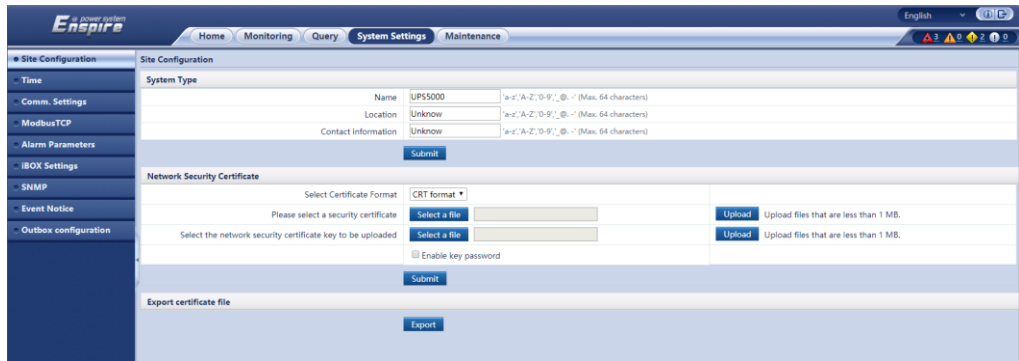
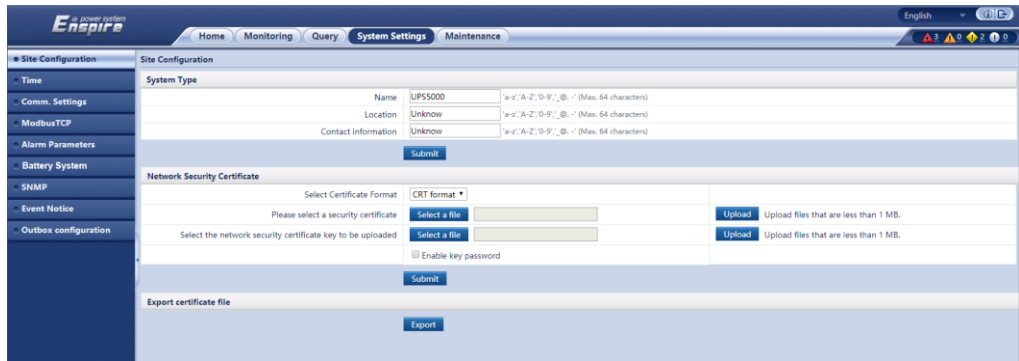


Figure 4-51 System settings (lithium battery)



## Site Configuration

Table 4-16 System type

Item	Description
Name	Site name.
Location	Site location.
Contact information	Site contact information.

Table 4-17 Network security certificate

Item	Description
Select Certificate Format	<b>CRT format</b> and <b>PFX format</b> are supported.
Please select a security	Upload a network security certificate.

Item	Description
certificate	
Select the network security certificate key to be uploaded	Upload the key of the network security certificate.

Export certificate file: Export the root certificate.

## Time

Set the time zone and time for the site.

## Comm. Settings

Set parameters such as **IP Settings**, **RS485 Settings**, **ModbusTCP Settings**, **Amb. T/H Sensor**.

## ModbusTCP

**Table 4-18** Access ModbusTCP security certificate

Item	Description
Upload CA certificate file	Import a CA certificate for the UPS to verify the certificate of the Modbus-TCP communication access party.
Upload local certificate file	Users can replace the UPS certificate with a trusted certificate.
Upload key file	Key file of the certificate.
Key password	Decryption password of the key.
Confirm key password	Confirm the decryption password of the key.

## Alarm Parameters

Enable or disable alarm information for components in the system.

## iBOX Settings

Set iBOX parameters.

## Battery System

Check the SmartLi start address.

## SNMP

- The default SNMP version is SNMPv3, and the preset MD5/SHA password is **Changeme1**, and the preset DES/AES password is **Changeme2**. Change the password after your first login, preventing unauthorized access.

### NOTE

- The standard protocols SNMP V1 and SNMP V2 have security risks. You are advised to use the secure protocol SNMP V3.
- The standard encryption algorithms MD5 and DES have security risks. You are advised to use the secure encryption algorithms SHA and AES.
- To obtain the Mib file, choose **System Settings > SNMP > Mib File > Export**.
- The **SNMP Trap** is used to set the IP address of a server on which the NMS software is installed. The trap port needs to be the same as that on the NMS. If **SNMP Trap** is incorrectly set or not set, system information will be lost or not reported in time.

## Event Notice

- Mailbox Settings: Set the email address of the recipient in **Mailbox Settings**.
- Alarm Notification: Set **Alarm notification delay** in **Alarm Notification Parameter Settings**, set **Time of the first reminder** and **Interval** in **Alarm Reminder Configuration**, and perform the **Add**, **Modify**, or **Delete** operation on alarm notifications in **Alarm Notification User Settings**.
- After the **Event Notice** information is configured, alarms will be sent to the configured mailbox.

## Outbox configuration

Table 4-19 Outbox settings

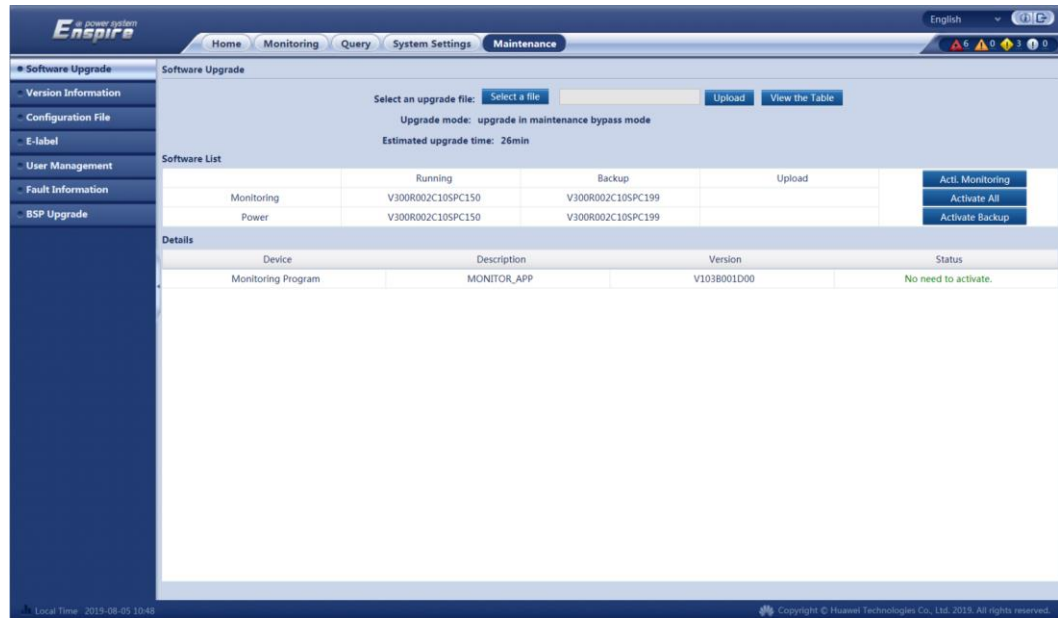
Item	Description
Address type	<b>IP address</b> is supported.
Mailbox server IP address	After the IP address of the outbox server is configured, alarm notification emails will be sent to the configured server.
Encryption mode	<b>TLS</b> , <b>SSL</b> , and <b>No encryption</b> are supported.
SMTP port	The default value is <b>587</b> .
Outbox	Outbox address.
User authentication for mailbox server login	After <b>Enable</b> is selected, user authentication is required for server login.
User Name	User name for authentication.
Password	Password for authentication.

Mailbox Certificate: Upload the CA certificate file.

## 4.2.6 Maintenance

On the **Maintenance** page, you can perform **Soft Upgrade** and **User Management**, query **Version Information**, query and export **E-label**, export **Fault Information**, and import and back up **Configuration File**.

Figure 4-52 Maintenance



Item	Description
Soft Upgrade	Upgrade the system software version.
Version Information	Query the software and hardware versions of devices in the system.
Configuration File	Import and export system configuration files.
E-label	Query and export E-labels of devices in the system.
User Management	Users can add, modify, delete, lock, and unlock operations, and set passwords.
Fault Information	Export fault information.
BSP Upgrade	Upgrade the BSP version.

## 4.3 Old WebUI

### NOTE

User interfaces displayed in this document correspond to the WebUI version V100R003C01SPC408 and are for reference only.

## 4.3.1 Login

### Context

Internet Explorer 11 is used as the example browser.

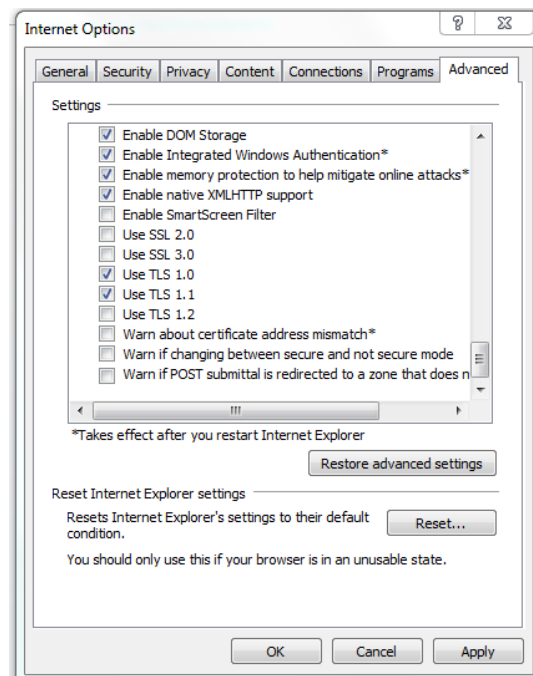
The system supports Internet Explorer 11 and Firefox 31.0.

### Procedure

**Step 1** Open the browser and choose **Tools > Internet Options**.

**Step 2** On the **Advanced** tab page, ensure that **Use TLS 1.0**, and **Use TLS 1.1** are selected and click **OK**.

**Figure 4-53** Settings in the Internet Options dialog box



**Step 3** Enter **https://UPS IP address** in the address box of the browser, select a language, set **User name** and **Password**, and click **Login**.

#### NOTE

The preset UPS IP address is 192.168.0.10. You can set the UPS Ethernet IP address on the LCD or WebUI. The value range is 1.0.0.0–223.255.255.255.

**Table 4-20** User description

Default User	Preset Password	User Rights
admin (system administrator)	Changeme	Performs all operations on the LCD and WebUI, including system running information browsing,

Default User	Preset Password	User Rights
		system information exporting, parameter setting, system control, system configuration, and system maintenance.
operator (common user)	Changeme	Only browses the system running information, exports system information, starts/shuts down the inverter, rectifies faults, and controls the buzzer. Other control and maintenance functions that may affect system operation are invisible and parameters cannot be set.
browser (browsing user)	-	Only browses the system running information.

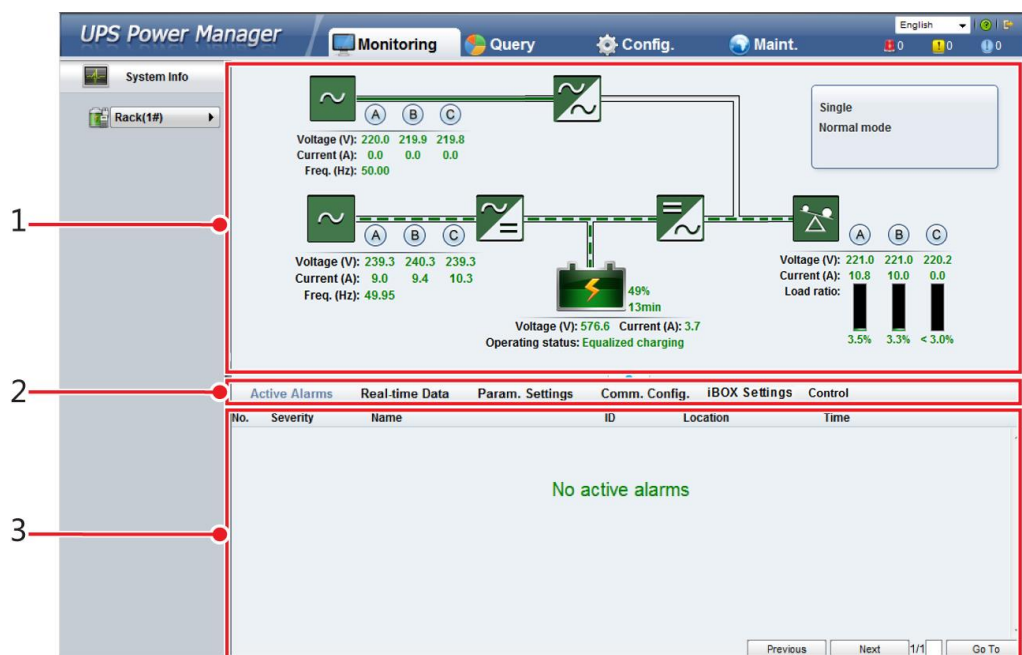
**NOTE**

- If an incorrect password is entered five consecutive times, the account will be logged out for 5 minutes.
- After a user logs in to the WebUI, if another user logs in with the same user name, the current account will be logged out.
- It is advised to change the password after the first login using **User Mgmt.** on the **Config.** page to prevent unauthorized access.

----End

### 4.3.2 Monitoring

Figure 4-54 Monitoring





**NOTE**

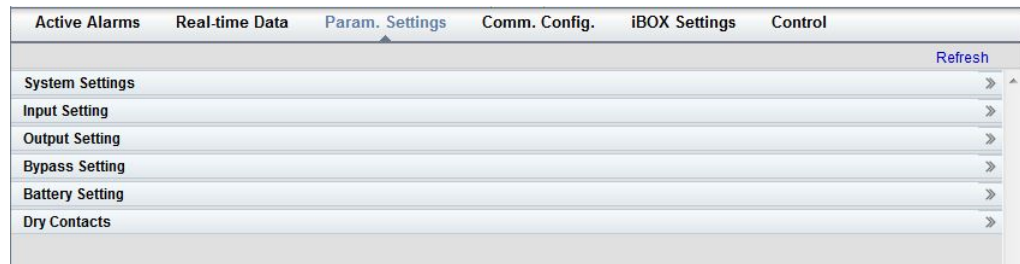
If NA is displayed for load ratio, the value is invalid or outside the range.

**Table 4-21** Monitoring details

Number	Area	Function
1	Running status area	Displays the power flow and UPS running information.
2	Menu bar	Displays alarms and real-time data, sets parameters, and provides control commands. The <b>Active Alarms</b> page is displayed by default.
3	Information area	Displays system monitoring information.

### 4.3.2.1 Parameter Settings

**Figure 4-55** Parameter settings



### System Settings

Item	Description	Default Value	Value Range
High ambient temperature alarm threshold (°C)	An alarm is generated when the ambient temperature reaches or exceeds the threshold specified by this parameter.	55	40–60
Low ambient temperature alarm threshold (°C)	An alarm is generated when the ambient temperature is lower than the threshold specified by this parameter.	–10	–20 to 0
EPO detection	Indicates whether to enable emergency power-off (EPO). EPO is performed only when this parameter is enabled and the EPO switch is triggered.  When <b>EPO detection</b> is changed from <b>Disable</b> to <b>Enable</b> , check	Enable	Disable, Enable

Item	Description	Default Value	Value Range
	that the EPO cable is connected correctly.		
Bus capa. life	If this parameter is set to <b>Enable</b> , the UPS detects the bus capacitor lifespan.	Disable	Disable, Enable
Paral. sys. hibernate	When customer loads are light, enable parallel hibernation to alternate modules in hibernation mode, which can prolong their service life and improve the system efficiency.	Disable	Disable, Enable
Module cycle hiber. period (d)	Indicates the rotation interval of modules in hibernation mode. The default value is 30, which means that the hibernating module is rotated every 30 days.	30	1–100
D.G. ECO bypass supply	Indicates whether ECO bypass is allowed to supply power in D.G. mode. When the D.G. is connected to the dry contact signal GEN: <ul style="list-style-type: none"> <li>If this parameter is set to <b>Enable</b>, the system can enter ECO bypass mode when the D.G. supplies power to the bypass and the ECO function is enabled.</li> <li>If this parameter is set to <b>Disable</b>, the system is not allowed to enter ECO mode when the D.G. supplies power to the bypass.</li> </ul>	Enable	Disable, Enable
RAM verification	Enable or disable the memory check function. If this parameter is set to <b>Enable</b> , the control chip RAM working status is checked regularly. If this parameter is set to <b>Disable</b> , regular check is disabled.	Disable	Disable, Enable
Collect real-time site waveform	If this parameter is set to <b>Enable</b> , one waveform can be stored manually.	Disable	Disable, Enable
BCB trips in case of EOD	If this parameter is set to <b>Enable</b> , the BCB will trip in case of EOD.	Enable	Disable, Enable

## Input Settings

Item	Description	Default Value	Value Range
Input adaptability	The value of <b>Input adaptability</b> can be <b>Strong</b> or <b>Weak</b> . Strong input adaptability applies to the D.G. or input sources whose input current has high frequency oscillation. In this mode, the total distortion of the input current waveform (THDi) is poor, but the system is stable. Weak input adaptability is suitable for mains and AC input sources.	Strong	Strong, Weak

## Output Settings

Item	Description	Default Value	Value Range
Zero display with no load output	If this parameter is set to <b>Enable</b> , the output current is displayed as 0 when no load is output. The output load rate is displayed as 3%. When this parameter is set to <b>Disabled</b> , the output current and output load rate are not adjusted to zero.	Enable	Disable, Enable
Calib. output current if no load	If this parameter is set to <b>Enable</b> , the current at no load will be calibrated once automatically. This function can be used only when the UPS carries no load.	Disable	Disable, Enable
Output interruption transfer time (ms)	Set this parameter based on the output interruption time acceptable to loads.	0	0 ms, 40 ms, 60 ms, 80 ms, 100 ms, 120 ms
Max. BPM transfer times	Cross currents occur during the transfer between bypass mode and normal mode, which impacts the system. This parameter specifies the number of transfers between bypass mode and normal mode within 1 hour, which ensures system security.	5	1–10
Current equal. detection	Monitors the current differences between racks or modules. If this parameter is set to <b>Enable</b> , the <b>Mod. Cur. Eql. Data</b> can be viewed on the running	Disable	Disable, Enable

Item	Description	Default Value	Value Range
	information screen.		
Inverter async. alarm	Specifies whether an <b>Inverter asynchronous</b> alarm can be displayed on the LCD when the inverter cannot track the bypass frequency change. Normal power supply is not affected no matter whether this parameter is set to <b>Enable</b> or <b>Disable</b> .	Disable	Disable, Enable
Bus overvoltage recovery	Specifies whether to automatically clear the alarm and restart the power module when the rectifier or inverter shuts down due to a bus overvoltage alarm. If <b>Bus overvoltage recovery</b> is set to <b>Enable</b> , the bus overvoltage alarm is automatically cleared, and the rectifier and inverter automatically start when the bus voltage recovers (less than 420 V) within <b>Bus overvolt. recovery time</b> . When <b>Bus overvoltage recovery</b> is set to <b>Disable</b> , the bus overvoltage alarm cannot be automatically cleared, and the rectifier and inverter cannot automatically start.	Enable	Disable, Enable
Bus overvolt. recovery time	If <b>Bus overvoltage recovery</b> is set to <b>Enable</b> , the bus overvoltage alarm is automatically cleared, and the rectifier and inverter automatically start when the bus voltage recovers (less than 420 V) within <b>Bus overvolt. recovery time</b> .	5s	5s, 1 min, 5 min, 10 min
Capacitor failure detection	If <b>Capacitor failure detection</b> is set to <b>Enable</b> , the power module (power unit) performs inverter capacitor fault detection based on the settings of <b>Capacitor failure detection upper limit</b> and <b>Capacitor failure detection lower limit</b> . If the power module determines that the inverter capacitor is faulty, it shuts down the inverter to prevent the fault from expanding.	Disable	Disable, Enable

## Bypass Settings

Item	Description	Default Value	Value Range
BPM mode upon BPM overtemp.	Specifies whether to start bypass mode when overtemperature occurs.	Enable	Disable, Enable
Lightload BPM cur. eql. detect	Enable or disable the light load bypass current imbalance alarm. If this parameter is set to <b>Enable</b> , the load is light (less than 30% load), and the load rate of a certain rack is less than 10%, the system will generate a bypass current imbalance alarm and cannot enter the ECO mode. If this parameter is set to <b>Enable</b> , the preceding detection is not performed. Whether the bypass current is imbalanced does not affect the ECO bypass mode.	Enable	Disable, Enable

## Battery Settings

### NOTICE

Battery parameter settings impact battery maintenance, battery lifespan, and UPS discharge time. When you set battery parameters, note the following:

- Retain default settings for **Chg. cur. limiting coef.** and **Cell float voltage**. Only professional maintenance personnel are allowed to change the settings.
- When you set parameters, ensure the following: **Chg. cur. limiting coef.** > **Transfer-to-equalized charging cur. coef.**
- **Single batt. float chg. voltage deviation alarm thres.** and **Single batt. dis. voltage deviation alarm thres.** are used to check whether the batteries in each battery string have the same charge voltage and discharge voltage. When a value exceeds the specified range, an alarm is generated. The calculation formula is (Charge/Discharge voltage – Average voltage)/Average voltage x 100%. The charge/discharge voltage and average voltage are obtained from the BMU. If the BMU is not configured, these two parameters do not need to be set.

Item	Description	Default Value	Value Range
Float volt. temp. comp.	If this parameter is set to <b>Enable</b> , the float voltage is calibrated based on the battery temperature when a battery temperature sensor is connected. The	Enable	Disable, Enable

Item	Description	Default Value	Value Range
	parameter is configurable in any mode.		
Float volt. temp. comp. coef. (mV/°C·cell)	Calibration coefficient during float voltage temperature compensation.	3.3	0.0–6.0
Float Chg temp comp center (°C)	Indicates the reference temperature during temperature compensation of the float charging voltage.	25	20–30
Automatic equalized charging	If this parameter is set to <b>Enable</b> , the UPS automatically changes the battery management status to equalized charge based on the charge current and float charge time.	Enable	Disable, Enable
Transfer-to-equalized charging cur. coef. (C10)	The battery enters equalized charge state when the battery current exceeds this parameter value.	0.05	0.02–0.08
SOC to start equalized charging (%)	If the SOC is lower than the specified value, batteries start equalized charging.	70	0–100
Scheduled equalized charging interval (d)	After batteries transfer from equalized charging to float charging, if the batteries do not discharge, equalized charging starts only after the float charging time reaches <b>Equalized charging protection interval</b> .	60	30–180
Equalized charging protection interval (d)	After equalized charging is complete, scheduled equalized charging starts when the non-equalized charging time exceeds <b>Scheduled equalized charging interval</b> .	7	0–15
Forced equalized charging protection time (h)	When batteries are continuously under float charging or hibernation, enable forced equalized charging. When the forced equalized charging time reaches the value of this parameter, batteries automatically transfer to float charging mode.	18	12–24
Max. batt. dis. time (h)	Set the maximum battery discharge time. When the	24	0–48

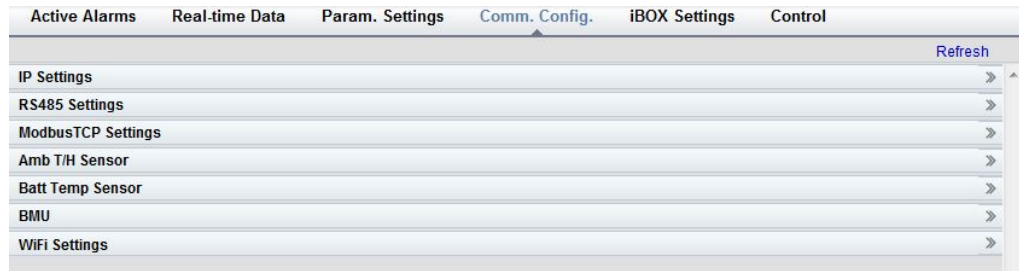
Item	Description	Default Value	Value Range
	discharge time reaches this value, the UPS powers off. The battery discharge time can be set only to 0 hours or a value only in the range of 16–48 hours. If the time is set to 0 hours, battery discharge protection is not implemented.		
EOD restart	If the mains is not functioning normally, the UPS will transfer to battery mode. When batteries reach the EOD threshold, the bypass is disabled, and <b>EOD restart</b> is <b>Enable</b> , the UPS will restart as soon as the mains resumes.  If <b>EOD restart</b> is disabled, clear the alarm manually or enable the restart function for the UPS.	Enable	Disable, Enable
EOD restart delay (min)	If <b>EOD restart</b> is set to <b>Enable</b> , the UPS starts working after the time set for <b>EOD restart delay</b> when the input recovers from the power failure upon EOD.	10	1–1440
Undertemp. alarm thresh. (°C)	Battery temperatures can be monitored in a timely manner. If a battery overtemperature alarm is detected, the charging current limit decreases to 0.03 CA. Battery charging stops if a battery overtemperature protection alarm (when the temperature reaches the high temperature threshold plus 3°C) is generated.	–5°C	–20°C to +5°C
Overtemp. alarm thresh. (°C)		50°C	35°C to 55°C
Single batt. float chg. voltage deviation alarm thres. (%)	<b>Single batt. float chg. voltage deviation alarm thres. (%)</b> and <b>Single batt. dis. voltage deviation alarm thres. (%)</b> are used to check whether the cells in each battery string have the same charge voltage and discharge voltage. When a value exceeds the specified range, an alarm is generated.  The calculation formula is (Charge/Discharge voltage – Average voltage)/Average voltage x 100%.	10	5–30
Single batt. dis. voltage deviation alarm thres. (%)		20	10–30

Item	Description	Default Value	Value Range
Batt. charging capacity mismatch	After this function is enabled, an alarm is generated if the configured battery capacity exceeds the charging capacity of the rack.	Disable	Disable, Enable
Bat mode shut	In battery mode, the UPS can automatically power off according to the preset shutdown delay time. If the parameter is disabled, this function is not available.	Disable	Disable, Enable
Backup time warning	An alarm is generated if this parameter is set to <b>Enable</b> and the backup time is less than the warning threshold.	Disable	Disable, Enable
Remain. cap. warning	An alarm is generated if this parameter is set to <b>Enable</b> and the remaining capacity is less than the warning threshold.	Disable	Disable, Enable
Intelligent hibernation	If this parameter is set to <b>Enable</b> , the intelligent battery hibernation function is enabled.	Disable	Disable, Enable
Thres. of low batt. SOC over dry contact (%)	If an output dry contact is set to <b>Low battery SOC</b> , and the battery SOC is lower than this threshold, the output dry contact will output signals.	75	5–80
Thres. of low batt. volt. over dry contact (V/cell)	If an output dry contact is set to <b>Batt. Volt. Below Threshold</b> , and the battery voltage is lower than this threshold, the output dry contact will output signals.	1.70	1.70–2.10



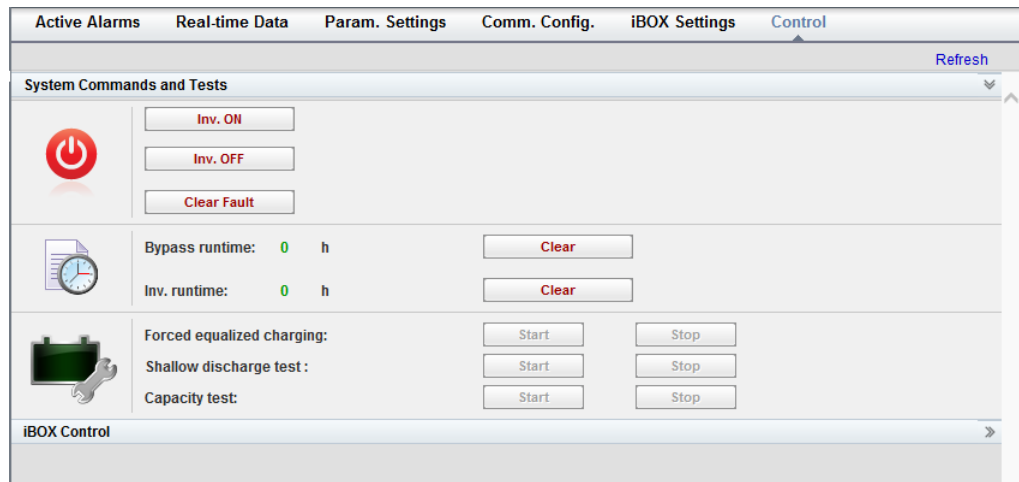
## 4.3.2.2 Communication Settings

Figure 4-56 Communication settings



## 4.3.2.3 Control

Figure 4-57 Control

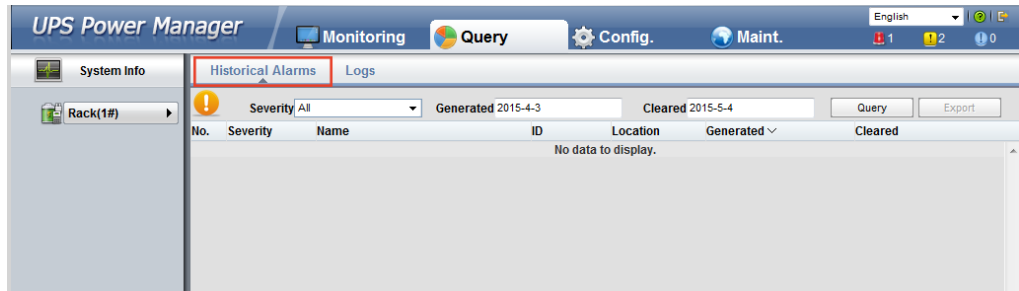


## 4.3.3 Query

### 4.3.3.1 Historical Alarms

On the homepage, click the **Query** tab to open the **Historical Alarms** page for querying historical alarms based on severity, generation time, and clear time.

Figure 4-58 Historical alarms



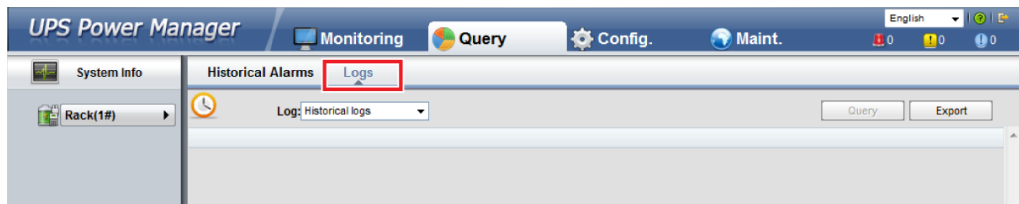
### 4.3.3.2 Logs

On the **Logs** page, you can set **Log** to **Historical logs**, **Cap. test logs**, or **Common test logs**, and query or export logs.

#### NOTE

Historical logs can be exported but not queried.

Figure 4-59 Logs

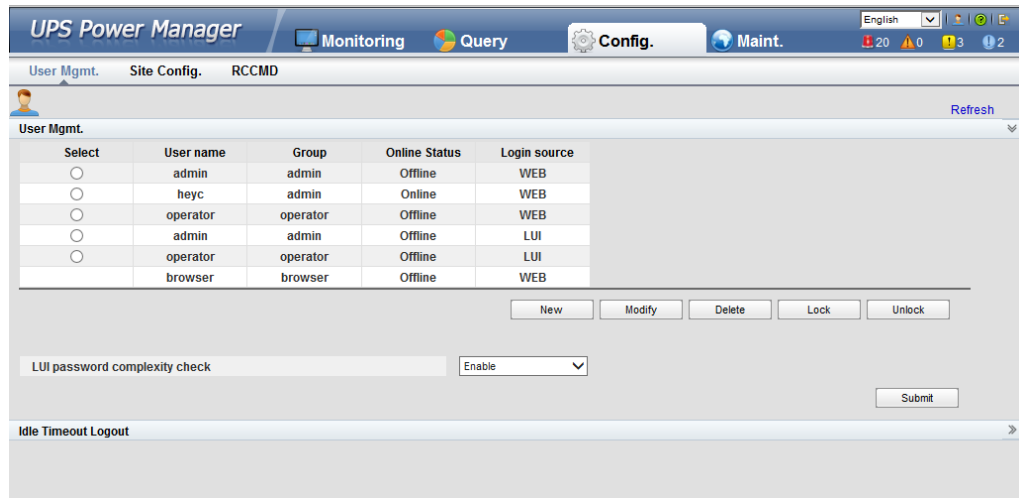


## 4.3.4 Config.

### 4.3.4.1 User Management

On the home page, choose **Config.** > **User Mgmt.**

Figure 4-60 User management



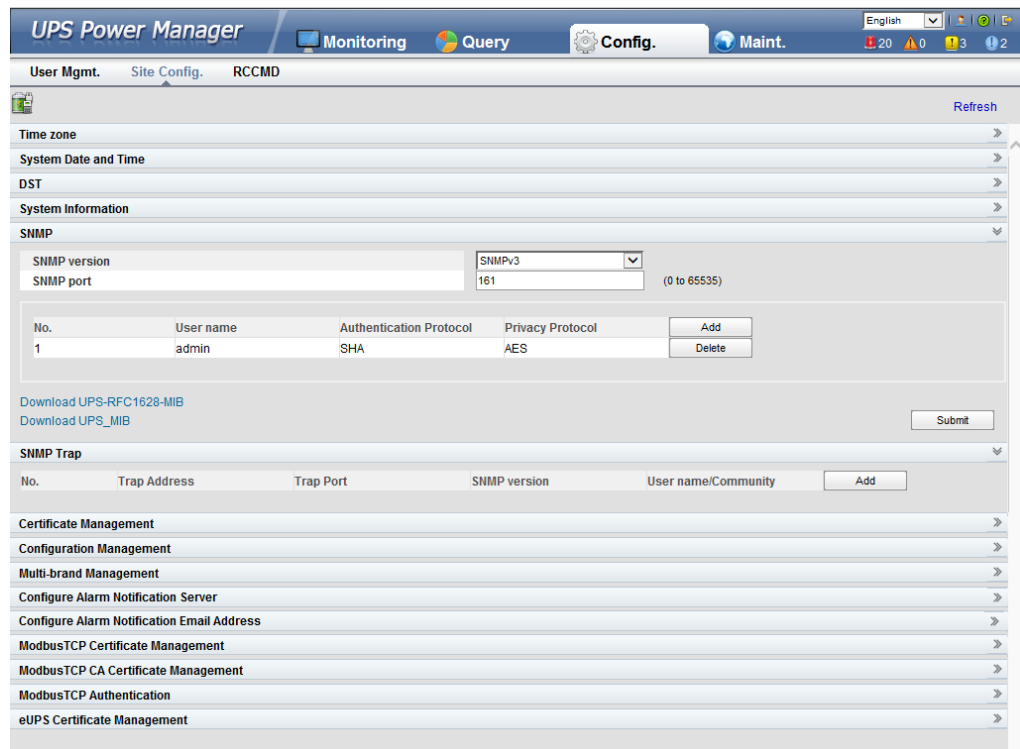
**NOTE**

- On the **User Mgmt.** page, you can add, modify, delete, lock, or unlock users and change user passwords.
- The WebUI user name cannot exceed 10 characters and can contain only uppercase and lowercase letters, digits, and underscores. The password contains 6 to 20 characters and at least two types of uppercase letters, lowercase letters, digits, and underscores.
- If the LUI password complexity check is disabled, the user password is required to be a string of six to eight digits. If the password complexity check is enabled, the user password is required to be a string of 6–20 characters and contain at least two types of characters.

### 4.3.4.2 Site Config.

On the home page, choose **Config.** > **Site Config.**

**Figure 4-61** Site configuration



- The NTP parameters are used to set the NTP server address, port number, and synchronization interval.
- The default SNMP version is SNMPv3, and the preset MD5/SHA password is **Changeme1**, and the preset DES/AES password is **Changeme2**. Change the password after your first login, preventing unauthorized access.

**NOTE**

- The standard protocols SNMP V1 and SNMP V2 have security risks. You are advised to use the secure protocol SNMP V3.
- The standard encryption algorithms MD5 and DES have security risks. You are advised to use the secure encryption algorithms SHA and AES.
- To obtain the MIB file, choose **Config. > Site Config. > SNMP > Download HUAWEI\_UPS\_MIB**.
- The **SNMP Trap** is used to set the IP address of a server on which the NMS software is installed. The trap port needs to be the same as that on the NMS. If **SNMP Trap** is incorrectly set or not set, system information will be lost or not reported in time.
- The certificate is used for Secure Sockets Layer (SSL) encryption protection for WebUI login. You need to apply to a third-party institution for the certificate.
- **Configuration Management** is used to upload and export configuration parameters in the monitoring system.
- **Multi-brand Management** is used to import the brand information of a partner to the corresponding WebUI.
- Specify **Email server IP address**, **Sender's email**, and **User account authentication required** when sending a mail and click **Test** to check whether the test email can be received. **Configure Alarm Notification Server** is used to configure a server for receiving alarm emails from the monitoring system.

- Set **Email** and **Alarm Severity** and simulate an alarm. Check that the alarm email can be received. **Configure Alarm Notification Email Address** is used to configure the email address for receiving alarm emails from the monitoring system.
- **ModbusTCP Certificate Management:** ModbusTCP supports the Transport Layer Security (TLS) secure protocol for encrypted transmission and implements access authentication through the bidirectional certificate. Customers can replace the UPS certificate with the certificate trusted by them.
- **ModbusTCP CA Certificate Management:** Import a CA certificate to verify the validity of the ModbusTCP access certificate.
- **ModbusTCP Authentication:** Verify the identity legitimacy of both parties to ensure data security for both parties in ModbusTCP communication.
- After eUPS certificate management is configured, a certificate can be imported on the WebUI to replace the preset eUPS certificate.

### 4.3.4.3 RCCMD

#### RCCMD

**RCCMD function** is set to **Disable** by default, as shown in [Figure 4-62](#). If required, set it to **Enable** upon first login. After you submit the setting, the page refreshes. The controls such as **SSL Encrypted Transmission** and **Event Configuration** will be displayed on the page, as shown in [Figure 4-63](#).

**Figure 4-62** RCCMD function disabled

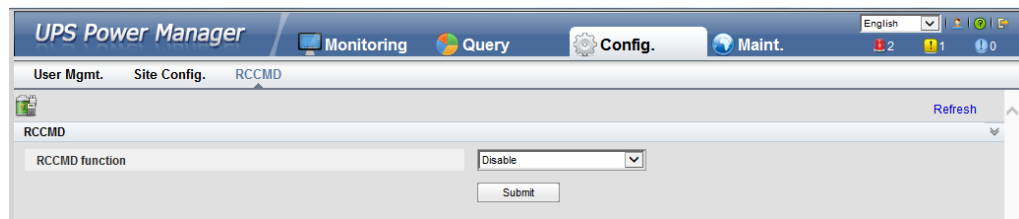
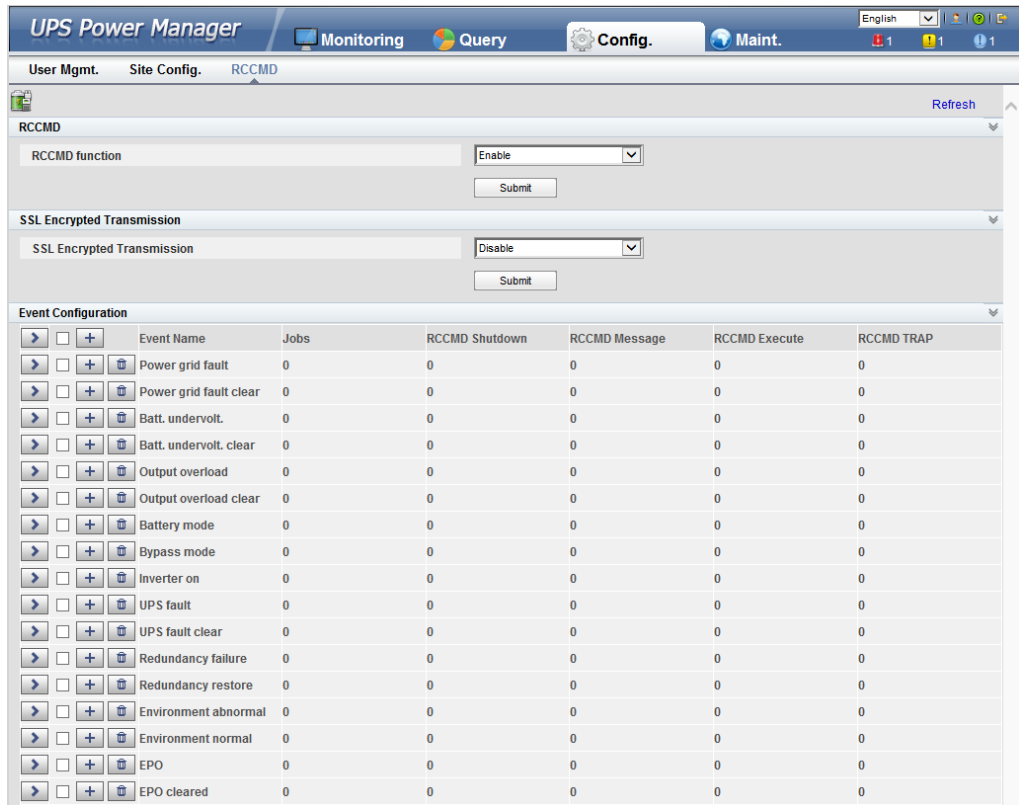


Figure 4-63 RCCMD function enabled



## SSL Encrypted Transmission

### NOTICE

The SSL encrypted transmission set on the page of the UPS5000 monitor display module (MDU) must be the same as the setting on the RCCMD client.

**SSL Encrypted Transmission** is set to **Enable** by default, as shown in [Figure 4-64](#). If it is set to **Disable**, the RCCMD certificate controls will not be displayed on the page, as shown in [Figure 4-65](#). If **SSL Encrypted Transmission** is set to **Disable**, a message indicating there is a risk will be displayed.

Figure 4-64 SSL encrypted transmission enabled by default

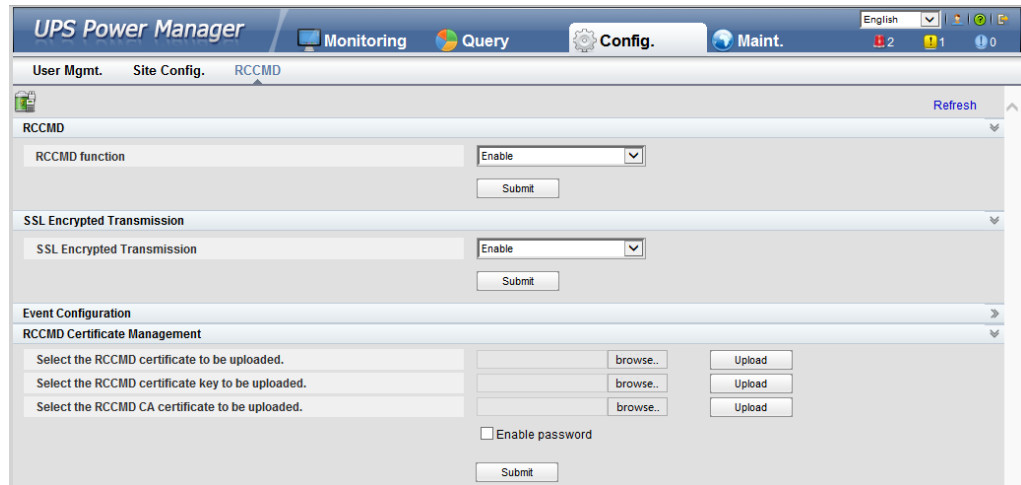
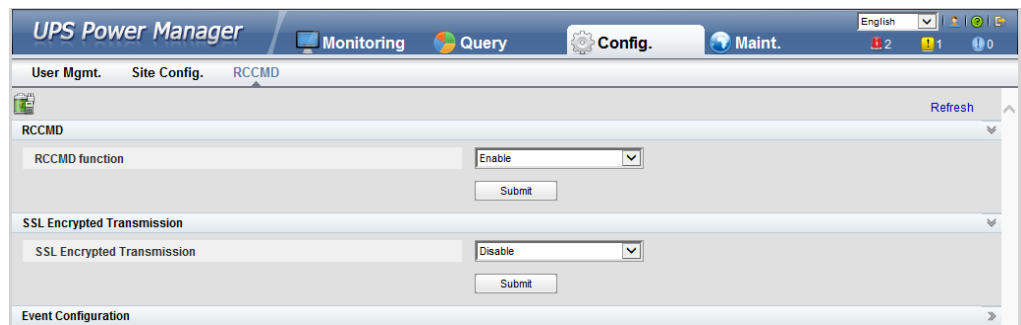


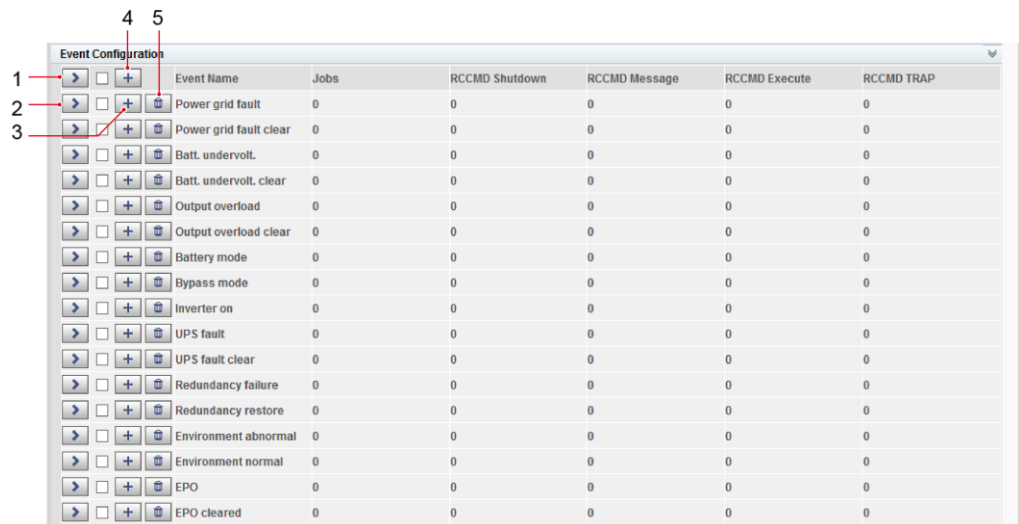
Figure 4-65 SSL encrypted transmission disabled



## Event Configuration

The MDU supports 17 alarm events, and a maximum of 50 jobs can be added for each event, as shown in Figure 4-66. Figure 4-66 shows the buttons on the **Event Configuration** page, and Table 4-22 describes these buttons.

**Figure 4-66** Event configuration page



**NOTE**

Number of jobs = Number of **RCCMD Shutdown** jobs + Number of **RCCMD Message** jobs + Number of **RCCMD Execute** jobs + Number of **RCCMD TRAP** jobs.

**Table 4-22** Buttons on the event configuration page

No.	Name	Description
1	Button for expanding all	You can view all jobs of all events by clicking this button.
2	Button for expanding one event	You can view all jobs of the event by clicking this button.
3	Button for adding one job	You can add one job for the event by clicking this button.
4	Button for adding one job for events	Select multiple events, and you can add one job for the selected events at the same time by clicking this button.
5	Button for deleting all jobs	You can delete all jobs of the event by clicking this button.

Figure 4-67 shows the buttons after one event is expanded and Table 4-23 describes these buttons.



Figure 4-67 Buttons after one event is expanded

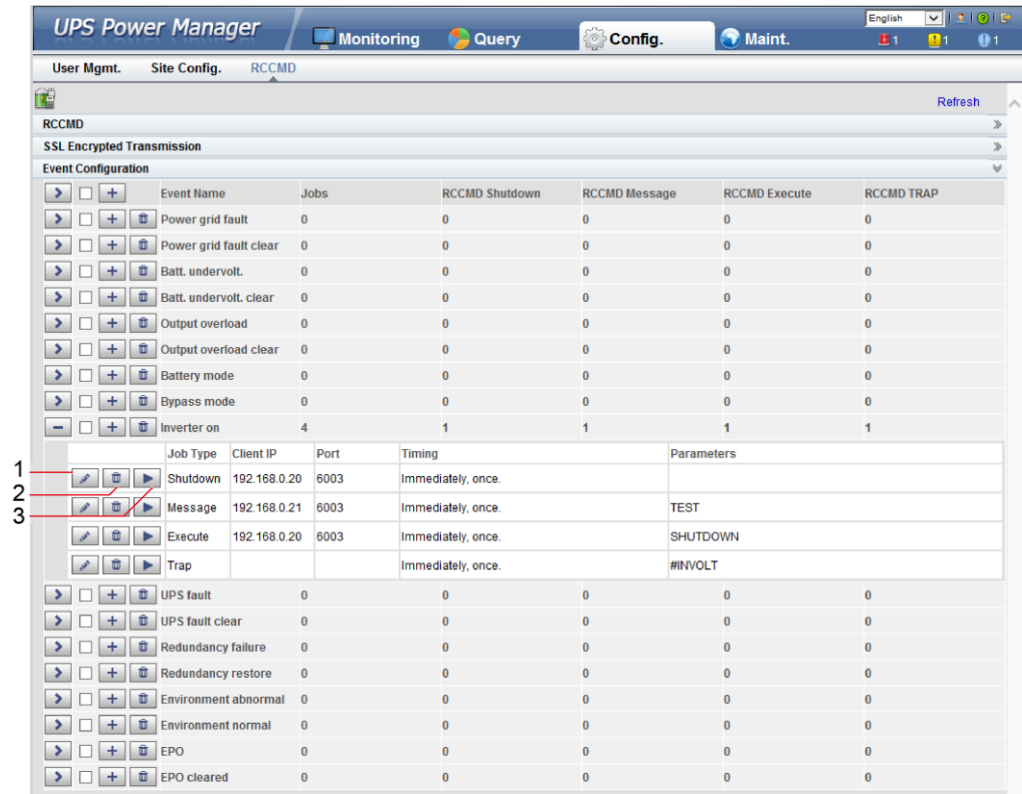


Table 4-23 Buttons after one event is expanded

No.	Name	Description
1	Button for modifying	A dialog box for modifying a job is displayed after you click this button. You can modify the job.
2	Button for deleting one job	You can delete the job by clicking this button.
3	Button for test	If you click this button, the job will be performed and a message showing test succeeds or fails will be displayed on the page.

Adding one job for one event: Select one event (for example, **Inverter on**), click the button for adding one job, and the page for adding a job for the event is displayed.

When adding a job, the job types to be selected are: **RCCMD Shutdown**, **RCCMD Message**, **RCCMD Execute**, and **RCCMD TRAP**. **RCCMD Shutdown** is selected by default. For different job types, you need to enter different contents.

- **RCCMD Shutdown:** You need to specify the RCCMD client IP address and port. When the RCCMD client receives the job, it will shut down the computer.

**Figure 4-68** RCCMD shutdown

The screenshot shows a dialog box titled "Batt. undervolt. clear Job 1". It contains the following fields and options:

- Job Type:** A dropdown menu set to "RCCMD Shutdown".
- Client IP:** An empty text input field.
- Port:** A text input field containing "6003" with a hint "(1-65535)".
- Timing:** Two radio button options: "Immediately, once." (selected) and "Scheduled in [ ] (5-86400) seconds.".
- Actions will only be executed if event condition is still true after the specified seconds!** A section with three radio button options: "After [ ] (0-86400) seconds, repeat all [ ] (5-86400) Specify the interval.", "After [ ] (0-86400) seconds on Battery.", and "At [ ] (5-86400) seconds remaining time.".
- Buttons:** "Test", "Submit", and "Cancel".

- **RCCMD Message:** Specify the RCCMD client IP address, port, and message to be conveyed. The RCCMD client will receive the message. For example, enter "This is a test message".

**Figure 4-69** RCCMD message

The screenshot shows a dialog box titled "Batt. undervolt. clear Job 1". It contains the following fields and options:

- Job Type:** A dropdown menu set to "RCCMD Message".
- Client IP:** An empty text input field.
- Port:** A text input field containing "6003" with a hint "(1-65535)".
- Message:** A large empty text input field.
- Timing:** Two radio button options: "Immediately, once." (selected) and "Scheduled in [ ] (5-86400) seconds.".
- Actions will only be executed if event condition is still true after the specified seconds!** A section with three radio button options: "After [ ] (0-86400) seconds, repeat all [ ] (5-86400) Specify the interval.", "After [ ] (0-86400) seconds on Battery.", and "At [ ] (5-86400) seconds remaining time.".
- Buttons:** "Test", "Submit", and "Cancel".

- **RCCMD Execute:** Specify the RCCMD client IP address, port, and command to be executed. For example, enter **SHUTDOWN**, and the RCCMD client will shut down the computer after receiving the command.

**Figure 4-70** RCCMD execute

Batt. undervolt. clear Job 1

Job Type:

Client IP:

Port:  (1-65535)

Execute:

**Timing**

Immediately, once.

Scheduled in  (5-86400) seconds.

**Actions will only be executed if event condition is still true after the specified seconds!**

After  (0-86400) seconds, repeat all  (5-86400) Specify the interval.

After  (0-86400) seconds on Battery.

At  (5-86400) seconds remaining time.

- **RCCMD TRAP:** When the event happens, the MDU will send the TRAP message to all connected RCCMD clients based on the sending mechanism.

If you want to define the TRAP message by yourself, you can use the TRAP signal to display the UPS information. For example, if you enter **#INVOLT V**, the RCCMD client will receive the UPS input voltage value (for example, single-phase: 220 V; three-phase A: 220 V, B: 220 V, C: 220 V). [Table 4-24](#) lists the signal names that can be entered.

**Figure 4-71** RCCMD TRAP

Batt. undervolt. clear Job 1

Job Type:

Message:

**Timing**

Immediately, once.

Scheduled in  (5-86400) seconds.

**Actions will only be executed if event condition is still true after the specified seconds!**

After  (0-86400) seconds, repeat all  (5-86400) Specify the interval.

After  (0-86400) seconds on Battery.

At  (5-86400) seconds remaining time.

**Table 4-24** RCCMD TRAP signal

Signal Name	Description	Unit in the UPS
#MODEL	Device name	N/A
#OUTPOWER	Active power	kW
#OUTVOLT	Output voltage	V
#OUTCURR	Output current	A
#OUTLOAD	Output load rate	%
#BATTCAP	Remaining battery capacity	%
#INVOLT	Input voltage	V
#BYPASSINVOLT	Bypass input voltage	V
#TEMPDEG	Temperature inside the UPS	Celsius
#AUTONOMTIME	Battery backup time	minutes
#STATUS	UPS status	N/A
#RUNTIME	UPS operating time	minutes
#BATTVOLT	Battery voltage	V
#INFREQ	Input frequency	Hz
#BYPASSINFREQ	Bypass input frequency	Hz
#OUTFREQ	Output frequency	Hz
#CNT_PF	Power supply failure times	N/A
#CNT_BL	Low battery voltage times	N/A
#INPHASES	Input phases	N/A
#OUTPHASES	Output phases	N/A

When you add a job, five sending methods are available. The latter three methods can take effect only when the event condition is still true after the specified seconds.

- **Immediately, once:** After the event happens, the job will be sent to the RCCMD client immediately.
- **Scheduled in X seconds:** After the event happens, the job will be sent to the RCCMD client once in X seconds. No matter whether the event disappears or not within X seconds, the job will be sent.
- **After X seconds, repeat all Y Specify the interval:** After the event happens, the job will be sent once in X seconds, and then be sent once every Y seconds.
- **After X seconds on Battery:** After the battery mode is activated for X seconds, the job will be sent to the RCCMD client once.
- **At X seconds remaining time:** When the battery backup time has only X seconds left, the job will be sent to the RCCMD client once.

 **NOTE**

X and Y are variables and stand for time.

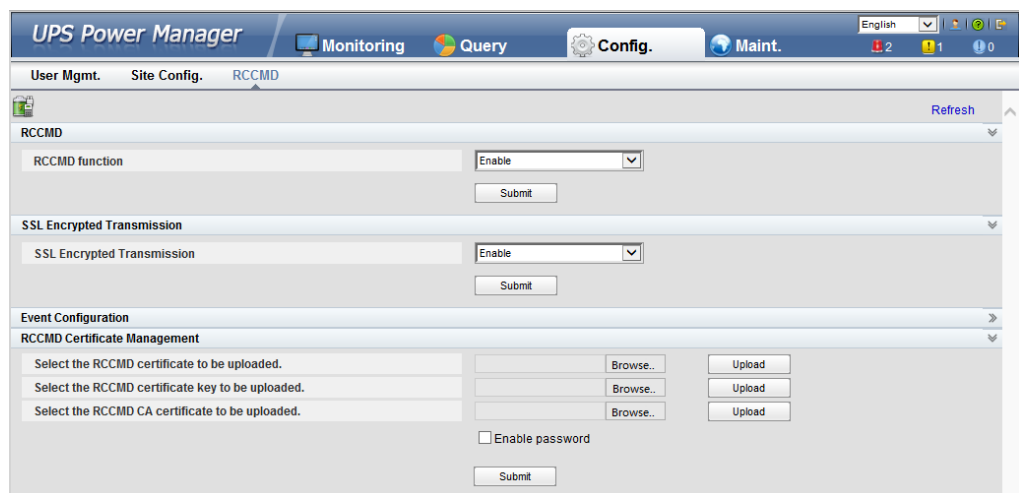
## RCCMD Certificate Management

**NOTICE**

- After replacing the certificate on the MDU WebUI, replace the certificate on the RCCMD client too. Otherwise, communication will fail. For details about the replacing method, see the RCCMD user manual.
- The default certificate provided by the system has expired. Replace the certificate immediately.

After **SSL Encrypted Transmission** is set to **Enable**, **RCCMD Certificate Management** is displayed. The RCCMD certificate, RCCMD certificate key, and RCCMD CA certificate can be uploaded, as shown in [Figure 4-72](#). If the RCCMD certificate or RCCMD CA certificate is not uploaded, the default certificate provided by the system is used for communication. After the certificate is uploaded successfully, click **Submit**. The WebUI of the MDU will restart, and the uploaded certificate will be used for communication.

**Figure 4-72** RCCMD certificate management



 **NOTE**

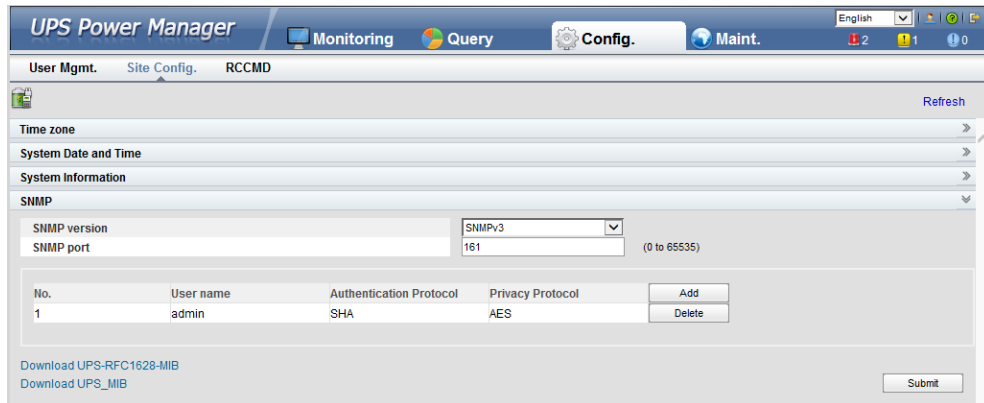
If the RCCMD certificate key has been encrypted, enable and enter the key password.

### 4.3.4.4 Managing the UPS by Using the NMS Complying with RFC1628 Standard

#### Installing the UPS MIB

The MIB is in the MDU. Click **Download UPS-RFC1628-MIB** on the page of the web browser to download the MIB file which allows the third-party NMS to manage the UPS remotely.

Figure 4-73 Download the MIB



**NOTE**

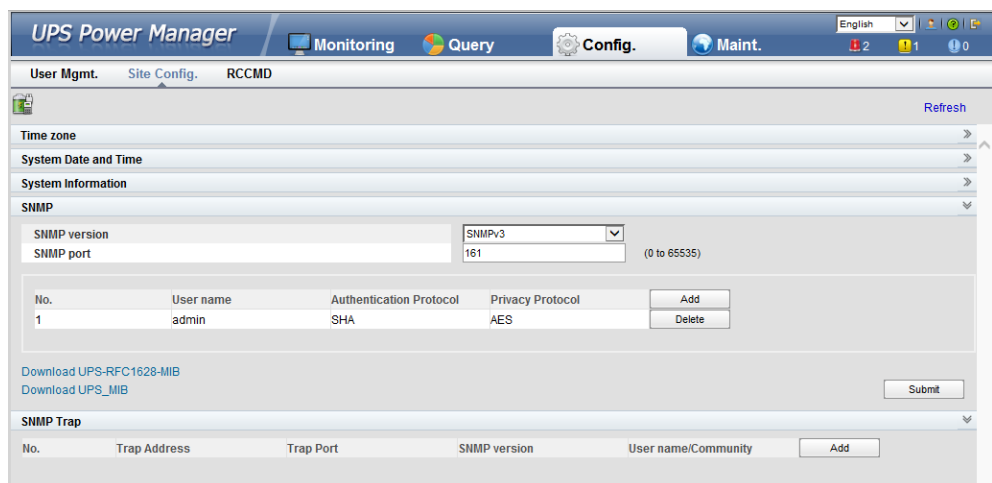
The UPS-RFC1628-MIB has more alarms than RFC1628. Download the UPS-RFC1628-MIB before using.

## Managing the UPS by Using the NMS

- Applying for Access Rights

To manage the UPS by using the UNMS II of Generex over the MDU, apply to the system administrator of the MDU for access rights and add the NMS information to the NMS access list of the MDU. The NMS address and access right settings are used for adding information about the NMS accessing the MDU, including the NMS address, access right, and Trap port. For details about how to add an NMS over a web browser, see [Figure 4-74](#).

Figure 4-74 Setting the SNMP Trap



- Managing the UPS

Take the UNMS II of Generex for example. The method for managing the UPS by using the UNMS II is the same as the method for managing other devices by using the UNMS II. For details, see the UNMS II user manual.

## 4.3.5 Protecting the Server by Using the RCCMD Software

### 4.3.5.1 Introduction to the Software

The RCCMD shutdown software is part of the centralized monitoring system of the GenereX network. The UPS5000 MDU integrates the functions of the GenereX RCCMD server:

- Sends the shutdown command, notification message, and Trap message to the RCCMD client if the UPS system generates an alarm; executes commands on the RCCMD client.
- Receives the message "UPS alive check" sent by the RCCMD client and replies with the system status.
- Configures and saves the address and port for receiving the shutdown command, and the message sending mechanism.

For the method of installing the RCCMD client, see the manual related to the RCCMD.

### 4.3.5.2 RCCMD Event Shutdown and Message Sending

#### Procedure

- Step 1** On the RCCMD client, choose **Connections**, add the server IP address, and set the encryption mode to encryption.

 **NOTE**

- If encryption is disabled, you do not need to select the encrypted transmission.
- All configurations take effect only after restart.

**Figure 4-75** Setting the MDU IP address and SSL encrypted transmission mode on the RCCMD client

<h1>RCCMD</h1>	<h1>IP: 127.0.0.1</h1>		
<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <p><b>Status</b></p> <ul style="list-style-type: none"> <li>• <a href="#">View Event Log</a></li> <li>• <a href="#">System Status</a></li> <li>• <a href="#">Logout</a></li> </ul> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <p><b>Options</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Connections</a></li> <li>• <a href="#">Heartbeats</a></li> <li>• <a href="#">Redundancy</a></li> <li>• <a href="#">Shutdown Settings</a></li> <li>• <a href="#">E-mail Settings</a></li> <li>• <a href="#">Notification Settings</a></li> <li>• <a href="#">Advanced Settings</a></li> <li>• <a href="#">Web Configuration</a></li> <li>• <a href="#">User Settings</a></li> </ul> </div> <div style="border: 1px solid #ccc; padding: 5px;"> <p><b>Help</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Manual</a></li> <li>• <a href="#">Info</a></li> </ul> </div>	<p><b>Connections</b></p> <p>The list below identifies all senders that are allowed to connect to this listener.</p> <p>Note: An empty list means that every sender can connect to this listener.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid #ccc; padding: 5px; width: 80%;"> <p><b>Sender IP Address</b></p> <p>192.160.0.10</p> </td> <td style="border: 1px solid #ccc; padding: 5px; text-align: center; width: 20%;"> <p><b>Insert</b></p> <hr/> <p><b>Remove</b></p> <hr/> <p><b>Edit</b></p> </td> </tr> </table> <hr/> <p><b>Protocol</b></p> <p>The setting below increases the security of connections to this RCCMD</p> <p><input checked="" type="checkbox"/> Accept only SSL connections (requires restarting RCCMD)</p> <p><input type="checkbox"/> Reject expired SSL certificates</p> <div style="text-align: right; margin-top: 10px;"> <span style="border: 1px solid #ccc; padding: 2px 10px; margin-right: 10px;">Cancel</span> <span style="background-color: #0070c0; color: white; padding: 2px 10px; border: 1px solid #0070c0;">Save Changes</span> </div>	<p><b>Sender IP Address</b></p> <p>192.160.0.10</p>	<p><b>Insert</b></p> <hr/> <p><b>Remove</b></p> <hr/> <p><b>Edit</b></p>
<p><b>Sender IP Address</b></p> <p>192.160.0.10</p>	<p><b>Insert</b></p> <hr/> <p><b>Remove</b></p> <hr/> <p><b>Edit</b></p>		

- Step 2** On the MDU WebUI, choose **Config. > RCCMD**, and set **RCCMD function** to **Enable**.
- Step 3** On the WebUI of the MDU, the SSL encryption is set to **Enable** by default and does not need to be set. If the RCCMD client is set to the unencrypted mode, you need to set the SSL encryption to **Disable** on the server WebUI.
- Step 4** Configure events. If you set the job type to **RCCMD Message** under **Inverter on**, specify the IP address and port of the RCCMD client. The port is 6003 by default. If you need to modify the port, modify the port on the RCCMD client at the same time to keep them the same. Enter the message to be sent and set the message sending mechanism. For example, set it to **Immediately, once**.
- Step 5** On the **Monitoring > Control** page, start the UPS, and the inverter mode will be triggered. Send the message to the RCCMD client, indicating that the inverter is on.
- Step 6** On the RCCMD client, you can view messages through the **View Event Log** at the upper left corner.

----End

### 4.3.5.3 UPS Alive Check Function

#### Context



**NOTICE**

Whether the RCCMD SSL encrypted transmission is enabled on the WebUI of UPS5000 MDU and RCCMD client is irrelevant to the heartbeat detection function. Only when the SSL encryption is enabled on the RCCMD client, the logs recorded by the RCCMD client are marked with "(SSL...)".

On the RCCMD client, the IP address of the MDU that detects heartbeat needs to be added. Then the UPS alive check function is supported; the RCCMD can check whether the UPS and RCCMD communicate properly; the RCCMD can receive messages sent by the MDU.

**Procedure**

- Step 1** On the RCCMD client, add the IP address of the MDU that detects heartbeat, as shown in [Figure 4-76](#).
- Step 2** The UPS5000 MDU supports both ways of heartbeat detection. If the job configured for the MDU event is set to **RCCMD TRAP**, the RCCMD client needs to be set to **by the use of CS121/UPSMAN Traps**. If **by polling CS121/UPSMAN every x seconds...** is selected as the method of detecting heartbeats, set the detection method. The default interval is 1800s and detection is performed 100 times, as shown in [Figure 4-76](#).

**Figure 4-76** Heartbeat detecting mode on the RCCMD client

<b>RCCMD</b>	<b>IP: 127.0.0.1</b>
<b>Status</b> <ul style="list-style-type: none"><li>View Event Log</li><li>System Status</li><li>Logout</li></ul>	<b>Heartbeats</b> <p>The UPS alive check can be used to monitor the availability of each sender.</p> <p><input checked="" type="checkbox"/> Enable automatic UPS alive check</p> <p><input type="radio"/> by the use of CS121 / UPSMAN Traps</p> <p><input checked="" type="radio"/> by polling CS121 / UPSMAN every: <input type="text" value="1800"/> seconds and retry each failed connection: <input type="text" value="100"/> times</p> <p>When the alive check fails, then RCCMD will use the following setting: Run this command file : C:\Program Files (x86)\RCCMD\alive.bat</p> <p><input type="button" value="Edit File..."/></p> <p>Test UPS connections: <input type="button" value="Run alive check now..."/></p> <p><input type="button" value="Cancel"/> <input type="button" value="Save Changes"/></p>
<b>Options</b> <ul style="list-style-type: none"><li>Connections</li><li>Heartbeats</li><li>Redundancy</li><li>Shutdown Settings</li><li>E-mail Settings</li><li>Notification Settings</li><li>Advanced Settings</li><li>Web Configuration</li><li>User Settings</li></ul>	
<b>Help</b> <ul style="list-style-type: none"><li>Manual</li><li>Info</li></ul>	

You can also manually detect heartbeat by clicking **Run alive check now...**

Figure 4-77 Detecting heartbeat manually

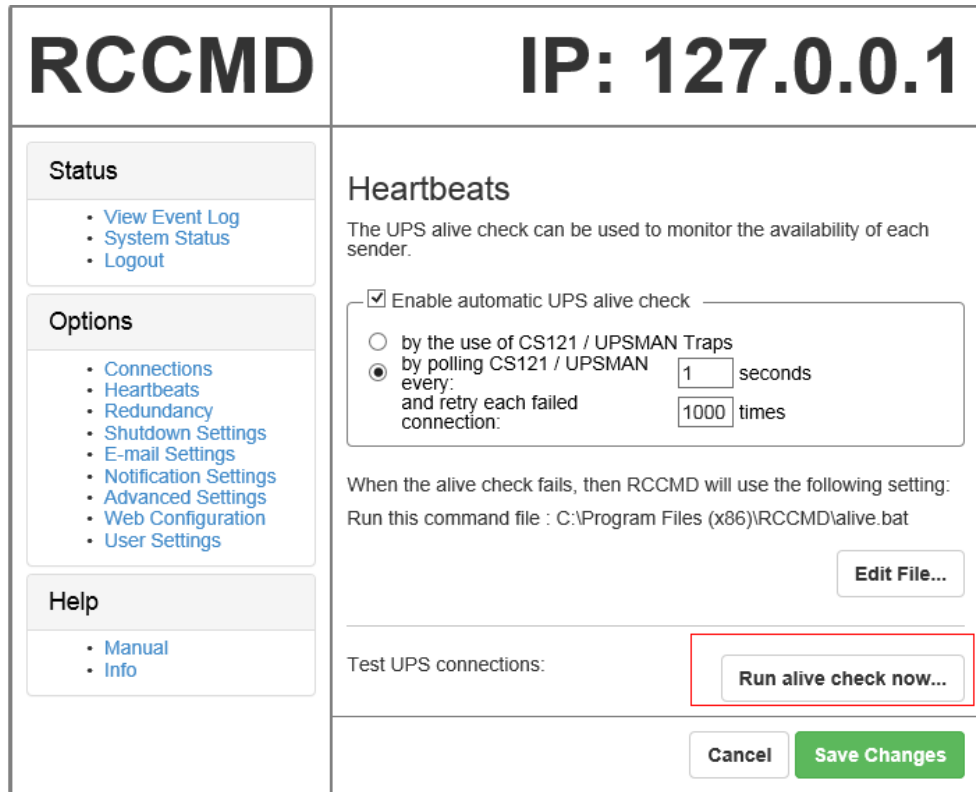
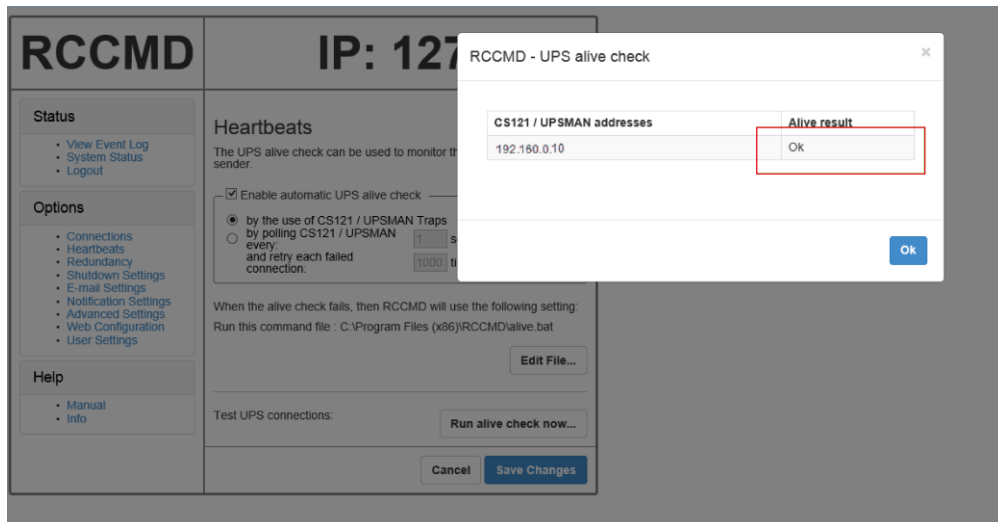


Figure 4-78 Detecting heartbeat manually and successfully



----End

---

# 5 Operations

---

## 5.1 Powering On and Starting the UPS

### 5.1.1 Powering On the UPS

#### Prerequisites

Measure the voltage and frequency of the UPS upstream input switch. The line voltage range is 138–485 V AC, and the frequency range is 40–70 Hz.

#### Context

- The following operations are applicable to a single UPS. For parallel systems, contact Huawei technical support.
- Before powering on the UPS, ensure that the UPS has passed all check items in the section "Installation Verification."
- Before powering on the UPS, ensure that all the UPS switches and upstream switch are OFF.

#### Procedure

**Step 1** Close the upstream bypass and mains input switches.

**Step 2** (Full configuration model) Close the UPS bypass input switch, mains input switch, and output switch.

After the UPS is powered on, initialization begins. The MDU displays the Huawei logo and an initialization progress bar.

----End

### 5.1.2 Initial Startup

---

**NOTICE**

- If the UPS is powered on for the first time, you need to obtain the startup password from the **Service Expert** app. Skip this step if the UPS is not powered on for the first time.
  - The **Service Expert** app can be downloaded from **Google Play Store** and can run on Android.
  - This document corresponds to the app version V100R001C00SPC111.
- 

### 5.1.2.1 Obtaining Startup Password

#### Procedure

**Step 1** Download and install the **Service Expert** app.

**Step 2** On the app home screen, tap **StartUp** to access the **Set Startup** screen.

- Online Startup
  - a. Insert the WiFi module into the USB port on the MDU. Enable the mobile phone WLAN, search for the **UPS\_WIFI** signal, and connect to the WiFi signal. The password is **Changeme**.
  - b. Set the **Site** and **Device Type** as required, and connect the device. Set **IP** to **192.168.0.10**, **Port** to **443**, **Username** to **admin**, **Password** to **Changeme**, and click **Login**.
  - c. After login, tap **Power-on password activation** on the screen. A message is displayed, indicating whether to start the UPS. Tap **OK**.
- Offline Startup
  - a. Set **Site** and **Device Type** as required, and tap **Offline Activation**.
  - b. Enter **Bar code** and **Verification code** obtained from the LCD on the **Offline Activation** screen. Tap **Generate PWD** to generate a startup password.
  - c. Enter the generated password in the password text box on the LCD to start the inverter.

----End

### 5.1.2.2 Settings Wizard

#### Procedure

**Step 1** Set the language, time, network parameters, system parameters, and battery parameters on the **Settings Wizard** screen.

---

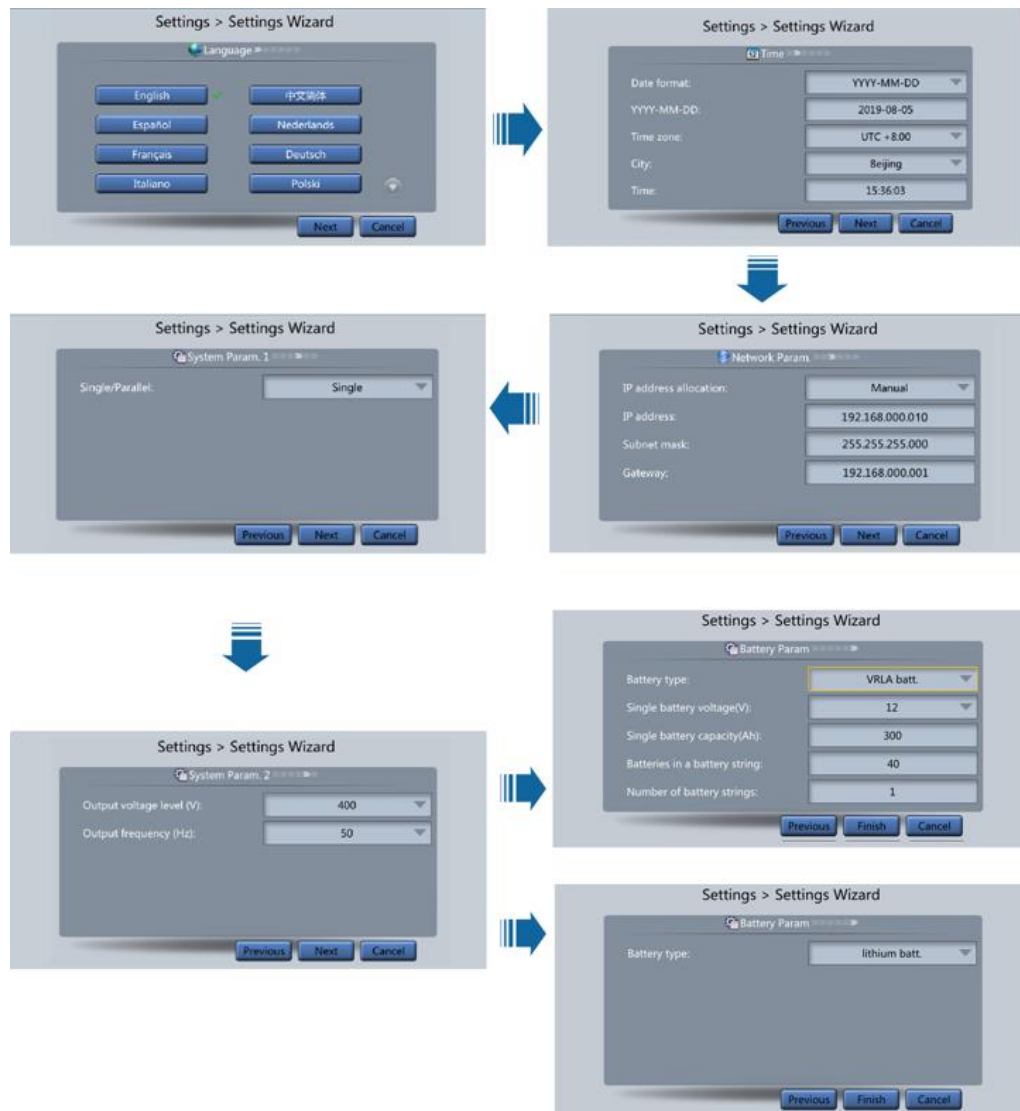
**NOTICE**

Set system parameters with caution because the settings determine normal UPS operation.

---

- Set **Single/Parallel** after double check. Incorrect setting may affect the normal UPS operation.
- **Output voltage level** refers to the line voltage level. Set it based on site requirements.
- Set **Output frequency** correctly; otherwise, loads may be affected and the UPS may not work properly.
- Battery parameter settings are critical to battery maintenance, battery lifespan, and UPS discharge time.

Figure 5-1 Settings Wizard



**NOTE**

- Set the time and date correctly. Incorrect time and date will cause false fault analysis during maintenance or repair.
- After you set network parameters, connect the UPS to the network over a network cable, which enables you to remotely manage the UPS. If you do not need remote management, retain the default network parameter settings.

**Step 2** After you set parameters on the **Settings Wizard** screen, the system displays the **Bypass mode** and **No battery** alarms, which do not need to be handled. If there is any other alarm, you need to rectify the fault.

 **NOTE**

- After you set parameters on the **Settings Wizard** screen, choose **System Info > Settings > System Setting**. Check that **System Capacity**, **Power module capacity**, **Requisite modules**, and **Redundant modules** match the actual values.
- If dry contact signals are connected to the system, choose **System Info > Settings > Dry contacts Set** and check that the connected dry contacts have been enabled and that the disconnected dry contacts have been disabled.
- If the system has connected to the remote EPO switch, you need to choose **Monitoring > UPS Sytem > Param. Settings > System Settings** on the WebUI and check that **EPO detection** is set to **Enable**.

**Step 3** View the system running diagram on the MDU to check that the UPS is working in bypass mode.

----End

## 5.1.3 Starting the Inverter

### UPS System User List

**Table 5-1** UPS system user list

Default User	Preset Password	
admin (administrator)	LCD	000001
	WebUI	Changeme
operator (common user)	LCD	000001
	WebUI	Changeme
browser (browsing user)	WebUI	N/A

### Starting the UPS on the MDU

**Step 1** Choose **Common Functions > Inv. ON**.

 **NOTE**

You can also start the inverter by choosing **System Info > Maintenance > Inv. ON**.

**Step 2** In the displayed login screen, select a user name and enter the password.

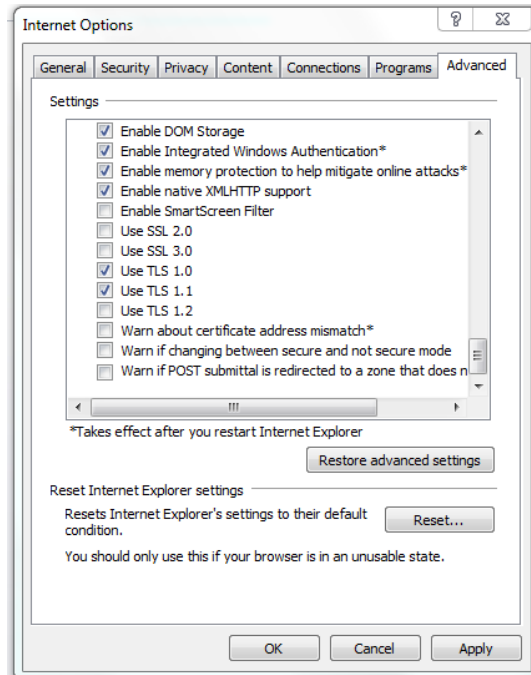
**Step 3** In the displayed dialog box, tap **Yes** to start the inverter.

----End

## Starting the UPS on the WebUI

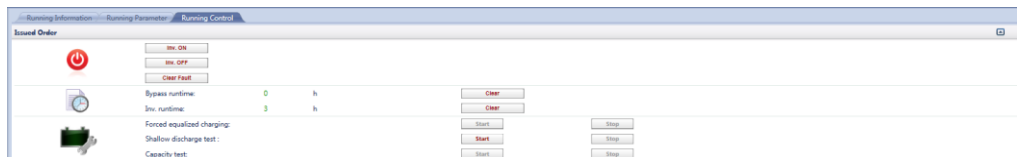
- Step 1** Open a browser (Internet Explorer 11 for example) and choose **Tools > Internet Options**.
- Step 2** Click the **Advanced** tab, check that **Use TLS 1.0** and **Use TLS 1.1** are selected, and then click **OK**.

**Figure 5-2** Setting the Internet options



- Step 3** In the address box of the browser, enter `https://UPS IP address`.
- Step 4** Enter the correct user name and password and click **Login**.
- Step 5** On the home page of the WebUI, choose **Monitoring > UPS System > Running Control**, click **Inv. ON**, and confirm the operation to start the inverter.

**Figure 5-3** Starting the inverter



### NOTE

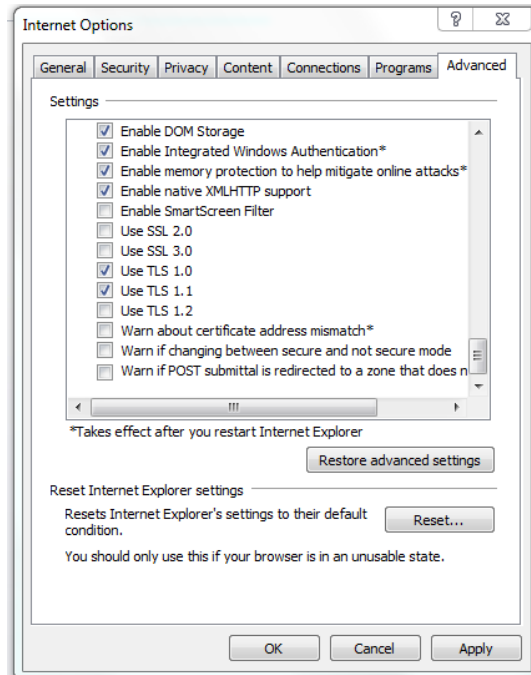
If the power module receives a startup command when it cannot be started, the startup command will be kept for 1 minute. If the startup command is not cleared within 1 minute (for example, other faults occur on the module, or you perform shutdown or rectify faults) and the module can be started, the module responds to the startup command.

----End

## Starting the UPS on the Old WebUI

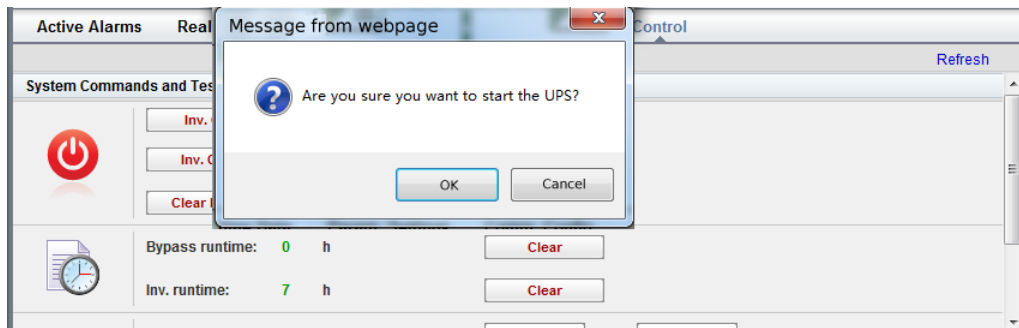
- Step 1** Open a browser (Internet Explorer 11 for example) and choose **Tools > Internet Options**.
- Step 2** Click the **Advanced** tab, check that **Use TLS 1.0** and **Use TLS 1.1** are selected, and then click **OK**.

**Figure 5-4** Setting the Internet options



- Step 3** In the address box of the browser, enter `https://UPS IP address`.
- Step 4** Enter the correct user name and password and click **Login**.
- Step 5** On the home page of the WebUI, choose **Monitoring > Control**, click **Inv. ON**, and confirm the operation to start the inverter.

**Figure 5-5** Starting the inverter





 **NOTE**

If the power module receives a startup command when it cannot be started, the startup command will be kept for 1 minute. If the startup command is not cleared within 1 minute (for example, other faults occur on the module, or you perform shutdown or rectify faults) and the module can be started, the module responds to the startup command.

----End

## 5.1.4 Powering On Loads

### Context

After the inverter starts, the UPS works in normal mode. The **Bypass mode** alarm disappears.

### Procedure

**Step 1** After confirming that the battery strings are properly connected, close the battery string input circuit breaker. If there are multiple battery strings, close the circuit breaker for each battery string and then the general circuit breaker between battery strings and the UPS. The **No battery** alarm disappears from the MDU.

**Step 2** Close the UPS downstream output switch to supply power to the loads.

----End

## 5.1.5 (Optional) Setting Parameters for the BCB Box

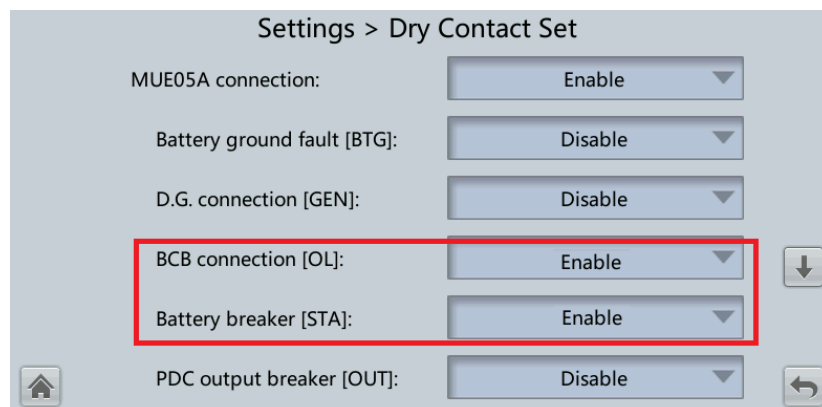
### Prerequisites

A BCB box is installed.

### Procedure

**Step 1** On the **Settings > Dry Contact Set** screen, set **MUE05A connection** to **Enable**, and set **BCB connection [OL]** and **Battery breaker [STA]** to **Enable**.

**Figure 5-6** BCB connection setting



----End

## 5.2 Shutting Down and Powering Off the UPS

### Context

#### NOTICE

After the inverter is shut down, if the bypass is normal, the UPS transfers to bypass mode; if the bypass is not normal, the UPS supplies no power. Before shutting down the UPS, ensure that all loads have shut down.

### Procedure

**Step 1** Shut down the inverter.

- On the LCD  
On the main screen, tap **Common Functions**. Tap **Inv. OFF**.

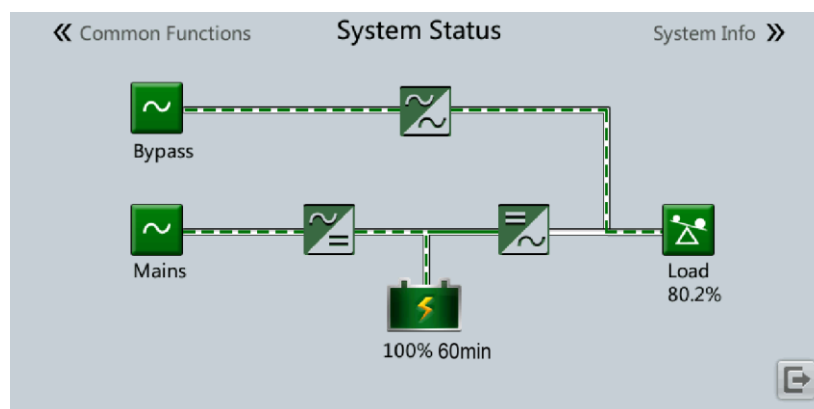
#### NOTE

To shut down the inverter on the **Maintenance** screen, tap **System Info > Maintenance**.

- On the WebUI  
Choose **Monitoring > Control**, and click **Inv. OFF**. In the displayed dialog box, click **OK** to shut down the inverter.

After the inverter shuts down, the UPS works in bypass mode if the bypass is normal, as shown in [Figure 5-7](#); the UPS supplies no power and the loads power off if the bypass is abnormal, as shown in [Figure 5-8](#).

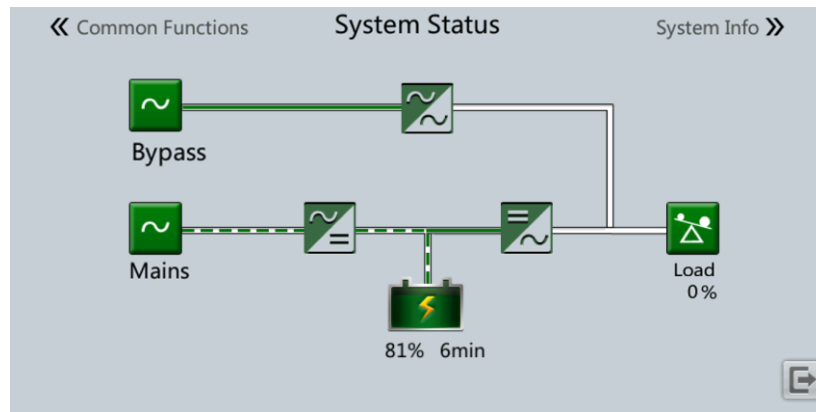
**Figure 5-7** Normal bypass



#### NOTE

After you shut down the inverter, the **Bypass mode** alarm is displayed on the LCD.

**Figure 5-8** Abnormal bypass



**NOTE**

If you need to shut down the inverter and transfer the UPS to bypass mode, check that the UPS has not generated an alarm and perform [Step 1](#).

- Step 2** After the inverter shuts down, open the downstream output switch.
- Step 3** Open the battery string circuit breaker. If there are multiple battery strings, open the general circuit breaker between battery strings and the UPS and then open the circuit breaker for each battery string.
- Step 4** For a UPS in full configuration:
1. Open the UPS mains input switch, bypass input switch, and output switch.
  2. Open the upstream mains input and bypass input switches.
- Step 5** For a UPS in standard configuration, open the upstream mains input and bypass input switches.
- End

## 5.3 Starting the UPS in Battery Mode

### Procedure

- Step 1** Ensure that batteries have been connected properly. Use a multimeter to check that the absolute voltages of positive and negative battery strings are greater than a certain value (single battery voltage x number of batteries in the battery string).
- Step 2** Open the upstream mains input and bypass input switches, and close the battery circuit breaker. If there are multiple battery strings, close the circuit breaker for each battery string and then the general circuit breaker between battery strings and the UPS.
- Step 3** Use a multimeter to measure the positive and negative battery string voltages at the UPS battery input terminal. If the absolute values of the voltages are greater than a certain value (single battery voltage x number of batteries in the battery string), the batteries are connected properly.

**Step 4** Press and hold down the **BATT START** button on the bypass module for at least 2 seconds. The system automatically enters the battery cold start status. The LCD displays the Huawei logo and an initialization progress bar.

**Step 5** After LCD initialization, start the inverter on the LCD.

----End

## 5.4 Transferring to Bypass Mode

### NOTICE

Before shutting down the inverter, ensure that the bypass is normal. If the bypass is not normal, after the inverter is shut down, the UPS supplies no power, and the loads shut down.

Shut down the UPS inverter. Shut down the inverter on the LCD or WebUI, and the UPS transfers to bypass mode.

### NOTE

If the inverter is shut down when the input voltage or frequency exceeds the specified threshold, the UPS supplies no power, and the loads shut down.

## 5.5 Setting ECO Mode

### Prerequisites

The system is working in inverter mode.

### Context

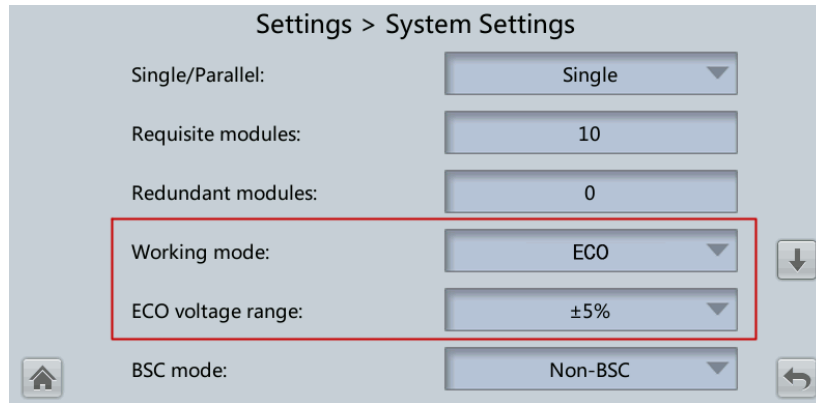
- The UPS is set to non-ECO mode by default. Set the UPS to ECO mode when energy saving is required.
- In ECO mode, the bypass takes priority over the inverter in supplying power. If the bypass is disconnected, the UPS transfers to normal mode.
- Both a single UPS and the parallel system support the ECO mode for higher efficiency.
- To avoid frequent transfer between ECO mode and normal mode, do not set the ECO mode when the bypass input is unstable or is sensitive to load changes.
- ECO mode is not recommended when the load is less than 10%.
- Before transferring the UPS to ECO mode, ensure that the bypass module works properly.

### Procedure

**Step 1** On the LCD, set **System Info > Settings > System Settings > Working mode** to **ECO**. The information indicating that the UPS works in ECO mode is displayed on the LCD.

**Step 2** Set the ECO voltage range.

**Figure 5-9** ECO parameters

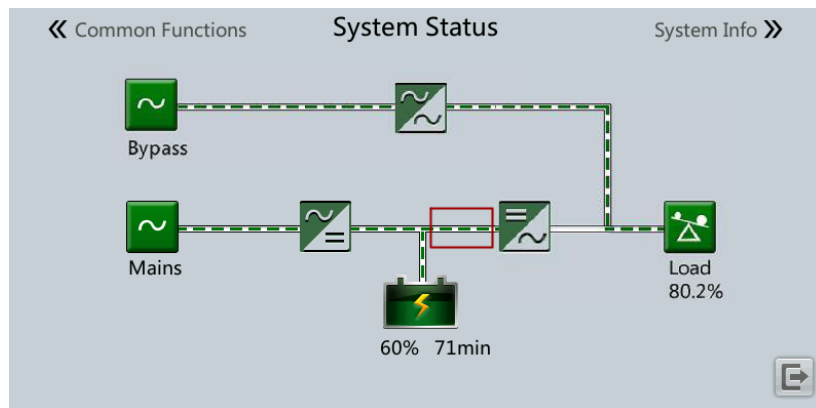


**Step 3** (Optional) If you set ECO mode in bypass mode, manually start the UPS inverter.

**NOTICE**

After the inverter starts, the UPS still works in bypass mode and the inverter is on standby. If the bypass is not normal, the inverter supplies power immediately. If the inverter is not started, the UPS may be disconnected.

**Figure 5-10** System status in ECO mode



----End

## 5.6 Testing Batteries

### 5.6.1 Lead-Acid Battery Test

#### 5.6.1.1 Forced Equalized Charging Test

##### Context

##### NOTICE

Before a forced equalized charging test, ensure that:

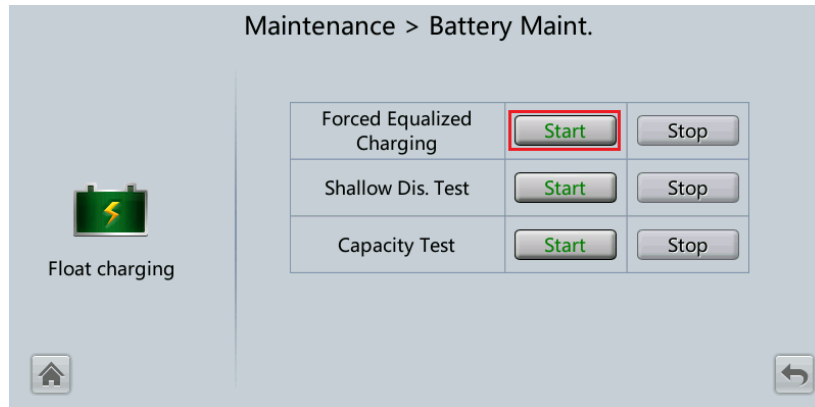
- The mains input is normal.
- Batteries are properly connected.
- Batteries are not in the equalized charging state.

##### Procedure

**Step 1** On the home screen of the LCD, choose **System Info** > **Maintenance** > **Battery Maint.**

**Step 2** Tap **Start** next to **Forced Equalized Charging** to start a forced equalized charging test.

**Figure 5-11** Starting a forced equalized charging test



##### NOTE

The forced equalized charging test automatically stops in any of the following cases:

- The forced equalized charging test duration reaches the forced equalized charging protection time (12–24 h, 18 h by default).
- The UPS generates a battery overtemperature, overvoltage, or overcurrent alarm.
- An alarm is generated.

----End

## 5.6.1.2 Shallow Discharge Test

### NOTICE

Before performing a shallow discharge test, ensure that:

- The UPS works in normal mode with a load ratio fluctuation less than 10%.
- The UPS generates no battery overtemperature, overvoltage, or overcurrent alarm. No generator is connected to the UPS.
- The mains, batteries, charger, and discharger are normal. No overload alarm is generated.

### Automatic Shallow Discharge Test

**Step 1** On the home screen of the LCD, choose **System Info** > **Settings** > **Battery Settings** and set **Sched. shallow dis. test** to **Enable**.

**Step 2** Set **Sched. shallow dis. test time** and **Sched. shallow dis. test interval** as required. After setting is complete, the system will perform automatic shallow discharge tests based on the settings.

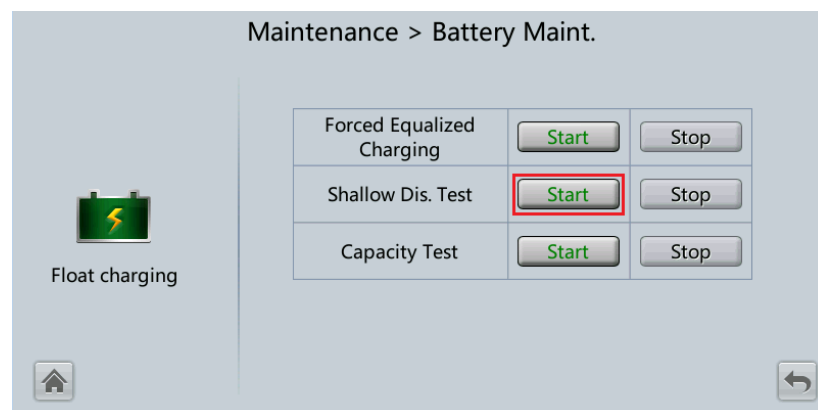
----End

### Manual Shallow Discharge Test

**Step 1** On the home screen of the LCD, choose **System Info** > **Maintenance** > **Battery Maint.**

**Step 2** Tap **Start** next to **Shallow Dis. Test** to start a shallow discharge test.

**Figure 5-12** Starting a shallow discharge test



### NOTE

When the battery test is complete, the test data is used as common test data. Record the data obtained from the latest five tests.

The shallow discharge test automatically stops in any of the following cases:

- The battery discharge capacity reaches the specified value (10%–50%, 20% by default).
- The discharge voltage reaches the warning threshold (calculated in real time).
- The load ratio fluctuation exceeds 10%.

- An alarm is generated.

----End

### 5.6.1.3 Capacity Test

#### Context

#### NOTICE

Before a capacity test, ensure that:

- The UPS is working in normal mode; float charging or hibernation has lasted for 2 hours after the state of charge (SOC) reaches 100%; and the load ratio fluctuation is less than 10%.
- The UPS has generated no battery overtemperature, overvoltage, or overcurrent alarm. No generator is connected to the UPS.
- The mains, batteries, charger, and discharger are normal. No overload alarm is generated.

#### Procedure

**Step 1** On the home screen of the LCD, choose **System Info** > **Maintenance** > **Battery Maint.**

**Step 2** Tap **Start** next to **Capacity Test** to start a capacity test.

**Figure 5-13** Starting a capacity test



#### NOTE

The capacity test automatically stops in any of the following cases:

- The battery discharge voltage reaches the end of discharge (EOD) voltage plus 0.01 V.
- The load fluctuation exceeds 10%.
- An alarm is generated.

When the battery discharge voltage reaches the EOD voltage plus 0.01 V, the test is complete. The test data is used as capacity test data. Save the capacity test data record with the largest discharge capacity in a month as the capacity test data for the month. A maximum of recent 36 capacity test records can be saved.



----End

## 5.6.2 Lithium Battery Test

### 5.6.2.1 Shallow Discharge Test

#### NOTICE

Before performing a shallow discharge test, ensure that:

- The UPS is working in normal mode; float charging or hibernation has lasted for 2 hours after the state of charge (SOC) reaches 100%; and the load ratio fluctuation is less than 10%.
- The UPS generates no battery overtemperature, overvoltage, or overcurrent alarm. No generator is connected to the UPS.
- The mains, batteries, charger, and discharger are normal. No overload alarm is generated.
- The SmartLi has generated no alarms related to lithium batteries.

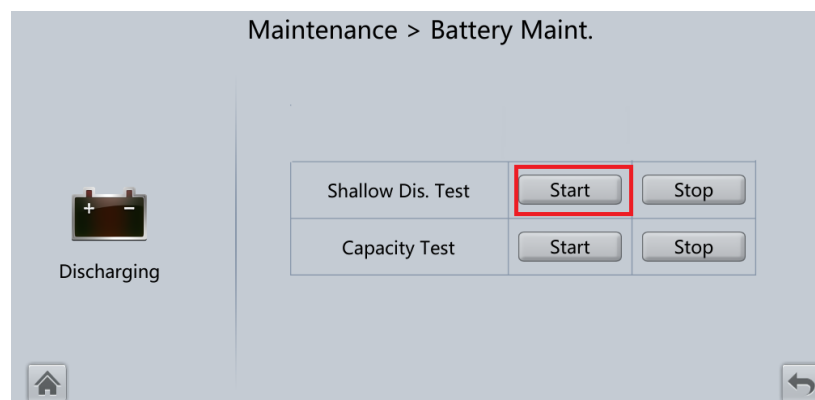
#### Automatic Shallow Discharge Test

1. On the home screen of the UPS LCD, choose **System Info > Settings > Battery Settings** and set **Sched. shallow dis. test** to **Enable**.
2. Set **Sched. shallow dis. test time** and **Sched. shallow dis. test interval** as required. After setting is complete, the system will perform automatic shallow discharge tests based on the settings.

#### Manual Shallow Discharge Test

1. On the home screen of the UPS LCD, choose **System Info > Maintenance > Battery Maint.**
2. Tap **Start** next to **Shallow Dis. Test** to start a shallow discharge test.

**Figure 5-14** Starting a shallow discharge test



#### NOTE

When the battery test is complete, the test data is used as common test data. Record the data obtained from the latest five tests.

The shallow discharge test automatically stops in any of the following cases:

- The battery discharge capacity reaches the specified value (10%–50%, 20% by default).
- The discharge voltage reaches the warning threshold (calculated in real time).
- The load ratio fluctuation exceeds 10%.
- An alarm is generated.

## 5.6.2.2 Capacity Test

### Context

#### NOTICE

Before a capacity test, ensure that:

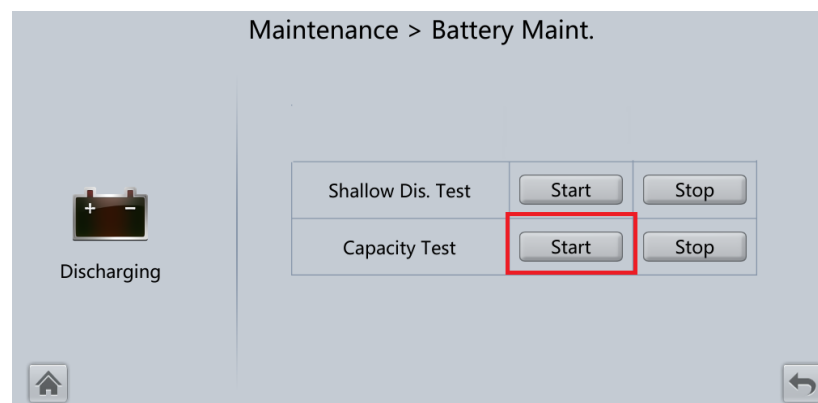
- The UPS is working in normal mode; float charging or hibernation has lasted for 2 hours after the state of charge (SOC) reaches 100%; and the load ratio fluctuation is less than 10%.
- The UPS has generated no battery overtemperature, overvoltage, or overcurrent alarm. No generator is connected to the UPS.
- The mains, batteries, charger, and discharger are normal. No overload alarm is generated.
- The SmartLi has generated no alarms related to lithium batteries.

### Procedure

**Step 1** On the home screen of the UPS LCD, choose **System Info** > **Maintenance** > **Battery Maint.**

**Step 2** Tap **Start** next to **Capacity Test** to start a capacity test.

**Figure 5-15** Starting a capacity test



#### NOTE

The capacity test automatically stops in any of the following cases:

- The minimum cell voltage reaches 2.6 V.
- The load fluctuation exceeds 10%.

- An alarm is generated.

The test is complete when the minimum cell voltage reaches 2.6 V. Data about the most amount of energy discharged is stored once a month for 36 months.

----End

## 5.6.3 Test Data Download

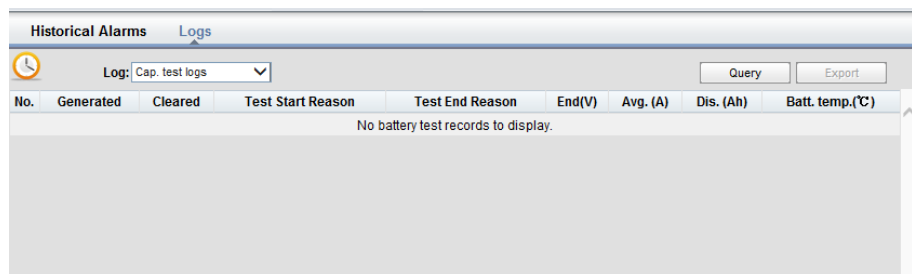
- Web
  - a. On the WebUI, choose **Query > Operation Log**, choose logs that need to be queried from the **Log** drop-down list box, and click **Query**.

Figure 5-16 Operation Log



- b. Choose logs that have been queried from the **Log** drop-down list box, and click **Export**.
- Old Web
    - a. On the WebUI, choose **Query > Logs**, choose logs that need to be exported from the **Log** drop-down list box, and click **Query**.

Figure 5-17 Logs



- b. Choose logs that have been queried from the **Log** drop-down list box, and click **Export**.

## 5.7 Transferring to Maintenance Bypass Mode

### Context

### NOTICE

- You are advised to install a lock on the maintenance bypass switch. The lock core has a diameter of 5–10 mm.
- Strictly observe the following procedure to transfer the UPS to maintenance bypass mode. Otherwise, loads may power off.
- In maintenance bypass mode, the mains supplies power to the loads directly over the maintenance bypass. If the mains is abnormal, the loads may power off.

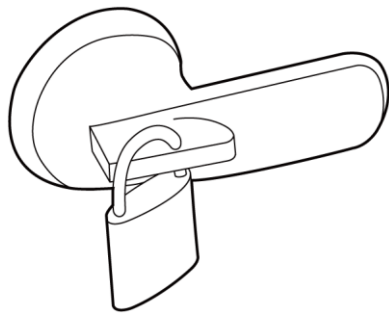
## Procedure

**Step 1** Manually switch the UPS to bypass mode.

**Step 2** Close the maintenance bypass switch.

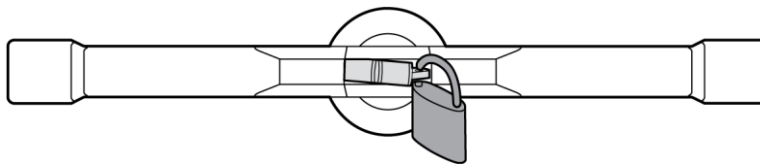
If the maintenance bypass switch is locked, unlock it first. [Figure 5-18](#) and [Figure 5-19](#) shows a locked maintenance bypass switch. After you close the maintenance bypass switch, the UPS transfers to maintenance bypass mode. The maintenance bypass switch is OFF by default. To close the maintenance bypass switch, rotate it to the ON position, as shown in [Figure 5-20](#) and [Figure 5-21](#).

**Figure 5-18** Locked maintenance bypass switch (400 kVA UPS and 500 kVA UPS)



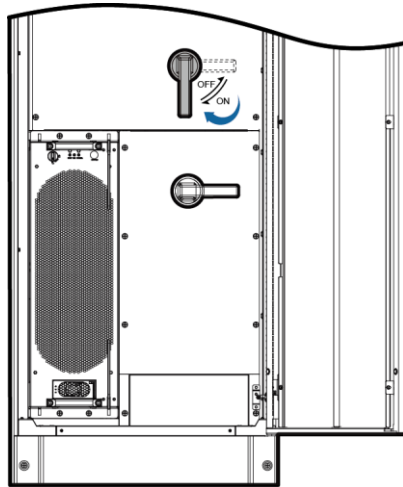
UA1000066

**Figure 5-19** Locked maintenance bypass switch (600 kVA UPS)



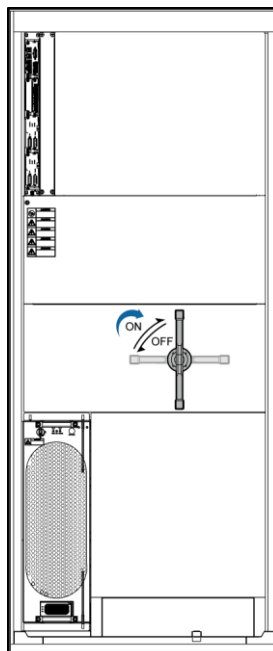
UA1500091

**Figure 5-20** Closing the maintenance bypass switch (400 kVA UPS in full configuration)



UA13000047

**Figure 5-21** Closing the maintenance bypass switch (600 kVA UPS in standard configuration)



UA15000075

**NOTE**

- **Figure 5-20** shows how to operate the maintenance bypass switch on a 400 kVA UPS in full configuration. Operate the maintenance bypass switches on a 400 kVA UPS in standard configuration and a 500 kVA UPS in this way. **Figure 5-21** shows how to operate the maintenance bypass switch on a 600 kVA UPS in standard configuration. Operate the maintenance bypass switches on a 600 kVA UPS in full configuration and an 800 kVA UPS in this way.
- Exercise force when closing or opening the bypass maintenance switch.

 **NOTE**

After the UPS transfers to maintenance bypass mode, the **Maint. breaker closed**, **Maint. breaker misoperation** and **Bypass mode** alarms are displayed on the LCD.

----End

## 5.8 Transferring from Maintenance Bypass Mode to Normal Mode

### Context

**NOTICE**

Before transferring the UPS from maintenance bypass mode to normal mode, ensure that the bypass input and output are normal.

### Procedure

**Step 1** Open the maintenance bypass switch.

The **Maint. breaker misoperation** and **Maint. Breaker closed** alarms disappear from the alarm list. Check whether the UPS works in bypass mode by viewing the system running status diagram on the LCD or WebUI.

 **NOTE**

If the stopper or barrier of the maintenance bypass switch is configured, reinstall the stopper or barrier on the maintenance bypass switch.

**Step 2** Start UPS inverters.

----End

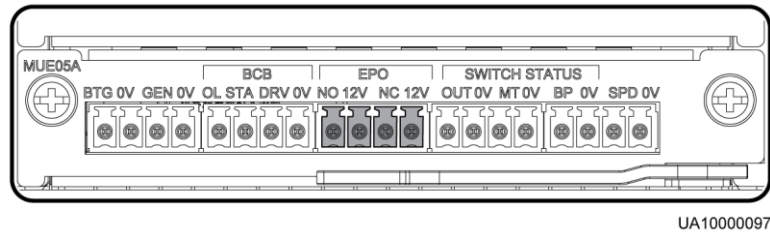
## 5.9 Performing EPO

**NOTICE**

- After the EPO button is turned on, the UPS supplies no power and the loads shut down.
- In maintenance bypass mode, the UPS continues to supply power even after the EPO button is turned on.

Press the external EPO switch that connects to the dry contact card or remove the 4-pin terminal on the EPO port of the dry contact card of the bypass unit.

Figure 5-22 EPO ports



After you press the EPO button, the **EPO** and **No power supplied** alarms are displayed on the LCD.

## 5.10 Clearing the EPO State

### Procedure

- Step 1** Clear the EPO state. Ensure that the EPO button connected to the dry contact is not in the EPO state.
  - Step 2** Clear the EPO alarm.
    - On the LCD  
On the LCD, choose **System Info** > **Alarms** and tap **Clear Faults**. In the displayed dialog box, tap **Yes**. The EPO alarm is cleared successfully.
    - On the WebUI  
Choose **Monitoring** > **UPS system** > **Running Control** > **Issued Order** and click **Clear Fault**. The EPO alarm is cleared successfully.
    - On the old WebUI  
Choose **Monitoring** > **Control** > **System Commands and Tests** and click **Clear Fault**. The EPO alarm is cleared successfully.
  - Step 3** Check that the EPO alarm is cleared by viewing active alarms. If the system bypass input is normal, the UPS transfers to bypass mode.
    - Viewing active alarms on the LCD  
Choose **System Info** > **Alarms** > **Active Alarms** to check that the EPO alarm is cleared.
    - Viewing active alarms on the WebUI  
Choose **Home** > **Active Alarm** to check that the EPO alarm is cleared.
    - Viewing active alarms on the old WebUI  
Choose **Monitoring** > **Active Alarms** to check that the EPO alarm is cleared.
  - Step 4** Start the inverter.
- End

## 5.11 Exporting Data

The following data can be exported:

- Historical Alarm
- Active Alarms
- Performance Data
- Operation Log
- E-Label
- Fault Information

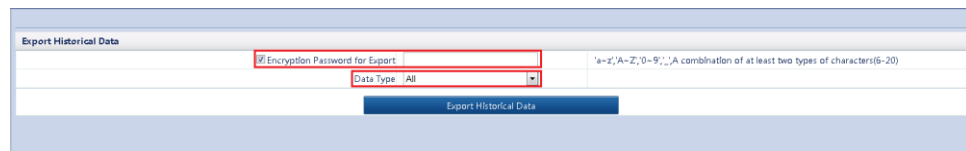
### NOTE

This topic describes how to export historical alarms.

### Web

1. Choose **Query > Export Data > Export Historical Data**. Set **Encryption Password for Export**, and select **Historical Alarm** from the **Data Type** drop-down list.

**Figure 5-23** Export Historical Data

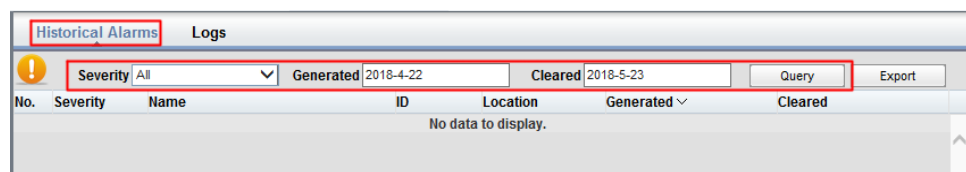


2. Click **Export Historical Data** and save the displayed webpage.

### Old Web

1. Choose **Query > Historical Alarms**, and set **Severity**, **Generated**, and **Cleared**. Click **Query** to view the historical alarm information.

**Figure 5-24** Querying historical alarms



### NOTE

You do not need to query logs. Choose **Query > Logs**, click **Export**, and save the file.

2. Click **Export** and save the displayed webpage.



## 5.12 Setting Hibernation Mode

When the load power is small and stable, you can shut down the inverters in some power modules so that these power modules enter hibernation mode and other power modules bear all the load power. This improves the system efficiency in the case of small load power and increases the power module service life. The hibernation function can be set on the WebUI.

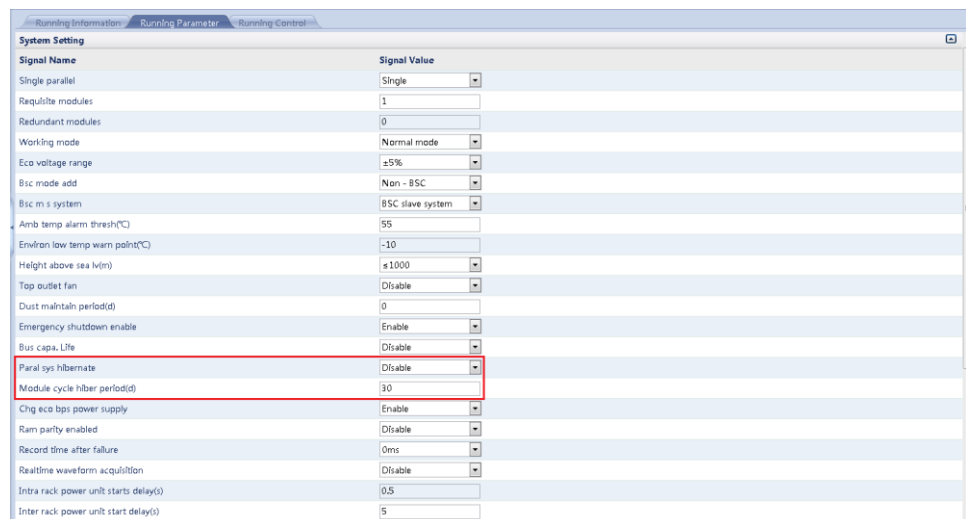
### NOTICE

- Ensure that the load power is stable. If the system load power fluctuation is greater than the rated capacity of half a module (for example, the single-phase load power fluctuation is greater than 8.33 kVA for a 50 kVA module), the UPS may enter and exit from hibernation mode repeatedly.
- Check that the number of redundant power modules and racks are appropriate. If the number is insufficient, the UPS may not enter hibernation mode.

### Web

1. On the WebUI, choose **Monitoring > UPS system > Running Parameter** and set **Paral sys hibernate** to **Enable**.
2. Set the module cycle hibernation period to an integer ranging from 1 to 100. The default value is 30.

Figure 5-25 Running Parameter



### NOTE

Click **Submit** after setting parameters on the WebUI.

### Old Web

1. On the WebUI, choose **Monitoring > Param. Settings > System Settings** and set **Paral. sys. hibernate** to **Enable**.

2. Set the module cycle hibernation period to an integer ranging from 1 to 100. The default value is 30.

**Figure 5-26** System settings

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	iBOX Settings	Control
<a href="#">Refresh</a>					
<b>System Settings</b>					
Single/Parallel		Single	▼		
Requisite modules		12			
Redundant modules		0			
Hibernated redundant modules		0			
Working mode		Normal mode	▼		
ECO voltage range		±5%	▼		
BSC mode		Non-BSC	▼		
High ambient temperature alarm threshold (°C)		55			
Low ambient temperature alarm threshold (°C)		-10			
Altitude (m)		≤1000	▼		
Top outlet fan		Disable	▼		
Air filter maintenance period (d)		0			
EPO detection		Disable	▼		
Bus capa. life		Disable	▼		
Paral. sys. hibernate		Disable	▼		
Module cycle hiber. period (d)		30			

 **NOTE**

Click **Submit** after setting parameters on the WebUI.

# 6 Routine Maintenance

## 6.1 UPS Maintenance

### NOTICE

- Only trained personnel are allowed to perform maintenance. Before performing operations on the UPS, wear electrostatic discharge (ESD) clothes, ESD gloves, and an ESD wrist strap. Remove conductive objects such as jewelry or watches during operations to avoid electric shocks or burns.
- Use insulated tools when maintaining internal devices. Only trained personnel are allowed to perform maintenance. Customers are not allowed to maintain components behind protective covers that can be removed only using tools. If the components are to be maintained, contact Huawei technical support.
- Only maintenance engineers can maintain power modules and bypass modules.
- Maintain UPSs regularly based on the following requirements. Otherwise, the UPSs may fail to operate properly and the service life may be shortened.

### 6.1.1 Monthly Maintenance

Table 6-1 Monthly maintenance

Check Item	Expected Result	Troubleshooting
Operating environment	<ul style="list-style-type: none"><li>• Ambient temperature: 0–40°C</li><li>• Humidity: 0–95% RH (non-condensing)</li><li>• Rodent-proof measures have been taken for the equipment room.</li><li>• The equipment room is airtight.</li></ul>	<ul style="list-style-type: none"><li>• If the humidity or temperature is abnormal, check the air conditioner status.</li><li>• Put rodent-proof baffle plates at the door of the UPS equipment room.</li><li>• Check that the equipment room is airtight and not in a direct ventilation environment.</li></ul>
Power grid environment	<ul style="list-style-type: none"><li>• Input voltage: 380 V AC, 400 V AC, or 415 V AC (line voltage)</li></ul>	<ul style="list-style-type: none"><li>• If the input voltage is abnormal, check the power grid status and input cable</li></ul>

Check Item	Expected Result	Troubleshooting
	<ul style="list-style-type: none"> <li>Output voltage: 380 V AC, 400 V AC, or 415 V AC (tolerance <math>\pm 1\%</math>, line voltage)</li> <li>Frequency: 40–70 Hz</li> </ul>	<p>connection.</p> <ul style="list-style-type: none"> <li>If the output voltage is abnormal, check the UPS running status and check whether an alarm is generated.</li> </ul>
Information on the LCD	The status icons on the LCD indicate that all units are operating properly, all operating parameters are within their normal ranges, and no fault or alarm information is displayed.	If an alarm is generated, rectify the fault by checking the device status and parameters.

## 6.1.2 Quarterly Maintenance

**Table 6-2** Quarterly maintenance

Check Item	Expected Result	Troubleshooting
Cleanliness	Wipe the cabinet surface using a white paper and the paper does not turn black.	Remove the dust, especially from the air filter on the front door, or replace the air filter.
Parameter configuration	The configuration of the output voltage grade, frequency, number of batteries, and battery capacity meets requirements.	Reset the parameters.
Status record	Record the three-phase load rate and output power factor.	If an exception occurs, check the load status.
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	If an alarm is generated, refer to the alarm list.

## 6.1.3 Annual Maintenance

**Table 6-3** Annual maintenance

Check Item	Expected Result	Troubleshooting
Grounding	Check that the ground cables are connected securely.	Tighten the screws.
Power cables and terminals (between the UPS and the power distribution cabinet)	The insulation layer of cables is intact and terminals are free from black marks	<ul style="list-style-type: none"> <li>Replace the cables.</li> <li>Secure the output terminals.</li> </ul>

Check Item	Expected Result	Troubleshooting
	and noticeable sparks.	
Cables and circuit breaker through-current capacity	The circuit breakers and cables meet load requirements. The actual cable through-current capacity is greater than the circuit breaker specifications.	<ul style="list-style-type: none"> <li>• Replace the circuit breaker.</li> <li>• Replace the cable.</li> </ul>

## 6.2 Battery Maintenance

### NOTICE

Before installing batteries, read through the battery user manuals and pay attention to safety precautions and connection methods provided by battery manufacture.

When installing and maintaining batteries, pay attention to the following points:

- Wrap tools with insulation tape to prevent electric shock.
- Protect your eyes with relevant devices and apply other protective measures.
- Wear insulated gloves and a protective coat in case of electrolyte overflow.
- When moving batteries, avoid handling the battery upside down, handle batteries gently, and pay attention to personal safety.
- Keep the battery switch off when installing or maintaining the batteries.

### 6.2.1 Precautions for Battery Maintenance

- Before battery maintenance, get the tools, such as handles, insulated. Do not place other objects on the top of batteries.
- Never use any organic solvent to clean batteries.
- Never try to remove the safety valve or pour anything into batteries.
- Never smoke or have an open flame around batteries.
- After battery discharge, charge the battery in time to maintain a good service life.
- Only professionals are allowed to perform the maintenance tasks.

### 6.2.2 Monthly Maintenance

Table 6-4 Monthly maintenance

Item	Expected Result	Troubleshooting
Battery management	No battery management alarm is generated.	Identify the cause of an alarm based on the alarm information.

Item	Expected Result	Troubleshooting
alarm		
Battery appearance	<ol style="list-style-type: none"> <li>1. The surface is clean and tidy without stains.</li> <li>2. The battery terminals are intact.</li> <li>3. Batteries are free from damage and cracks.</li> <li>4. Batteries are free from acid leakage.</li> <li>5. Batteries are not deformed or bulged.</li> </ol>	If the battery appearance is abnormal, contact Huawei technical support.
Battery operating temperature	<ol style="list-style-type: none"> <li>1. The ambient battery temperature is <math>25\pm 5^{\circ}\text{C}</math>.</li> <li>2. The battery operating temperature is lower than battery temperature <math>+20^{\circ}\text{C}</math>.</li> <li>3. Battery charge and discharge conditions meet the requirements specified in the battery specifications.</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify the cause of an abnormal battery operating temperature.</li> <li>2. If the fault persists, contact Huawei technical support.</li> </ol>
Charge voltage of battery string	<ul style="list-style-type: none"> <li>• Equalized charging voltage: <math>(2.35 \text{ V/cell} \pm 1\%) \times \text{Single battery voltage} / 2 \times \text{Number of batteries in a battery string}</math></li> <li>• Float charging voltage: <math>(2.25 \text{ V/cell} \pm 1\%) \times \text{Single battery voltage} / 2 \times \text{Number of batteries in a battery string}</math></li> </ul>	<ol style="list-style-type: none"> <li>1. If the voltage drop between the battery string output terminals and the battery input terminals at the UPS side is greater than 1% of the battery string voltage, check whether the cable between the battery string and the UPS is excessively long, or the cable diameter is excessively small.</li> <li>2. Check whether the equalized charging voltage and float charging voltage are correctly set for the UPS.</li> <li>3. If the fault persists, contact Huawei technical support.</li> </ol>

## 6.2.3 Quarterly Maintenance

Table 6-5 Quarterly maintenance

Item	Expected Result	Troubleshooting
Battery temperature sensor measurement accuracy	The difference between the temperature measured by the temperature sensor and the temperature displayed on the MDU is less than $3^{\circ}\text{C}$ .	<ol style="list-style-type: none"> <li>1. Install the temperature sensor in the correct position.</li> <li>2. Replace the battery temperature sensor.</li> </ol>

Item	Expected Result	Troubleshooting
Battery management parameter settings	The settings of battery management parameters meet the requirements in the user manual.	Set parameters correctly.
Tightness of battery screws	The location of the signs marked on battery terminals indicating tight connections does not change.	Take photos from multiple angles and contact Huawei technical support.
Cables between batteries	No cable deteriorates and the insulation layer does not crack.	Replace the faulty cable.
Battery voltage	<ul style="list-style-type: none"> <li>• Equalized charging voltage: 2.35 V/cell <math>\pm</math>0.02 V/cell</li> <li>• Float charging voltage: 2.25 V/cell <math>\pm</math>0.02 V/cell</li> </ul>	<ol style="list-style-type: none"> <li>1. Check whether the equalized charging voltage and float charging voltage of a battery are normal.</li> <li>2. If the charging voltage of a battery exceeds the specifications requirement, perform a complete forcible equalized charging for the battery, and check again whether the voltage is normal.</li> <li>3. If the fault persists, contact Huawei technical support.</li> </ol>
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	<ol style="list-style-type: none"> <li>1. If the batteries cannot discharge normally, locate the fault (for abnormal alarms, see the alarm list).</li> <li>2. If the fault persists, contact Huawei technical support.</li> </ol>

## 6.2.4 Annual Maintenance

**Table 6-6** Annual maintenance

Item	Expected Result	Troubleshooting
Capacity Test	When the UPS is backed up, discharge a battery to the undervoltage alarm threshold, to refresh the capacity of the battery.	<ol style="list-style-type: none"> <li>1. Locate the cause when an exception is identified.</li> <li>2. If the fault persists, contact Huawei technical support.</li> </ol>
Battery connection reliability	<ol style="list-style-type: none"> <li>1. Each battery terminal is connected reliably. (When battery strings are powered off, check the reliability of each terminal in the order</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any abnormal connection.</li> <li>2. If the fault persists, contact Huawei technical support.</li> </ol>

Item	Expected Result	Troubleshooting
	<p>from positive terminals to negative terminals.)</p> <p>2. The tightening torque of each battery screw meets the requirements of the battery manufacturer. (A torque wrench is used for checking the torque. After checking that the battery screws meet the requirements, mark the screws for later check.)</p>	



# 7 Troubleshooting

## CAUTION

- If the UPS is faulty, alarm information is displayed on the LCD. Clear critical alarms before powering on the UPS again. Otherwise, the fault scope expands or the UPS is damaged.
- Do not clear alarms by reseating modules.
- Remove a faulty module after it is confirmed that the module needs replacing. After removing the module, do not insert it into the UPS again.

## NOTICE

- After a UPS finishes troubleshooting and is started, if the LCD continues displaying alarm information, choose **System Info > Alarms > Clear Faults** to clear the alarm and then start the inverter.
- When batteries reach EOD, the battery switch in the BCB box trips if the BCB box is configured. To restore battery discharge, close the battery switch in the BCB box (if any) first.
- To restore battery discharge after batteries reach EOD, use one of the following methods: 1. Switch to another battery string. Ensure that each battery has a voltage greater than the EOD voltage and 11.3 V/cell. 2. Restore the mains power supply to start the inverter. Close the battery switch and charge batteries until each battery has a voltage greater than the EOD voltage and 11.3 V/cell.

For details about how to rectify common faults, see [Table 7-1](#). If any unmentioned faults occur, see the alarm list chapter, or contact Huawei technical support.

**Table 7-1** Troubleshooting

Case	Symptom	Possible Cause	Measure
The rectifier is not	The rectifier is not working, and the bus voltage is not boosted.	The mains voltage exceeds the upper threshold 280 V or is less than the lower	Check whether the mains voltage exceeds the threshold. If yes, contact the electric

Case	Symptom	Possible Cause	Measure
normal.		threshold 80 V.	power company.
		PFC soft-startup fails.	Replace the power module.
		The power module is faulty.	Replace the power module.
The inverter is not normal.	The buzzer is activated, the Fault indicator is on, the inverter is faulty, and the UPS transfers to bypass mode.	The UPS is overloaded or short-circuited.	Reduce load or rectify short circuits.
		The power module is faulty.	Replace the power module.
The charger generates an alarm.	The buzzer is activated, the Fault indicator is on, and the charging function fails.	The charger fails.	Replace the power module.
		The charger experiences overcurrent.	Replace the power module.
		The charger experiences undervoltage.	Check whether the configured number of batteries is correct. If the value is correct but the alarm persists, replace the power module.
The UPS works in bypass mode and does not transfer to inverter mode.	When the mains is normal, the UPS works in bypass mode and does not transfer to inverter mode.	Set the UPS working mode to ECO mode.	Set the working mode correctly.
		The bypass transfer times reach the upper threshold.	On the LCD, choose <b>Clear Faults</b> .
The bypass is not normal.	The buzzer is activated, and the Fault indicator is on.	The bypass thyristor is damaged.	Replace the bypass module.
		The bypass module experiences overtemperature.	Reduce the load, or improve ventilation.

 **NOTE**

For details about component replacement and maintenance involved in Troubleshooting and Alarm List, consult Huawei maintenance engineers.

# 8 Technical Specifications

## 8.1 Physical Parameters

Physical Parameters	400 kVA	500 kVA	600 kVA	800 kVA
Cabling mode	Cables are routed from the top or bottom.			
Protection level	IP20 (IP21 can be reached by configuring IP21 components.)			
Dimensions (H x W x D)	2000 mm x 1200 mm x 850 mm		2000 mm x 1400 mm x 850 mm	2000 mm x 2400 mm x 850 mm
Communication	Supports dry contacts, RS485 ports, and FE ports. Supports Simple Network Management Protocol (SNMP).			
Weight	UPS5000-E-40 OK-SM: 670 kg UPS5000-E-40 OK-FM: 710 kg	UPS5000-E-50 OK-SM: 810 kg UPS5000-E-50 OK-FM: 830 kg	UPS5000-E-60 OK-SM: 1040 kg UPS5000-E-60 OK-FM: 1090 kg	UPS5000-E-80 OK-SM: 1520 kg UPS5000-E-80 OK-FM: 1600 kg

## 8.2 Internal Switch Parameters

UPS	Maintenance bypass switch	Mains input switch	Bypass input switch	Output switch
UPS5000-E-40 OK-SM	1000 V AC/630 A/3P	-	-	-
UPS5000-E-40 OK-FM	1000 V AC/630 A/3P	1000 V AC/800 A/3P	1000 V AC/630 A/3P	1000 V AC/630 A/3P
UPS5000-E-50 OK-SM	1000 V AC/800 A/3P	-	-	-

UPS	Maintenance bypass switch	Mains input switch	Bypass input switch	Output switch
UPS5000-E-50 0K-FM	1000 V AC/800 A/3P	1000 V AC/1000 A/3P	1000 V AC/800 A/3P	1000 V AC/800 A/3P
UPS5000-E-60 0K-SM	1000 V AC/1000 A/3P	-	-	-
UPS5000-E-60 0K-FM	1000 V AC/1000 A/3P	1000 V AC/1250 A/3P	1000 V AC/1000 A/3P	1000 V AC/1000 A/3P
UPS5000-E-80 0K-SM	1000 V AC/1250 A/3P	-	-	-
UPS5000-E-80 0K-FM	1000 V AC/1250 A/3P	1000 V AC/1600 A/3P	1000 V AC/1250 A/3P	1000 V AC/1250 A/3P

## 8.3 Environment Parameters

Environment Feature	Specifications
Operating temperature	0–40°C
Storage temperature	–40°C to +70°C
Relative humidity	0%–95% RH (non-condensing)
Altitude	0–1000 m When the altitude is greater than 1000 m and less than 4000 m, the rated power should be derated. For details, see the IEC62040-3.

## 8.4 Safety Regulations and EMC

Safety and EMC	Specifications
Safety regulations	EN62040-1: 2013 IEC62040-1: 2013 YD/T2165-2010
EMC	EN62040-2 IEC62040-2 IEC61000-2-2 IEC61000-4-2 IEC61000-4-4

Safety and EMC	Specifications
	IEC61000-4-5 EN61000-4-3 EN61000-4-6 IEC61000-4-8

## 8.5 Mains Input Electrical Specifications

Item	Specifications
Input system	Three-phase, four-wire, and PE. If current is allowed in the PE wire, input without the N wire is supported.
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)
Input voltage	<ul style="list-style-type: none"> <li>80–280 V AC (phase voltage)</li> <li>At 40°C: The UPS works at full load when the voltage is 187–280 V AC and is derated to 40% load when the voltage is 187–80 V AC.</li> <li>At 30°C: The UPS works at full load when the voltage is 176–280 V AC and is derated to 40% load when the voltage is 176–80 V AC.</li> </ul>
Rated frequency	50 Hz or 60 Hz
Input frequency	40–70 Hz
Input PF	<ul style="list-style-type: none"> <li>&gt; 0.99 (full load)</li> <li>&gt; 0.98 (half load)</li> </ul>
THDi	<ul style="list-style-type: none"> <li>THDi ≤ 3% (full linear load)</li> <li>THDi ≤ 5% (full non-linear load)</li> </ul>

## 8.6 Bypass Input Electrical Specifications

Item	Specifications
Input system	Three-phase, four-wire, and PE
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)
Rated frequency	50 Hz or 60 Hz
Input frequency	±6 Hz (adjustable, 0.5–6 Hz, ±2 Hz by default)
Input system	The mains input and bypass input can share a power source or

Item	Specifications
	use different power sources.

## 8.7 Battery Specifications

### NOTICE

The UPS supports the SmartLi. For details about related parameters, see the SmartLi user manual.

Item	Specifications
Battery voltage (VRLA battery)	<ul style="list-style-type: none"> <li>12 V battery: 30–44 batteries (40 by default). 34 batteries, the output power is derated to 90%. 32 and 30 batteries, the output power is derated to 80%.</li> <li>2 V battery: 180–264 batteries (240 by default). 204–214 batteries, the output power is derated to 90%. 180–204 batteries, the output power is derated to 80%.</li> <li>The number of positive and negative battery strings must be the same.</li> </ul>
Battery management	Intelligent battery management
One-button cold start	In the case of a mains failure, batteries can start the UPS to power loads.
Charger output power	Under rated conditions, the maximum charge power of a module is 5 kW.
Charger current limit	Maximum 10 A for a module
Battery string sharing	Battery string sharing is supported in a parallel system. No battery string is shared by default.
Charge voltage (VRLA battery)	<ul style="list-style-type: none"> <li>Equalized voltage: 2.3–2.4 V/Cell, default: 2.35 V/Cell (30–42 batteries)</li> <li>Equalized voltage: 2.3–2.4 V/Cell, default: 2.35 V/Cell (44 batteries)</li> <li>Float voltage: 2.23–2.3 V/Cell, default: 2.25 V/Cell (30–44 batteries)</li> </ul>

## 8.8 Output Electrical Specifications

Item	Specifications
------	----------------

Item	Specifications
Output system	Three-phase, four-wire, and PE
Voltage	380 V AC, 400 V AC, or 415 V AC (tolerance $\pm 1\%$ ) (line voltage)
Frequency	<ul style="list-style-type: none"> <li>In normal mode, the mains frequency is synchronous with the bypass input frequency.</li> <li>In battery mode, the frequency is 50 Hz or 60 Hz (tolerance <math>\pm 0.05\%</math>).</li> </ul>
Total harmonic distortion of output voltage (THDv)	<ul style="list-style-type: none"> <li><math>\leq 1\%</math> (full linear load)</li> <li><math>\leq 4\%</math> (full non-linear load)</li> </ul>
Output PF	1
Transfer time	<ul style="list-style-type: none"> <li>0 ms (uninterruptible transfer)</li> <li><math>\leq 20</math> ms (interruptible transfer)</li> </ul>
Output voltage unbalance	Voltage unbalance: $\pm 3\%$ ; phase unbalance: $\pm 2^\circ$
Overload capability	Inverter overload capability: <ul style="list-style-type: none"> <li>100% &lt; load <math>\leq 110\%</math>: transfer to bypass mode after 60 minutes</li> <li>110% &lt; load <math>\leq 125\%</math>: transfer to bypass mode after 10 min</li> <li>125% &lt; load <math>\leq 150\%</math>: transfer to bypass mode after 1 min</li> <li>Load &gt; 150%: transfer to bypass mode after 200 ms</li> </ul>
	Bypass overload capability: At 40°C: <ul style="list-style-type: none"> <li>110% load: run for 60 minutes</li> <li>125% load: run for 10 minutes</li> <li>150% load: run for 1 minute</li> <li>Load &gt; 1000%: run for 100 ms</li> </ul>

## 8.9 System Electrical Specifications

Item	Specifications
Redundancy design	The auxiliary power supplies, centralized controllers, and parallel signals use redundancy design.
ECO	Supported

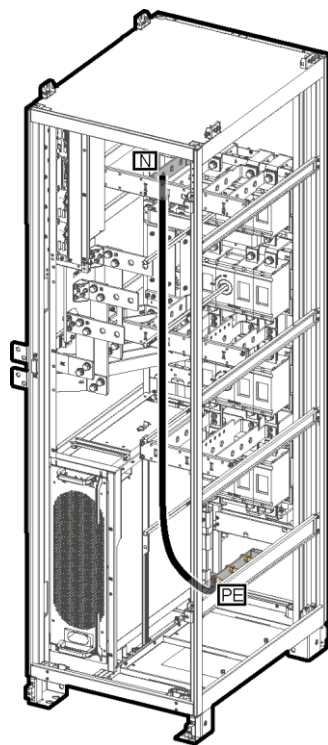
# A (Optional) TN-C System Application

If the TN-C system is adopted, short-circuit the input N and PE.

## NOTE

- Cables are connected in the same way for the 400 kVA UPS, 500 kVA UPS, and 600 kVA UPS. This section describes how to connect cables for the 600 kVA UPS.
- The following cable connections are for reference only.

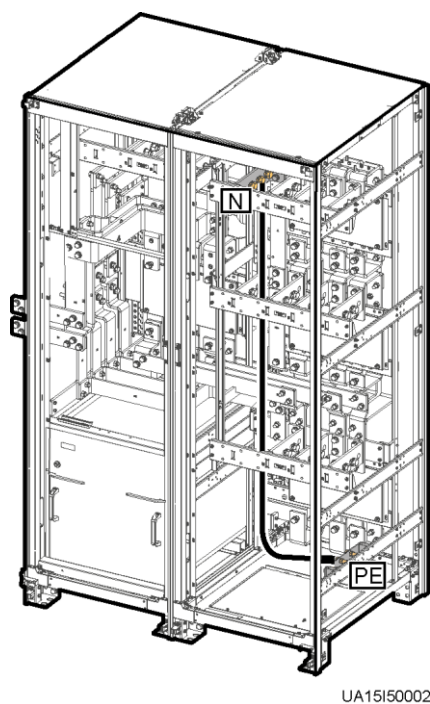
**Figure A-1** Short-circuiting the input N and PE (600 kVA UPS)



UA13110020



**Figure A-2** Short-circuiting the input N and PE (800 kVA UPS)



**Table A-1** Recommended cross-sectional areas for cables

Model	Current (A)	Recommended Cross-Sectional Area (mm <sup>2</sup> )
400 kVA	710.8	240
500 kVA	888.5	240
600 kVA	1066.2	240
800 kVA	1421.6	240

# B Alarm List

 **NOTE**

This table lists only common alarms. For more information, contact Huawei technical support.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0001-1	Mains voltage abnormal	Minor	<ul style="list-style-type: none"> <li>• Cable connections are incorrect.</li> <li>• The mains is not normal.</li> <li>• The power module is faulty.</li> <li>• The output or battery is incorrectly grounded.</li> </ul>	<ol style="list-style-type: none"> <li>1. Check whether cables to mains are disconnected, loose, or incorrectly connected.</li> <li>2. If cable connections are correct, measure the mains voltage with a multimeter. If the mains voltage exceeds 280 V, the mains input is not normal; if the mains voltage is less than 272 V, the sampling circuit of the power module is not normal. Replace the faulty module.</li> <li>3. Check whether the output or battery is incorrectly grounded.</li> </ol>
0001-2			<ul style="list-style-type: none"> <li>• Cable connections are incorrect.</li> <li>• The mains is not normal.</li> <li>• The mains input fuse for the power module is blown.</li> </ul>	<ol style="list-style-type: none"> <li>1. Check whether cables to mains are disconnected, loose, or incorrectly connected.</li> <li>2. If cable connections are correct, measure the mains voltage with a multimeter. If the mains voltage is less than 80 V, the mains voltage is not normal; if the mains voltage exceeds 88 V, the power module sampling circuit or fuse may not be working properly. Replace the faulty module.</li> </ol>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0001-3			The mains is not normal.	Check the mains.
0004-1	Mains ph. Reversed	Minor	Cable connections are incorrect.	Verify the cable connections.
0005-1	Mains neutral absent	Minor	Cable connections are incorrect.	<ol style="list-style-type: none"> <li>Secure or connect the neutral wire to the cabinet if it is loose or disconnected.</li> <li>Check that the neutral wire to the power distribution system is normal.</li> </ol>
0006-1	Mains undervoltage	Minor	<ul style="list-style-type: none"> <li>The mains is not normal.</li> <li>The power module sampling circuit is not normal.</li> </ul>	Check whether the mains voltage ranges from 80 V (excluding 80 V) to 176 V. If no, the mains monitoring circuit for the power module is faulty. Replace the faulty module.
0010-1	Abnormal bypass voltage	Minor	<ul style="list-style-type: none"> <li>The bypass voltage range is not correctly set.</li> <li>The bypass input voltage is not normal.</li> </ul>	<ol style="list-style-type: none"> <li>Check the bypass input voltage or cable connections with a multimeter.</li> <li>Check the voltage system and bypass voltage thresholds configured on the LCD.</li> </ol>
0010-2			<ul style="list-style-type: none"> <li>The bypass frequency range is not correctly set.</li> <li>The bypass input frequency is not normal.</li> </ul>	<ol style="list-style-type: none"> <li>Check the bypass input voltage or cable connections with a multimeter.</li> <li>Check the bypass input frequency. Check the rated frequency and frequency range configured on the LCD.</li> </ol>
0011-1	Bypass phase reversed	Minor	The phase sequence of the three-phase bypass input is reversed.	Check whether the cable phase sequence is correct using a multimeter. If no multimeter is available, exchange the positions of any two cables.
0012-1	Bypass neutral absent	Minor	The neutral wire of bypass input is not installed properly.	<ol style="list-style-type: none"> <li>Secure or connect the neutral wire to the cabinet if it is loose or disconnected.</li> <li>Check that the neutral wire to the power distribution system is normal.</li> </ol>
0020-1	Battery connected reversely	Critical	Batteries are not properly installed.	<ol style="list-style-type: none"> <li>Check whether battery polarities are correctly installed by using a</li> </ol>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
				<p>multimeter. If no, correct the installation.</p> <p>2. Check whether the battery input voltage of the UPS is normal. If yes, the battery sampling circuit of the power module is faulty. Replace the power module.</p>
0021-1	Battery EOD	Critical	The battery voltage reaches the EOD voltage threshold due to continuous discharge.	If the BCB box is configured, check whether the BCB box trips. If it trips, close the BCB box switch.
0022-1	No battery	Minor	<ul style="list-style-type: none"> <li>There is no battery string.</li> <li>The battery string is not properly installed.</li> <li>The power module battery fuse is blown.</li> </ul>	<ol style="list-style-type: none"> <li>Check that battery cables are correctly connected.</li> <li>Check that the battery terminal voltage is normal.</li> <li>Check that the battery fuse in the power module is intact.</li> </ol>
0025-1	Battery overvoltage	Minor	<ul style="list-style-type: none"> <li>The configured number of batteries is less than the actual number.</li> <li>The battery neutral wire is not installed properly.</li> </ul>	<ol style="list-style-type: none"> <li>Check whether battery parameters are correctly set.</li> <li>If they are correctly set, certain batteries may be faulty.</li> <li>Check whether the battery neutral wire is correctly connected.</li> </ol>
0026-1	Low battery voltage	Minor	<ul style="list-style-type: none"> <li>Battery discharge results in low battery voltage.</li> <li>The battery neutral wire is not installed properly.</li> <li>The charger is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>If the low battery voltage alarm is generated in battery mode, check whether the mains voltage recovers. If yes, charge batteries immediately.</li> <li>Check whether the battery neutral wire is correctly connected.</li> <li>If this alarm is generated in normal mode, check whether the battery switch is ON. If yes, the charger may be faulty. Replace the related power module.</li> </ol>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0530-1	Battery ground fault	Critical	<ul style="list-style-type: none"> <li>The battery string is not properly grounded.</li> <li>The battery ground monitoring cable is faulty.</li> <li>The dry contact board is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>Check whether the positive and negative terminals of the battery string are grounded or have sufficient resistance to the ground.</li> <li>Check whether the battery grounding failure detector is faulty by replacing it with a new one.</li> <li>If no battery grounding failure detector is available, check on the dry contact board whether the battery grounding failure detector is enabled. If yes, disable it and check whether the alarm is cleared. If the alarm persists, the dry contact board may be faulty. Replace the board.</li> </ol>
0032-1	Battery overvoltage protection	Critical	<ul style="list-style-type: none"> <li>The battery voltage is greater than the upper threshold.</li> <li>The configured number of batteries is less than the actual number.</li> <li>The actual number of batteries does not meet requirements.</li> </ul>	<ol style="list-style-type: none"> <li>Check the battery voltage.</li> <li>Check that the configured number of batteries matches the actual number.</li> <li>Check that the actual number of batteries meets requirements.</li> </ol>
0036-2	Battery maintenance reminder	Warning	The time for maintenance arrives.	Maintain the batteries.
0037-1	Battery undervoltage	Critical	<ul style="list-style-type: none"> <li>The UPS has worked in battery mode for an extended amount of time.</li> <li>The charger is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>Check whether the battery voltage is normal.</li> <li>Check whether the output is overloaded.</li> <li>Check whether any battery is damaged. If yes, replace the battery.</li> <li>Check whether any battery charger generates an alarm. If yes, replace the faulty module.</li> </ol>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0040-7	Rectifier abnormal	Critical	<ul style="list-style-type: none"> <li>The fan for the power module is not functioning properly.</li> <li>The air channel for the power module is obstructed.</li> </ul>	<ol style="list-style-type: none"> <li>Check that the air channel for the module is free from blockage.</li> <li>Check whether the fans are functioning properly. Replace the power module if the fans are faulty.</li> </ol>
0043-1	Fan abnormal	Critical	<ul style="list-style-type: none"> <li>The fan for the power module is abnormal.</li> <li>The fan monitoring cable for the power module is not working properly.</li> </ul>	Replace the faulty power module.
0043-2			The fan is faulty.	Check the fan or replace the bypass module.
0043-3			<ul style="list-style-type: none"> <li>The fan is faulty.</li> <li>The fan monitoring cable is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>Replace the fan.</li> <li>Check the fan monitoring cable.</li> </ol>
0043-4				
0047-1	Not ready	Critical	The ready switch is OFF.	Close the ready switch.
0060-4	Inverter abnormal	Critical	<ul style="list-style-type: none"> <li>A load short-circuit occurs.</li> <li>A short circuit occurs inside the module. (This fault seldom occurs.)</li> <li>The output is incorrectly grounded.</li> </ul>	<ol style="list-style-type: none"> <li>Check load cable distributions.</li> <li>Check whether the output is grounded.</li> <li>If the load cable connections are normal and the output is correctly grounded, replace the power unit or module.</li> </ol>
0061-2	Inverter alarm	Minor	<ul style="list-style-type: none"> <li>The I2C bus is not normal.</li> <li>The E2PROM is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>Rectify the fault and check whether the alarm is cleared.</li> <li>If the alarm is generated again, replace the power module.</li> </ol>
0061-7	Inverter alarm	Minor	The bypass waveform is not	<ul style="list-style-type: none"> <li>If not all modules generate the alarm, start the UPS, transfer it to normal mode, and replace</li> </ul>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			normal.	<p>the faulty module.</p> <ul style="list-style-type: none"> <li>If all modules generate the alarm, open the bypass input circuit breaker. After the inverter relay is closed, close the bypass input circuit breaker 10 seconds later.</li> </ul>
0564-1	Overload timeout	Critical	<ul style="list-style-type: none"> <li>The load is excessive.</li> <li>Derating reduces the rated system power.</li> <li>The module is damaged.</li> <li>The output is incorrectly grounded.</li> <li>The peak load current is too high.</li> </ul>	<ol style="list-style-type: none"> <li>Check that there is no overload.</li> <li>Check that the module power is not derated due to a fan fault.</li> <li>Check whether the power grid has a large asymmetric load.</li> <li>Check whether the output is grounded.</li> <li>Check whether the peak load ratio exceeds the upper limit.</li> <li>If the alarm persists, replace the power module.</li> </ol>
0565-1	Load impact transfer-to-bypass	Minor	<ul style="list-style-type: none"> <li>A large-power RCD load is instantly connected, or the output load short-circuits.</li> <li>The inverter bridge short-circuits.</li> </ul>	<ol style="list-style-type: none"> <li>Check the load.</li> <li>If the load is normal, replace the power module.</li> </ol>
0566-1	Output overload	Minor	<ul style="list-style-type: none"> <li>The load is excessive.</li> <li>Derating reduces the rated system power.</li> <li>The module is damaged.</li> </ul>	<ol style="list-style-type: none"> <li>Check that there is no overload.</li> <li>Check that the module power is not derated due to a fan fault.</li> <li>If the alarm persists, replace the power module.</li> </ol>
0570-4	BPM module abnormal	Critical	<ul style="list-style-type: none"> <li>The bypass fan is not functioning properly, or the air channel is blocked.</li> <li>The ambient temperature exceeds the</li> </ul>	<ol style="list-style-type: none"> <li>Check the bypass fan and air channel. If the fan is faulty, replace it.</li> <li>Check that the ambient temperature has not exceeded 40°C.</li> <li>Check that there is no overload.</li> </ol>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			upper threshold. <ul style="list-style-type: none"> <li>The load is excessive.</li> </ul>	
0583-1	Inter-rack par. cable abnormal	Critical	<ul style="list-style-type: none"> <li>The inter-rack parallel system CAN bus is disconnected or short-circuited.</li> <li>Only one rack works in a parallel system.</li> <li>An ECM is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>Check the inter-rack parallel system CAN bus.</li> <li>Rectify the disconnection or short-circuit fault.</li> <li>Replace the ECM.</li> </ol>
0583-4			The inter-rack industrial frequency synchronization cable is broken.	Replace the inter-rack parallel cable.
0583-5			The inter-rack carrier synchronization cable is broken.	
0583-6			<ul style="list-style-type: none"> <li>The intra-rack INVBYP cable is broken.</li> <li>The parallel CAN bus is broken.</li> </ul>	
0584-2	Inter-rack par. cable alarm	Minor	The inter-rack parallel cable is faulty.	Replace the inter-rack parallel cable.
0584-4			The inter-rack industrial frequency synchronization cable is broken.	
0085-1	EPO	Critical	The EPO button is pressed.	Restore the EPO button status. Start the UPS after the alarm is cleared.
0086-1	Max. number of BPM transfers	Minor	The system frequently transfers to bypass mode due to overload timeout or load impact.	Check the load.



Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0087-1	System transfer-to-bypass	Warning	The neighboring UPS is not normal, and transfers to bypass mode.	Check the reason why the neighboring UPS transfers to bypass mode.
0088-1	Rack address conflict	Critical	The configured rack address conflicts with another one.	Check the rack address setting.
0089-1	Rack output overload	Minor	<ul style="list-style-type: none"> <li>The load is excessive.</li> <li>The rack capacity setting is not appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Check the load and remove some loads or expand the UPS power capacity if the UPS is overloaded.</li> <li>Check that the configured rack capacity meets requirements.</li> </ul>
0090-1	Dry contact board fault	Critical	I2C communication with the dry contact board MUE05A fails.	Replace the dry contact board MUE05A.
0090-2			I2C communication with the dry contact board MUE06A fails.	Replace the dry contact board MUE06A.
0356	Battery Mode	Minor	The UPS is working in battery mode.	The running status is displayed. See details about how to handle other alarms.
0359	No power supplied	Warning	No power is supplied.	The running status is displayed. See details about how to handle other alarms.
0332	Output disabled	Minor	The output is disabled.	The running status is displayed. See details about how to handle other alarms.
0337	PDC bypass input breaker open	Critical	The bypass input circuit breaker on the PDC is OFF.	The running status is displayed. No further measures are required.
0338	PDC output breaker open	Critical	The output circuit breaker on the PDC is OFF.	<ol style="list-style-type: none"> <li>Check that all UPS output circuit breakers are ON.</li> <li>On the LCD, check that <b>PDC output breaker open</b> alarm has disappeared. If the alarm persists, tap the <b>Clear Fault</b> button to clear the alarm.</li> </ol>
0341	PDC Maint. breaker closed	Minor	The maintenance circuit breaker on	The running status is displayed. No further measures are required.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			the PDC is ON.	
0342	Mains input breaker open	Critical	The mains input circuit breaker is OFF.	The running status is displayed. No further measures are required.
0343	BPM input breaker open	Critical	The bypass input circuit breaker is OFF.	The running status is displayed. No further measures are required.
0340	Maint. breaker closed	Minor	The maintenance circuit breaker is ON.	The running status is displayed. No further measures are required.
0335	Generator connected	Warning	The generator is connected.	The running status is displayed. No further measures are required.
0594-1	Insufficient redundant racks	Minor	<ul style="list-style-type: none"> <li>The load is excessive.</li> <li>The configured number of redundant racks is incorrect.</li> </ul>	<ol style="list-style-type: none"> <li>Reduce the load.</li> <li>Decrease the configured number of redundant racks.</li> </ol>
0095-1	Insuffi. redundancy	Minor	<ul style="list-style-type: none"> <li>The load is excessive.</li> <li>The configured number of redundant modules is incorrect.</li> </ul>	<ol style="list-style-type: none"> <li>Reduce the load.</li> <li>Decrease the configured number of redundant modules.</li> </ol>
0096-1	ECO volt. Abnormal	Minor	<ul style="list-style-type: none"> <li>The ECO bypass voltage or frequency is out of the preset range.</li> <li>The ECO bypass voltage or frequency range is incorrectly set.</li> <li>The bypass input sequence is reverse or the neutral wire is disconnected.</li> </ul>	<ol style="list-style-type: none"> <li>Check the bypass input voltage and frequency.</li> <li>Check that the rated voltage, rated frequency, ECO bypass voltage range, and frequency range are correctly set.</li> <li>Check that the bypass cables and circuit breakers are correctly connected.</li> </ol>
0098-1	Bypass current not shared	Minor	<ul style="list-style-type: none"> <li>The output and input circuit breakers are OFF.</li> </ul>	<ol style="list-style-type: none"> <li>Check that the output and bypass input circuit breakers on each rack are ON.</li> <li>Check that bypass input and</li> </ol>

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			<ul style="list-style-type: none"> <li>The length of the bypass input or output cables is incorrect.</li> <li>The bypass SCR open-circuits.</li> </ul>	<p>output power cables on each rack meet the length requirements.</p> <ol style="list-style-type: none"> <li>Rectify any bypass SCR open-circuit.</li> </ol>
0150-1	Inverter asynchronous	Minor	<ul style="list-style-type: none"> <li>The bypass frequency changes fast.</li> <li>The output frequency track rate is incorrectly set.</li> </ul>	<ol style="list-style-type: none"> <li>Check that the bypass output frequency does not change fast.</li> <li>Check that the <b>Output freq. track rate</b> is properly set.</li> </ol>
0101-1	BSC signal abnormal	Minor	<ul style="list-style-type: none"> <li>The dual bus connector is loose.</li> <li>Parameters are set incorrectly.</li> </ul>	<ol style="list-style-type: none"> <li>Check the dual bus connector.</li> <li>Check the parameter settings.</li> <li>The master BSC system is not supplying power.</li> </ol>
0102-1	Maint. breaker misoperation	Critical	The user operation is incorrect.	<ol style="list-style-type: none"> <li>Shut down the inverter and then close the maintenance circuit breaker.</li> <li>After maintenance, open the maintenance circuit breaker and then start the inverter.</li> </ol>
0380	In self-check	Warning	The inverter is in self-check.	Wait until the inverter self-check is complete.

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# C Acronyms and Abbreviations

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## A

**ATS**

AC transfer switch

**AWG**

American wire gauge

## B

**BSC**

bus synchronization  
controller

**BCB-BOX**

battery circuit breaker box

**BBB-BOX**

battery bus bar box

## C

**CE**

Conformite Europeenne

## D

**DSP**

digital signal processing

## E

**ECO**

economic control  
operation

**EPO**

emergency power off

**ECM**

energy control module

**EOD**

end of discharge

## I

**IEC**

International  
Electrotechnical  
Commission

## L

**LCD**

liquid crystal display

## M

<b>MDU</b>	monitor display unit
<b>P</b>	
<b>PE</b>	protective earthing
<b>PDU</b>	power distribution unit
<b>R</b>	
<b>RS485</b>	Recommend Standard 485
<b>S</b>	
<b>SOC</b>	state of charge
<b>STS</b>	static transfer switch
<b>SNMP</b>	Simple Network Management Protocol
<b>T</b>	
<b>THDi</b>	total distortion of the input current waveform
<b>THDv</b>	total harmonic distortion of output voltage
<b>U</b>	
<b>UPS</b>	uninterruptible power system
<b>USB</b>	Universal Serial Bus
<b>V</b>	
<b>VRLA</b>	valve-regulated lead acid battery