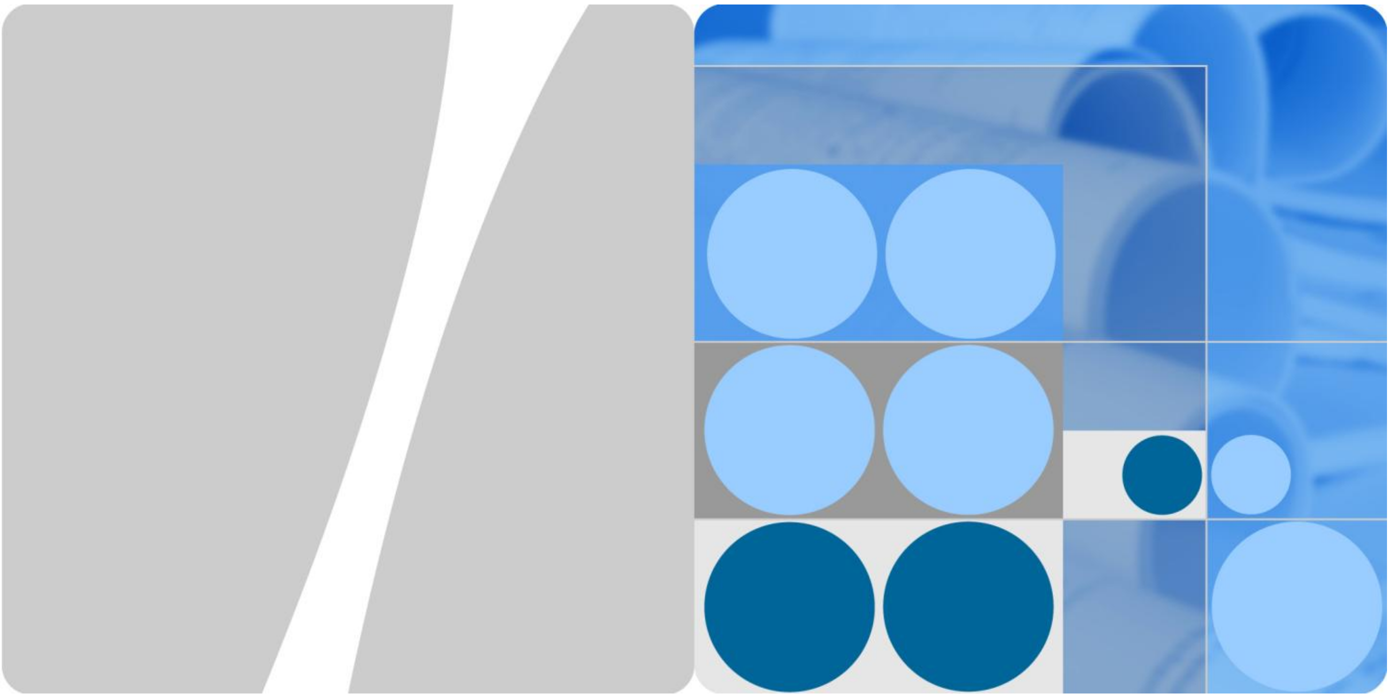

**UPS5000-E-(350 kVA-800 kVA)**

# User Manual (50 kVA Power Modules)

**Issue** 05

**Date** 2018-01-08

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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 an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
|  | Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
|  | Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. |


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| Symbol | Description |
|---|---|
| NOTICE | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.<br>NOTICE is used to address practices not related to personal injury. |
| NOTE | Calls attention to important information, best practices and tips.<br>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 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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# Contents




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# 1 Safety Precautions

## 1.1 General Safety

This section describes safety precautions to consider before installing, maintaining, and operating the UPS.

**NOTICE**

- To minimize the risk of personal injury and damage to equipment, read and follow all the precautions in this document before performing any operation. The "DANGER", "WARNING", "CAUTION", and "NOTICE" statements in this document are only supplemental and do not represent all the safety instructions.
- Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment.

Follow the precautions and special safety instructions provided by Huawei when operating Huawei products. Huawei will not be liable for any consequences that are caused due to violations regarding general safety regulations and equipment design, production, and usage safety standards.

### Declaration

Huawei does not take responsibilities for the following situations:

- Operation under severe environments that are not specified in this document.
- Installation or use in environments that are not specified in related international standards.
- Unauthorized product changes and software code modification.
- Operations not complying with the operation instructions and safety precautions in this document.
- Damage caused by extreme natural environments.
- Damage caused by using batteries provided by Huawei for non-Huawei UPSs.
- Damage caused by using batteries not provided by Huawei.


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## Power Grid Requirements

A standard UPS can connect to a three-phase, five-wire (L1, L2, L3, N, PE) TT, TN-C, TN-S, and TN-C-S AC power distribution system (IEC60364-1).

## Local Laws and Regulations

Equipment operations must comply with local laws and regulations. The safety instructions in this document are only supplemental to local safety regulations.

## Personal Requirements

**DANGER**

Only Huawei engineers or engineers certified by Huawei are allowed to perform UPS commissioning and maintenance. Otherwise, human injury or equipment damage may occur, and any resulting UPS faults will be beyond warranty scope.

Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and master the correct operation methods. Trained and qualified personnel, or personnel certified or authorized by Huawei are:

- Allowed to install, operate, and maintain the equipment.
- Allowed to remove safety facilities and inspect the equipment.
- Allowed to replace or change the devices or components (including software).
- Operation personnel must report faults or errors that might cause serious safety issues to related owners.
- This product should be installed and used according to the installation and technical, specification requirements found in this manual. Otherwise, the product may be damaged, and the resulting product exceptions or component damage will be beyond the warranty scope.

## Grounding Requirements

Devices to be grounded (excluding the energy storage unit) must meet the following requirements:

- When installing a device, install the ground cable first. When removing a device, remove the ground cable at the very end.
- Do not damage the ground conductor.
- Do not operate devices if the ground conductor is not installed. Before operating a device, check the electrical connection of the device to ensure that it is securely grounded.

## Personal Safety

- Do not operate the product, or handle cables, during thunderstorms.
- To avoid electric shocks, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.


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- Before operating a device, wear electrostatic discharge (ESD) clothes, ESD gloves, and an ESD wrist strap. Remove any conductors (such as jewelry or watches) before the operation to avoid electric shocks or burns.
- In the case of fire, leave the building or the equipment room immediately, and turn on the fire alarm bell or make an emergency call. Never enter the building on fire in any case.
- If the cabinet provides an ESD jack, wear an ESD wrist strap and insert the ground terminal of the ESD wrist strap into the jack.
- Ensure all switches are turned to OFF during device installation.
- Power on the UPS only after authorized engineers arrive at the site.
- If a C2 UPS is used in residential areas, additional measures must be taken to prevent radio frequency interferences.
- If the UPS is used for life-supporting medical apparatus and facilities such as lifts where adequate care has to be taken to ensure personal safety, discuss with the manufacturer in advance about the applicability, settings, management, and maintenance of the UPS, which require special considerations during design.

### Device Safety

- Before operation, ensure that the device is firmly anchored to the floor or other solid objects, such as a wall or an installation rack.
- Ensure ventilation vents are unblocked while the system is operating.
- Before powering on the device, ensure that all the screws inside it are securely tightened and will not fall off during operation.
- After the installation, remove packing materials from the equipment area.
- Replace danger signs that have worn out or are unreadable.
- 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. It does not apply to energy feedback loads.
- Do not alter the UPS internal structure or installation procedure unless consent from the manufacturer is given.
- Never use water to clean electrical components inside or outside the UPS.
- Do not drill holes into a cabinet.

## 1.2 Electrical Safety

### High Voltage


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**DANGER**

- The high voltage power supply provides power for the device operation. Direct or indirect contact with high voltage power sources may result in fatal injury.
- Non-standard or incorrect high voltage operations may result in fire and electric shocks.

- The personnel who install the AC facility must be qualified to perform high voltage and AC operations.
- When selecting, connecting, and routing power cables, ensure compliance with local laws and regulations.
- When operating the AC power supply facility, ensure compliance with local laws and regulations.
- Before connecting cables to the UPS, ensure that the input power and mains power distribution switches and output power distribution switch are turned off.
- Use only dedicated tools during high voltage and AC operations.
- If the operation is performed in a damp environment, ensure that the device is dry. When water is found in the rack or the rack is damp, switch off the power supply immediately.

## High Leakage Current

**DANGER**

- Ground a device before powering it on. Otherwise, personal injury or device damage may occur.
- If a "high leakage current" tag is attached to the panel of the device, ground the protective ground terminal on the device enclosure before connecting the AC power supply to prevent electric shocks.
- The UPS can generate high leakage currents. Using a circuit breaker that has the leakage current protection function is not recommended.

## Power Cable

**DANGER**

Do not install or remove power cables when the device is on. Transient contact between the core of the power cable and the conductor may generate electric arcs or sparks, which may cause fire or damage eyesight.

- Before moving or reconnecting the UPS, disconnect the mains and batteries, open the output power distribution switch, and wait a period of at least 5 minutes after the UPS completely powers off. Otherwise, electric shocks may occur.
- Before installing or removing the power cable, open the power switch.
- Before connecting a power cable, check that its label is correct.


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## Fuse

**NOTICE**

If a fuse needs replacing, ensure the new fuse is of the same type and specifications so that the system runs safely.

## Backfeed Protection Dry Contact

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 device installation and maintenance personnel do not need to use backfeed protection, paste labels on the external bypass input circuit breakers informing that the circuit is connected to the UPS. Disconnect the device from the UPS before performing operations on the circuit.

## Electrostatic Discharge

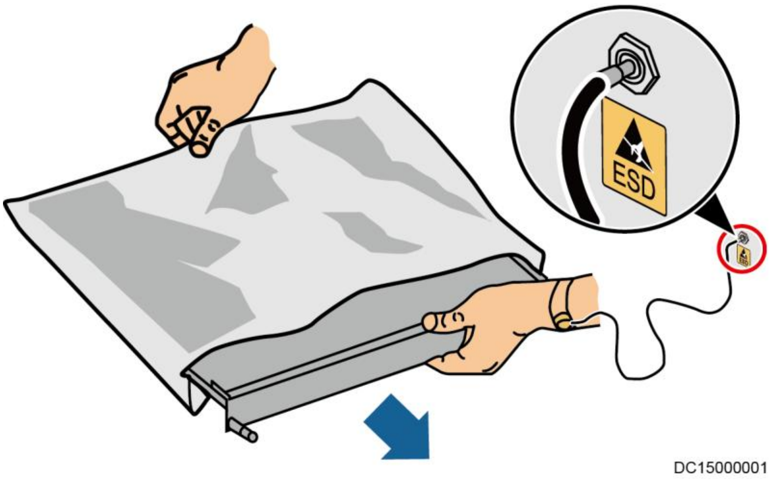
**NOTICE**

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

- Wear a pair of 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, especially chips.
- Package boards with ESD packaging materials before storing or transporting them.

Figure 1-1 shows how to wear an ESD wrist strap.

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





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### Liquid Prevention

- Do not place the product under areas prone to water leakage, such as near air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that there is no condensation inside the product or equipment room. Ensure that no liquid enters the product. Otherwise, short circuits will occur and may result in serious injury or death.
- If any liquid is detected inside the product, immediately disconnect the power supply and contact the administrator.

## 1.3 Operating Environment

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

The TIER4 or TIER3 power supply architecture specified in TIA942, that is, dual power supply routes, must be used in the power supply systems that are crucial to major economic interests or order of public places, such as the national computing center, military command system, emergency command center, railway signal system and control center, civil aviation air traffic control center, airport command center, financial clearing center, and transaction center.

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.

**DANGER**

Do not expose the equipment or perform any operations in an environment with flammable or explosive gas, or smoke.

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

Do not use the UPS in the following environments:

- Environment containing flammable gases, corrosive gases, abnormal vibrations, and impacts.
- Non-confined environment near the ocean (0–3.7 km) and indoor or semi-indoor environment where the temperature and humidity are not controllable, such as a simple equipment room near the ocean, citizen house, garage, corridor, direct ventilation cabinet, house with only the roof, railway station platform, gymnasium, aquarium, and so on.

## 1.4 Battery Safety

This section describes precautions for operating batteries.


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**DANGER**

Before operating batteries, carefully read the safety precautions to ensure correct battery handling and connection is performed, and personal safety is managed.

**NOTICE**

- To ensure battery safety and efficient battery management, use the batteries delivered with the UPS. Huawei shall not be responsible for battery damage caused by using non-Huawei batteries for Huawei UPSs.
- Ensure lead-acid battery handling is in accordance with local regulations.

- Incorrect handling of batteries may cause hazards. When operating batteries, avoid battery short circuits and electrolyte overflow or leakage.
- Electrolyte overflow may damage the device by corroding metal parts and circuit boards, and ultimately damaging the circuit boards.
- Short circuits caused by incorrect operations may cause serious injuries due to high power of batteries.
- Do not reversely connect positive and negative battery terminals.
- Use batteries of the specified type. Otherwise, the batteries may be damaged.
- Check battery connections periodically to ensure that all screws are securely tightened.
- Install or store batteries in clean, cool, and dry environments.
- Do not decompose, transform, or damage batteries. Otherwise, battery short circuit, electrolyte leakage, and even personal injury may occur.

## Preventative Measures

When installing and maintaining batteries, pay attention to the following points:

- Use dedicated insulated tools.
- Take measures to protect eyes, such as using eye protection devices.
- Avoid skin contact with electrolyte overflow. Wear rubber gloves and protective clothing.
- When handling a battery, ensure that its electrodes always point upward. Do not tilt or overturn batteries.
- Switch off the power supply during installation and maintenance.

## Short Circuit

**DANGER**

Battery short circuits may cause personal injury. The high transient current generated by a short circuit may release a surge of power and cause a fire.


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To avoid battery short circuits, do not maintain batteries while they are in use.

## Harmful Gas

**DANGER**

Do not use unsealed lead-acid batteries. Lead-acid batteries emit flammable gas. Therefore, place and secure lead-acid batteries horizontally to prevent fire or corrosion.

Store lead-acid batteries in a place with good ventilation, and take fire safety precautions.

## Battery Temperature

**DANGER**

High temperature may result in battery distortion, damage, and electrolyte overflow.

- Install or store batteries far away from fire sources and heating devices such as transformers. Never burn batteries.
- If the battery temperature exceeds 60 ℃, check the battery for electrolyte overflow. If electrolyte overflows, handle the leakage immediately.

## Electrolyte Leakage

**DANGER**

In the case of electrolyte leakage, counteract and absorb the leaking electrolyte immediately.

When moving or handling a battery whose electrolyte leaks, note that the leaking electrolyte may harm human bodies. If the electrolyte leaks, use the following substances to counteract and absorb the leaking electrolyte:

- Sodium bicarbonate (baking soda): $NaHCO_3$
- Sodium carbonate (soda): $Na_2CO_3$

When using substances to counteract and absorb electrolytes, strictly follow the guidelines provided by the battery manufacturer.

If any personnel are exposed to battery electrolyte, wash the exposed area with clean water immediately and seek medical advice if the situation is serious.


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# 1.5 Mechanical Safety

## Moving Sharp Objects

**CAUTION**

Wear protective gloves when moving sharp objects.

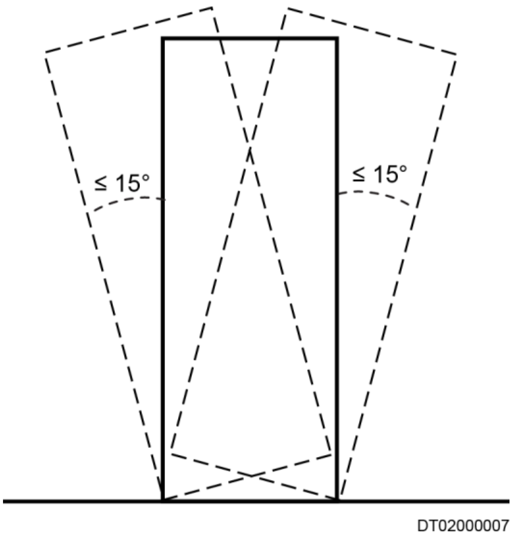
## Moving Heavy Objects

**DANGER**

- Perform operations in accordance with all instructional symbols on the device.
- Take caution to avoid injury when moving heavy objects.

- When moving or lifting a device, hold the handle or bottom of the device.
- When transporting a device using a pallet truck, the forks must be properly positioned to ensure that the device does not topple. No excessive tilt or jolt is allowed during the transportation, and the maximum tolerance of the tilting angle during loading and unloading is 15 °. To avoid toppling, secure the device to the pallet truck by using ropes before moving, and assign persons to watch out the device during movement.
- Move the cabinet with caution. Any bumping or falling may damage the device.

**Figure 1-2** Tilting angle of a cabinet





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### Handling Fans

Do not insert fingers or boards into the operating fans until the fans are switched off, and have stopped running.

## 1.6 Laying Out Cables

### Binding Signal Cables

**NOTICE**

Signal cables must be bound separately from strong-current cables and high-voltage cables.

### Laying Out Cables

When the temperature is low, a violent strike or vibrations may damage the cable sheathing. To ensure cable safety, comply with the following requirements:

- Cables can be laid, or installed, only when the temperature is higher than 0 ℃ (32 ℉). Handle cables with caution, especially at lower temperatures.
- Before laying out cables that have been stored in temperatures lower than 0 ℃ (32 ℉), move the cables to an environment that is at the requisite ambient temperature. Store them in this environment for at least 24 hours.
- Do not drop the cables directly from the vehicle.
- As the insulation layer of a cable may age, or be damaged from high temperatures, ensure a sufficient distance between cables and the DC busbars, shunts, and fuses. Cables prepared by the customer should be flame resistant. Cables must not be routed behind the air exhaust vent of the cabinet. The air exhaust vent should not be blocked by any object.

Before connecting a cable, ensure that the cable and cable label to be used meet the actual installation requirements.


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# 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

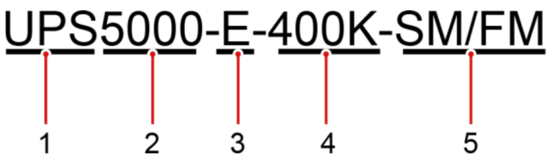


**Table 2-1** Model number details

| No. | Item | Description |
|---|---|---|
| 1 | Product category | UPS, short for uninterruptible power system |
| 2 | UPS family | 5000 |
| 3 | UPS subcategory | E series |
| 4 | Output | • 400K: The output capacity is 400 kVA. |


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| No. | Item | Description |
| --- | --- | --- |
| | capacity | • 500K: The output capacity is 500 kVA.<br>• 600K: The output capacity is 600 kVA.<br>• 800K: The output capacity is 800 kVA. |
| 5 | Configuration type | • SM: standard configuration<br>• FM: full configuration |

**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**

- → indicates an input mode.
- → 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 uses the digital signal processing (DSP) technology for 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 shows the UPS conceptual diagram.


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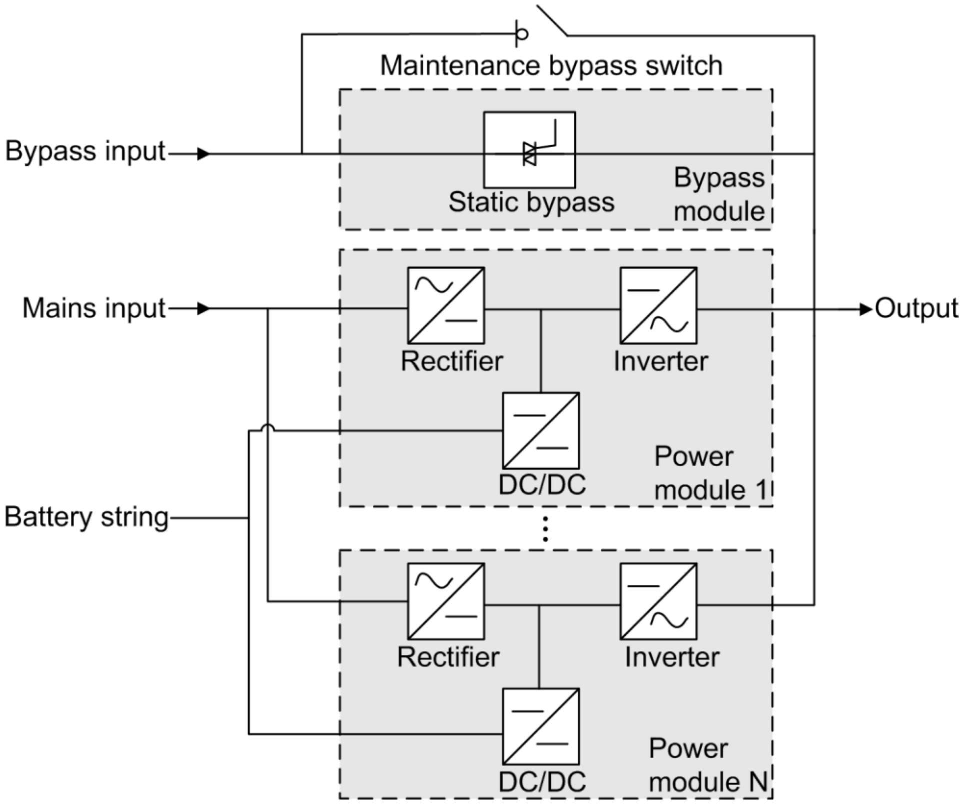
**Figure 2-2** UPS conceptual diagram




## 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.


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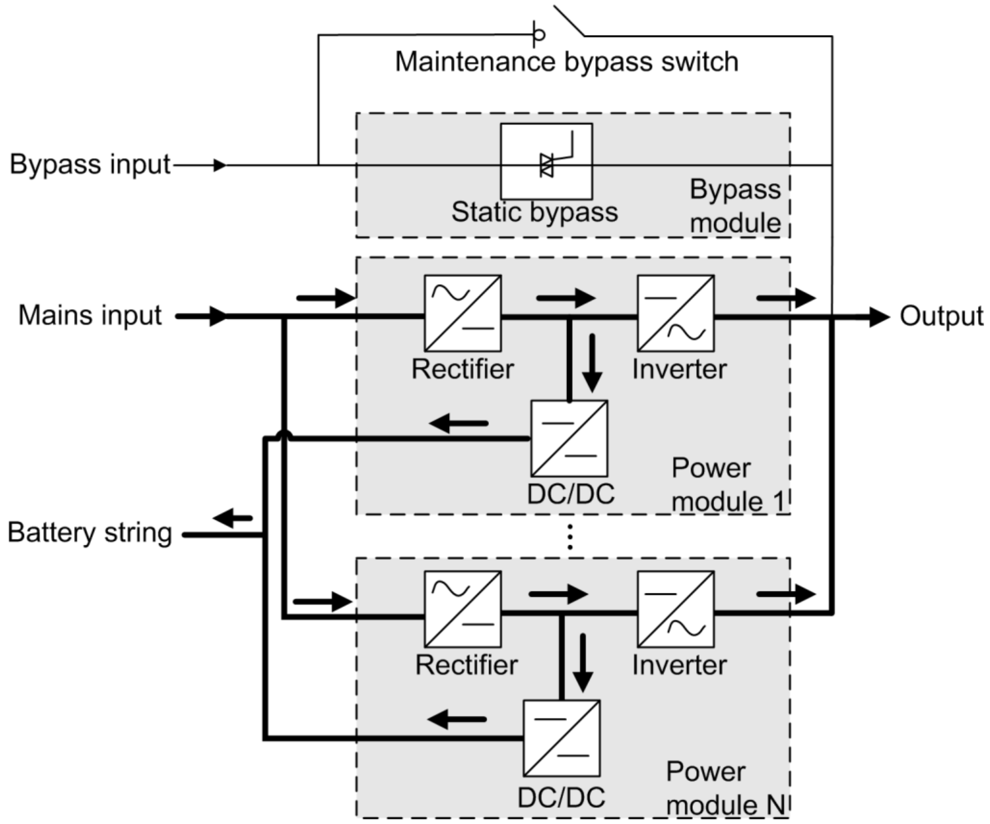
**Figure 2-3** UPS conceptual diagram in normal mode




### 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.


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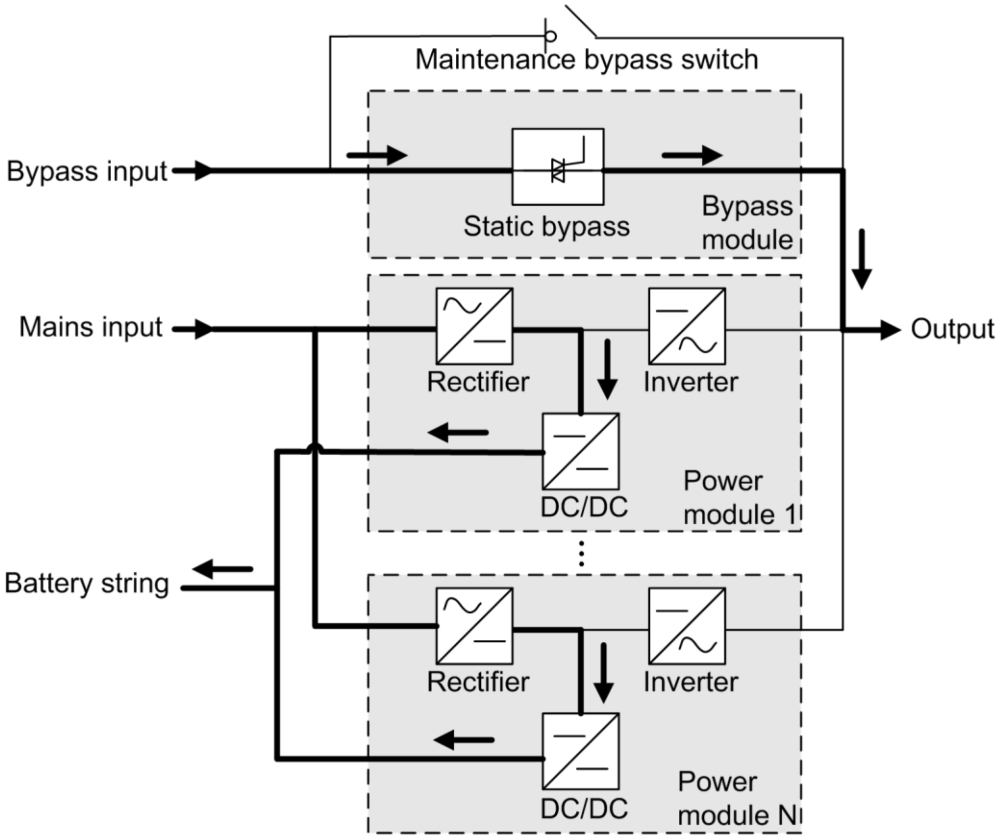
**Figure 2-4** UPS conceptual diagram in bypass mode




### 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.


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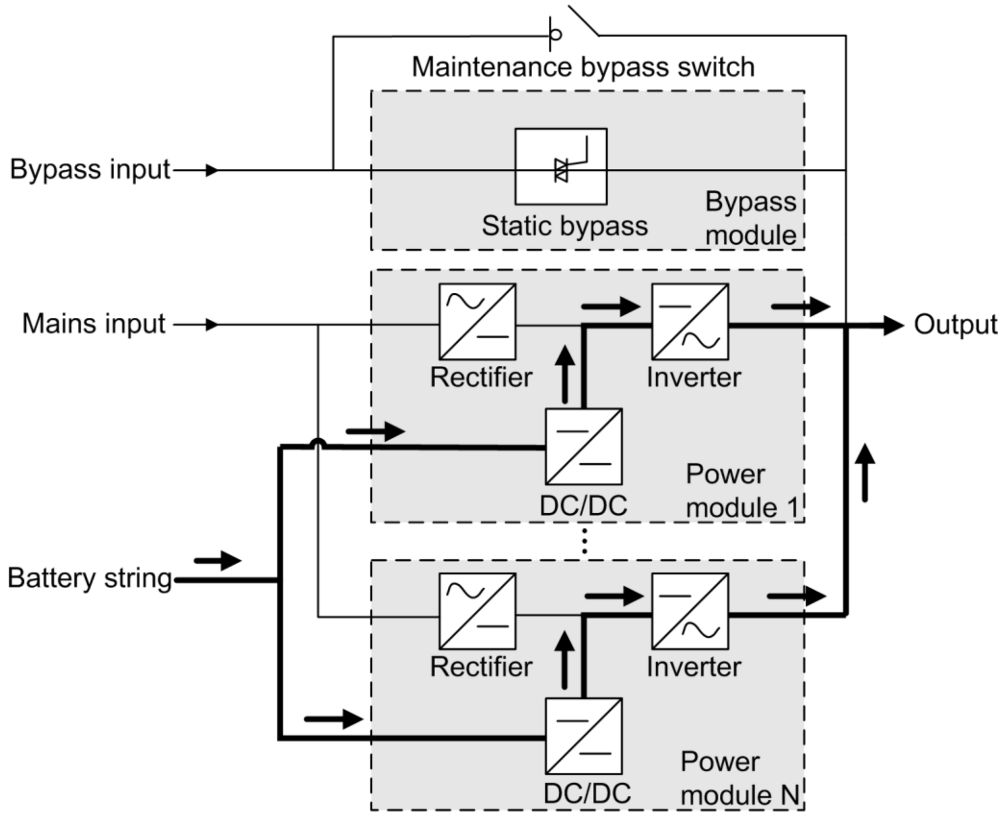
**Figure 2-5** UPS conceptual diagram in battery mode




### 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.


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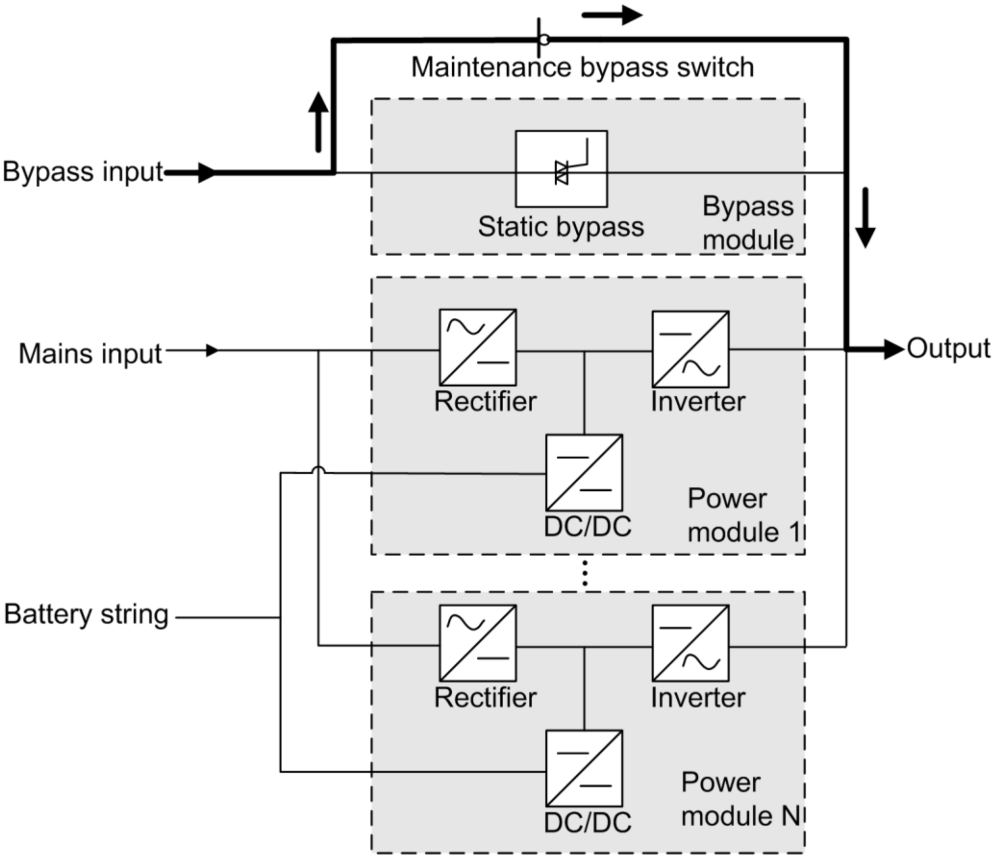
**Figure 2-6** UPS conceptual diagram in maintenance bypass mode




## 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.


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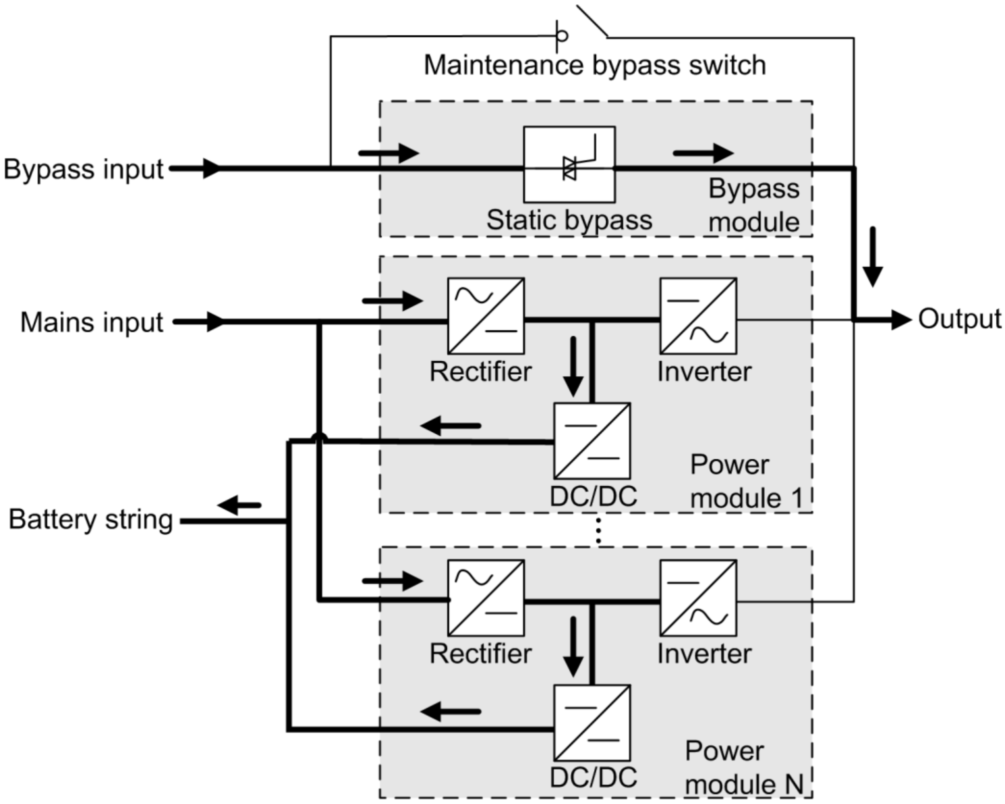
**Figure 2-7** UPS conceptual diagram in ECO mode




**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 to Figure 2-10 show the 400 kVA, 500 kVA, 600 kVA, and 800 kVA UPSs.


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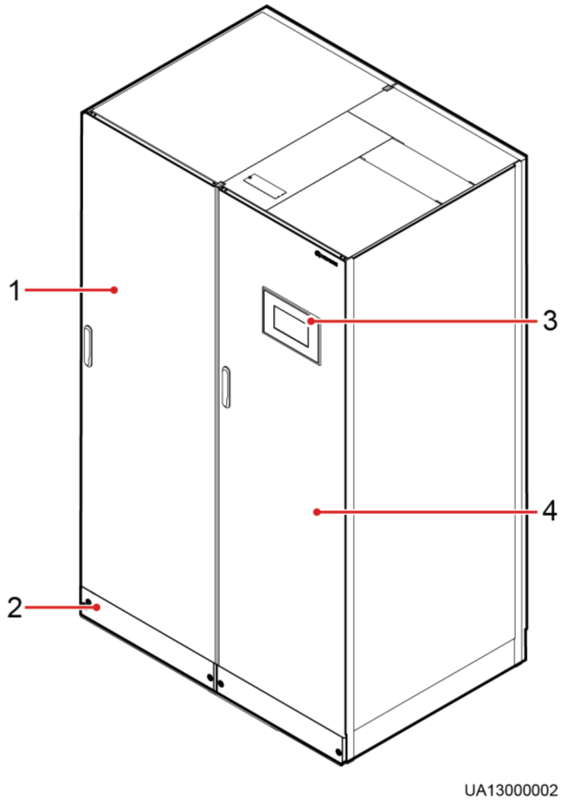
**Figure 2-8** 400 kVA/500 kVA UPS




| | | | |
|---|---|---|---|
| (1) Power cabinet | (2) Anchor baffle plates | (3) Monitor display unit (MDU) | (4) Bypass cabinet |


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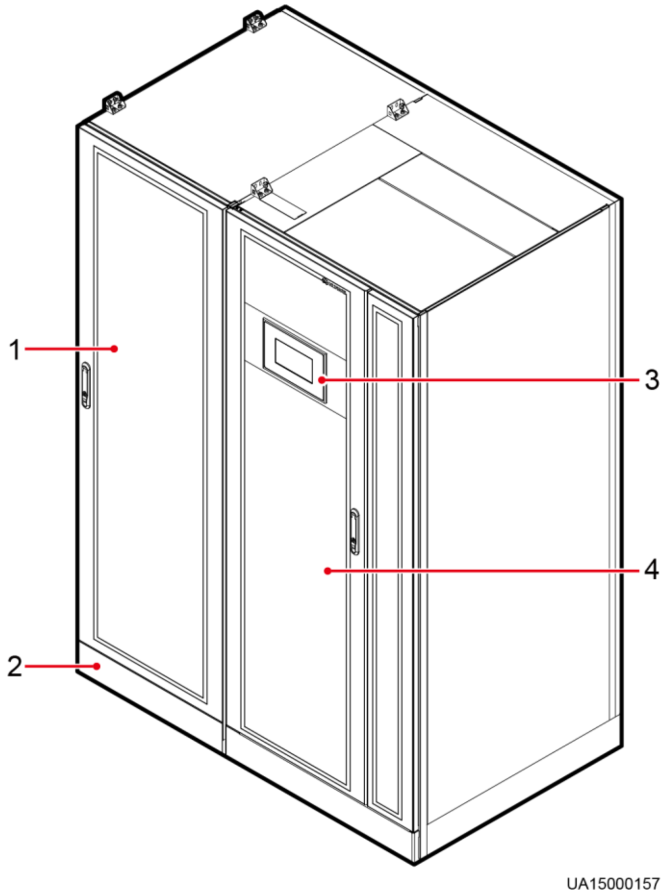
**Figure 2-9** 600 kVA UPS




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


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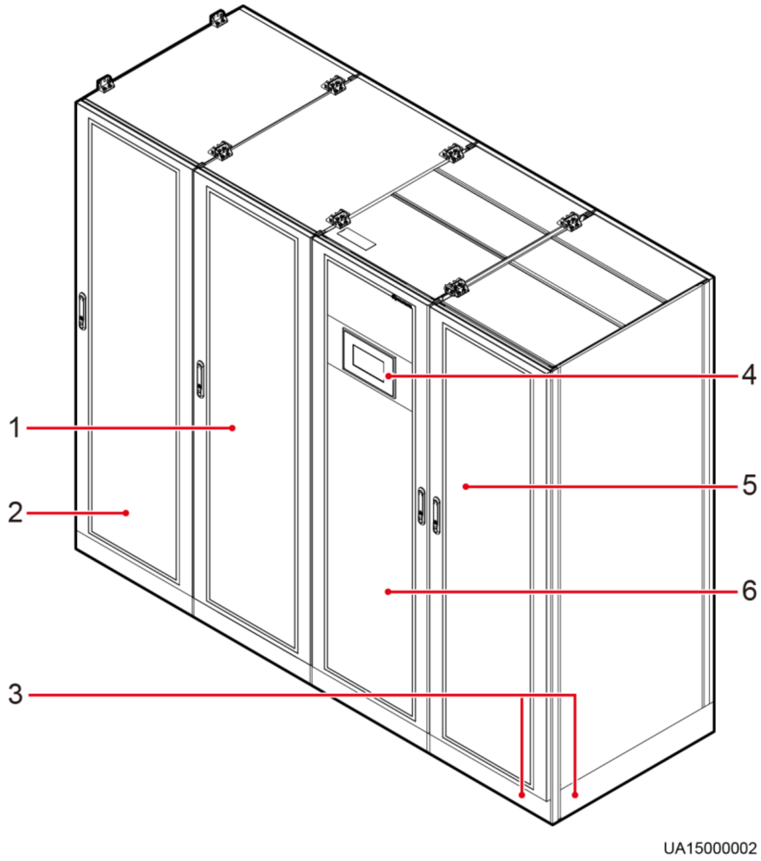
**Figure 2-10** 800 kVA UPS




| | | |
|---|---|---|
| (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 to Figure 2-18 show the structures of UPSs with the front doors open.


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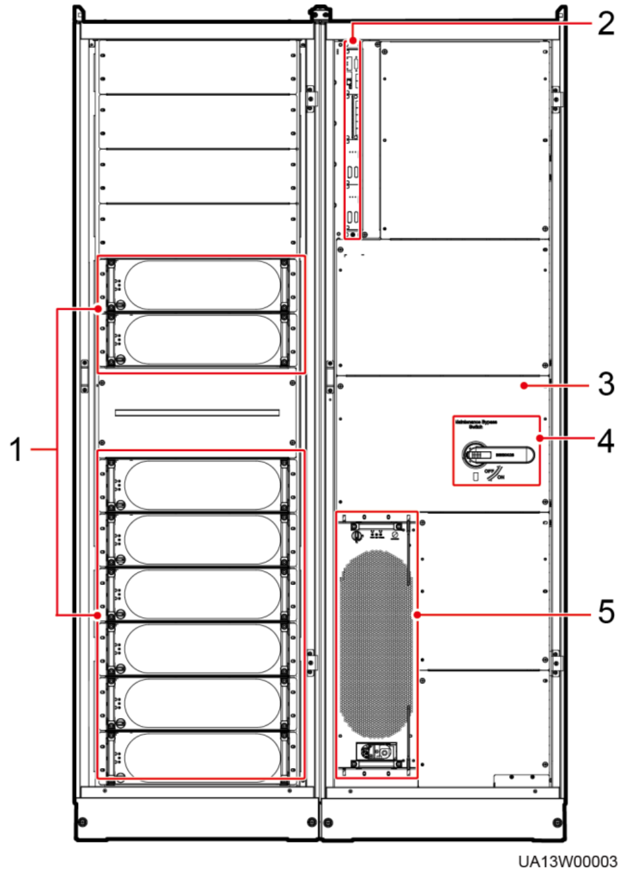
**Figure 2-11** Product structure (400 kVA in standard configuration)




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


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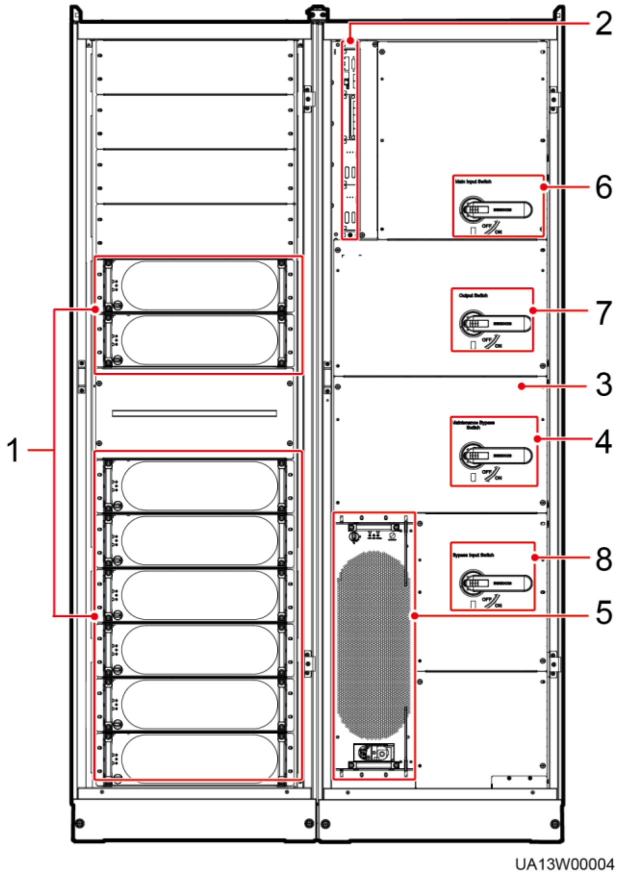
**Figure 2-12** Product structure (400 kVA in full configuration)




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


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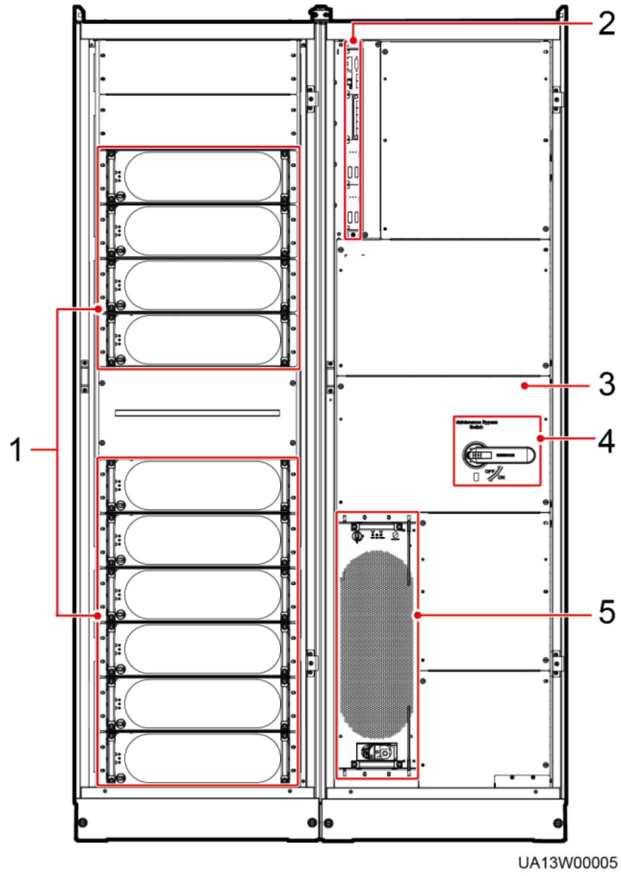
**Figure 2-13** Product structure (500 kVA in standard configuration)




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


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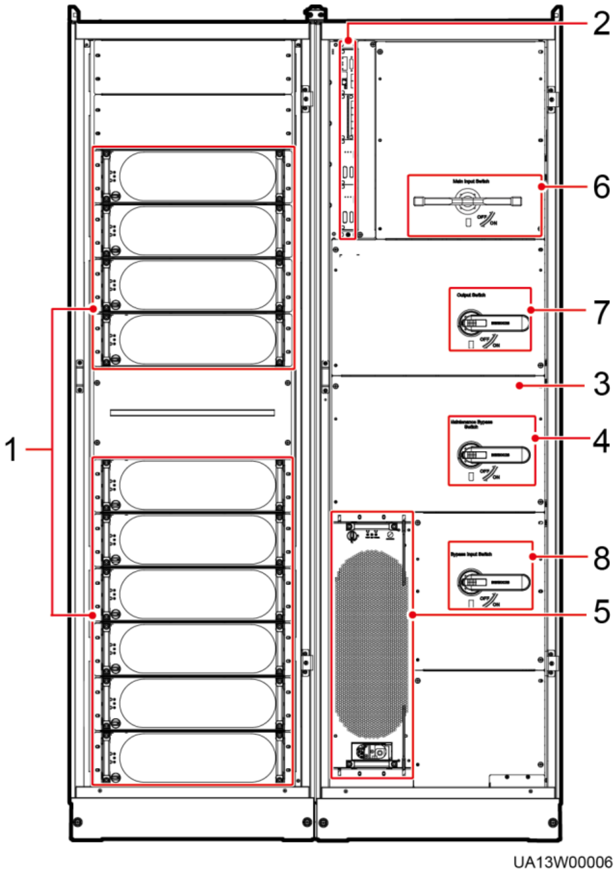
**Figure 2-14** Product structure (500 kVA in full configuration)




| | | |
|---|---|---|
| (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 | |

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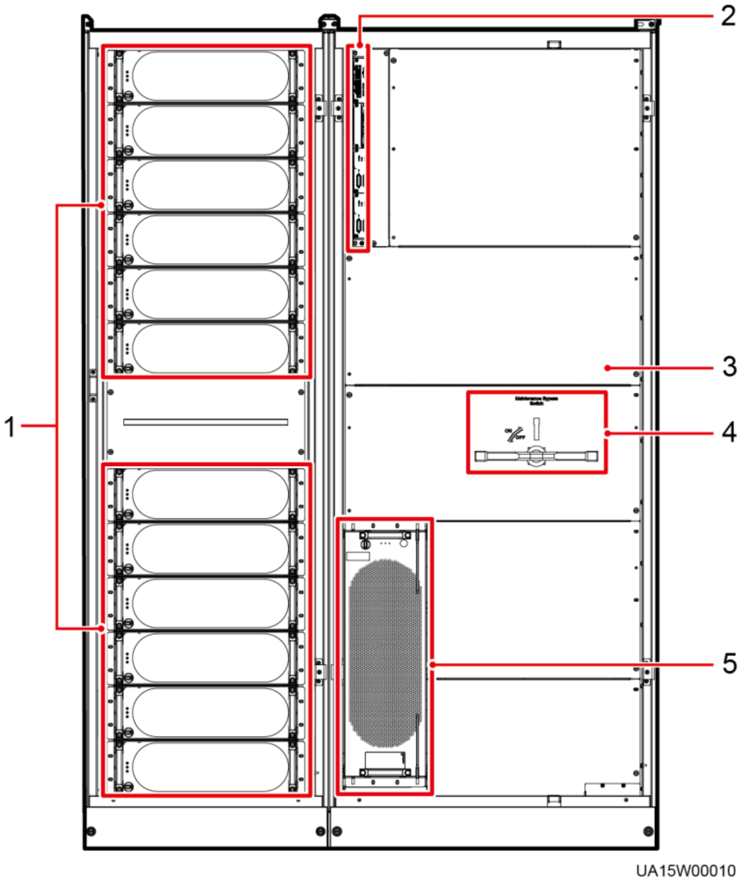
**Figure 2-15** Product structure (600 kVA in standard configuration)




(1) Power modules (2) Control module (3) Power distribution module cover

(4) Maintenance bypass switch (5) Bypass module


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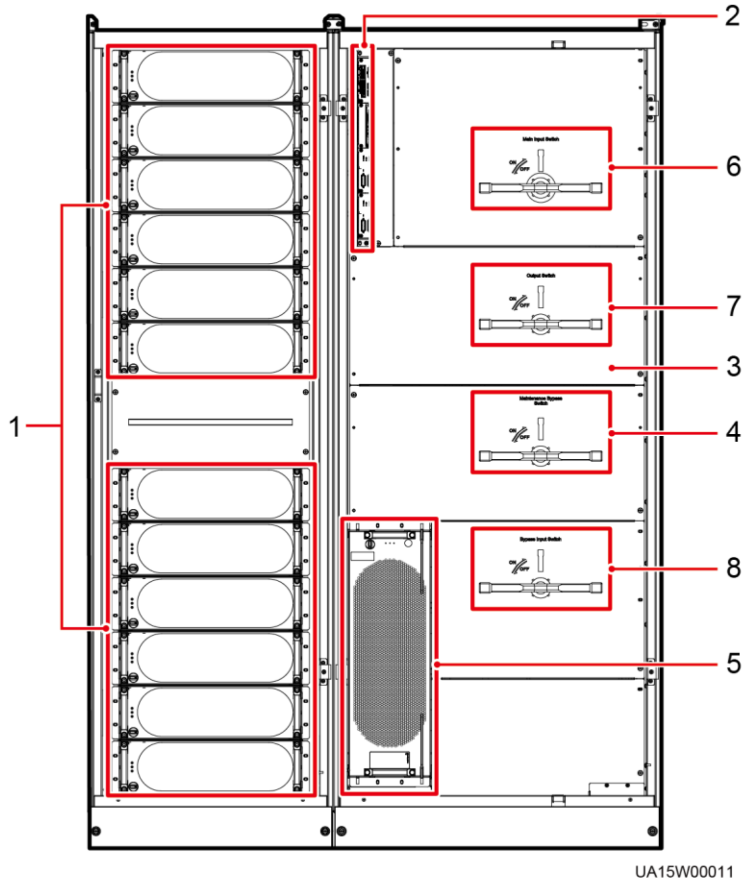
**Figure 2-16** Product structure (600 kVA in full configuration)




| | | |
|---|---|---|
| (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 | |


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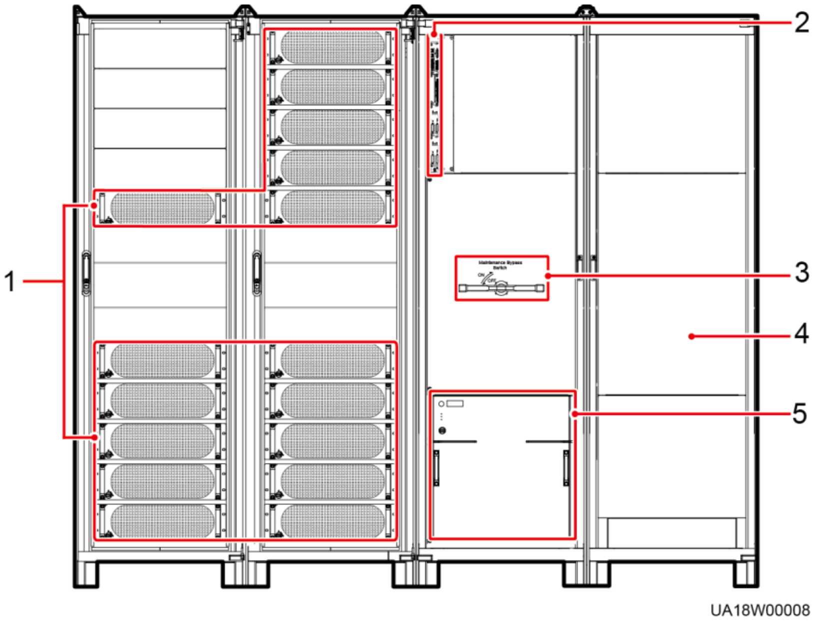
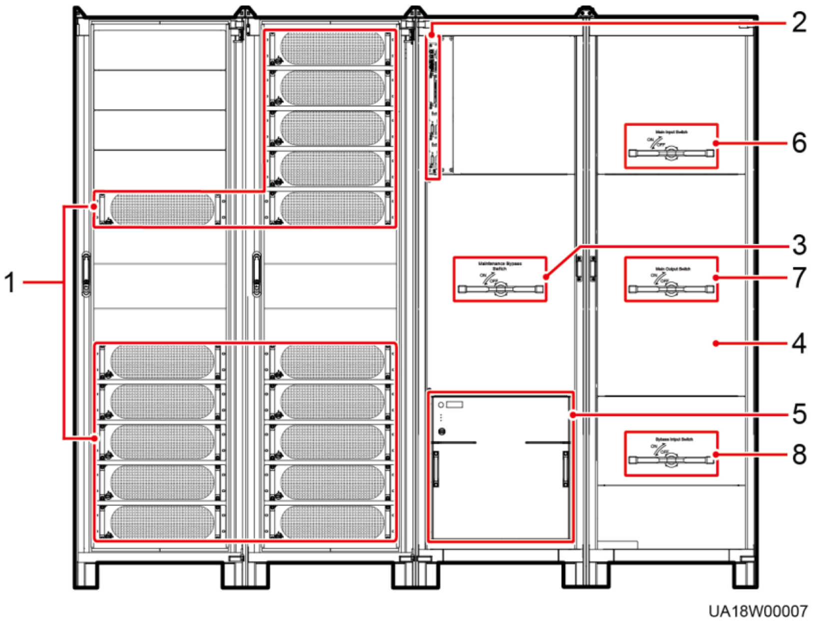
**Figure 2-17** Product structure (800 kVA in standard configuration)




(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)




(1) Power modules (2) Control module (3) Maintenance bypass switch

(4) Power distribution module cover (5) Bypass module (6) Mains input switch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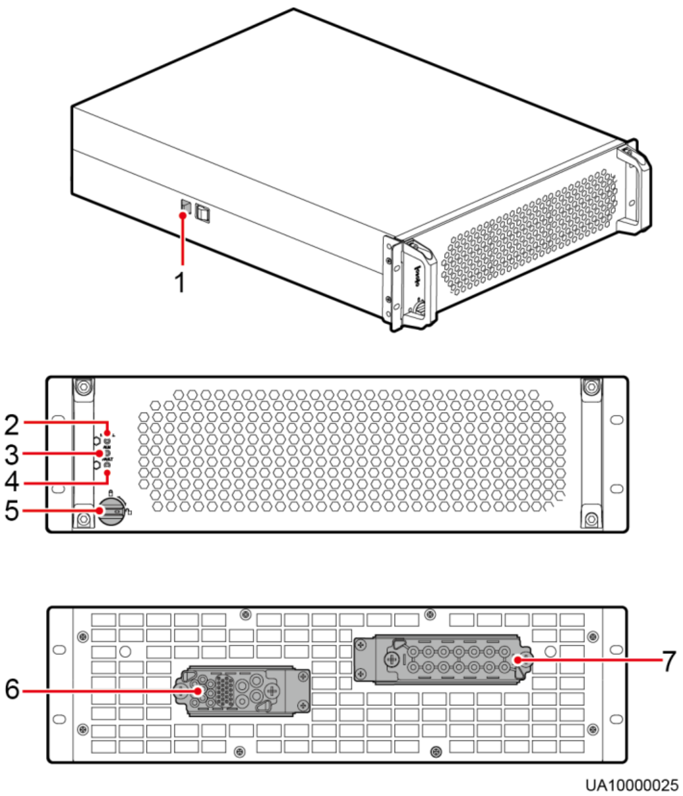
(7) Output switch (8) Bypass input switch

## 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 | • The inverter is ready and in standby state (blinking at 0.5 Hz, on for 1s and off for 1s).<br>• The inverter is not started (blinking at 0.2 Hz, on for 2.5s |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| Indicator | Color | Status | Description |
|---|---|---|---|
| | | | and off for 2.5s). |
| | | Blinking at short intervals | The module is not configured, the inverter or rectifier DSP software is being upgraded, or the inverter CPLD software is being upgraded (blinking at 4 Hz, on for 0.125s and off for 0.125s). |
| | | Off | The rectifier CPLD 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 CPLD 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 CPLD 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 shows the 600 kVA bypass module.


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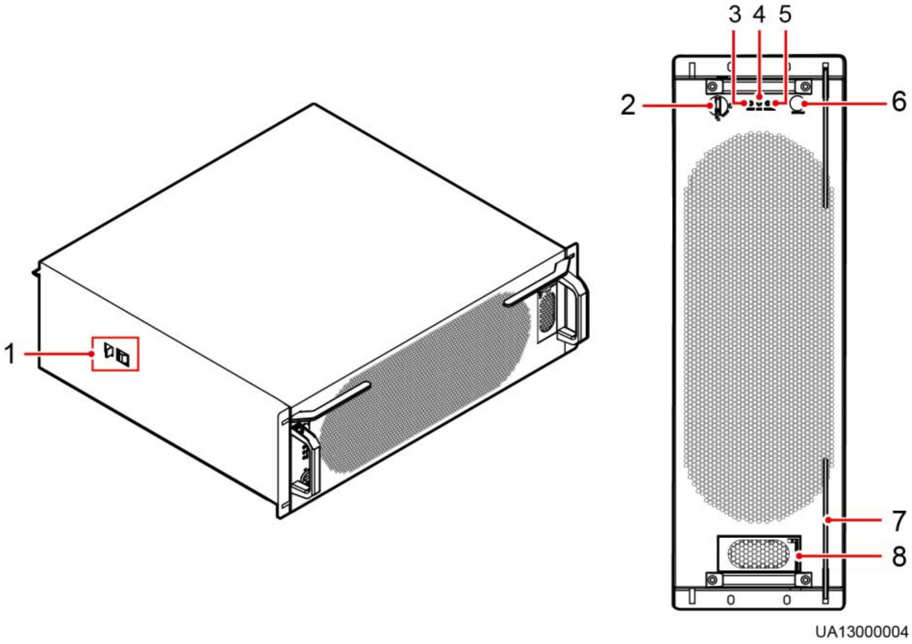
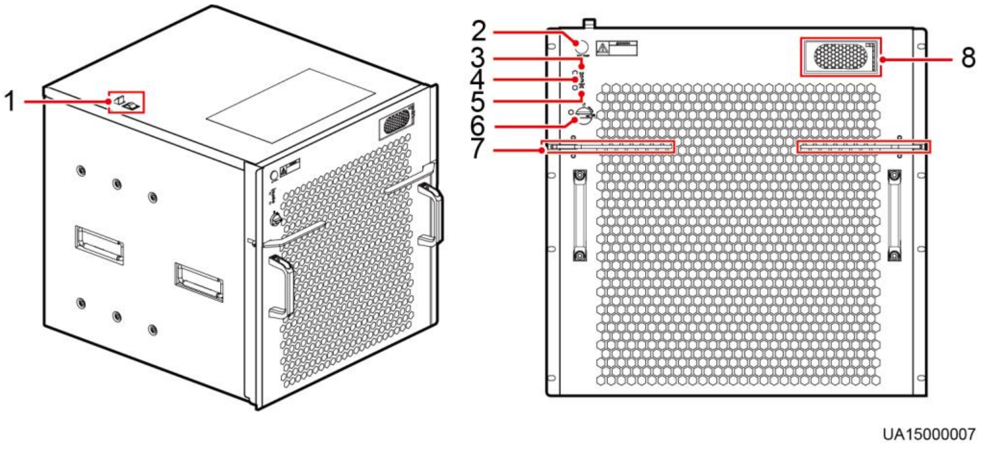
**Figure 2-20** 600kVA bypass module




| | | | |
|---|---|---|---|
| (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 |

Figure 2-21 shows the 800 kVA bypass module.

**Figure 2-21** 800kVA 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 |


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**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 DSP software is being upgraded (blinking at 4 Hz, on for 0.125s and off for 0.125s). |
| | | Off | The bypass CPLD 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 CPLD 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 CPLD 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


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– 800 kVA: 83 kg

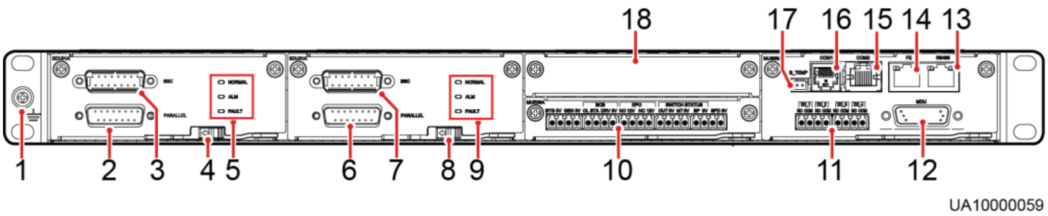
## 2.3.5 Control Module

### 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 shows the signal panel on the control module.

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




| | | | |
|---|---|---|---|
| (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.


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**Figure 2-23** ECM

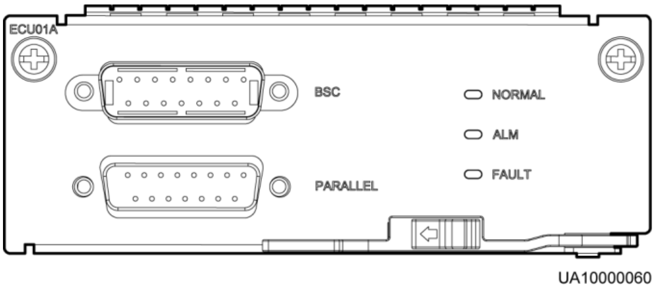


**Table 2-4** Ports on the ECM

| 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.<br>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 CPLD of this ECM is being upgraded. |
| | | Blinking at 4 Hz | The DSP 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 DSP 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 DSP of the ECM is being upgraded. |


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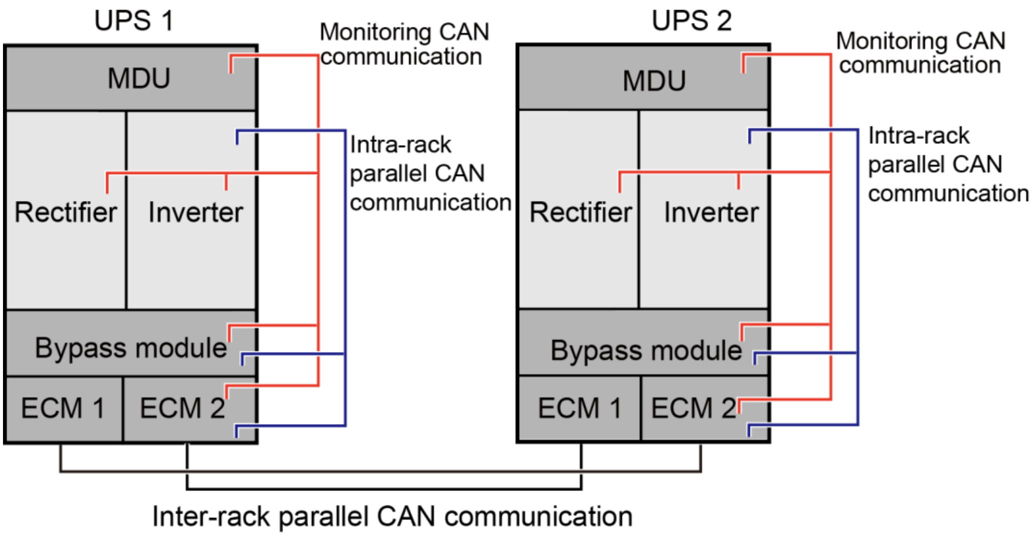
## Functions

- 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

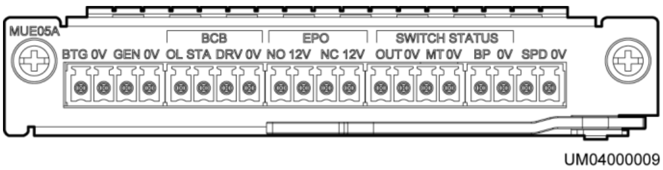




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**Table 2-6** Ports on the dry contact card

| Silk Screen | Description | Status | Initial Status |
|---|---|---|---|
| BTG | Port for detecting battery grounding faults | • Connected: battery grounding fault<br>• Disconnected: no battery grounding fault | Disconnected |
| 0V | Port for signal ground | | |
| GEN | Port for detecting diesel generator (D.G.) mode | • Connected: D.G. mode<br>• Disconnected: non-D.G. mode | Disconnected |
| 0V | Port for signal ground | | |
| BCB_OL | Port for detecting the BCB box | • Grounded: BCB box connected<br>• Disconnected: BCB box not connected | Grounded |
| BCB_STA | Port for monitoring the battery switch | • Connected: battery switch ON<br>• Disconnected: battery switch OFF | Disconnected |
| BCB_DRV | Controls battery circuit breaker trip. When the voltage is +12 V, the circuit breaker trips. | • 0 V: battery switch not tripped<br>• 12 V: battery switch tripped | 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 | • Connected: circuit breaker ON<br>• Disconnected: circuit breaker OFF | Connected |
| SWITCH STATUS_0V | Port for signal ground | | |
| SWITCH STATUS_ | Port for monitoring the maintenance circuit breaker | • Disconnected: circuit breaker ON | Disconnected |


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| Silk Screen | Description | Status | Initial Status |
|---|---|---|---|
| MT | | • Connected: circuit breaker OFF | |
| SWITCH STATUS_ 0V | Port for signal ground | | |
| SWITCH STATUS_ BP | Port for monitoring the bypass input circuit breaker | • Connected: circuit breaker ON<br>• Disconnected: circuit breaker OFF | Connected |
| SWITCH STATUS_ 0V | Port for signal ground | | |
| SPD | Port for monitoring the input AC surge protective device (SPD) | • Connected: SPD enabled<br>• Disconnected: SPD disabled | 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 $mm^2$ to 1.5 $mm^2$.

## 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


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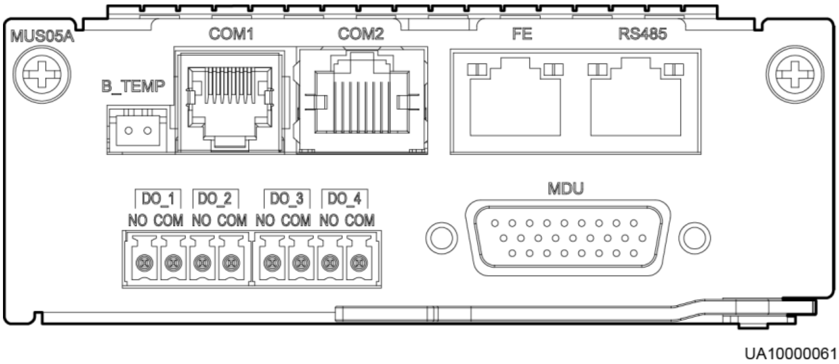
**NOTICE**

- 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.
- If MDU communication fails, the "Comm. failure" message is displayed on the LCD, screen switching is disabled, the buzzer buzzes, and the fault indicator is red. Once the fault is rectified, the LCD recovers, and the alarm is cleared.
- 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




**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 | DO_1 is used to output alarms and indicates critical alarms by default. It can be set to indicate minor alarms, bypass mode, battery mode, or low battery voltage. |
| | COM | |
| DO_2 | NO | DO_2 is used to output alarms and indicates minor alarms by default. It can be set to indicate critical alarms, bypass mode, |
| | COM | |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| Port | Silk Screen | Description |
|---|---|---|
| | | battery mode, or low battery voltage. |
| DO_3 | NO | DO_3 is used to output alarms and indicates bypass mode by default. It can be set to indicate critical alarms, minor alarms, battery mode, or low battery voltage. |
| | COM | |
| DO_4 | NO | DO_4 is used to output alarms and indicates battery mode by default. It can be set to indicate critical alarms, minor alarms, bypass mode, or low battery voltage. |
| | 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 | Connects to an ambient temperature and humidity sensor over two wires. |
| Southbound communications port 2 | COM2 | Connects to a southbound device, such as an iBattery. |
| Network port | FE | Connects to the network port on a PC. |
| Northbound communications port | RS485 | Connects to a northbound network management device or a third-party network management device over two wires. |

**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 $mm^2$.
- RS485 cables and FE cables must be shielded cables.

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


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**Figure 2-27** Wiring method 1

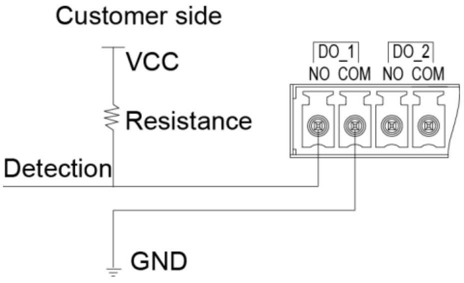


**Figure 2-28** Wiring method 2

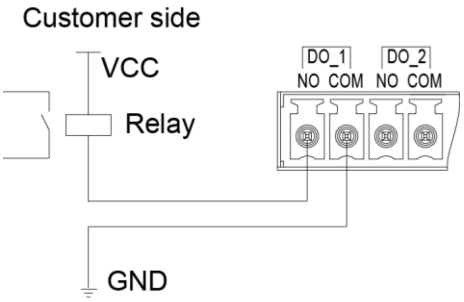


**Figure 2-29** COM1 pins

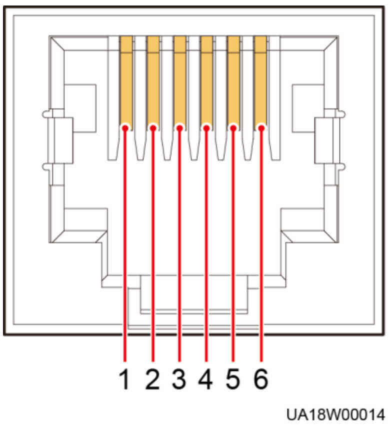


**Table 2-8** COM1 pin definition

| Pin | Description |
| --- | --- |
| 1 | GND |
| 2 | N/A |
| 3 | RS485– |
| 4 | RS485+ |


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| Pin | Description |
| --- | --- |
| 5 | N/A |
| 6 | 12V_PORT |

**Figure 2-30** COM2 pins

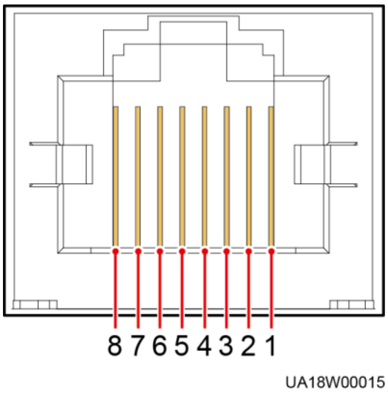


**Table 2-9** COM2 pin definition

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


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**Figure 2-31** RS485 pins

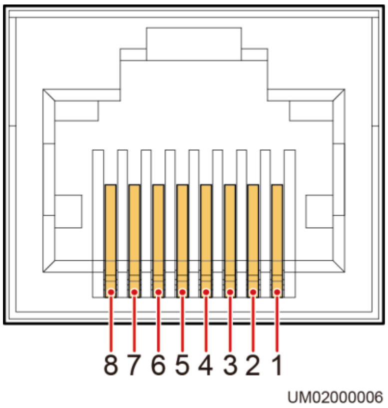


**Table 2-10** RS485 pin definition

| 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–.


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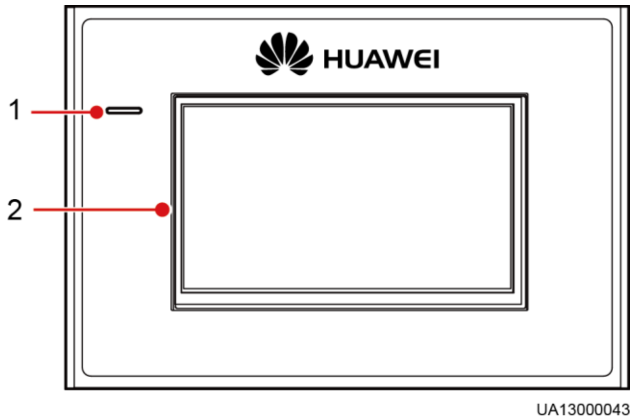
# 2.3.6 MDU

## Appearance

**Figure 2-32** MDU




(1) Status indicator (2) LCD touchscreen

**NOTE**
Touch the LCD screen firmly because it is an industrial resistive touchscreen. It is recommended that you use your fingernails for accurate selection and quick response.

**Figure 2-33** Touching the LCD

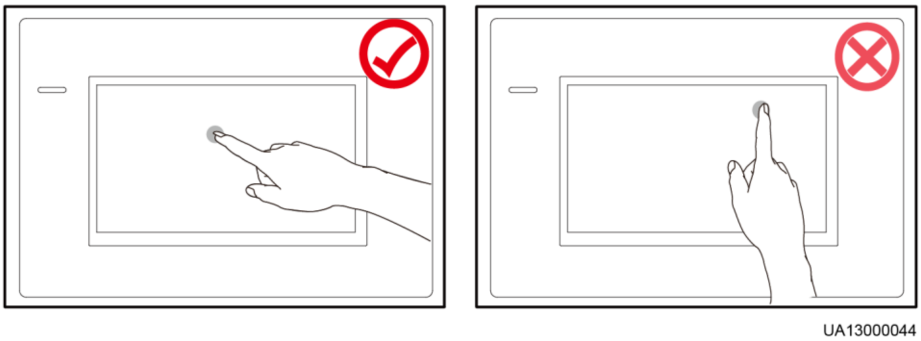



**Table 2-11** Status indicator

| 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. |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| Status | Color | Meaning |
|---|---|---|
| | 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 LCD panel is yellow when the bypass supplies power in non-ECO mode.

The ports of the LCD screen are located at the side of the LCD screen.

**Figure 2-34** LCD screen ports

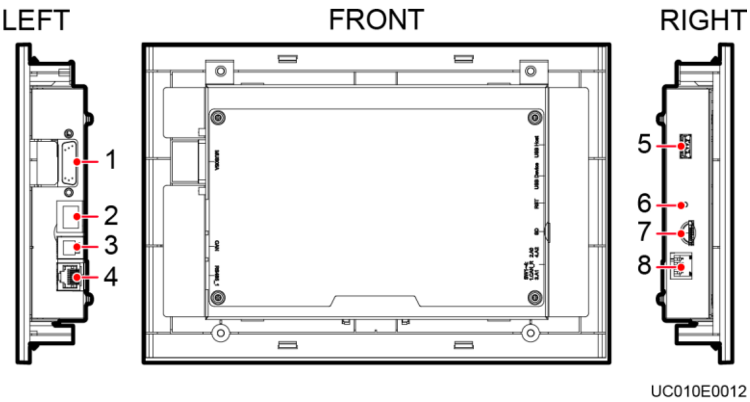


**Table 2-12** Description of LCD screen ports

| No. | Port Name | Description |
|---|---|---|
| 1 | MUS05A (DB26) | Connects to the MDU and monitoring interface card |
| 2 | FE | Network port for connecting to the web service and for SNMP networking |
| 3 | CAN | Reserved |
| 4 | RS485_1 | Reserved |
| 5 | USB Host | Connects to a USB flash drive, used for upgrading the LCD online and upgrading configurations |
| 6 | RST | Restart switch for the MDU |
| 7 | SD | Reserved |
| 8 | DIP switch | Implements specific functions by using the DIP switch and specific buttons; controls the CAN |


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| No. | Port Name | Description |
|---|---|---|
| | | 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 | 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.<br>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. |

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.


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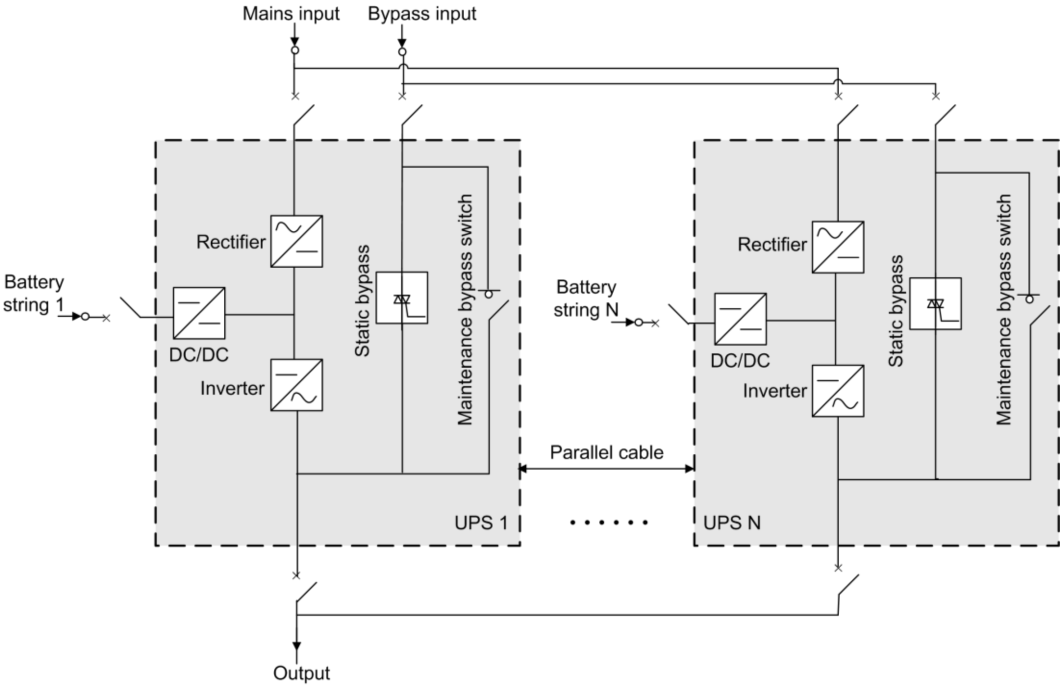
### 2.4.2 Parallel System

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 2-35** 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.


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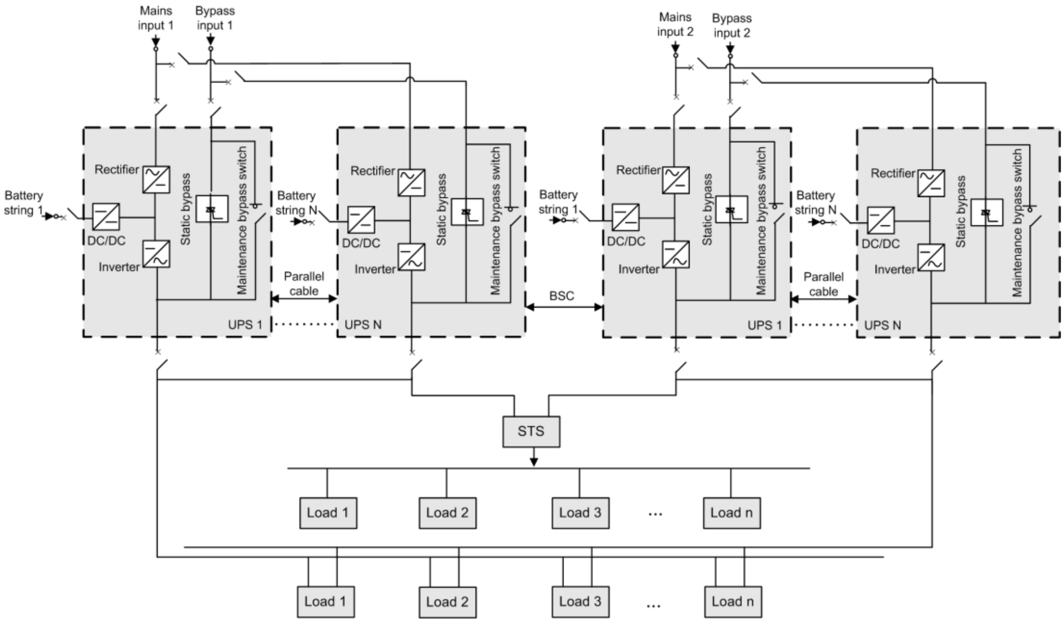
**Figure 2-36** Conceptual diagram of a dual-bus system




# 2.5 Optional Components

| Component | Model | | Function |
|---|---|---|---|
| BCB-BOX | 400 kVA, 500 kVA, 600 kVA | • PDU8000-0400DCV8-BXA001<br>• PDU8000-0630DCV8-BXA001<br>• PDU8000-0800DCV8-BXA001 | Controls the connection between battery strings and the UPS, and supports overload, short-circuit protection, and remote trip control. |
| | 800 kVA | • PDU8000-0630DCV8-BXA001<br>• PDU8000-0800DCV8-BXA001 | |
| BBB-BOX | 400 kVA, 500 kVA, 600 kVA | • PDU8000-1250DCV8-BGA001<br>• PDU8000-2000DCV8-BGA001 | Converges the energy of multiple battery strings. |
| | 800 kVA | PDU8000-2000DCV8-BGA001 | |
| Top air-flow cabinet | N/A | | Ensures heat dissipation. For details, see the document delivered with the top air-flow cabinet. |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| Component | Model | Function |
| --- | --- | --- |
| iBAT 2.0 | N/A | Collects battery information, such as battery status data, from the downstream BIM groups through 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. |
| 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. |


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**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.


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# 3 Installation

## 3.1 Installation Preparations

### 3.1.1 Site

#### 3.1.1.1 UPS Dimensions

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

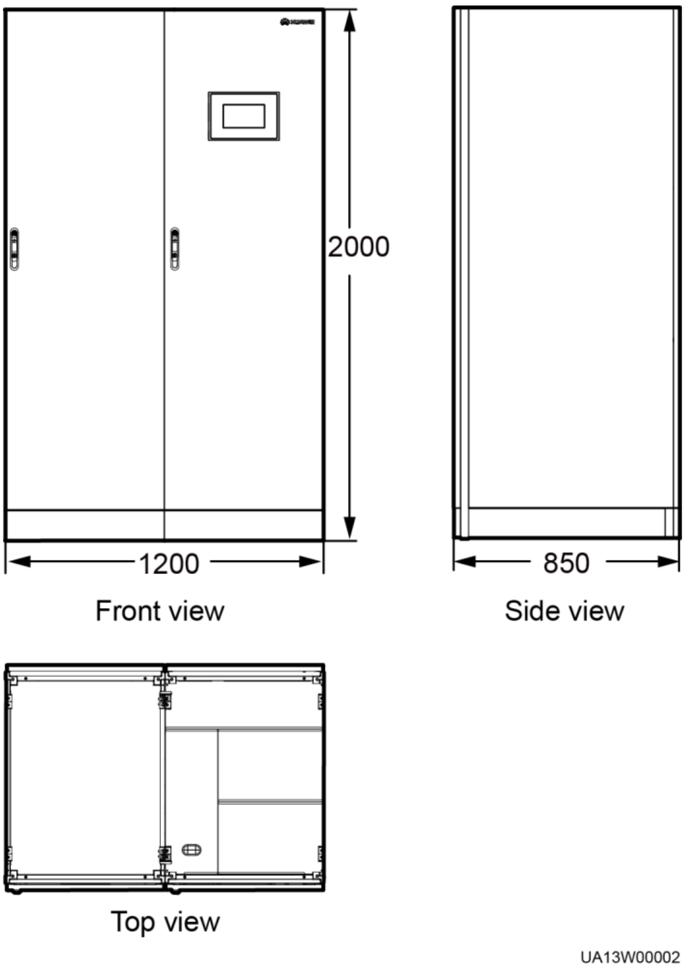



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**Figure 3-2** Dimensions (600 kVA, unit: mm)

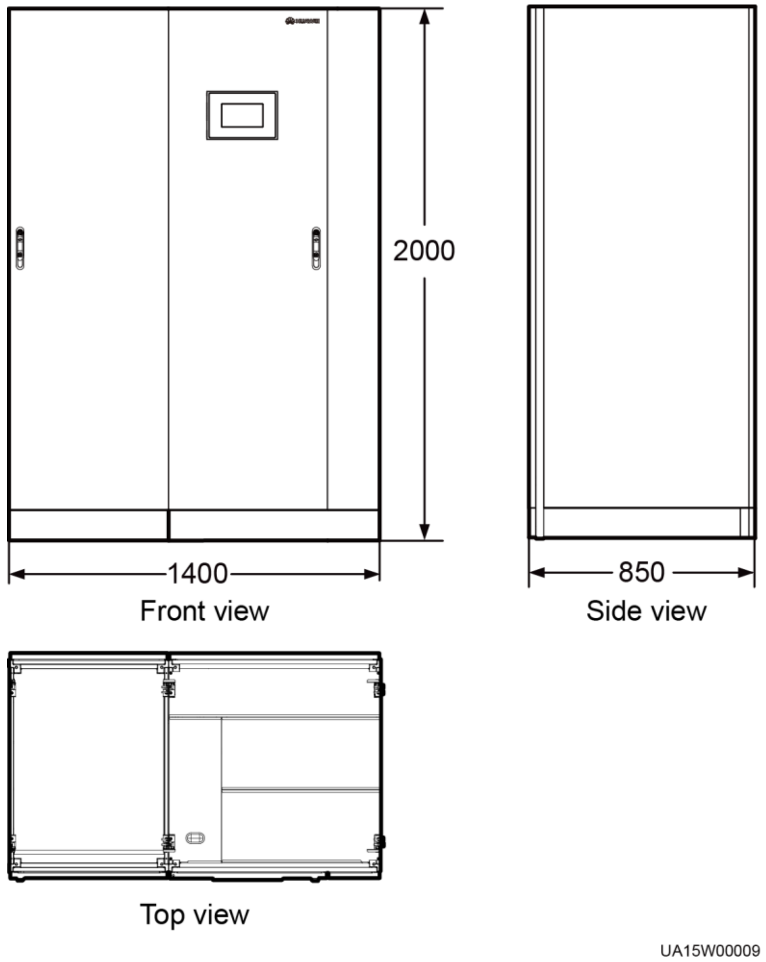



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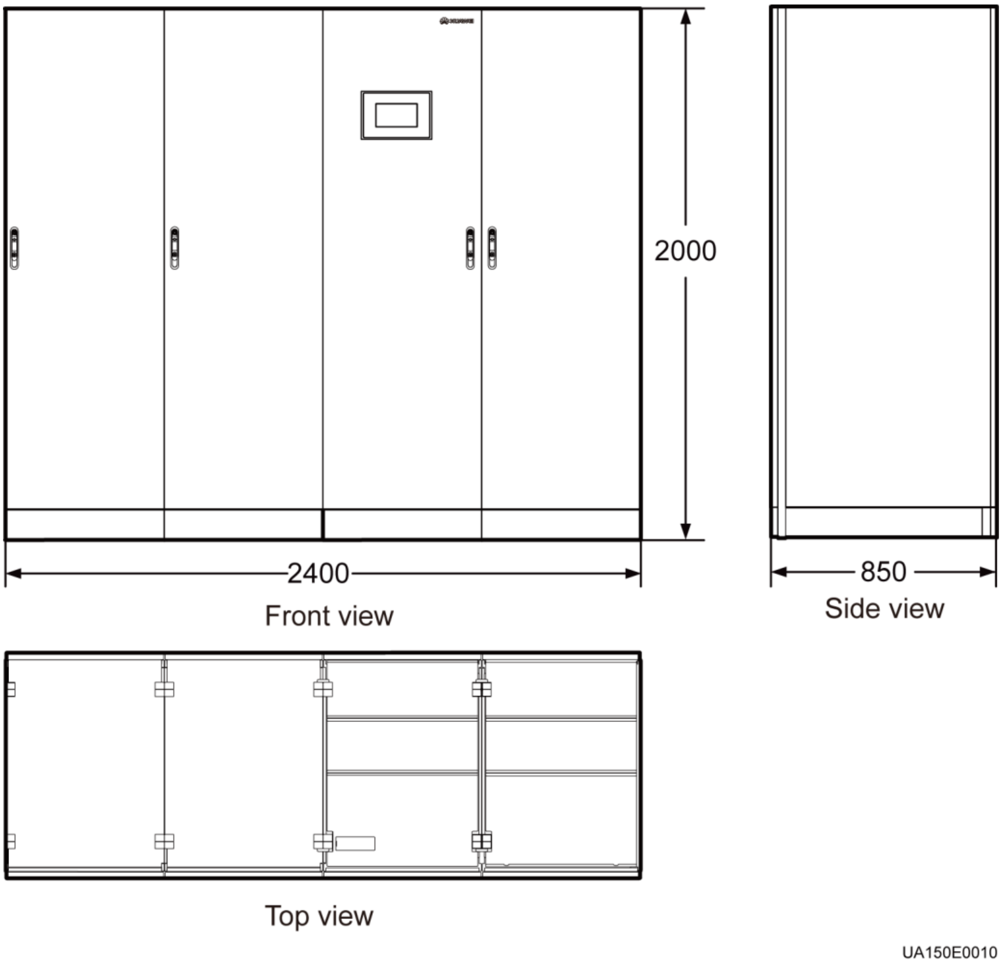
**Figure 3-3** Dimensions (800 kVA, unit: mm)




### 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 ℃. Operating temperatures higher than 30 ℃ shorten the battery lifespan and operating temperatures lower than 20 ℃ 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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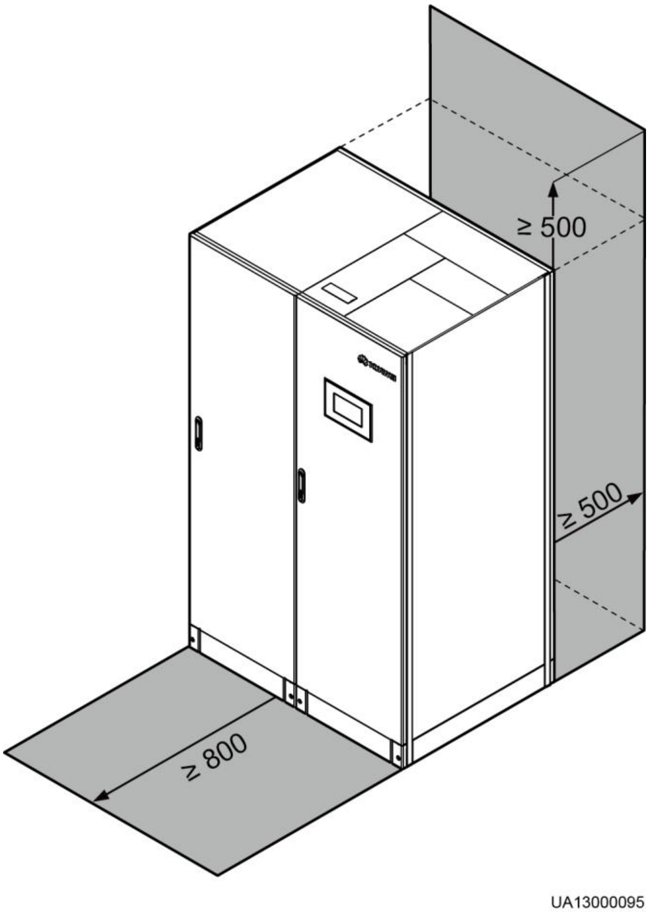
deployed, at least 500 mm space should be reserved at the rear for ventilation. If the UPS will be operated from the rear, at least 800 mm space should be reserved for operations.

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

**Figure 3-4** Reserved clearances (unit: mm)




## 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 |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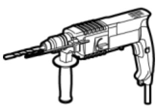
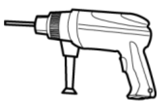
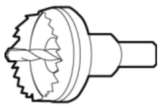
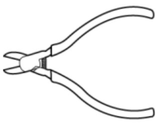
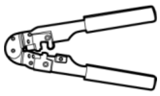
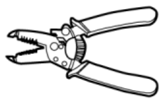
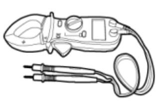
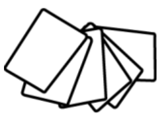
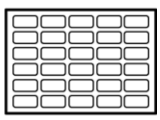
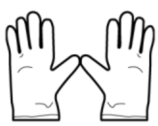
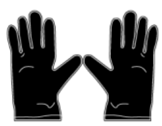
| Tools and Meters | | | |
|---|---|---|---|
|  |  |  |  |
| Hammer drill and drill bit Φ16 | Hand-held electric drill | Alloy hole saw | Heat gun |
|  |  |  |  |
| Diagonal pliers | Crimping tools | Wire stripper | Electric hydraulic pliers |
|  |  |  |  |
| Clamp meter | Multimeter | Cable tie | Level instrument |
|  |  |  |  |
| Polyvinyl chloride (PVC) insulation tape | Cotton cloth | Label | Electrician's knife |
|  |  |  |  |
| Electrostatic discharge (ESD) gloves | Protective gloves | Insulated gloves | Insulation protective shoes |
|  |  |  |  |
| Torque screwdriver | Cable cutter | Brush | Flat-head screwdriver<br>(2–5 mm) |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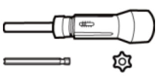
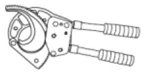
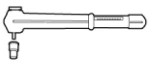
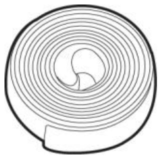
| Tools and Meters | | | |
|---|---|---|---|
|  |  |  |  |
| Phillips screwdriver (M3/M4/M5/M6/M8) | Insulated torque wrench (M6/M8/M12/M16) | Heat shrink tubing | Insulated adjustable wrench |
|  |  |  |  |

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. For the connecting method, see A (Optional) TN-C System Application.

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.

**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 input connector | Mains input current (A) | | 622 | 711 | 800 | 889 | 977 |
| | Recommended cross-sectional area (mm$^2$) | 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 | | | | | |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| **Item** | | | **350 kVA** | **400 kVA** | **450 kVA** | **500 kVA** | **550 kVA** |
|---|---|---|---|---|---|---|---|
| | | PE | 185 | 240 | 240 | 240 | 240 |
| Bypass input connector | Bypass input current (A) | | 532 | 608 | 684 | 760 | 836 |
| | Recommended cross-sectional area ($mm^2$) | 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 connector | Output current (A) | | 532 | 608 | 684 | 760 | 836 |
| | Recommended cross-sectional area ($mm^2$) | 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 connector | Nominal discharge current (A) | | 768 | 877 | 987 | 1096 | 1206 |
| | Maximum discharge current (A) | | 919 | 1051 | 1182 | 1313 | 1444 |
| | Recommended cross-sectional area ($mm^2$) | + | 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 |

**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 connector | Mains input current (A) | | 1066 | 1155 | 1244 | 1333 | 1422 |
| | Recommended cross-sectional area ($mm^2$) | 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 | | | | | |


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| **Item** | | | **600 kVA** | **650 kVA** | **700 kVA** | **750 kVA** | **800 kVA** |
|---|---|---|---|---|---|---|---|
| | | PE | 240 | 240 | 240 | 240 | 240 |
| Bypass input connector | Bypass input current (A) | | 912 | 988 | 1064 | 1140 | 1215 |
| | Recommended cross-sectional area ($mm^2$) | 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 connector | Output current (A) | | 912 | 988 | 1064 | 1140 | 1215 |
| | Recommended cross-sectional area ($mm^2$) | 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 connector | Nominal discharge current (A) | | 1316 | 1425 | 1535 | 1645 | 1754 |
| | Maximum discharge current (A) | | 1576 | 1707 | 1838 | 1970 | 2101 |
| | Recommended cross-sectional area ($mm^2$) | + | 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 |

- 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.


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- 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 ℃.
  - The AC voltage loss is less than 3%, and the DC voltage loss is less than 1%.
  - 90 ℃ 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 |
| 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[a] |
|---|---|---|
| 350 kVA | Mains input circuit breaker | 800 A/3P |


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| UPS Capacity | Component | Specifications[a] |
|---|---|---|
| | 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 |
| | 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 | 1250 A/3P |


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| UPS Capacity | Component | Specifications[a] |
|---|---|---|
| | breaker | |
| 800 kVA | Mains input circuit breaker | 1600 A/3P |
| | Bypass input circuit breaker | 1250 A/3P |
| | Output branch circuit breaker | 1250 A/3P |
| 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. | | |

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 Transportation and Unpacking

### 3.1.4.1 Removing a Carton (400 kVA, 500 kVA, or 800 kVA UPS)

#### 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 and take 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.

NOTE

The power cabinet and bypass cabinet of an 800 kVA UPS are separately packed for delivery. Perform the following steps for both the power cabinet and bypass cabinet.

#### Procedure

**Step 1** Visually inspect the UPS appearance for shipping damage. If any damage is found, report it to the carrier immediately.

**Step 2** Use a pallet truck to move the power cabinet and bypass cabinet near the installation position.


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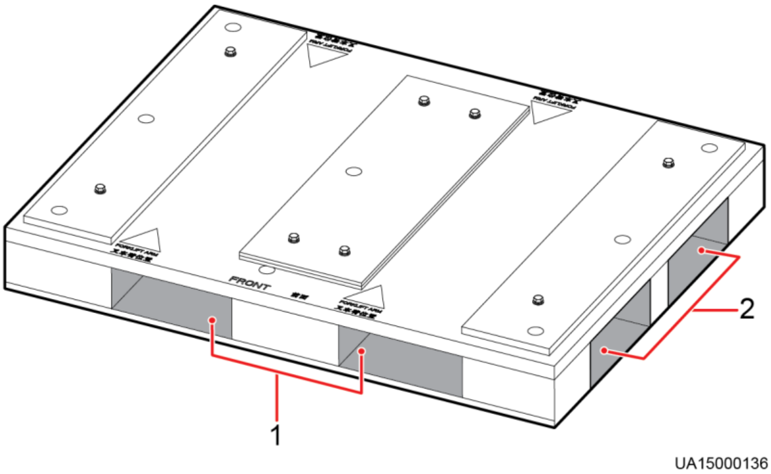
**NOTICE**

To prevent the UPS from falling over during transportation, the pallet is specially designed. If an electric pallet truck is used, insert the forks into the front of the pallet; if a manual pallet truck is used, insert the forks into the left or right side of the pallet, as shown in Figure 3-5.

**Figure 3-5** Pallet




| | |
|---|---|
| (1) Place for inserting the forks of an electric pallet truck | (2) Place for inserting the forks of a manual pallet truck |

**Step 3** Cut off and remove the binding tapes, as shown in Figure 3-6.


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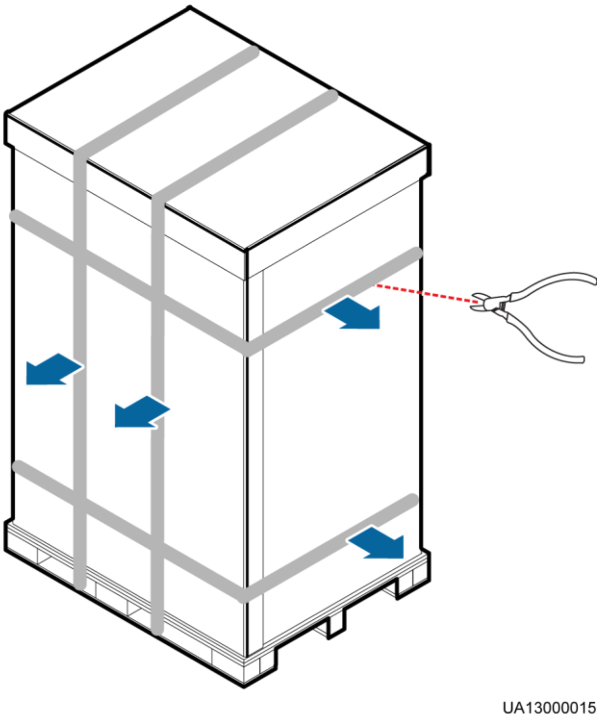
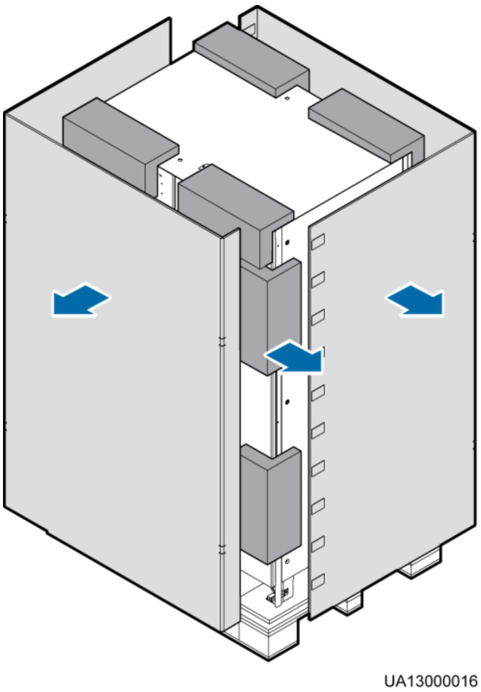
**Figure 3-6** Removing binding tapes




**Step 4** Remove the packing materials and foam, as shown in Figure 3-7.

**Figure 3-7** Removing the packing materials and foam




**Step 5** Remove the plastic bag and take out the fitting box. Store them for future use.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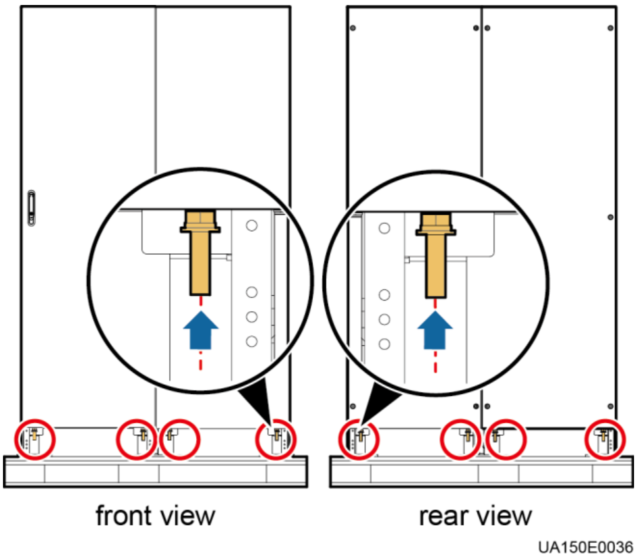
**Step 6** Check that the UPS is intact.

1. Visually inspect the UPS appearance for shipping damage. If it is damaged, notify the carrier immediately.
2. Check that the fittings comply with the packing list. If some fittings are missing or do not comply with the packing list, record the information and contact your local Huawei office immediately.

**Step 7** Remove the screws that secure the cabinet and pallet, as shown in Figure 3-8.

**Figure 3-8** Removing screws from the cabinet and pallet




**----End**

## 3.1.4.2 Removing a Wooden Case (600 kVA UPS)

### Context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**NOTICE**

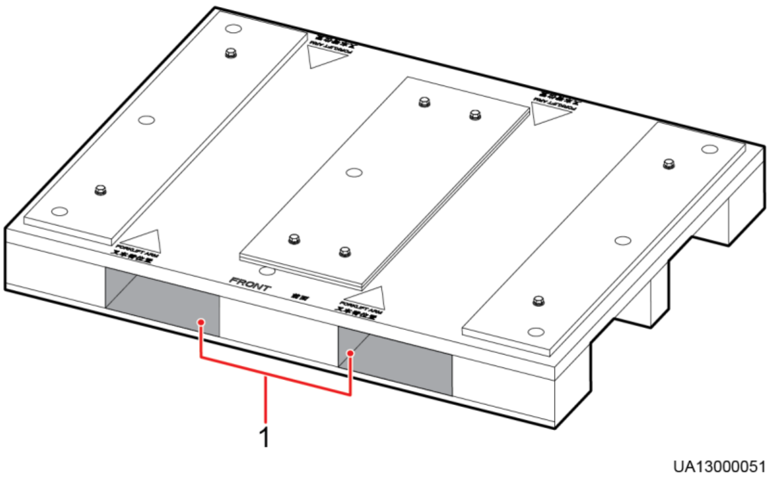
- Only trained personnel are allowed to move the UPS. Use a pallet truck to transport the UPS box secured to a wooden support to the installation position.
- To prevent the UPS from falling over, secure it to an electric pallet truck using ropes before moving it.
- To prevent shocks or falls, move the UPS gently. After placing the UPS in the installation position, unpack it and take 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** Visually inspect the UPS appearance for shipping damage. If any damage is found, report it to the carrier immediately.

**Step 2** Use an electric pallet truck to transport the UPS to the installation position. Special design is adopted for the pallet as the center of gravity of the UPS is in the power cabinet side. Figure 3-9 shows the pallet.

**Figure 3-9** Pallet




(1) Inserting position of forks

**Step 3** Remove the barrier chips around the cabinet packing materials, as shown in Figure 3-10.


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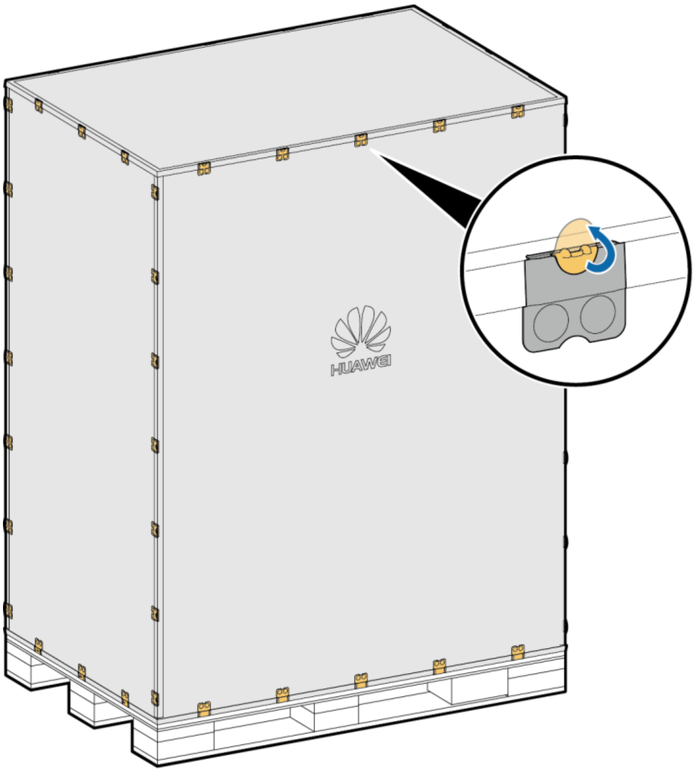
**Figure 3-10** Removing barrier chips




**Step 4** Remove the packing materials and foam, as shown in Figure 3-11.


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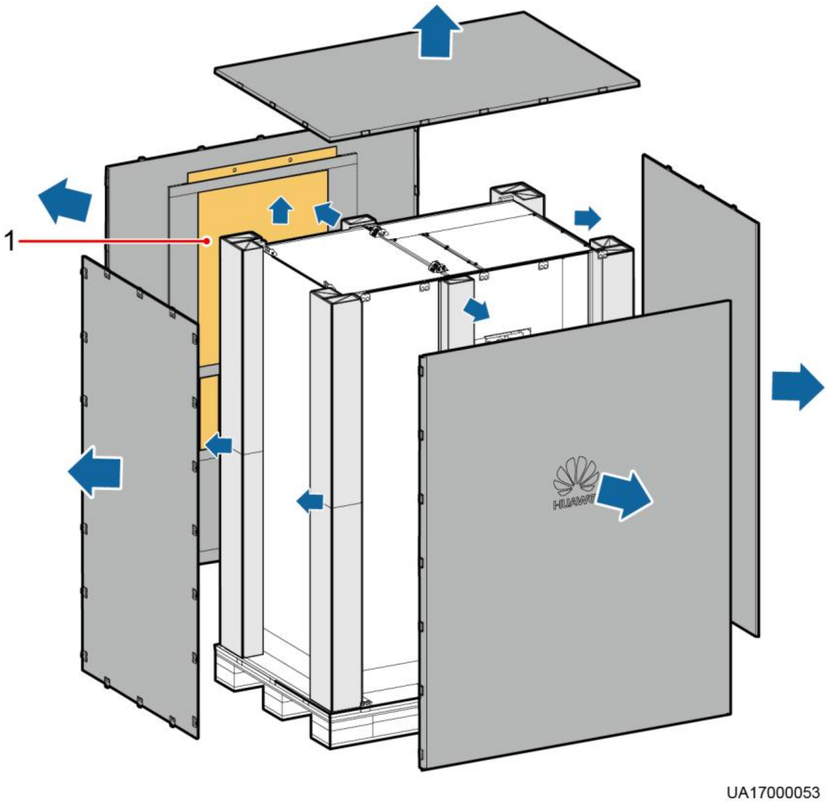
**Figure 3-11** Removing the packing materials and foam




(1) Marking-off template

**Step 5** Take out the marking-off template from the packing materials at the rear of the cabinet, as shown in Figure 3-11.

**Step 6** Remove the moisture-proof bag and take out the fitting box.

**Step 7** Check that the UPS is intact.

1. Visually inspect the UPS appearance for shipping damage. If it is damaged, notify the carrier immediately.
2. Check that the fittings comply with the packing list. If some fittings are missing or do not comply with the packing list, record the information and contact your local Huawei office immediately.

**Step 8** Remove the screws that secure the cabinet and pallet, as shown in Figure 3-12.


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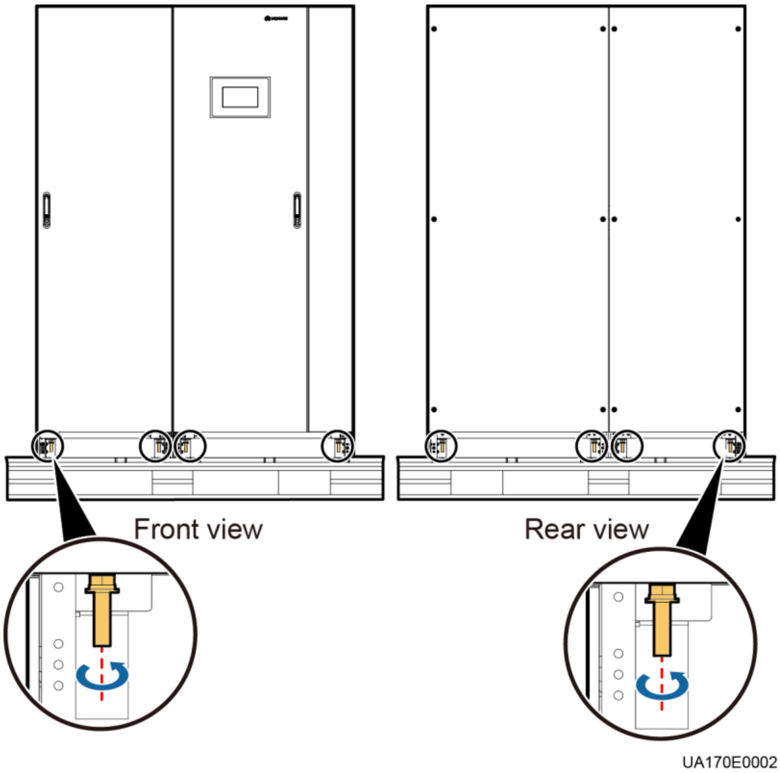
**Figure 3-12** Removing screws from the cabinet and pallet




**Step 9** Use an electric pallet truck to move UPS near the installation position.

**----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.


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**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.


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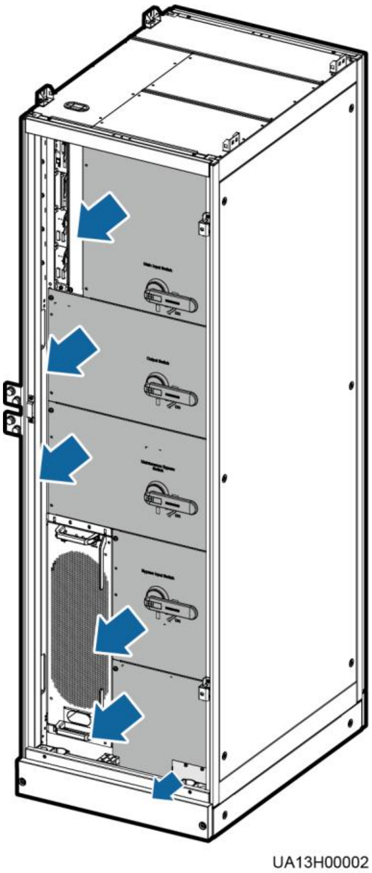
**Figure 3-13** Removing the covers of the power distribution subrack




**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 3-14 and Table 3-8, and cut off the cable ties on the disconnected cables.


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**Figure 3-14** Silk screens on the system signal interface board in the power cabinet

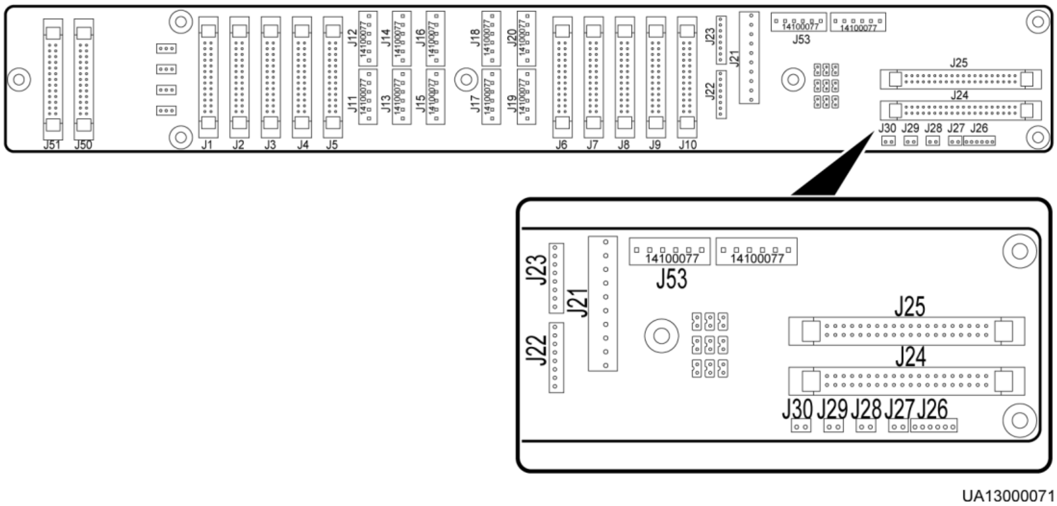


**Table 3-8** Mapping between cables and ports on the system signal interface board

| 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.


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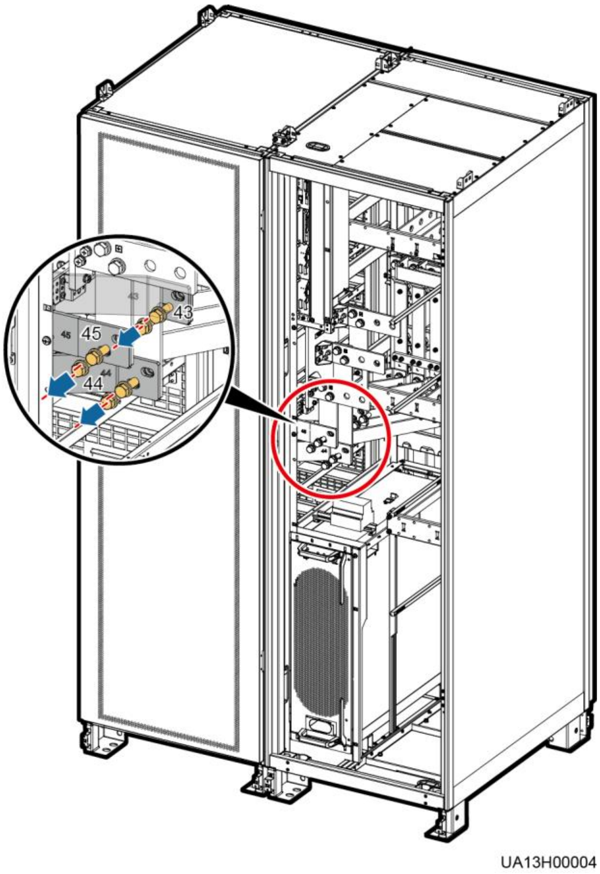
**NOTICE**

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 3-15** 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.


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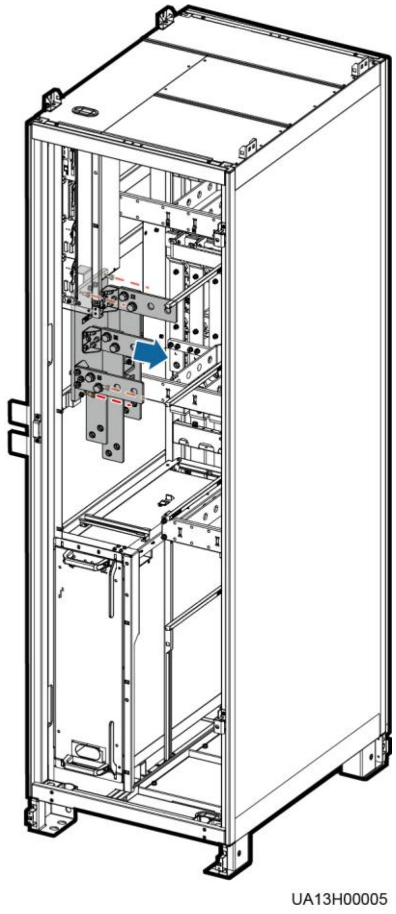
**Figure 3-16** Removing the battery copper bar component




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


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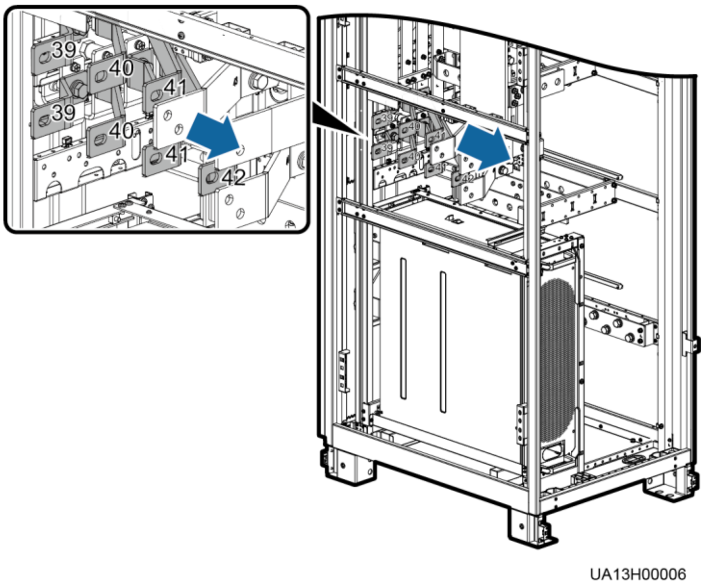
**Figure 3-17** Removing soft copper bars numbered 39–42




**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.


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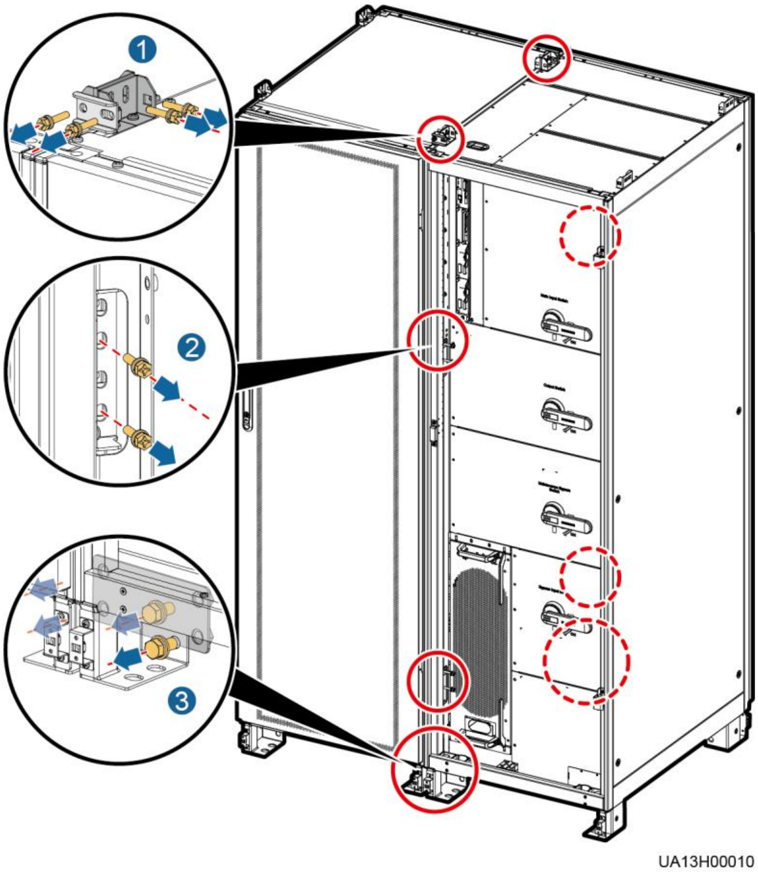
**Figure 3-18** Removing connecting plates




**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**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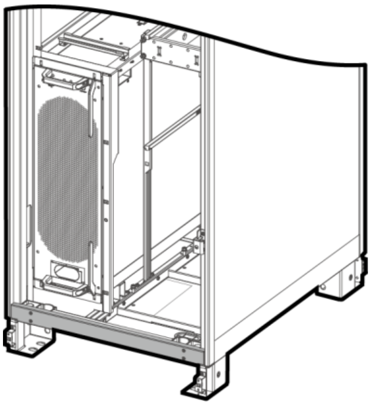
# 3.2 Single UPS Installation

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 3-19. Otherwise, the front door will not be properly closed.

**Figure 3-19** 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.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**NOTE**

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

**Figure 3-20** Mounting hole dimensions for the 400 kVA UPS and 500 kVA UPS (unit: mm)

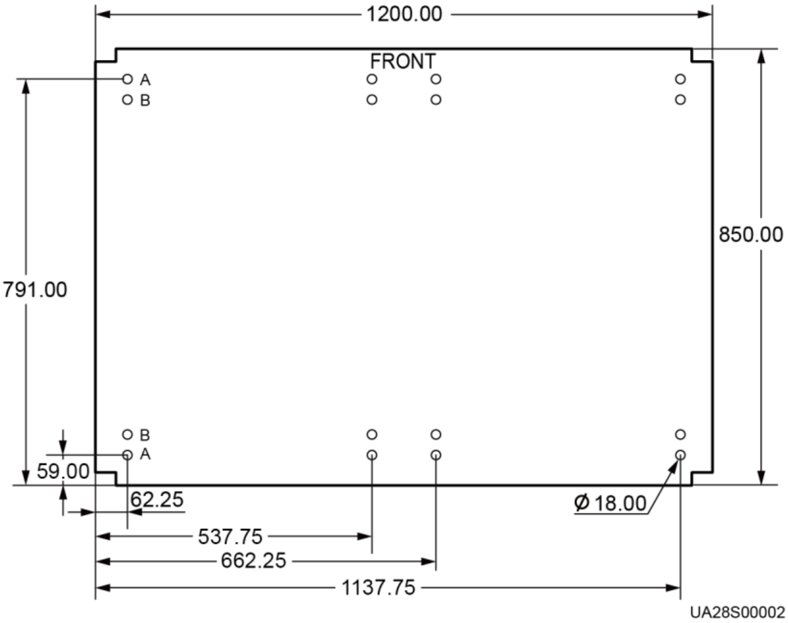
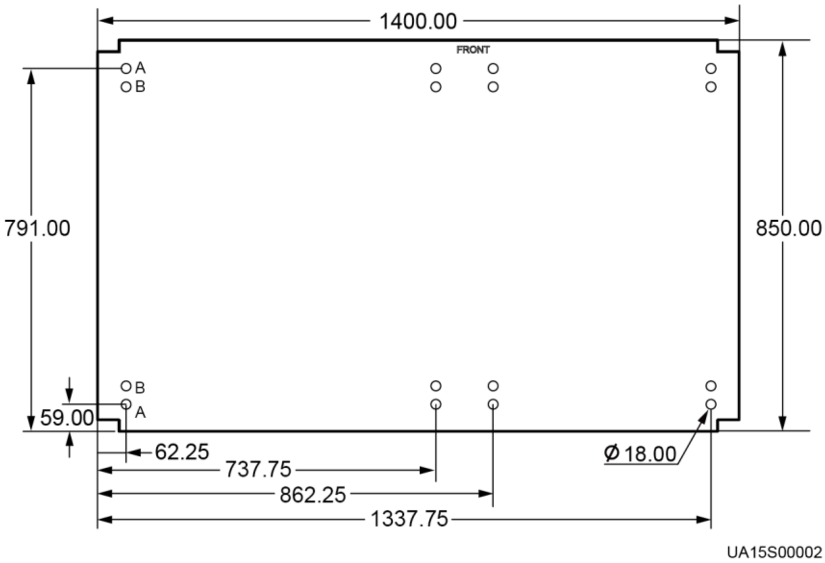



**Figure 3-21** Mounting hole dimensions for the 600 kVA UPS (unit: mm)




**Step 2** Use a hammer drill to drill holes for installing expansion bolts, and install expansion sleeves in the holes. Figure 3-22 shows expansion bolt composition. Figure 3-23 shows how to install an expansion bolt.


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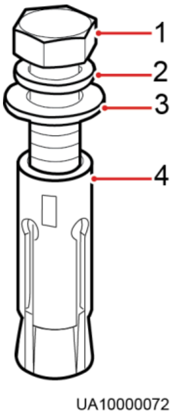
**Figure 3-22** Expansion bolt composition

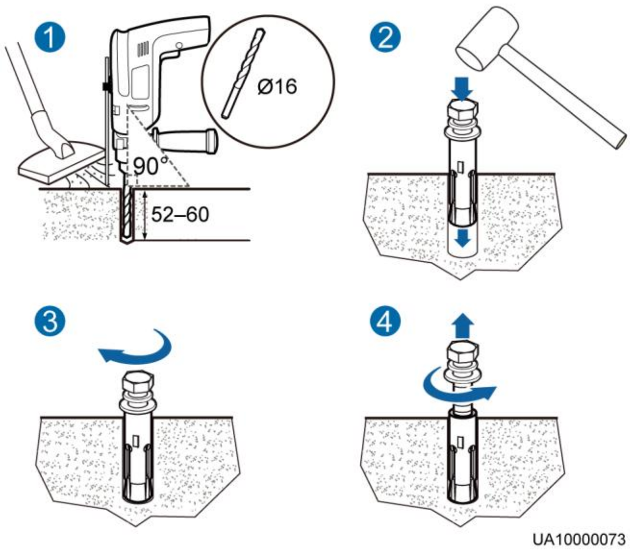



(1) M12 bolt (2) Spring washer (3) Flat washer (4) Expansion sleeve

**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 3-23** 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.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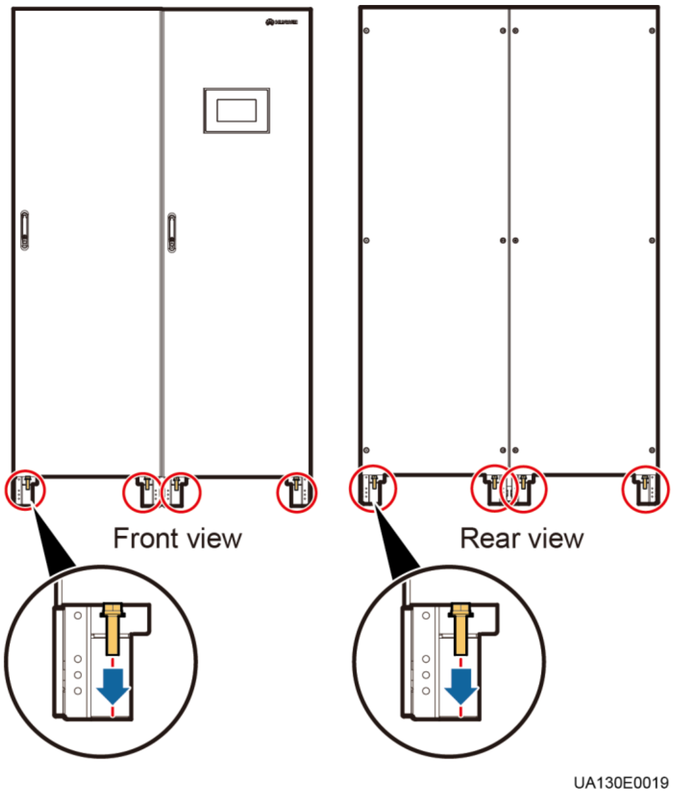
**Step 3** Use a pallet truck to move the cabinet to the installation position.

**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 3-24 shows how to secure a 400 kVA UPS cabinet.

**Figure 3-24** Tightening expansion bolts




**Step 5** Install the front, rear, left, and right anchor baffle plates. The installation methods for different UPS models are the same. Figure 3-25 shows how to install anchor baffle plates for a 400 kVA UPS cabinet.


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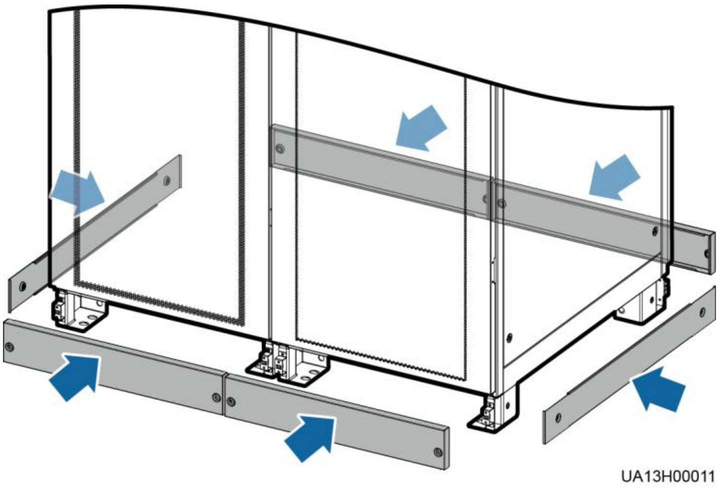
**Figure 3-25** Installing the front, rear, left, and right anchor baffle plates




**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 3-26 and Figure 3-27.

**Figure 3-26** Installing a lock for the maintenance bypass switch (400 kVA UPS, 500 kVA UPS)

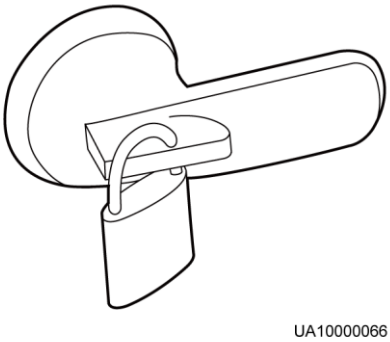
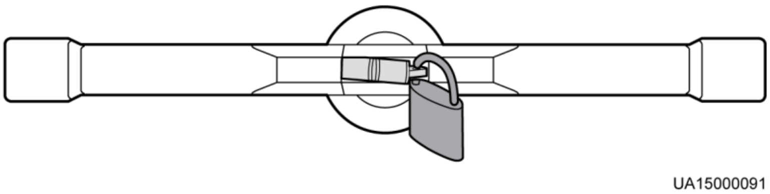



**Figure 3-27** Installing a lock for the maintenance bypass switch (600 kVA UPS)




**----End**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### 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 3-28** Mounting hole dimensions for the 400 kVA UPS and 500 kVA UPS (unit: mm)

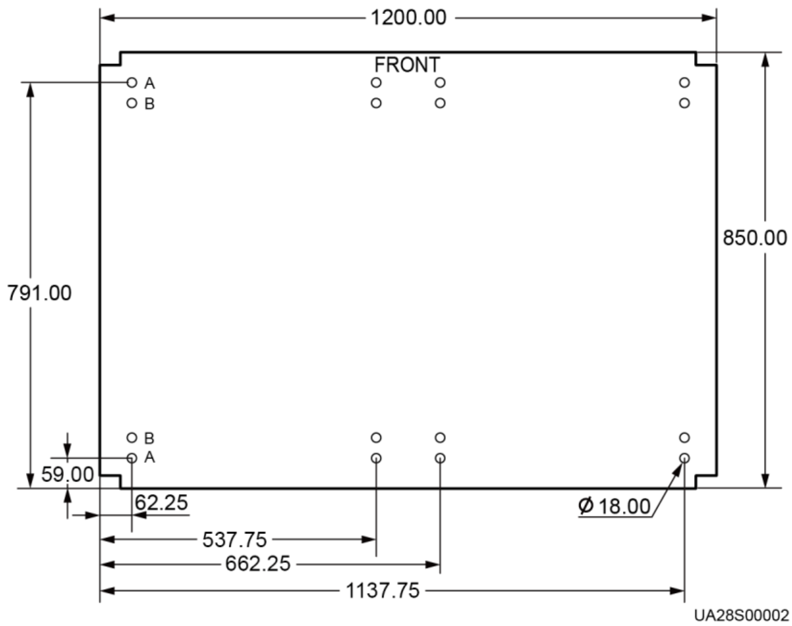



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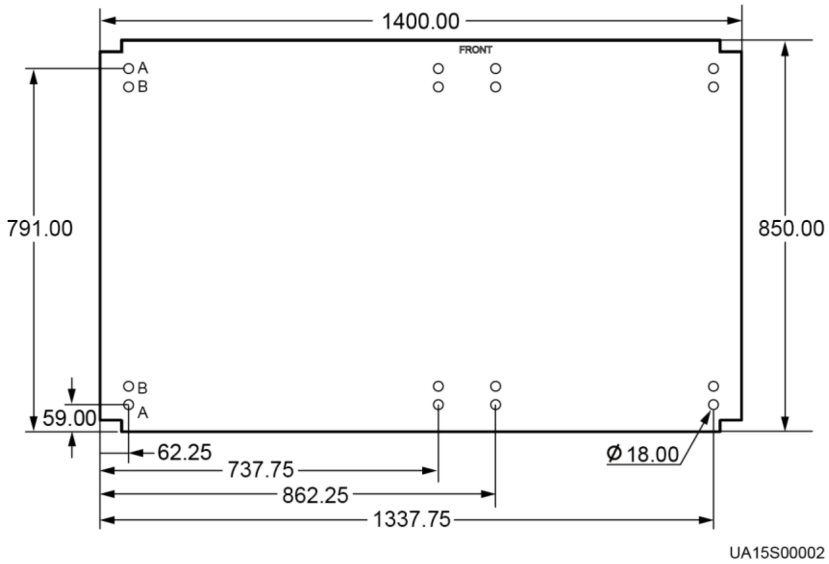
**Figure 3-29** Mounting hole dimensions for the 600 kVA UPS (unit: mm)




**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 M12x45 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


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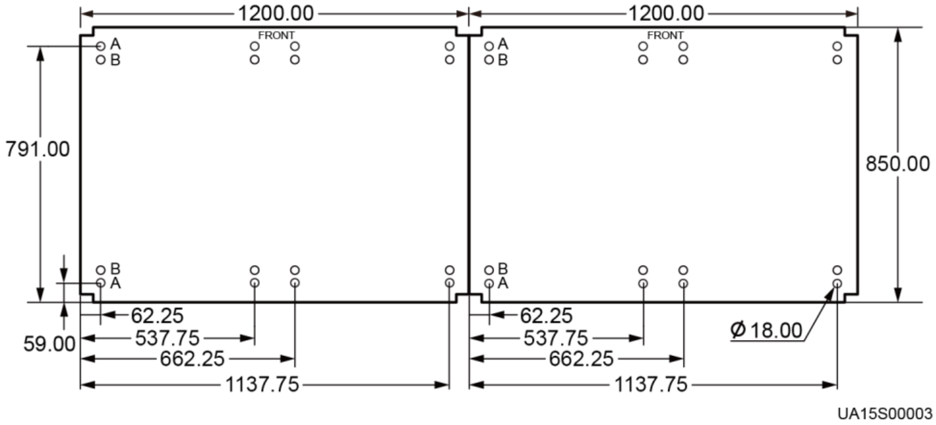
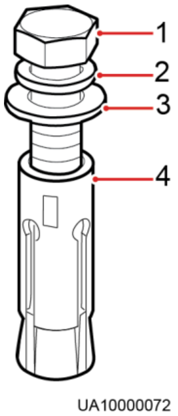
**Figure 3-30** Hole dimensions (unit: mm)




**Step 2** Use a hammer drill to drill holes for installing expansion bolts, and install expansion sleeves in the holes. Figure 3-31 shows expansion bolt composition. Figure 3-32 shows how to install an expansion bolt.

**Figure 3-31** 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.


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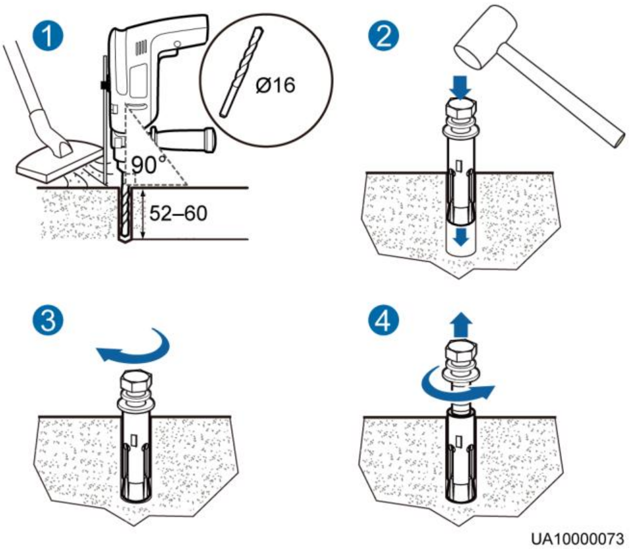
**Figure 3-32** Installing an expansion bolt (unit: mm)




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 (N m) | Remarks |
|---|---|---|---|---|---|
| Bottom connecting plate | 2 | M12x25 | 8 | 47 | • Fittings are delivered with the UPS. You can see the fittings after unpacking the bypass cabinet.<br>• The two soft copper bars are numbered 52.<br>• If holes are drilled for routing cables at the top of the cabinet, attach grommet strips on the hole edges to protect |
| Top connecting plate | 2 | M6x30 | 8 | 3 | |
| Soft connecting copper bar | 2 | M12x45 | 10 | 47 | |
| Grommet | N/A | N/A | N/A | N/A | |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| Mounting Fitting | Number of Fittings | Screw Specifications | Number of Bolts (PCS) | Torque (N·m) | Remarks |
|---|---|---|---|---|---|
| strip | | | | | cables. |
| Middle connecting plate | 2 | M6x30 | 4 | 3 | 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.

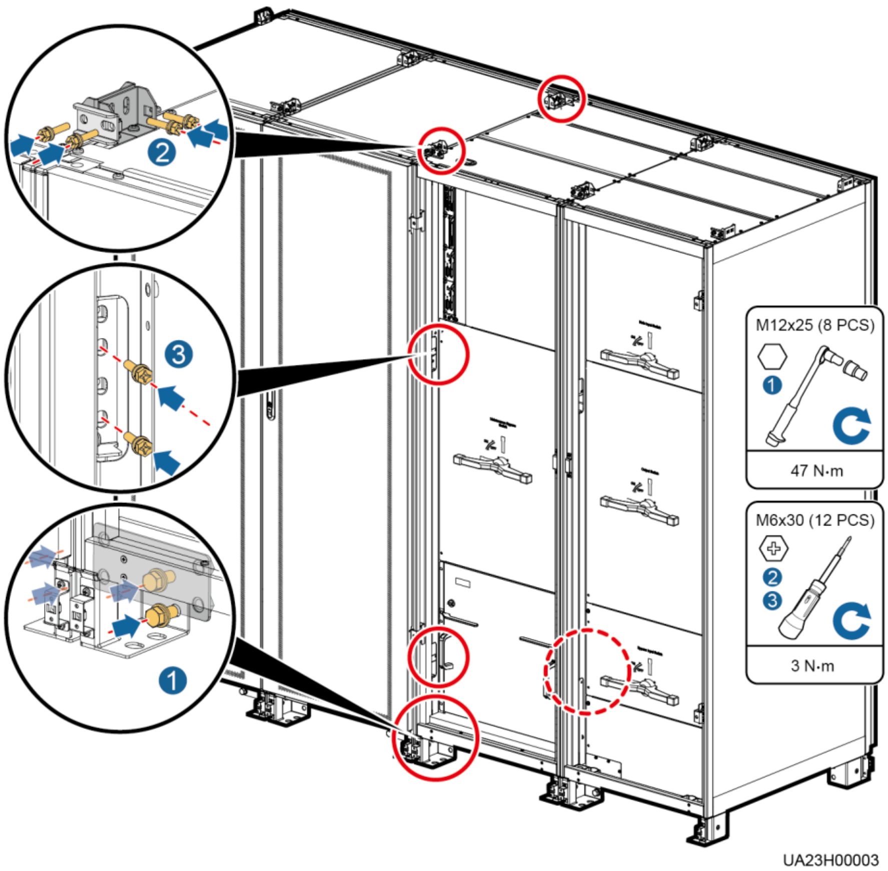
**NOTE**

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 3-33** Installing connecting plates




**Step 4** Use M12x60 expansion bolts to secure the cabinets to the expansion bolt holes on the ground. Figure 3-34 shows how to secure the power cabinets.


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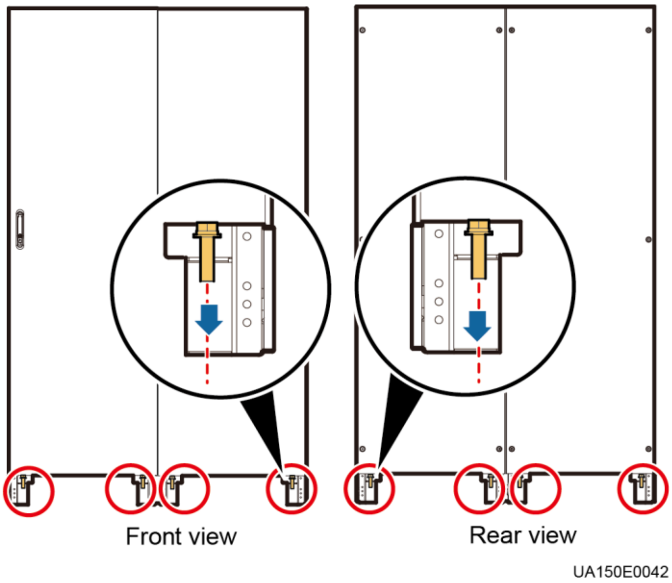
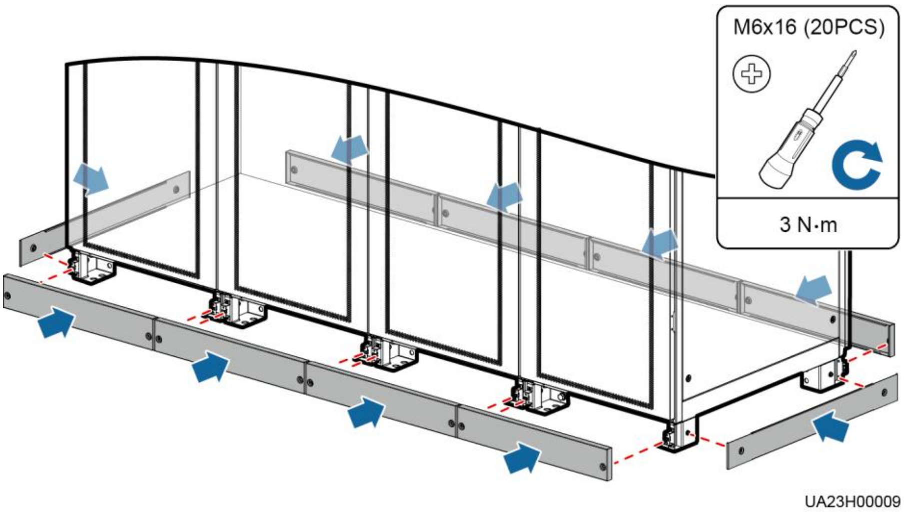
**Figure 3-34** Tightening expansion bolts




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

**Figure 3-35** 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 3-36.

**NOTE**

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


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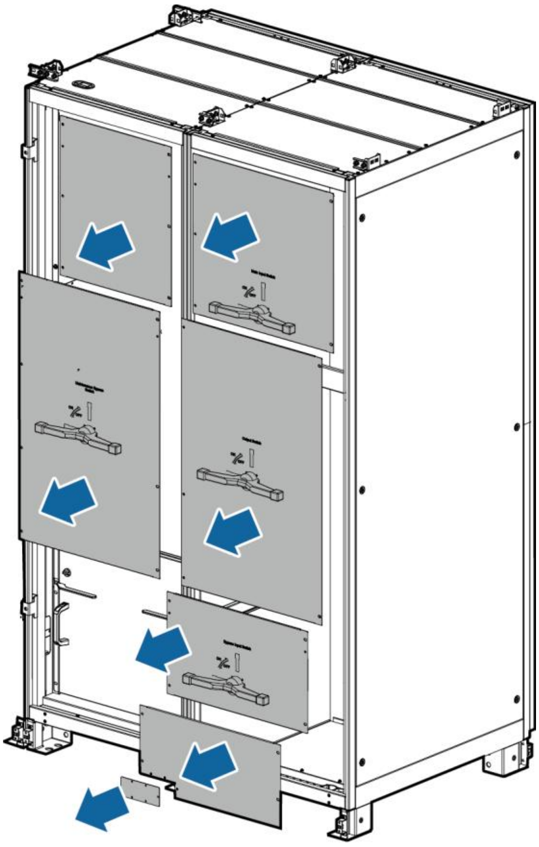
**Figure 3-36** Removing the front covers of the power distribution subrack




**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 3-37. Insert the switch extension rod to the blue mark, put washers, and tighten the slotted screw to reinstall the switch extension rod.


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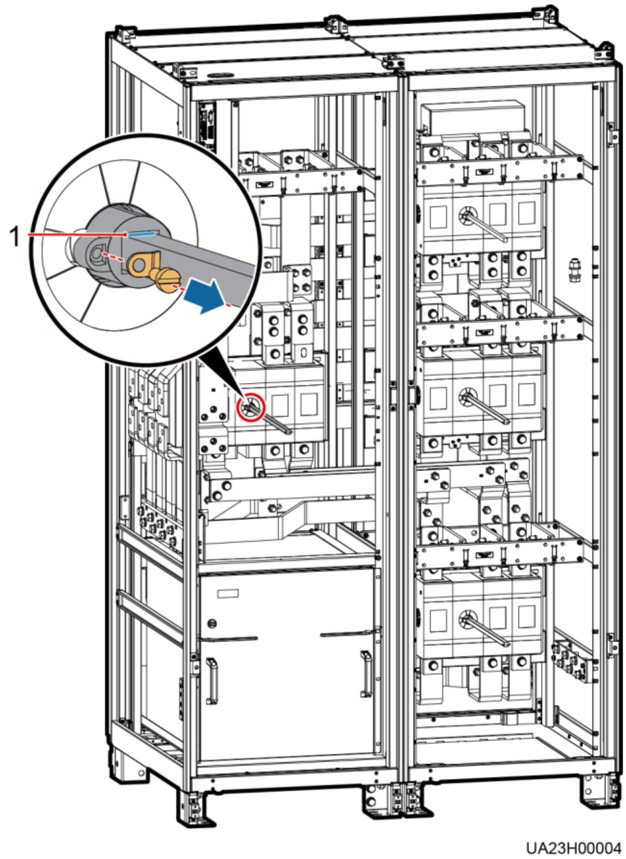
**Figure 3-37** Removing the switch extension rod




(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 3-38.


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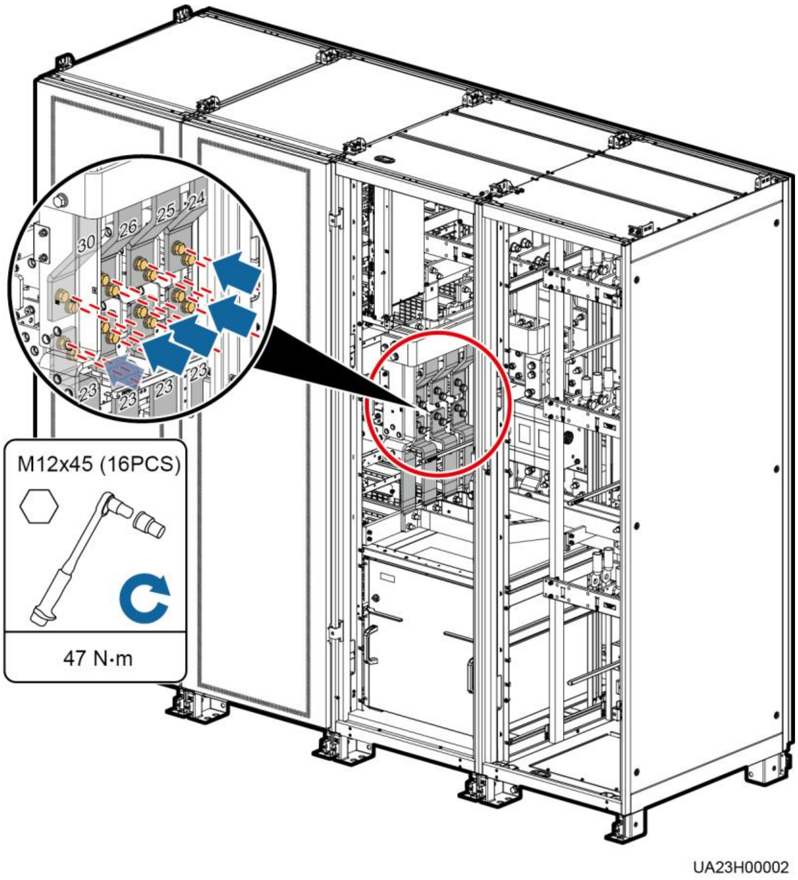
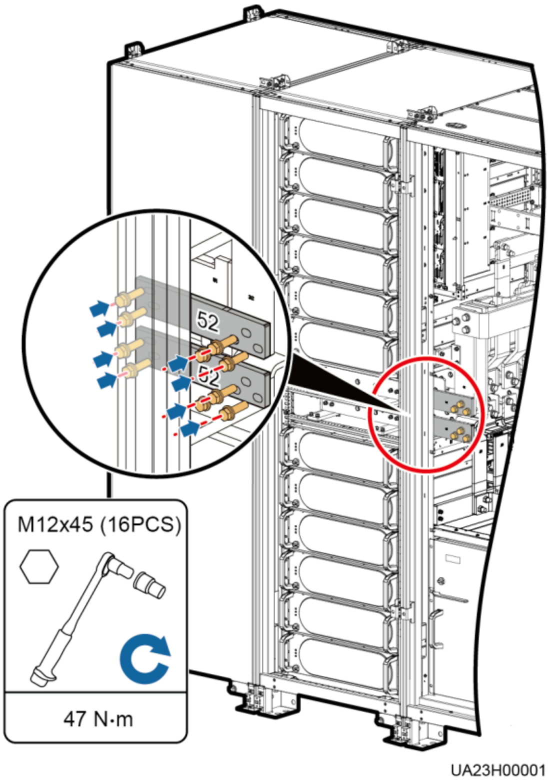
**Figure 3-38** Securing soft copper bars




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 3-39.

**Figure 3-39** 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 3-40. 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 3-41 shows cable connections for combined cabinets.


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**Figure 3-40** Silk screens on the system signal interface board in power cabinet 1

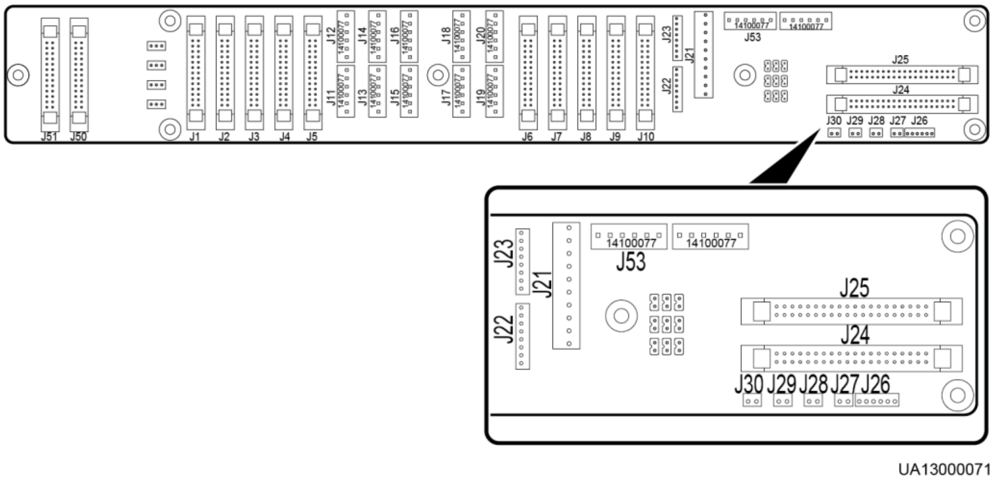


**Table 3-10** Mapping between the cables in the bypass cabinet and the ports on the system signal interface board in power cabinet 1

| 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 | • Full configuration: 04091625-06<br>• Standard configuration: SW1310 | 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.


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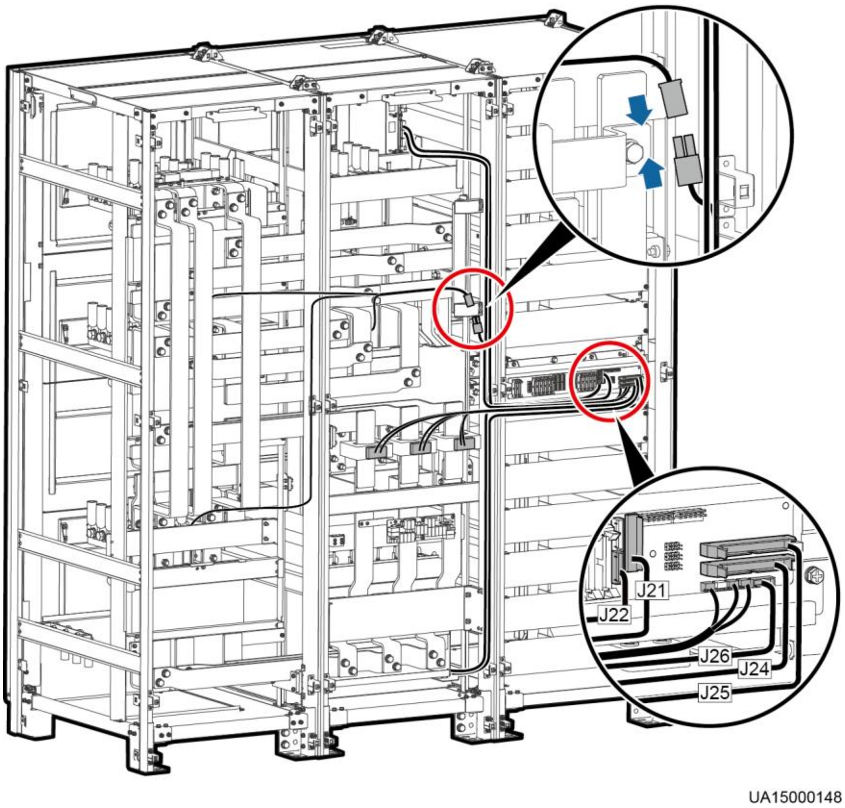
**Figure 3-41** Connecting cables for combined cabinets




**----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


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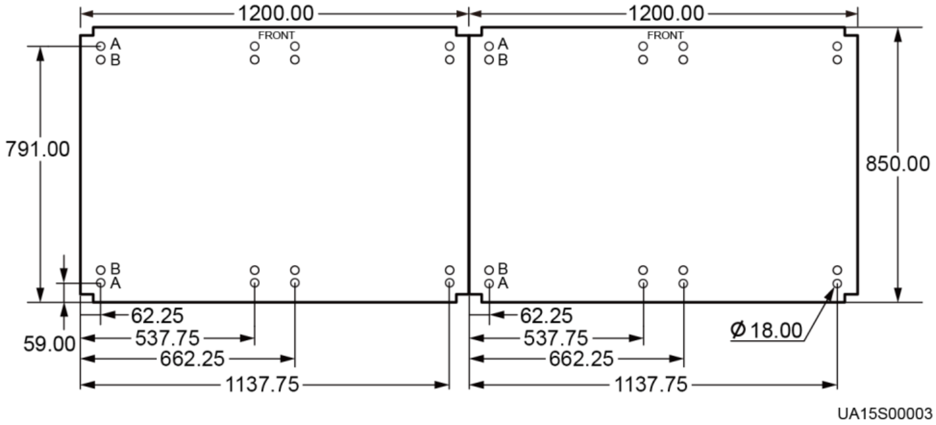
**Figure 3-42** Hole dimensions (unit: mm)




**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 M12x45 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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**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 3-43 to Figure 3-45 show the dimensions of antiseismic kit mounting holes.


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**Figure 3-43** Dimensions of antiseismic kit mounting holes for the 400 kVA UPS and 500 kVA UPS (unit: mm)

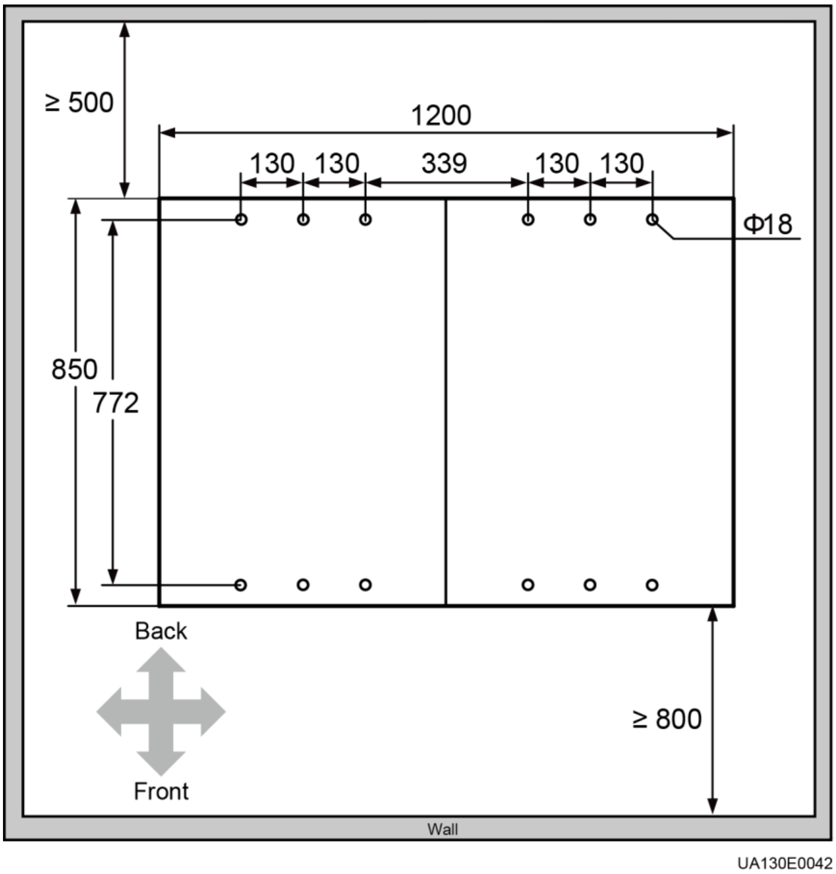



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**Figure 3-44** Dimensions of antiseismic kit mounting holes for the 600 kVA UPS (unit: mm)

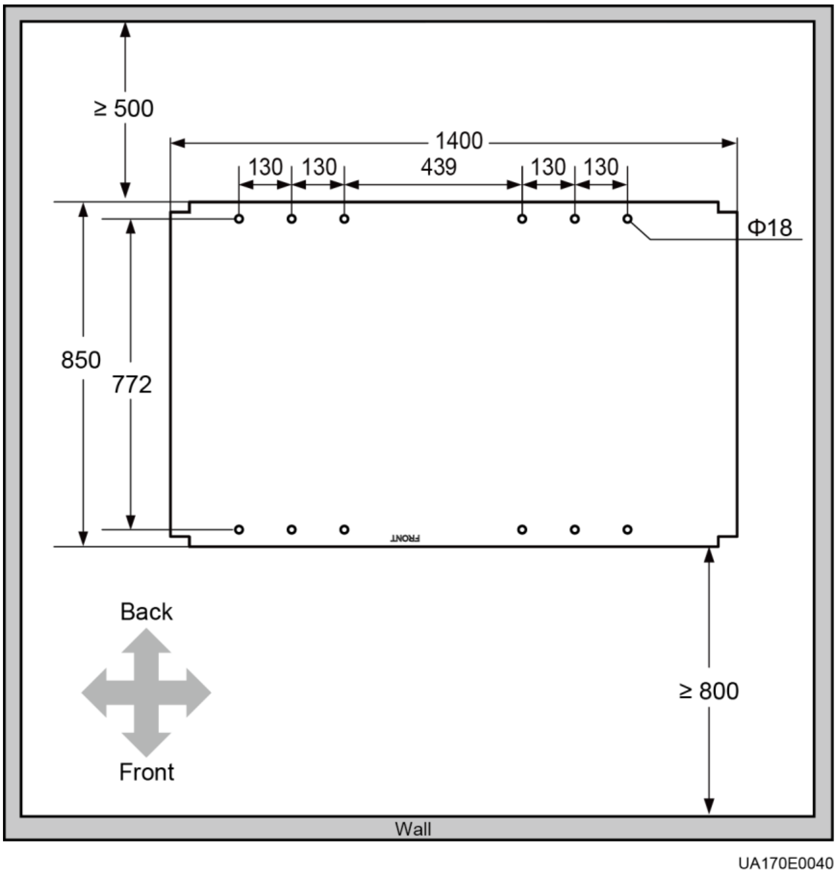
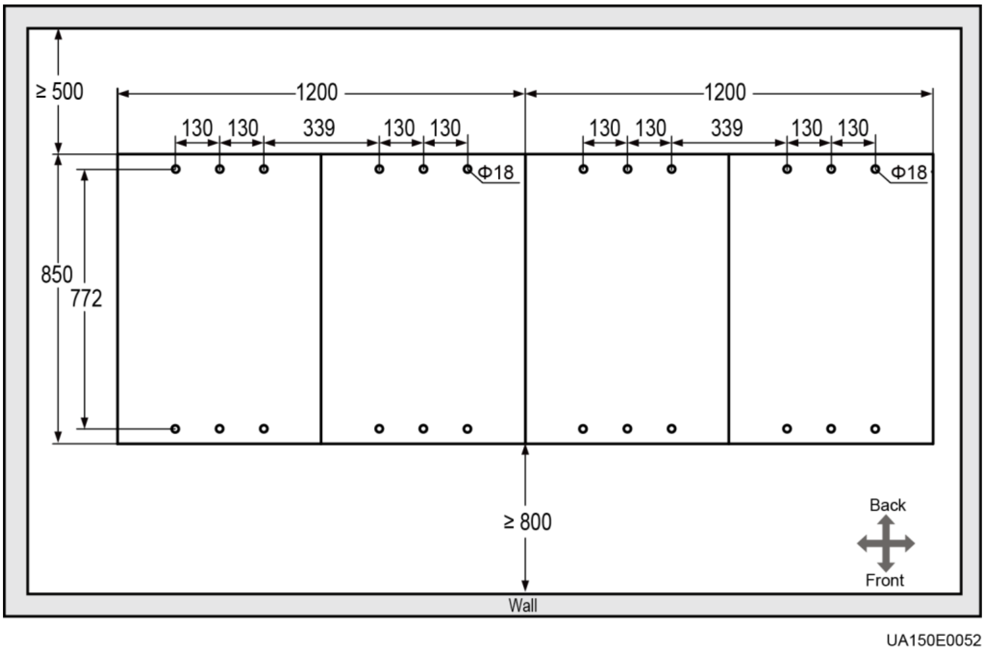



**Figure 3-45** Dimensions of antiseismic kit mounting holes for the 800 kVA UPS (unit: mm)





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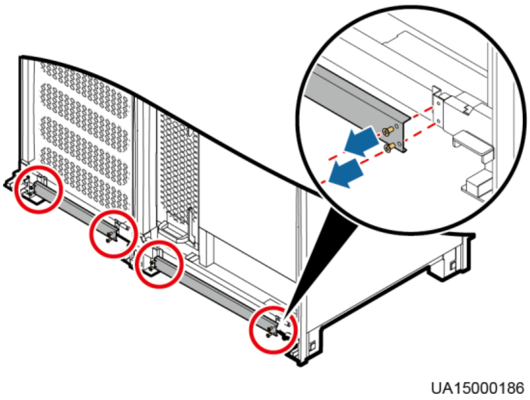
**Step 2** Drill holes for installing expansion bolts, and install expansion sleeve.

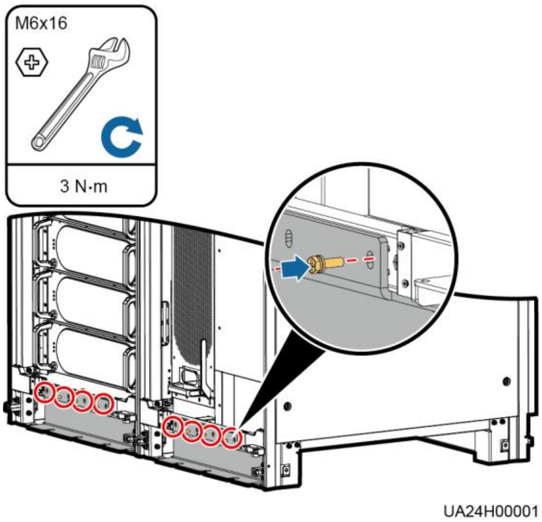
**Step 3** Open the front door of the cabinet and remove the support baffle plates from the front of the cabinet. The methods of removing baffle plates for different UPS models are the same. Figure 3-46 shows how to remove support baffle plates for a 600 kVA UPS. Remove the rear cover.

**Figure 3-46** Removing support baffle plates




**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 3-47 shows how to install antiseismic kits for a 600 kVA UPS.

**Figure 3-47** Securing the antiseismic kits to the cabinet




**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 3-48 shows how to lock antiseismic kits for a 600 kVA UPS.


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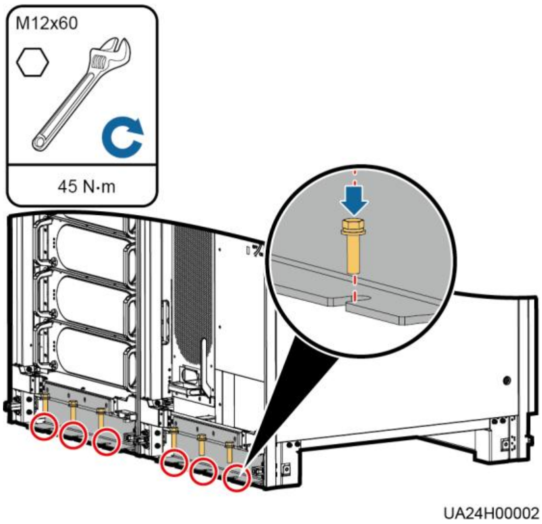
**Figure 3-48** Locking the antiseismic kits to the ground




**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

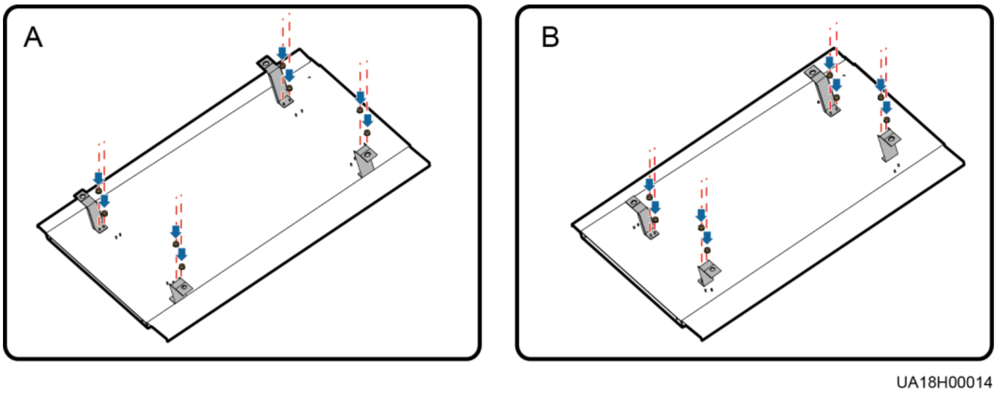
### Procedure

**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 3-49** Installing leveling feet




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


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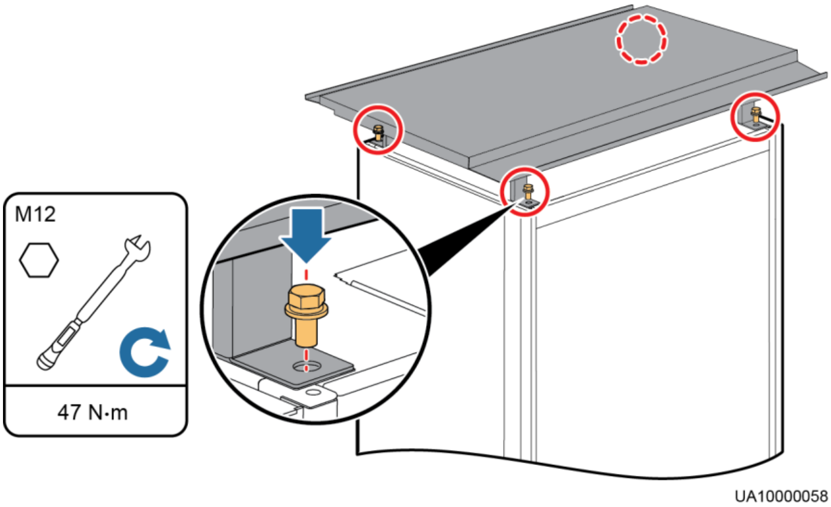
**Figure 3-50** Installing the IP21 component



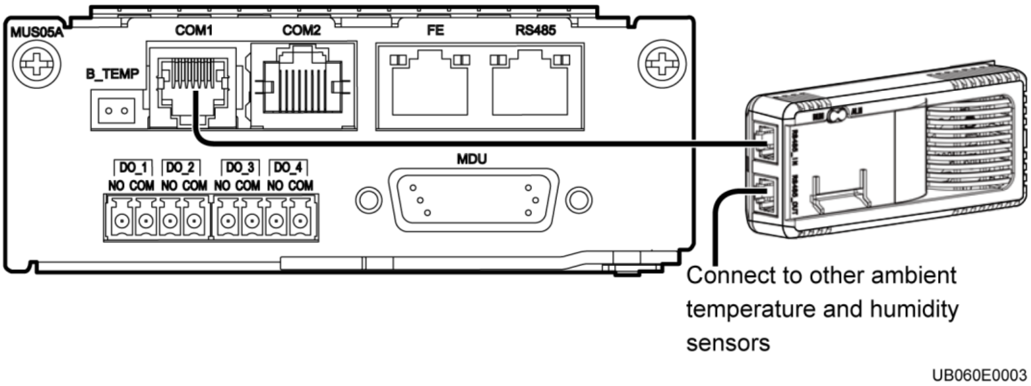

**----End**

### 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 3-51** Connecting a UPS and an ambient T/H sensor




**NOTE**

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

**----End**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### 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 $1 \text{ h} \leq$ backup time $< 3$ h, EOD is 1.75 V/cell.
3. If backup time $\geq 3$ 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*.


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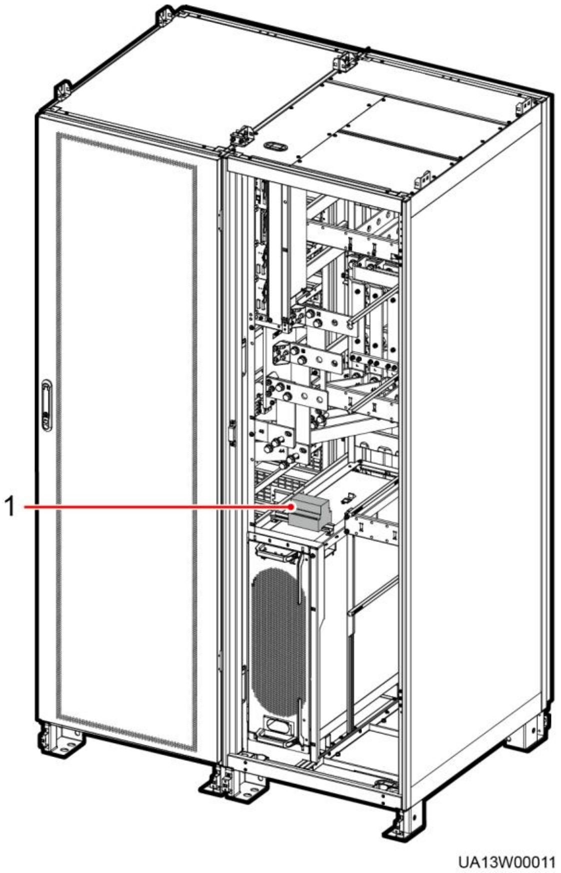
**Figure 3-52** Position of a battery grounding failure detector in the 400 kVA, 500 kVA, or 600 kVA UPS




(1) Battery grounding failure detector


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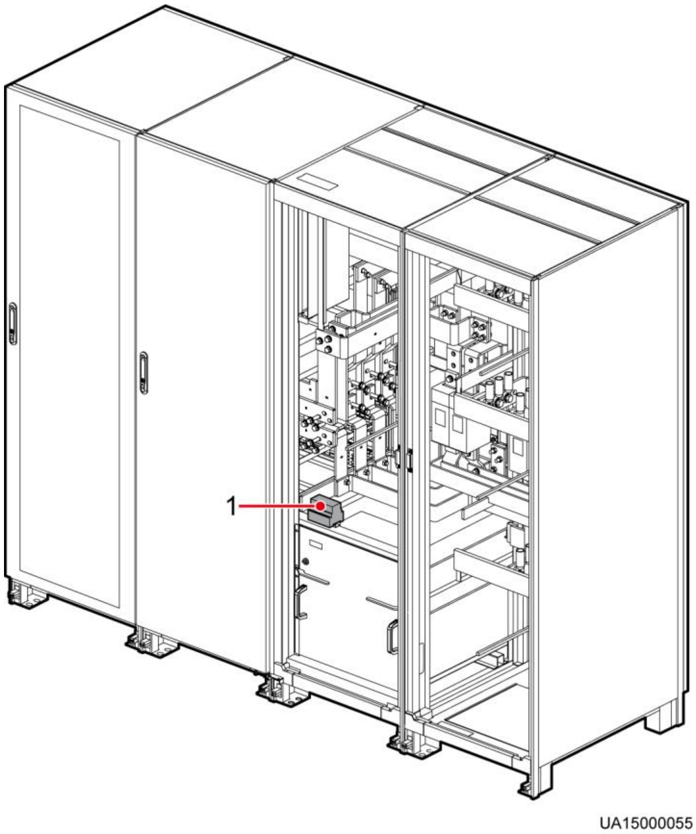
**Figure 3-53** Position of a battery grounding failure detector in the 800 kVA UPS




(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. For details, see *iBAT 2.0-CIM01C2 Quick Guide*.


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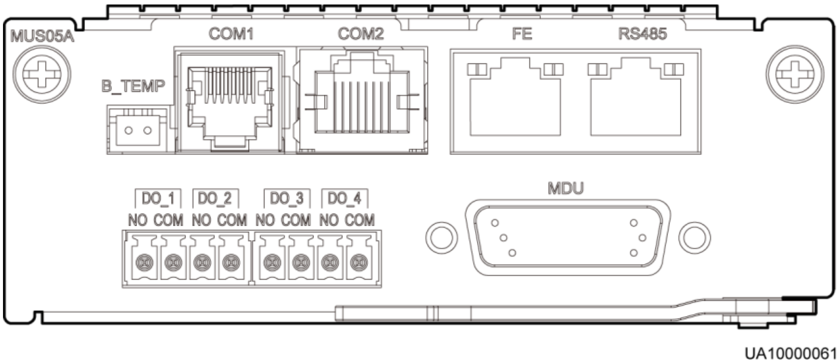
**Figure 3-54** COM2 port




**----End**

# 3.2.5 UPS Cable Connection Reference

## Context

CAUTION

- 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.


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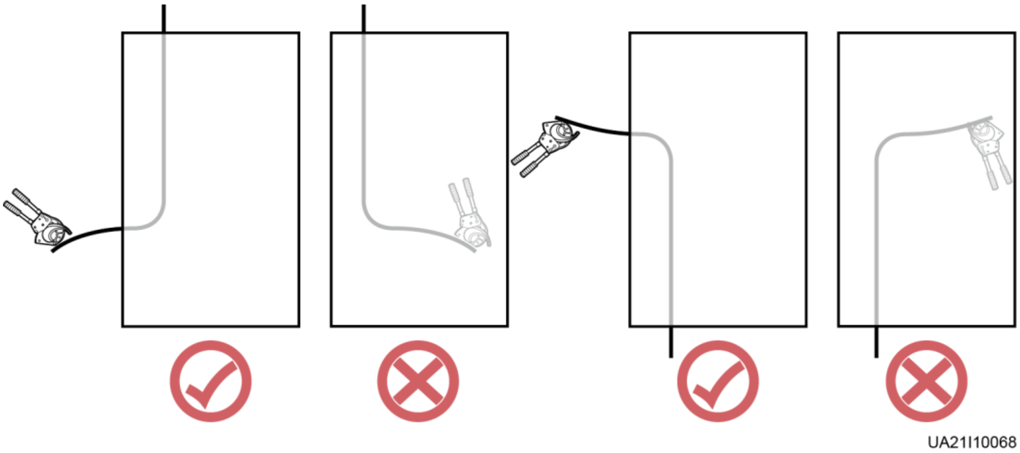
**Figure 3-55** Preparing a cable terminal outside the cabinet




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)

## 3.2.6.1 Top Cable Routing

### Context

NOTICE

- Route cables through holes, remove the power cable cover, spare power cable cover and battery cable cover and drill holes. After you drill holes, paste grommet strip to the hole edge to protect cables. Reinstall the covers on the cabinet.
- 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.
- The figures are for reference only. For more information about the recommended cable cross-sectional area and quantity, refer to 3.1.3 Power Cables and site requirements.
- 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.

Figure 3-56 and Figure 3-57 show power cable terminals.


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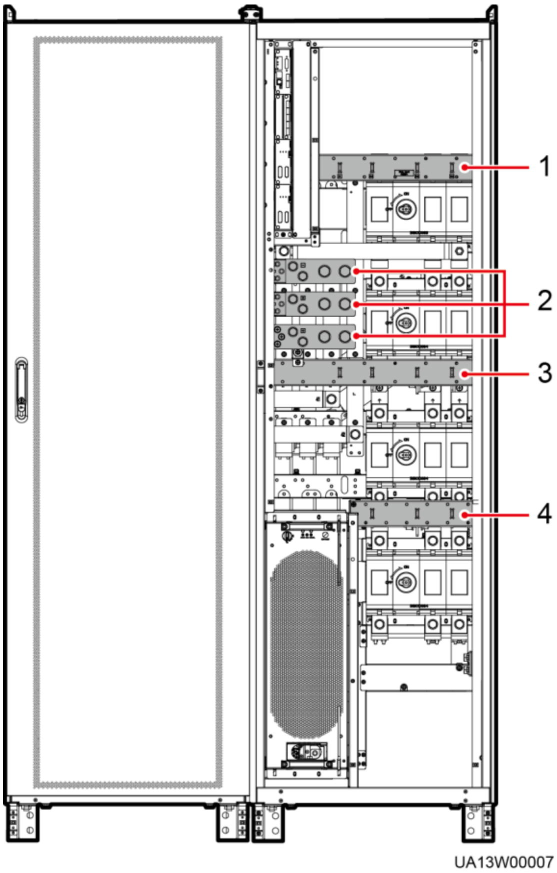
**Figure 3-56** Power distribution module (400 kVA UPS, 500 kVA UPS)




| | | | |
|---|---|---|---|
| (1) Mains input terminal | (2) Battery input terminal | (3) Output terminal | (4) Bypass input terminal |


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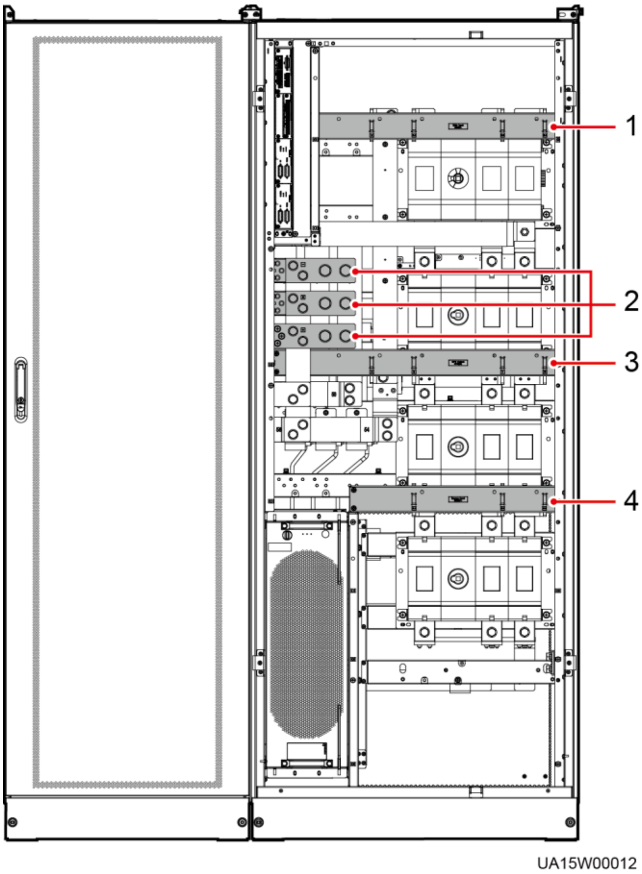
**Figure 3-57** Power distribution module (600 kVA UPS)




| | | | |
|---|---|---|---|
| (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, as shown in Figure 3-58.


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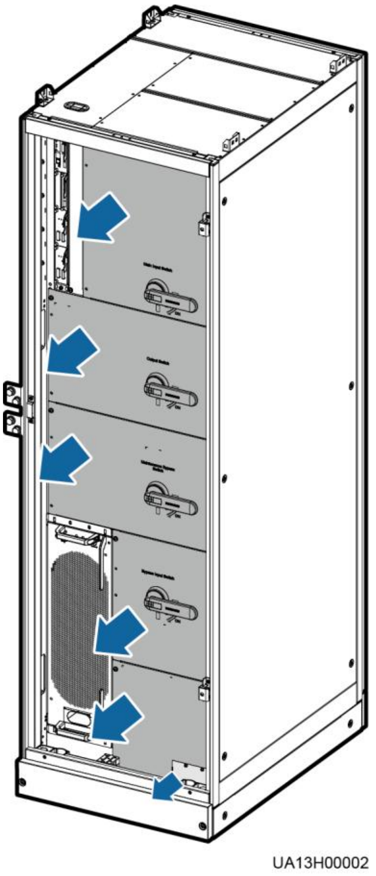
**Figure 3-58** Removing the covers of the power distribution subrack




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

**NOTE**

The hole diameter and quantity are for reference only.


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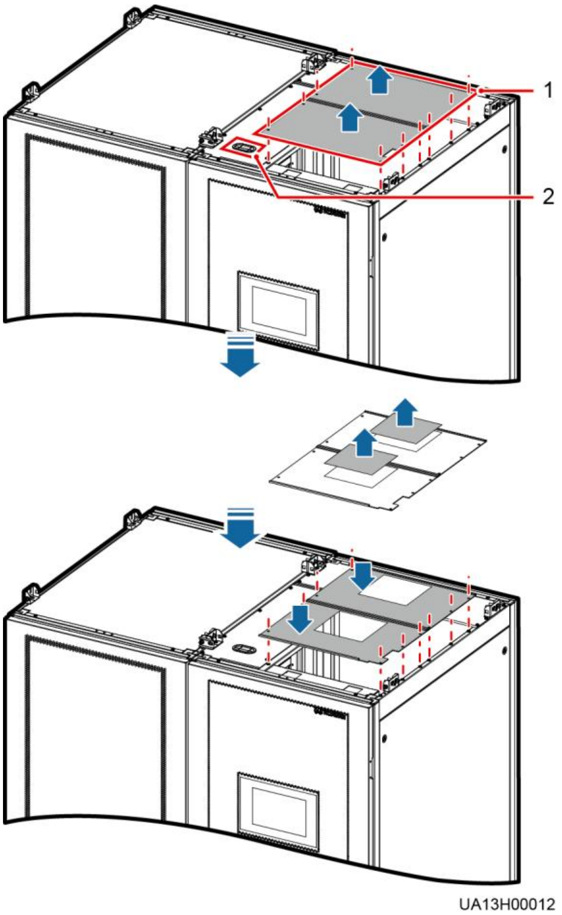
**Figure 3-59** Removing the top cable covers and drilling holes




(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.


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**Figure 3-60** Removing the copper bar protective covers at the rear

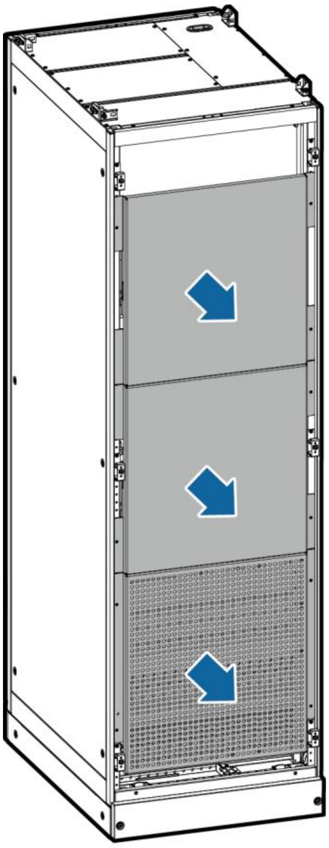



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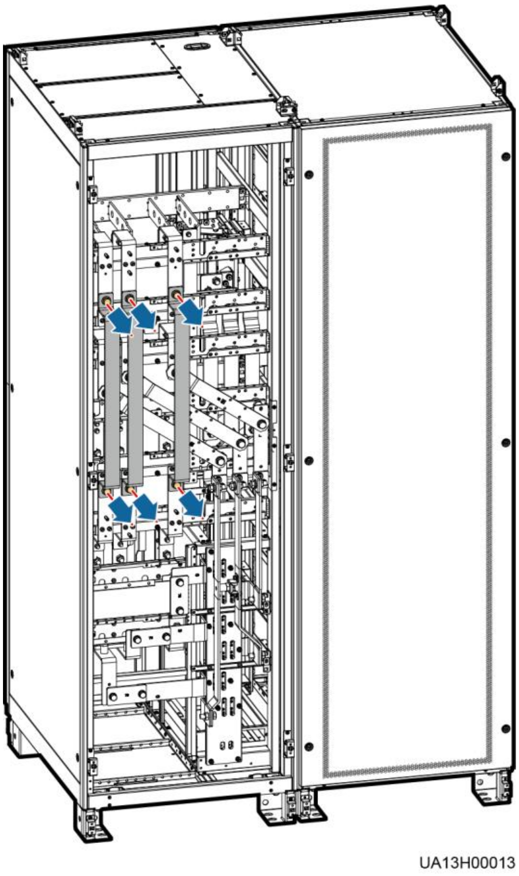
**Figure 3-61** Removing the connecting copper bars




**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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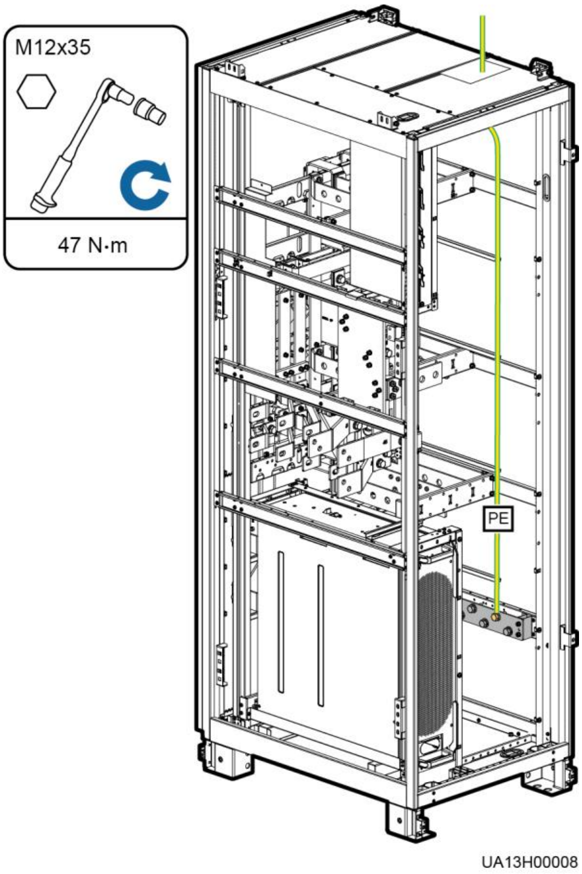
**NOTICE**

- 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 3-62** Ground cable




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


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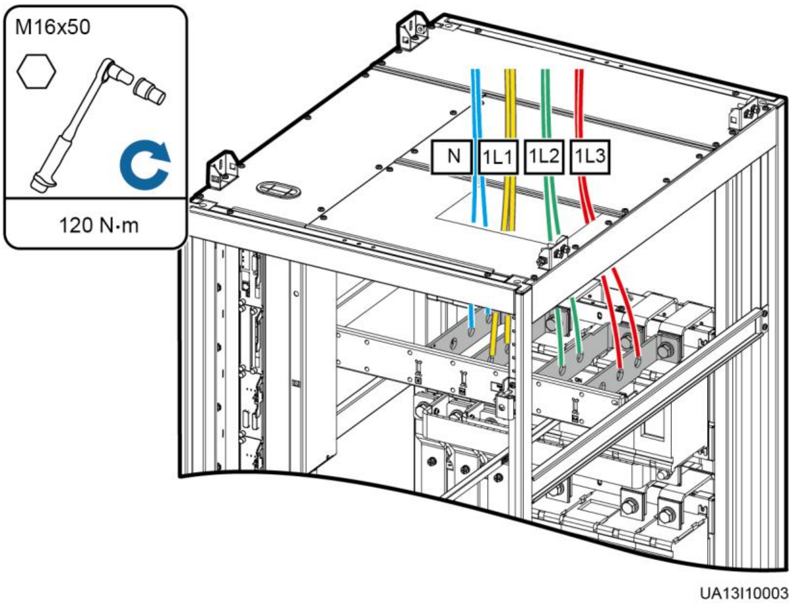
**Figure 3-63** Connecting the mains input power cables




**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.


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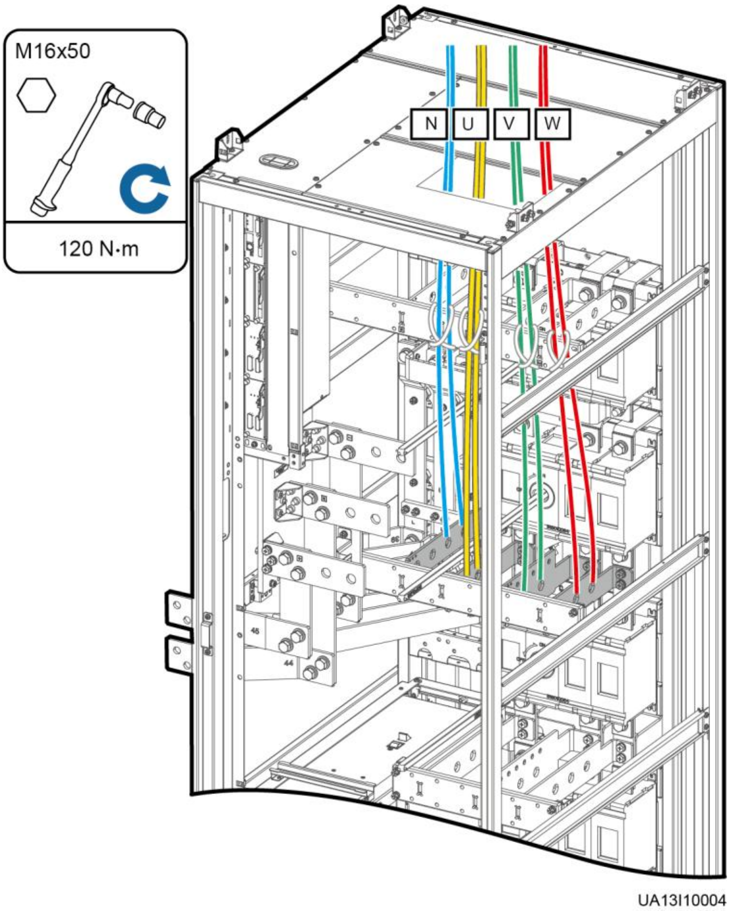
**Figure 3-64** Connecting AC output power cables




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


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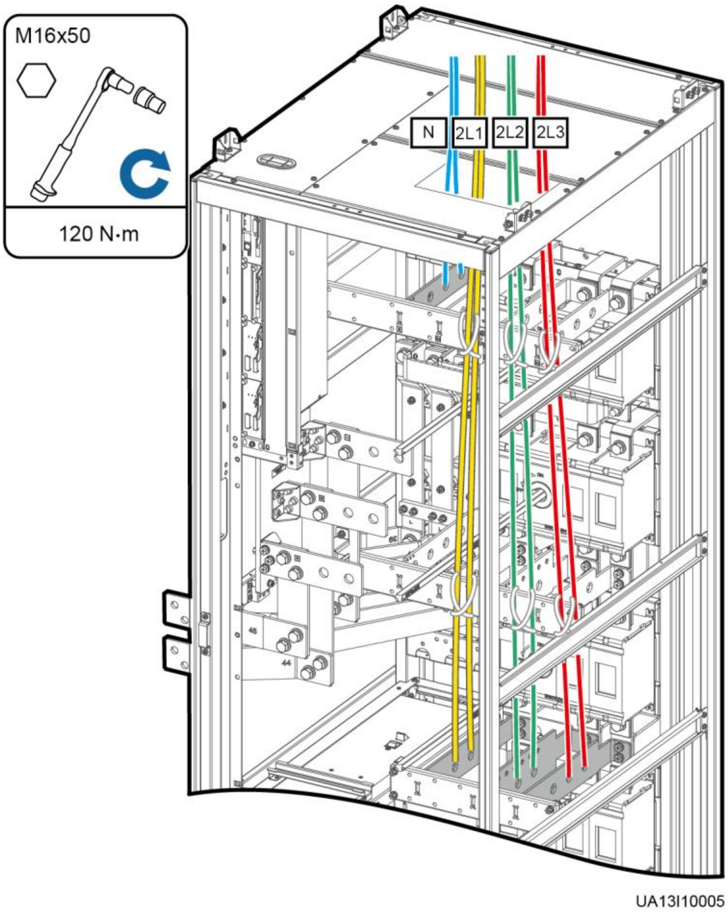
**Figure 3-65** Connecting the bypass input power cables




**Step 9** Connect the battery cables.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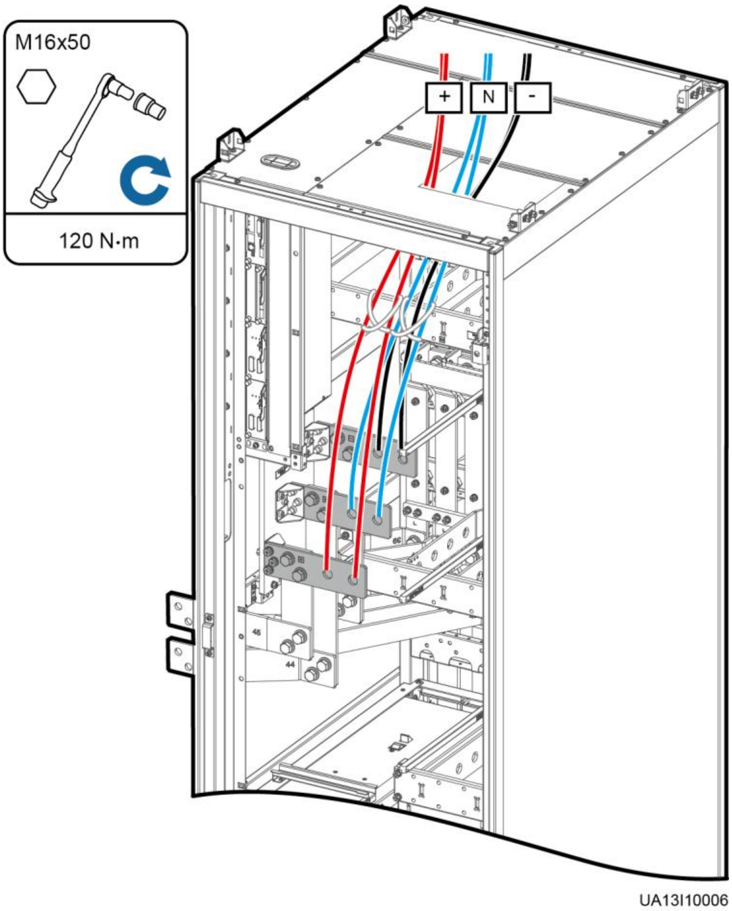
**DANGER**

- 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 3-66** 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.


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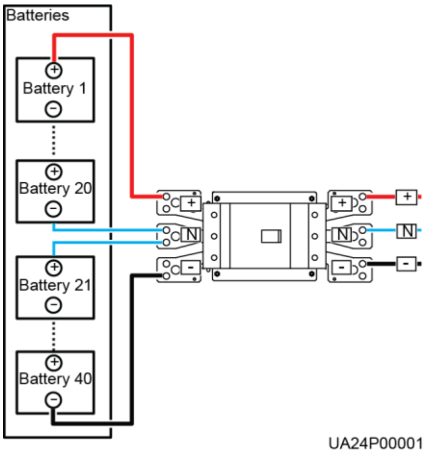
**Figure 3-67** Neutral wire




**Step 10** Route signal cables. Bind cables to the cabinet. Figure 3-68 shows the signal cables routed from the top of the cabinet.

**NOTICE**

Bind signal cables and power cables separately.


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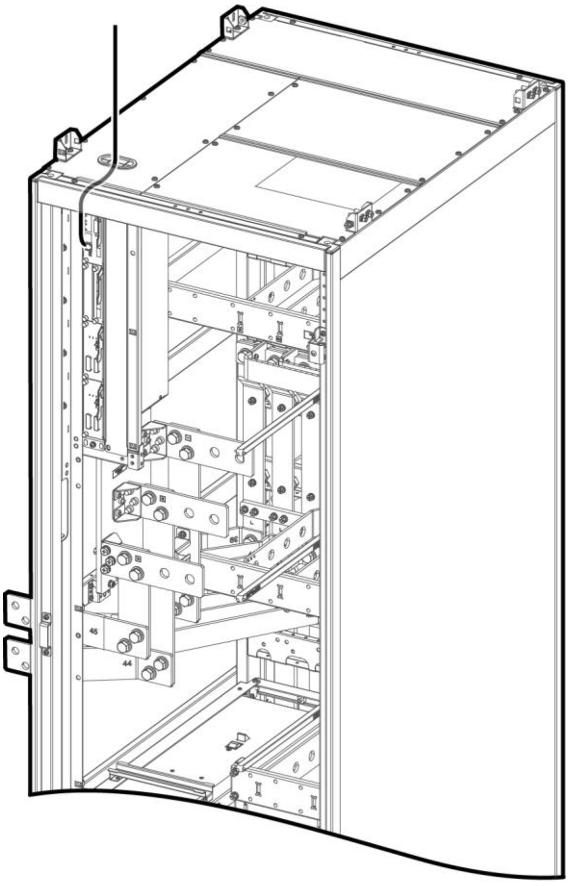
**Figure 3-68** Routing signal cables from the top of the cabinet




NOTE

The number and colors of signal cables in Figure 3-68 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

## Context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**NOTICE**

- If you choose to route cables from the bottom of the cabinet, ensure sufficient space at the bottom of the cabinet.
- 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.
- The figures are for reference only. For more information about the recommended cable cross-sectional area and quantity, refer to 3.1.3 Power Cables and site requirements.
- 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.

Figure 3-56 and Figure 3-57 show power cable terminals.

## Procedure

**Step 1** Open the front door of the bypass cabinet, and remove the covers of the power distribution subrack from the bypass cabinet, as shown in Figure 3-58.

**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.


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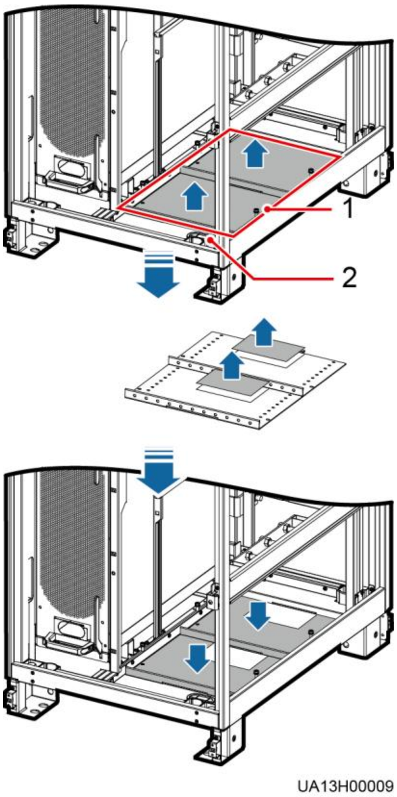
**Figure 3-69** Removing the bottom cable covers and drilling holes




(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, as shown in Figure 3-61. (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 3-60 shows how to remove the protective covers.

**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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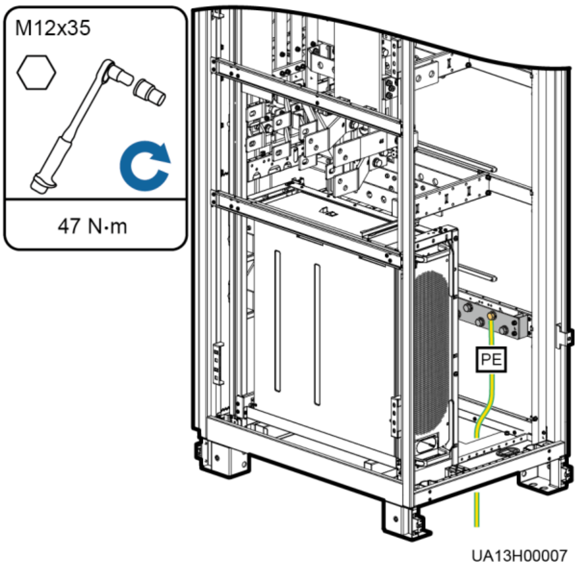
**NOTICE**

- Connect cables from 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 3-70** Grounding




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


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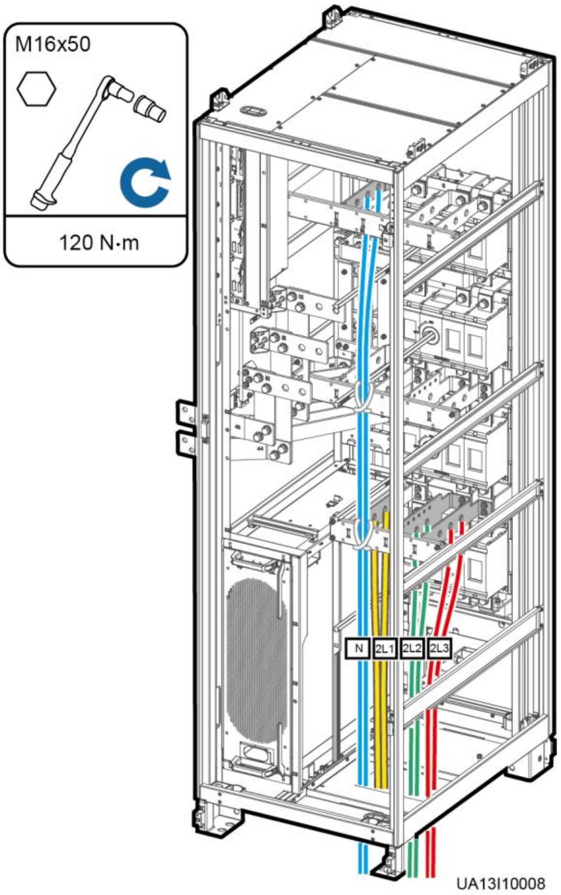
**Figure 3-71** Connecting the bypass input power cables




**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.


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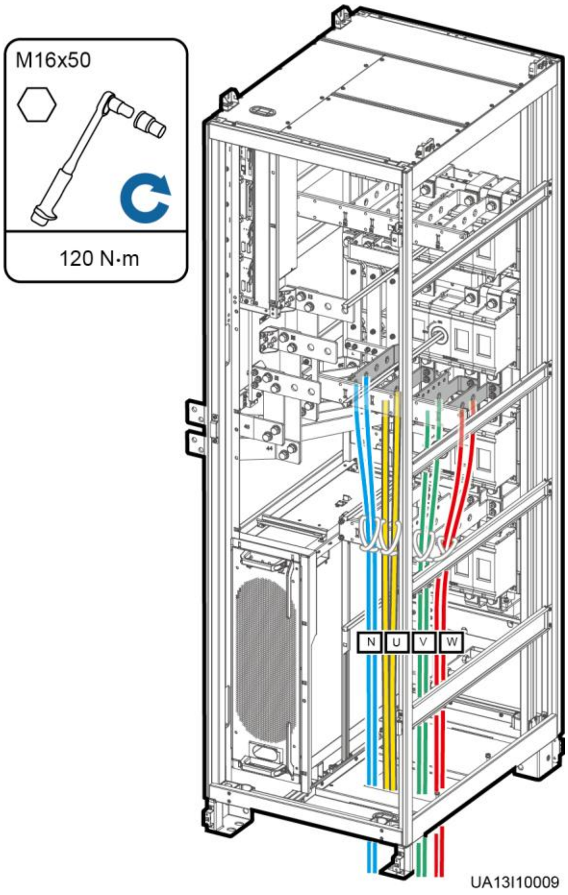
**Figure 3-72** Connecting output power cables




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


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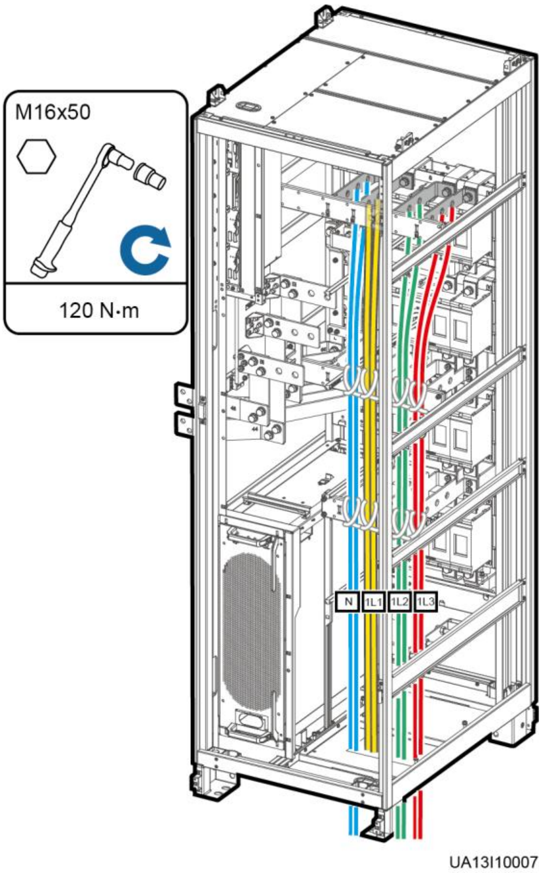
**Figure 3-73** Connecting the mains input power cables




**Step 9** Connect the battery cables.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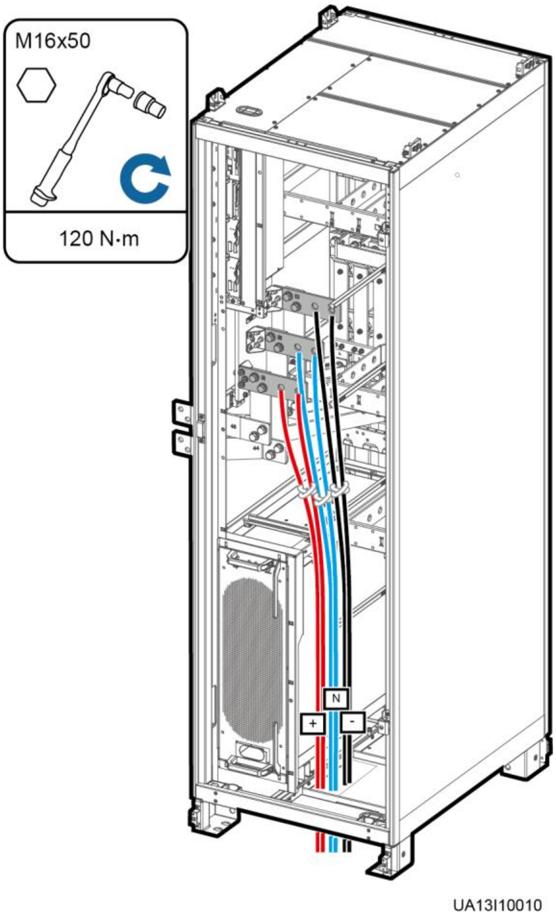
**DANGER**

- 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 3-74** 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.


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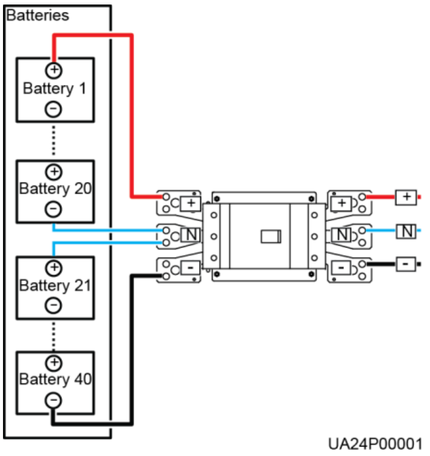
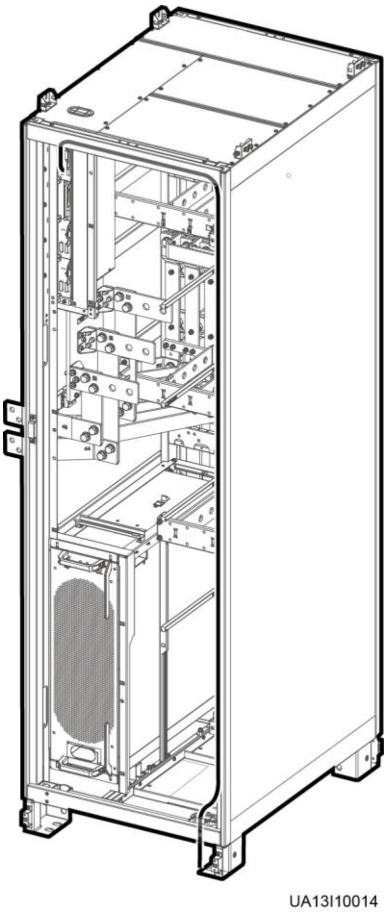
**Figure 3-75** Neutral wire




**Step 10** Route signal cables. Bind cables to the cabinet. Figure 3-76 shows the signal cables routed from the bottom of the cabinet.

**Figure 3-76** Signal cables routed from the bottom




**NOTE**

The number and colors of signal cables in Figure 3-76 are for reference only.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**----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)

## 3.2.7.1 Top Cable Routing

## Context

**NOTICE**

- Route cables for the UPS from inside out and from top down.
- 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.
- The figures are for reference only. For more information about the recommended cable cross-sectional area and quantity, refer to 3.1.3 Power Cables and site requirements.

Figure 3-77 shows power cable terminals.


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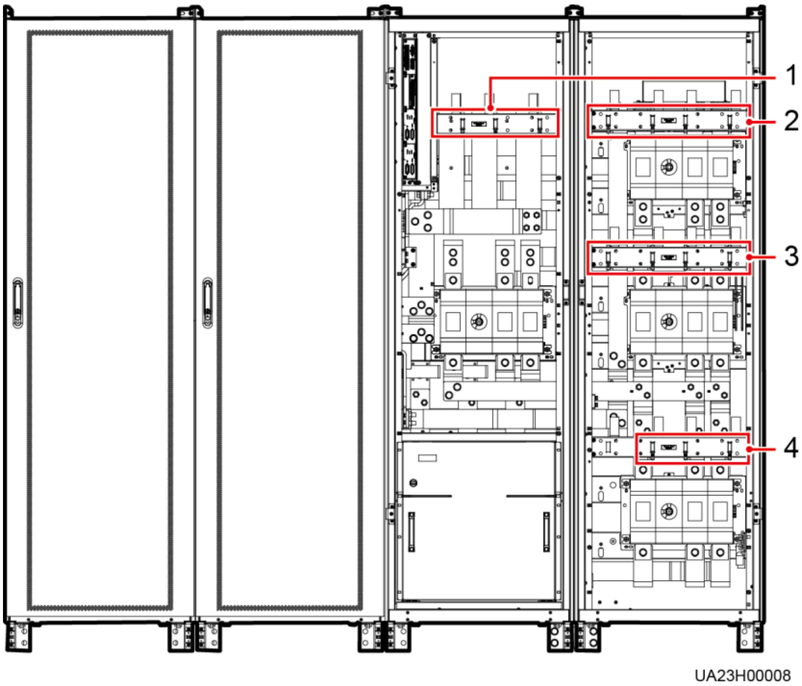
**Figure 3-77** Power distribution module




(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, as shown in Figure 3-36.

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


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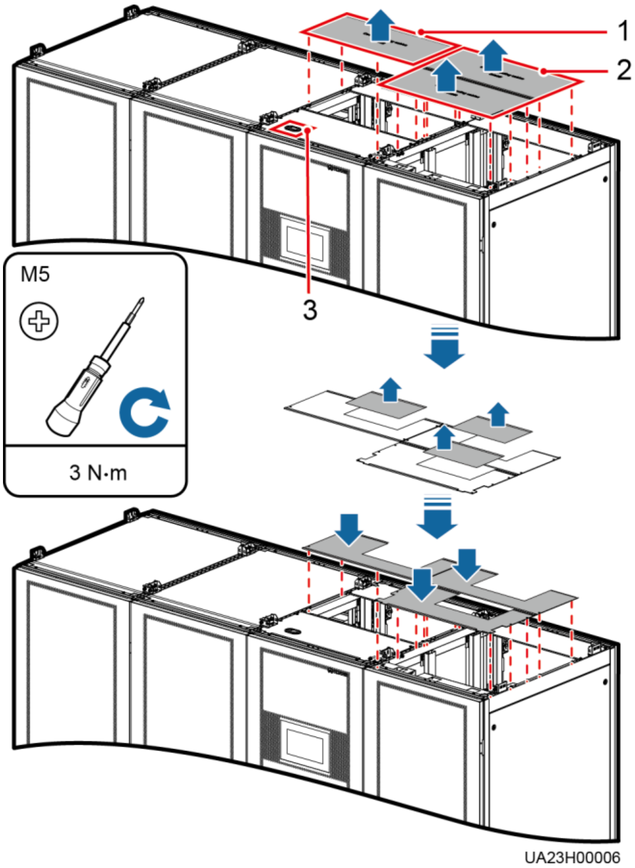
**Figure 3-78** Removing the top cable covers and drilling holes




(1) Battery cable cover (2) Power cable covers (3) 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 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.


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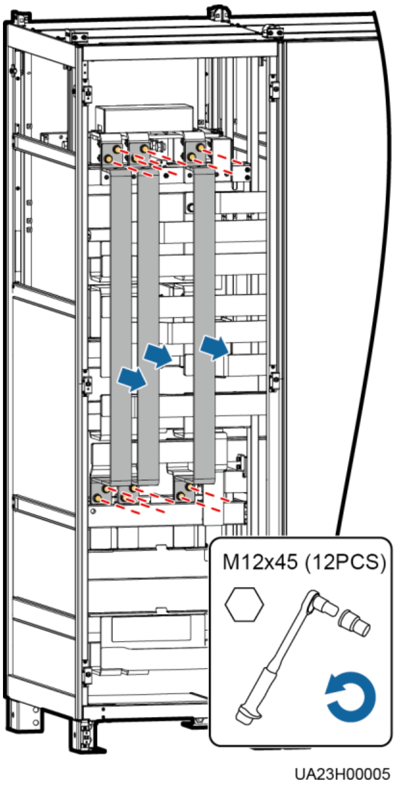
**Figure 3-79** Removing the connecting copper bars




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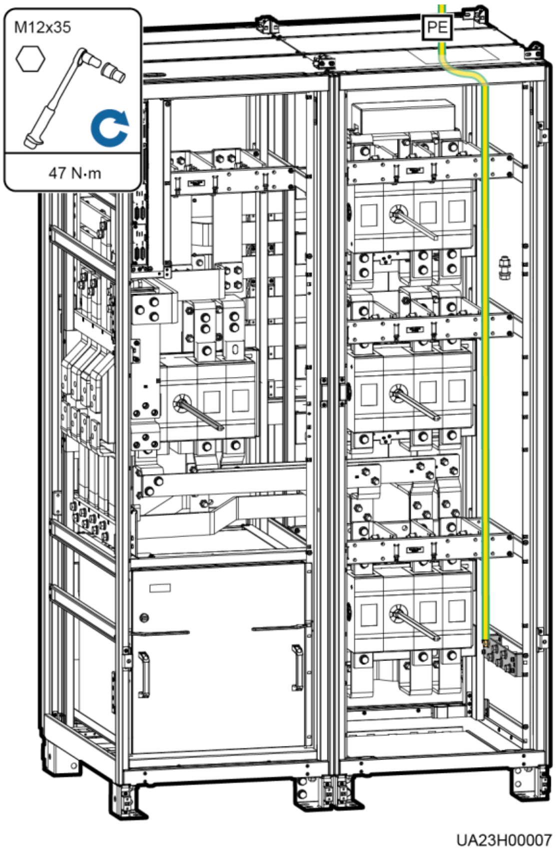
**NOTICE**

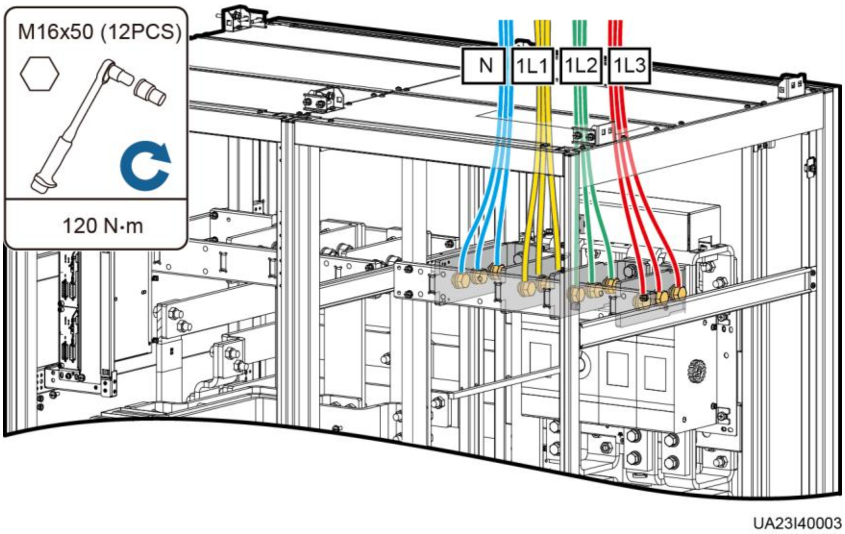
- Before connecting cables, ensure that all UPS input switches are turned off. Paste warning labels to prevent others from operating the switches.
- Connect the input power cables to the UPS before connecting power cables to customer equipment.

**Figure 3-80** Grounding




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

**Figure 3-81** 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.


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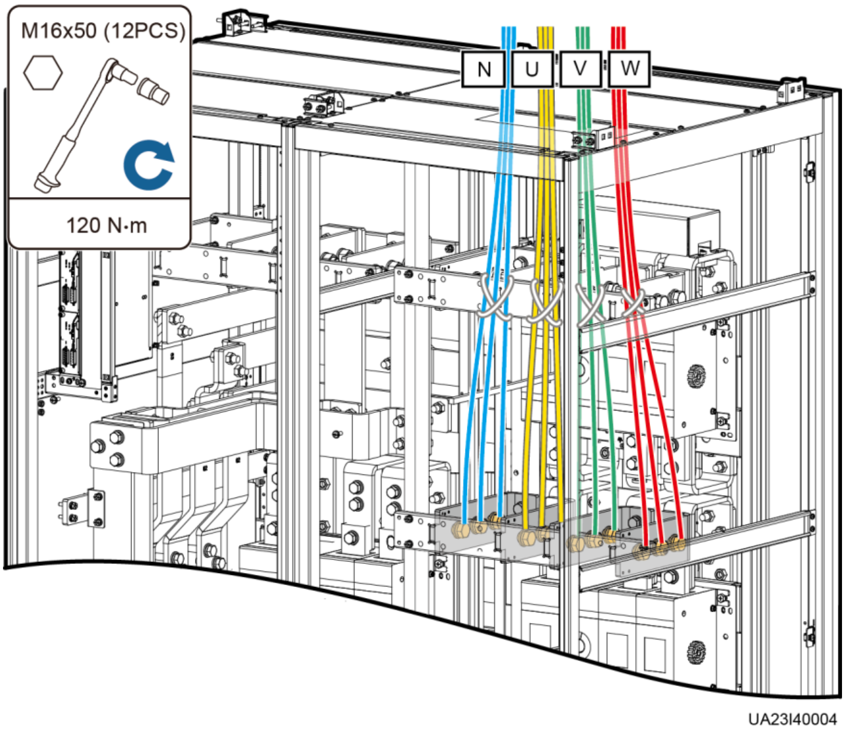
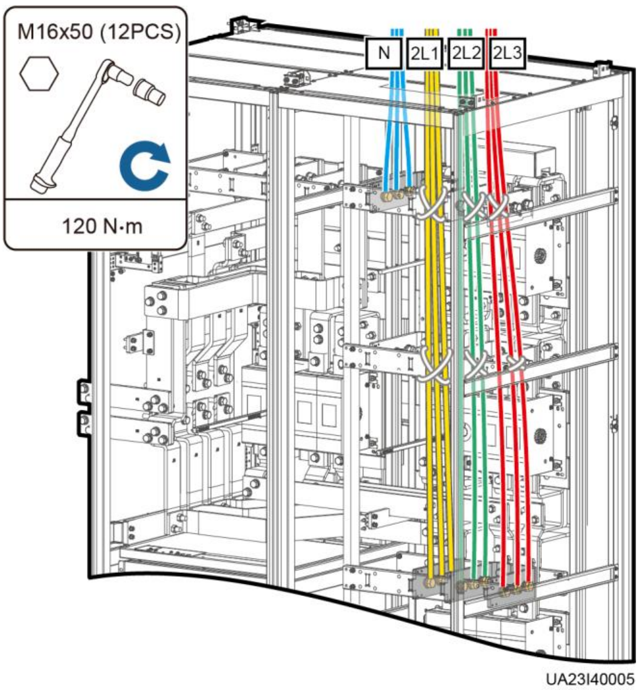
**Figure 3-82** Connecting AC output power cables




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

**Figure 3-83** Connecting the bypass input power cables





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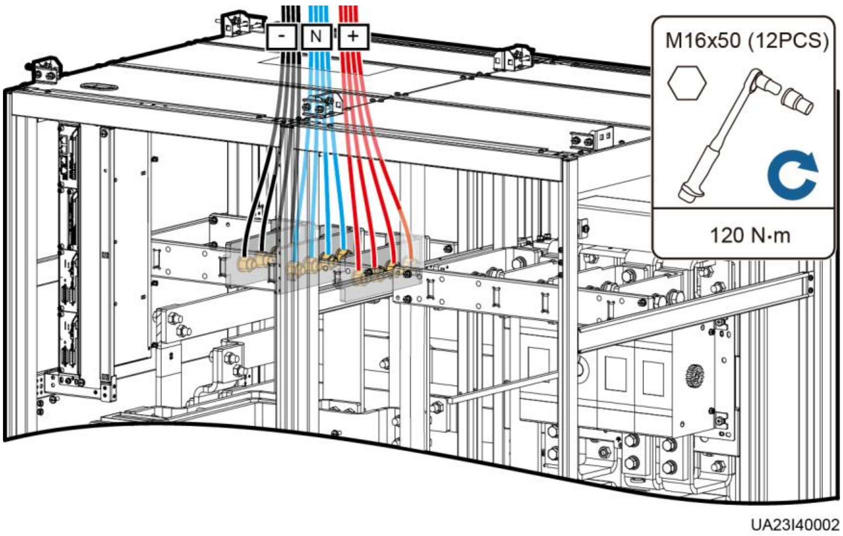
**Step 9** Connect the battery cables.

**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.

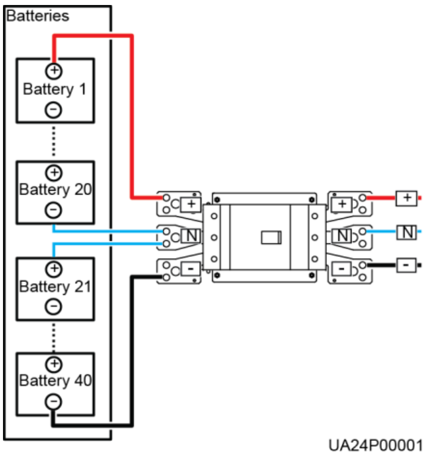
**Figure 3-84** Connecting battery cables




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 3-85** Neutral wire





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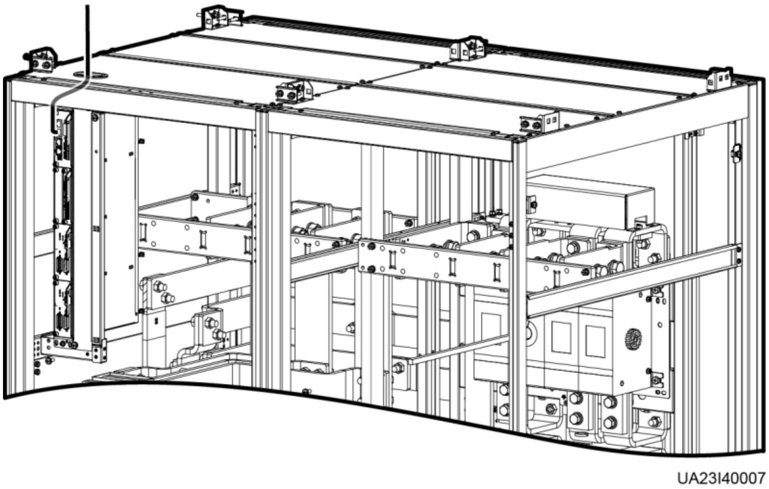
**Step 10** Route signal cables. Bind cables to the cabinet. Figure 3-86 shows the signal cables routed from the top of the cabinet.

**NOTICE**

Do not bind signal cables and power cables together.

**Figure 3-86** Routing signal cables from the top of the cabinet




**NOTE**

The number and colors of signal cables in Figure 3-86 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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**NOTICE**

- Route cables for the UPS from inside out and from bottom up.
- After routing cables, use firestop putty to seal the gaps between the cables and the cabinet.

## Procedure

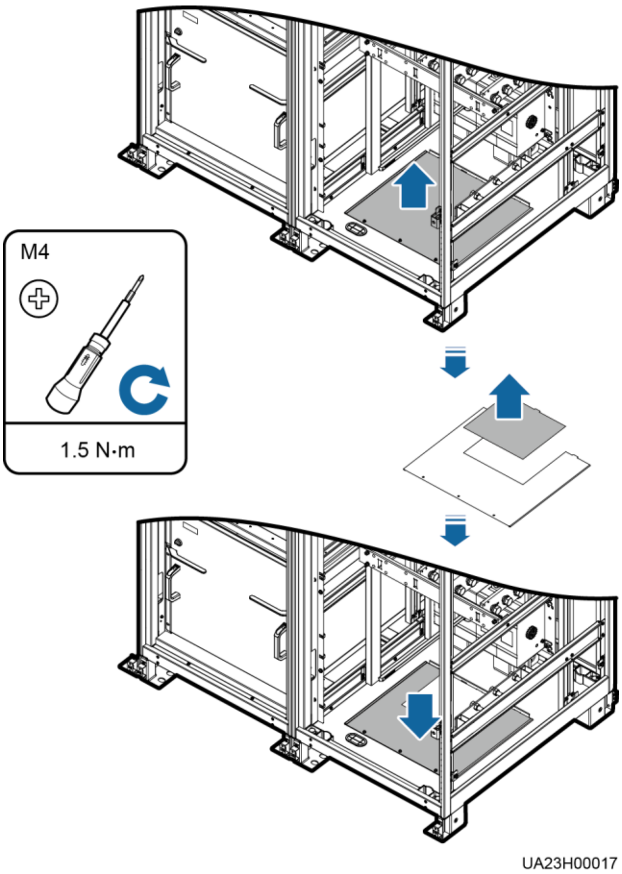
**Step 1** Open the front door of the bypass cabinet, and remove the covers of the power distribution subrack from the bypass cabinet, as shown in Figure 3-36.

**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 3-87** Removing the bottom cable covers and drilling holes




**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.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**Step 4** Remove the copper bars between the mains and bypass input wiring terminals, as shown in Figure 3-79. (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 3-60 shows how to remove the protective covers.

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

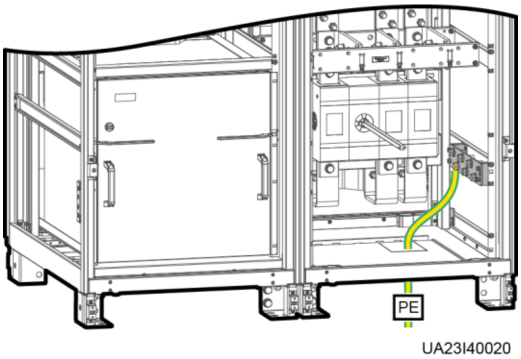
CAUTION

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 3-88** Grounding




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


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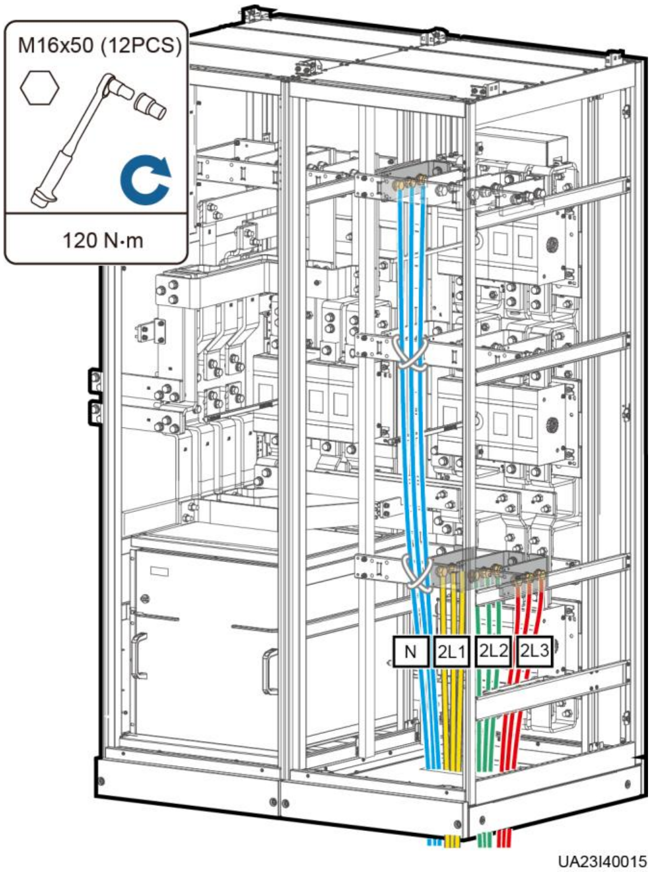
**Figure 3-89** Connecting the bypass input power cables




**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.


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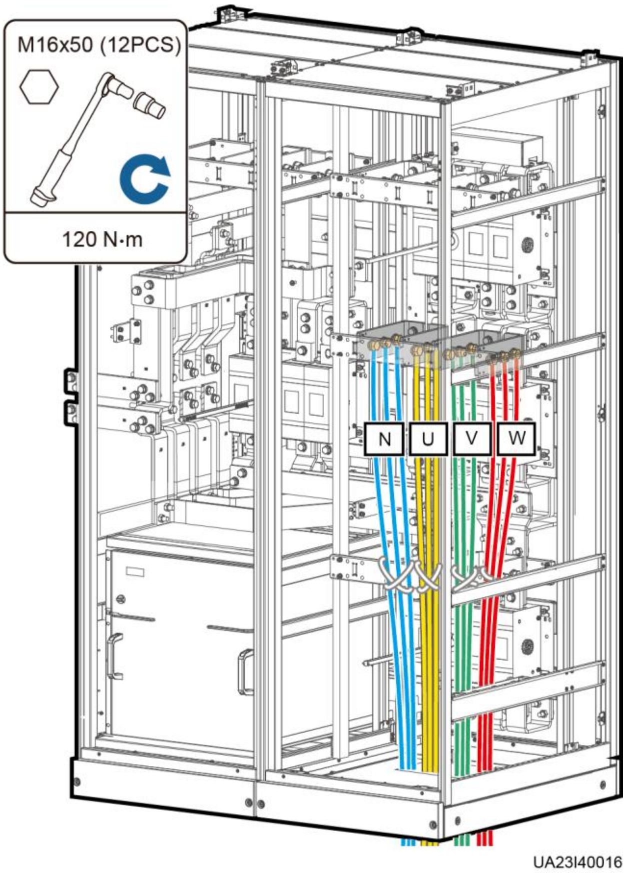
**Figure 3-90** Connecting the output power cables




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


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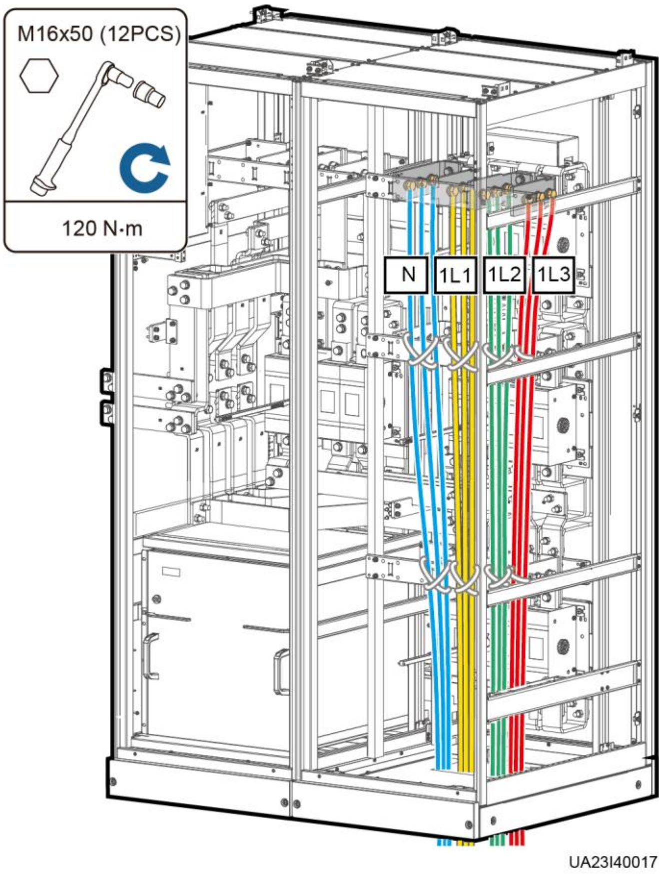
**Figure 3-91** Connecting the mains input power cables

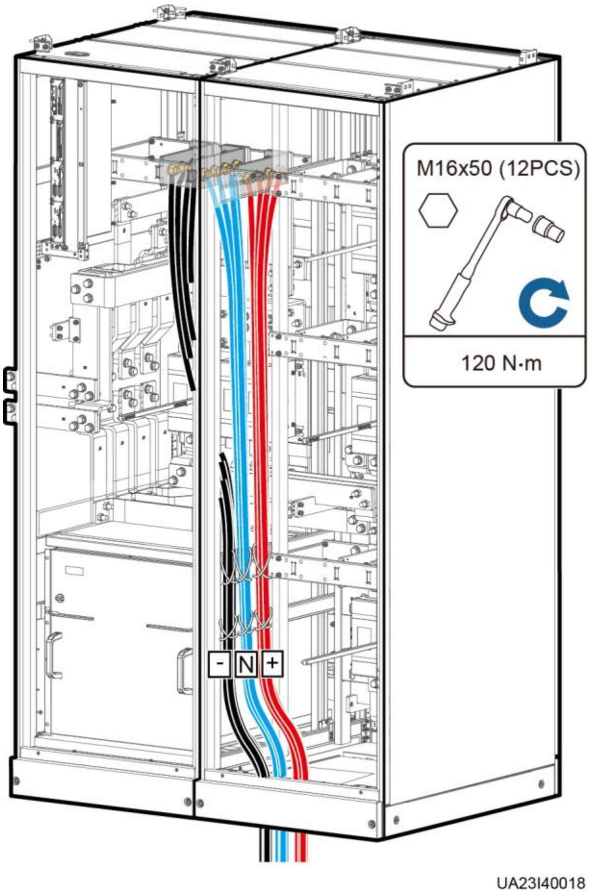



**Step 9** Connect the battery cables.

**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 3-92** Connecting the 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.


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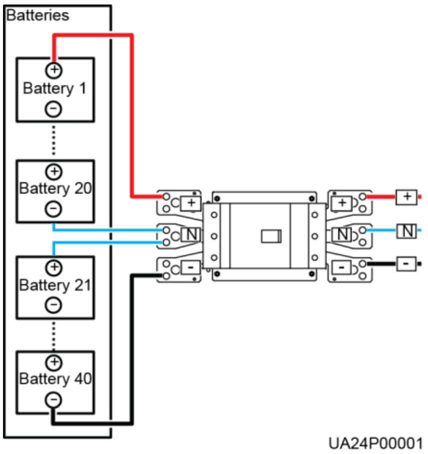
**Figure 3-93** Neutral wire




**Step 10** Route signal cables. Bind cables to the cabinet. Figure 3-94 shows the signal cables routed from the bottom of the cabinet.

**NOTICE**

Do not bind signal cables and power cables together.


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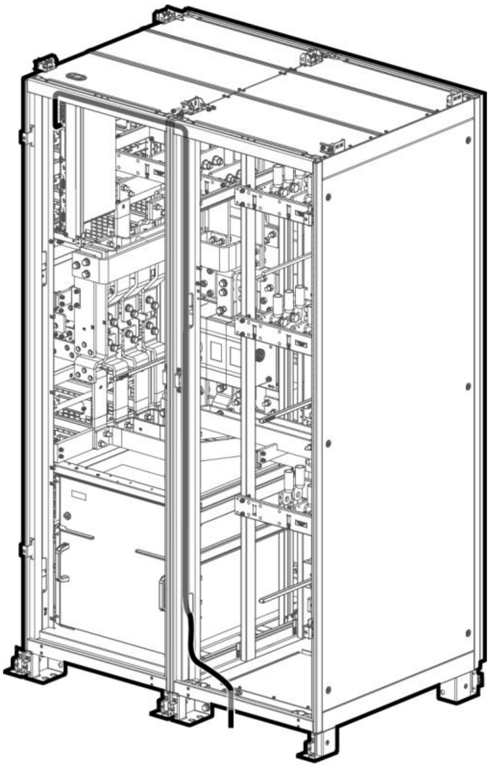
**Figure 3-94** Signal cables routed from the bottom




**----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.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- Figure 3-95 shows the cable connections for an NC EPO switch.
- Figure 3-96 shows the cable connections for an NO EPO switch.

**Figure 3-95** Cable connection for an NC EPO switch

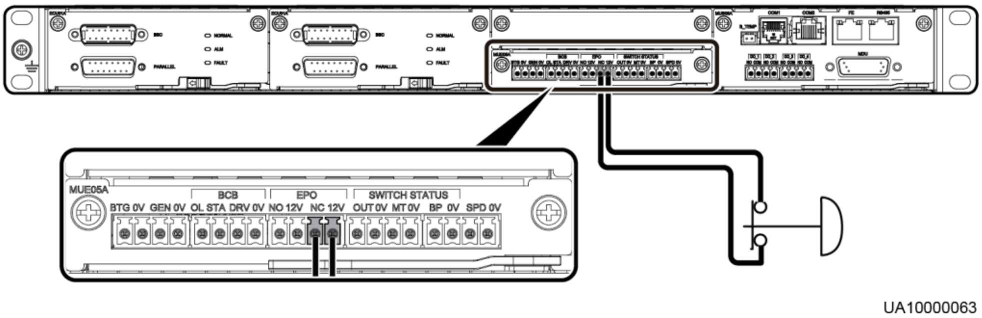
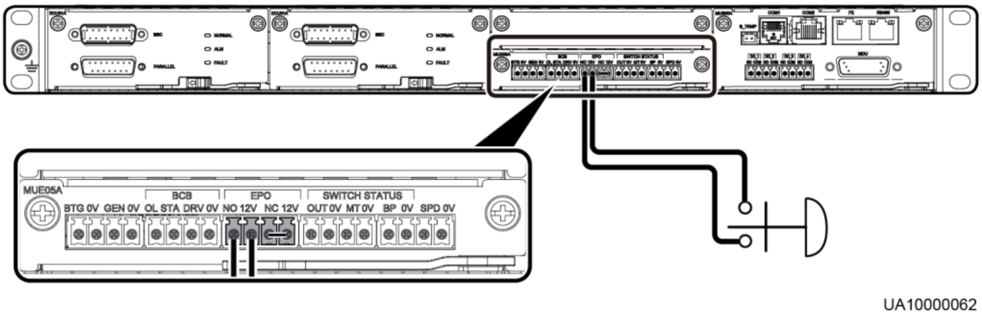



**Figure 3-96** Cable connection for an NO EPO switch




**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.

**Step 2** Connect the network port on a PC to the FE port.

**----End**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# 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.

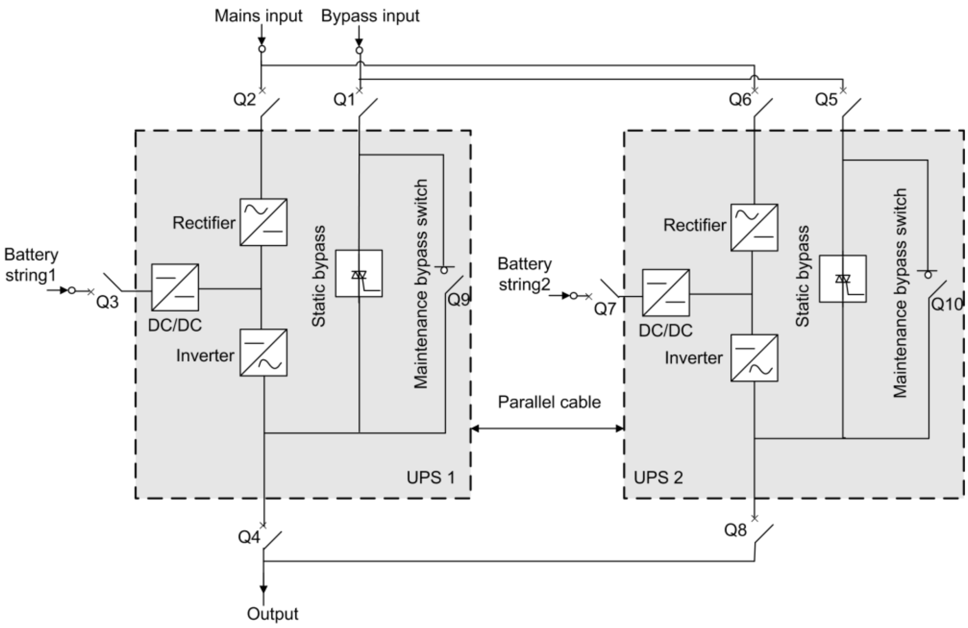
### Procedure

**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 3-97, Figure 3-98, and Figure 3-99 show the typical conceptual diagram and cable connections for a 1+1 parallel system.

**Figure 3-97** Conceptual diagram of a 1+1 parallel system




NOTICE

Connect power cables according to port silk screen.


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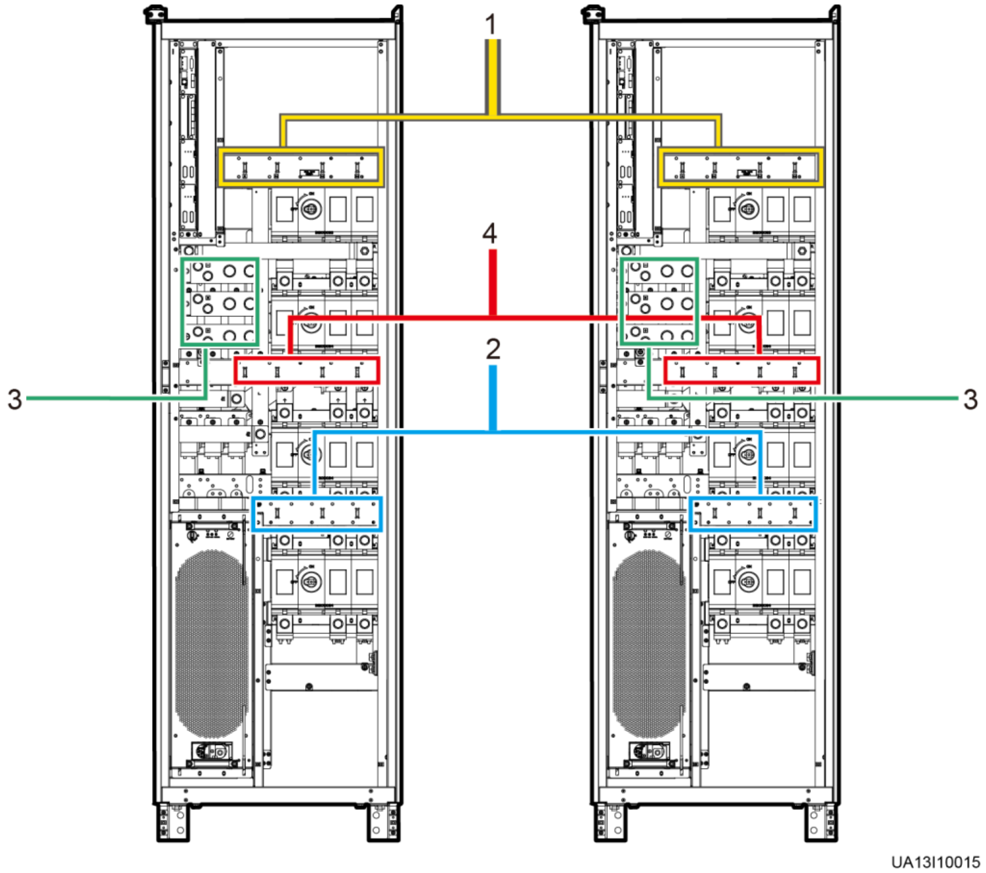
**Figure 3-98** Cable connections for a 1+1 parallel system (400 kVA UPS)




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


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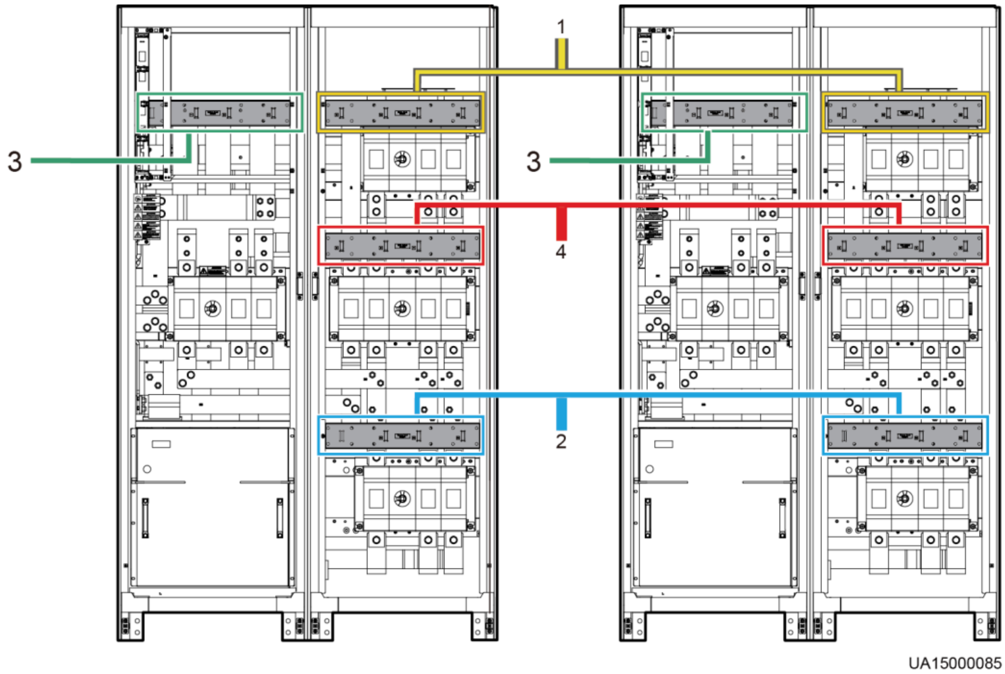
**Figure 3-99** Cable connections for a 1+1 parallel system (800 kVA UPS)




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

Figure 3-100, Figure 3-101, and Figure 3-102 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.


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**Figure 3-100** Conceptual diagram of a dual-bus system

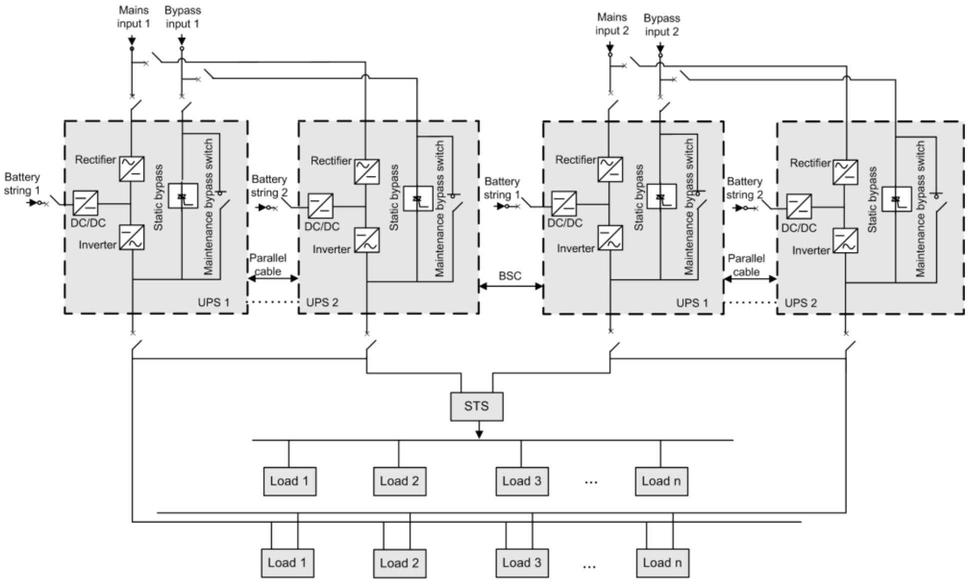



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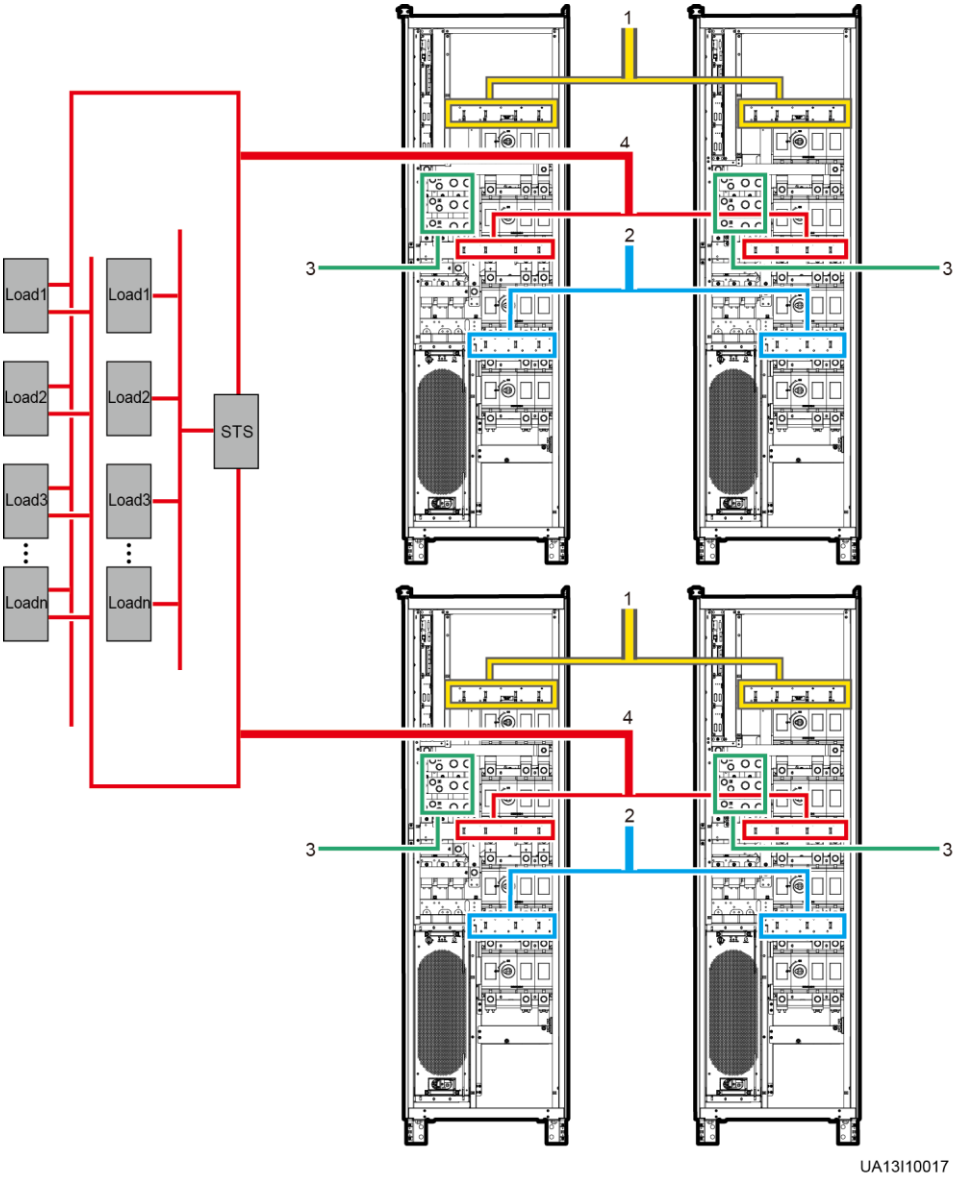
**Figure 3-101** Cable connections for a dual-bus parallel system (400 kVA UPS)




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


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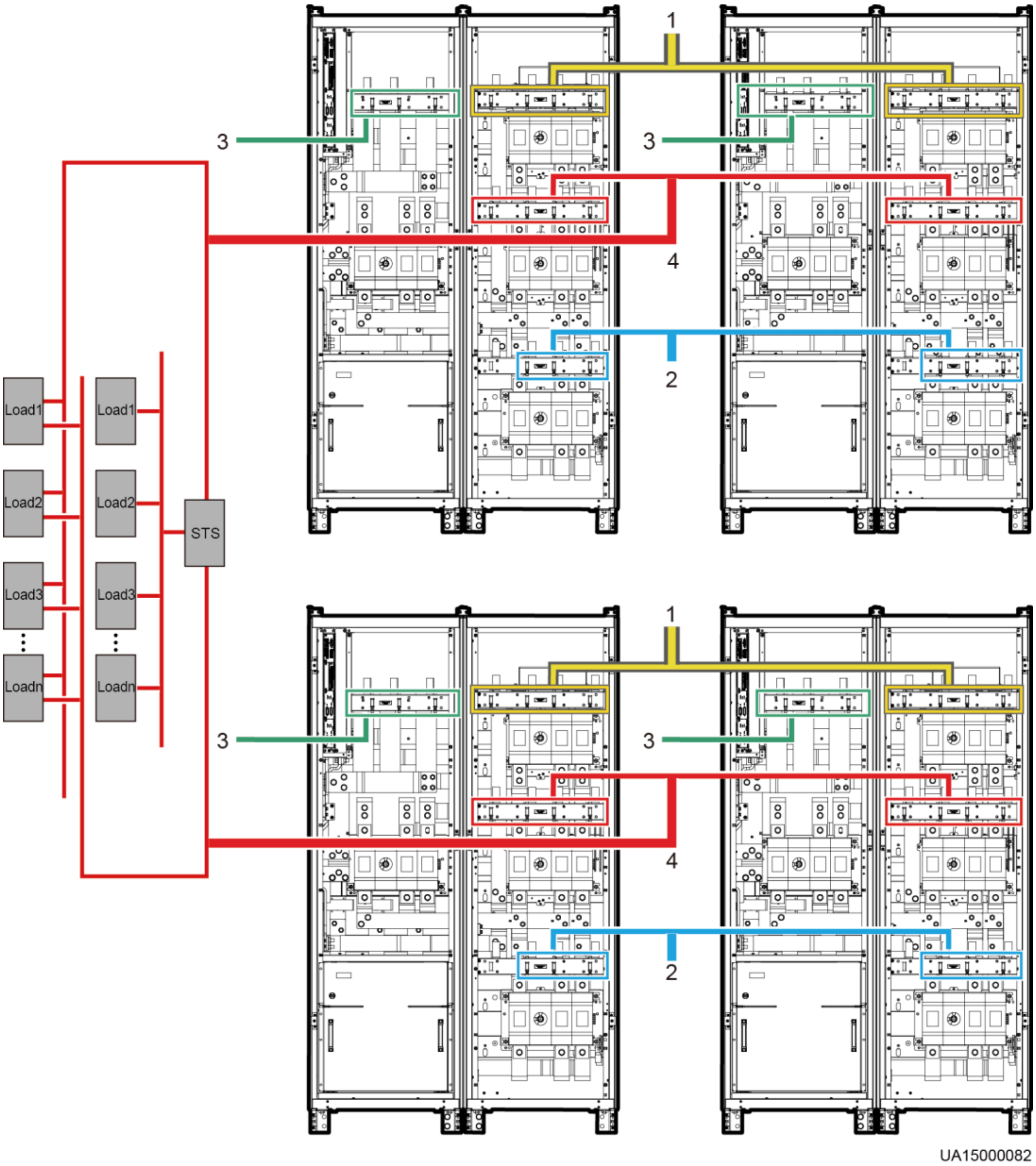
**Figure 3-102** Cable connections for a dual-bus parallel system (800 kVA UPS)




| | | | |
|---|---|---|---|
| (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 3-103 and Figure 3-104 show the wiring principle for an N+X parallel system.


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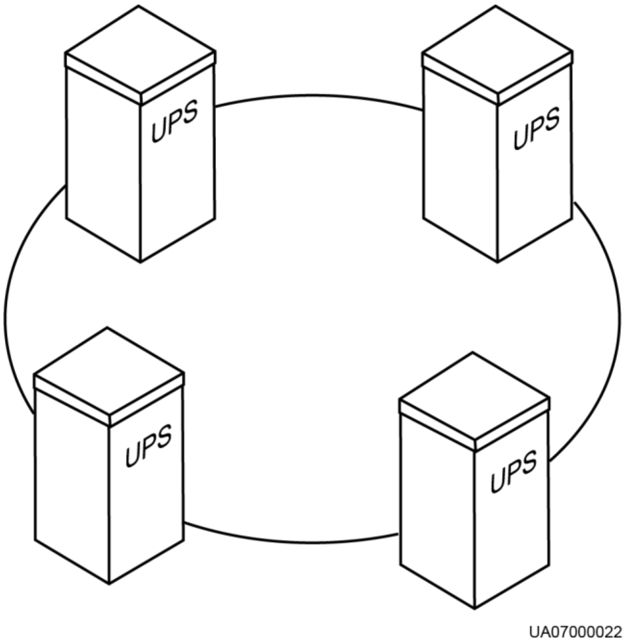
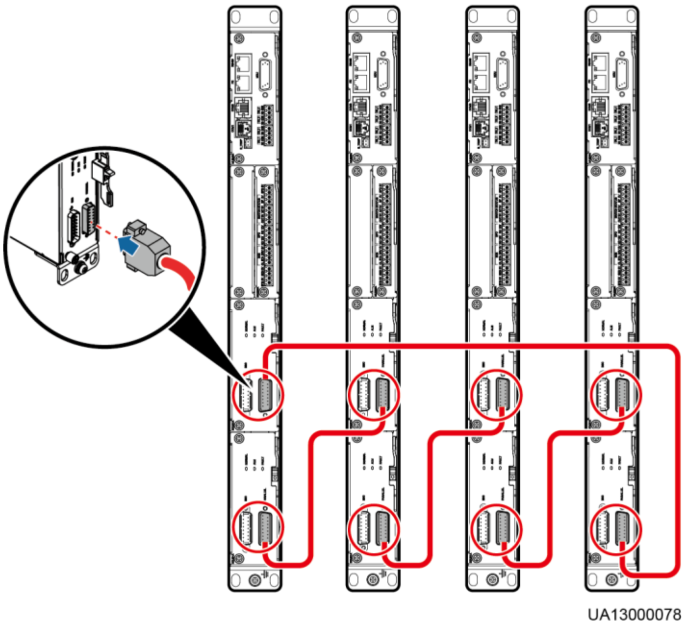
**Figure 3-103** N+X parallel system topology




**NOTICE**

Figure 3-104 shows only the CM, which stands for the UPS.

**Figure 3-104** Signal cable connections of N+X parallel system




- BSC master and slave cables are required in a dual-bus parallel system. Figure 3-105 shows the cable connections for a dual-bus system containing twomaster systems.


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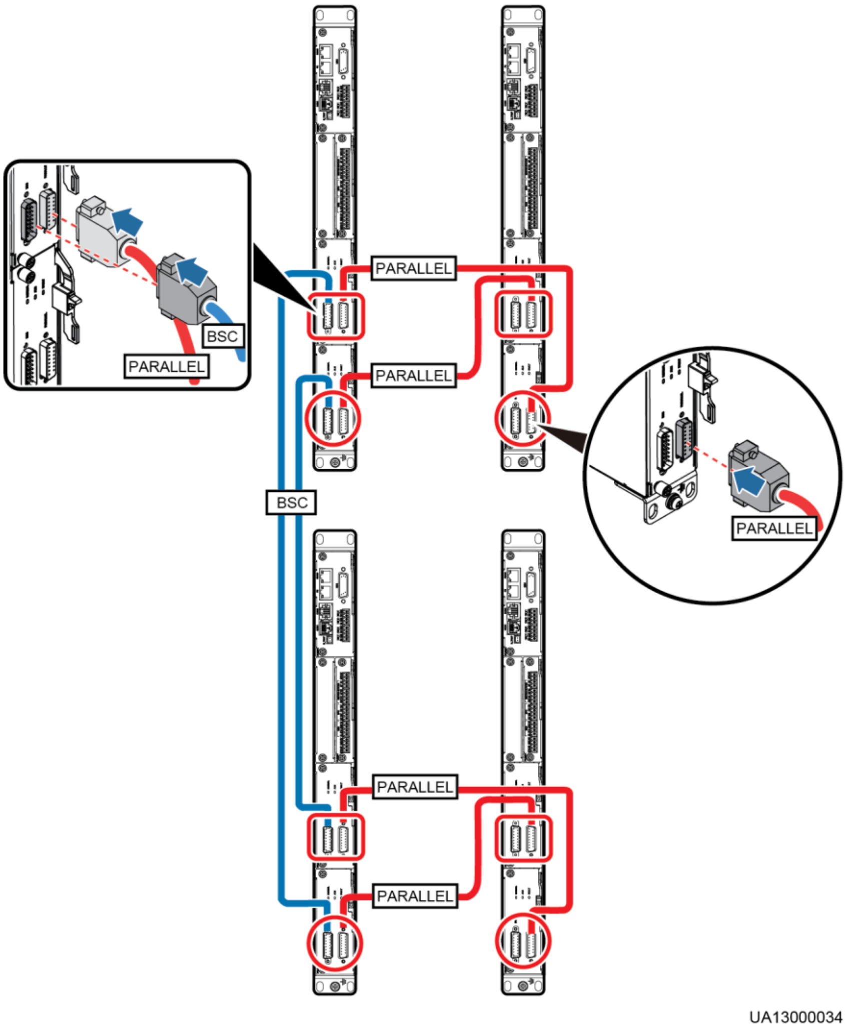
**Figure 3-105** Connecting signal cables to a dual-bus system




## Connecting Other Signal Cables

Connect signal cables for each UPS.

# 3.4 Installation Verification

Table 3-11 lists check items.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**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.<br>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.<br>1. There is no foreign matter (such as copper wires and screws) on the top of the cabinet.<br>2. There is no foreign matter on the copper bar terminals.<br>3. There is no foreign matter around switch terminals.<br>4. There is no foreign matter on the bottom plate of the cabinet.<br>5. There is no foreign matter on the rear module subrack. |


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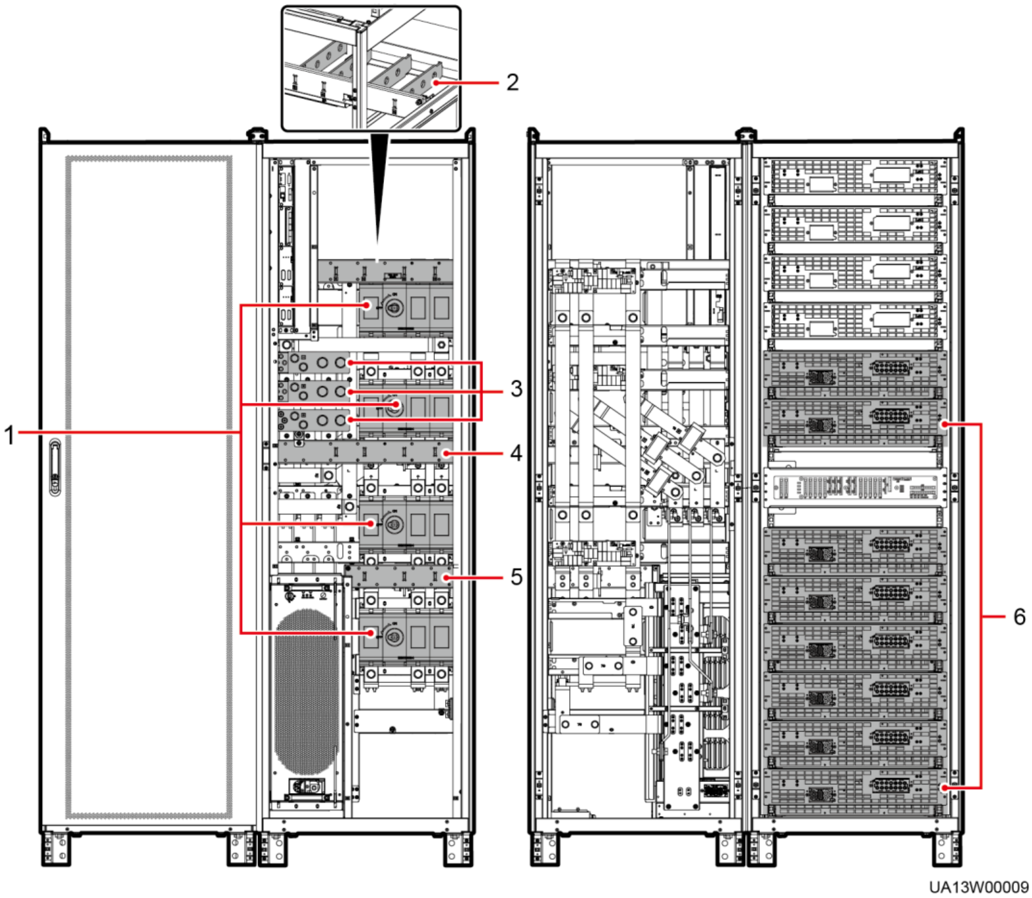
**NOTE**

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 firestop 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 3-106** 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 |


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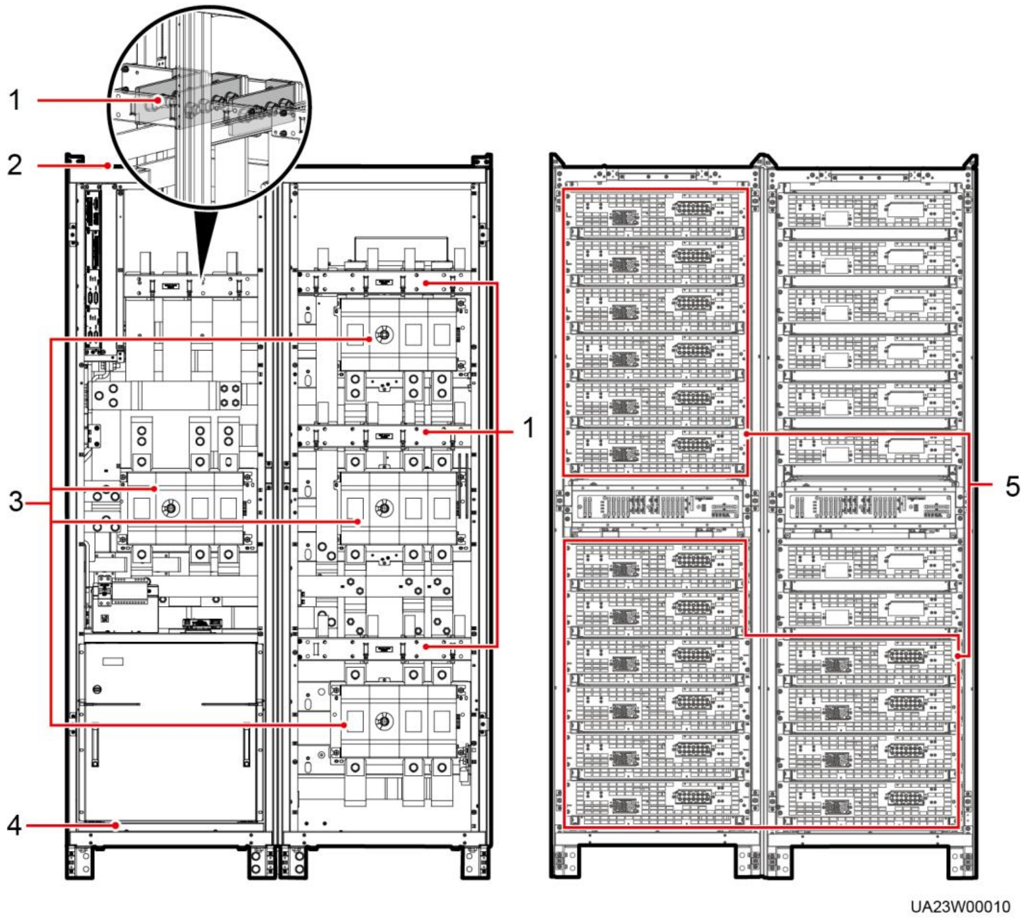
**Figure 3-107** Positions to be checked for foreign matter (800 kVA)




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

**Figure 3-108** Fill the holes with firestop putty

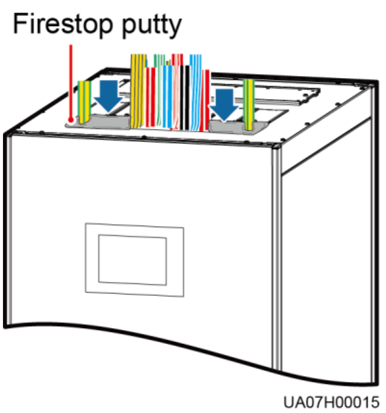




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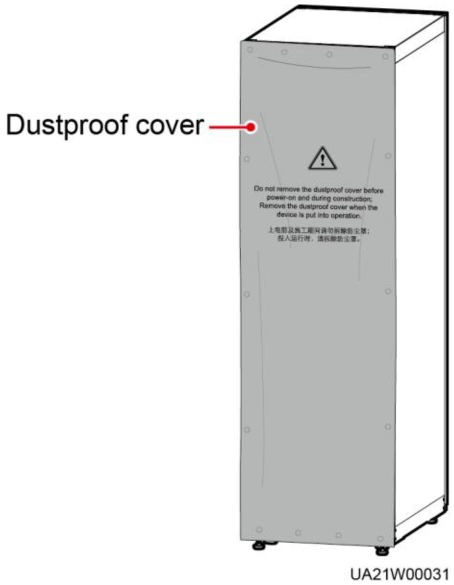
**Figure 3-109** Dustproof cover





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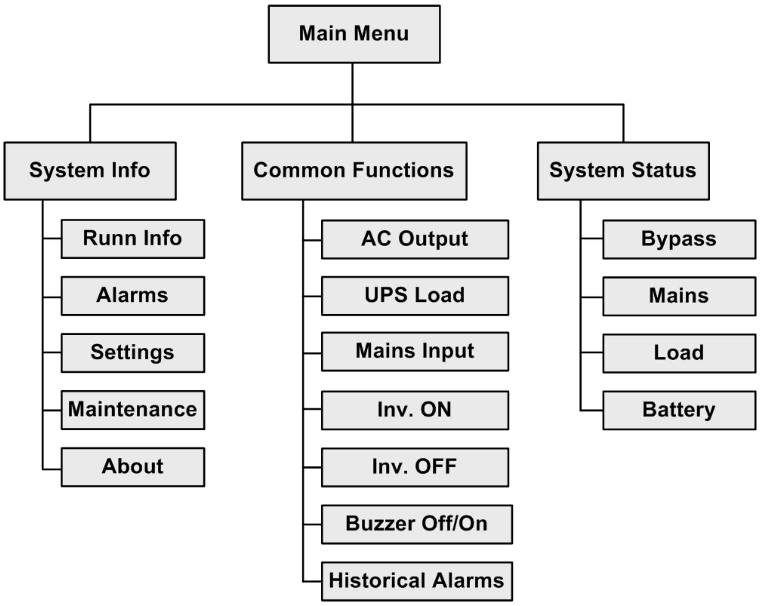
# 4 User Interface

## 4.1 LCD Interface

### 4.1.1 Menu Hierarchy

Figure 4-1 shows the LCD menu hierarchy.

**Figure 4-1** Menu hierarchy




### 4.1.2 Initial Startup

**NOTICE**

User interfaces displayed in this document correspond to the monitor display module (MDU) version V100R003C01SPC403 and are for reference only.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The **Settings Wizard** screen is displayed when the UPS is started for the first time or when the UPS restarts after restoring factory settings. Parameters including **Language**, **Time**, **Network Param.**, and **System Param.** can be set on the **Settings Wizard** of the MDU, as shown in Figure 4-2.

**Figure 4-2** Settings Wizard


## 4.1.3 Main Menu

The LCD screen is divided into three parts: status bar, alarm bar and information area. Figure 4-3 numerically labels functions of the default main screen, and Table 4-1 describes these functions.


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**Figure 4-3** Main Menu screen

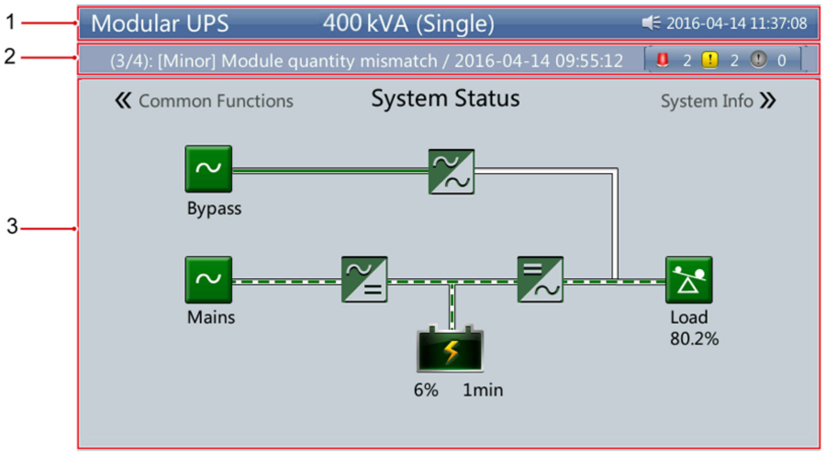


**Table 4-1** Main screen description

| Number | Area | Function |
|---|---|---|
| 1 | Status bar | Displays the UPS model, capacity, configuration, current date and time, USB 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 | Informatio n area | Displays the power flow as well as key information such as load and battery information. Tap the **Bypass**, **Mains**, **Battery**, and **Load** 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. |


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## 4.1.4 System Info Screen

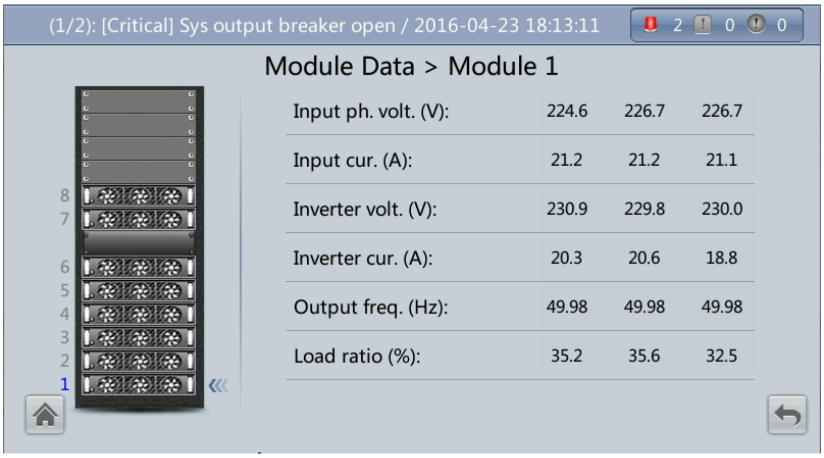
On the main screen, tap **System Info**. The **System Info** screen is displayed, as shown in Figure 4-4.

**Figure 4-4** System Info screen


### 4.1.4.1 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 4-5.

**Figure 4-5** Module Data screen




### 4.1.4.2 Runn Info Screen

On the **System Info** screen, tap to access the **Runn Info** screen. On this screen, **AC Output**, **UPS Load**, **Mains Input**, and **Bypass Input** can be queried, as shown in Figure 4-6 and Figure 4-7.


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**Figure 4-6** Runn Info screen 1

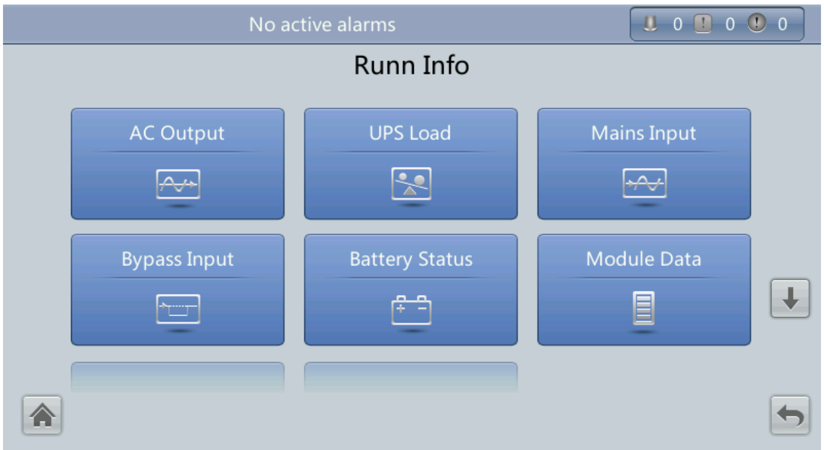


**Figure 4-7** Runn Info screen 2


NOTE

- On the **System Info** > **Settings** > **Advanced Param.** screen, 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.
- On the **System Info** > **Settings** > **CIM Param.** > **Basic Param.** screen, if the **Number of battery strings** is not **0**, the **Battery Detailed Data** is displayed on the **Runn Info** screen.


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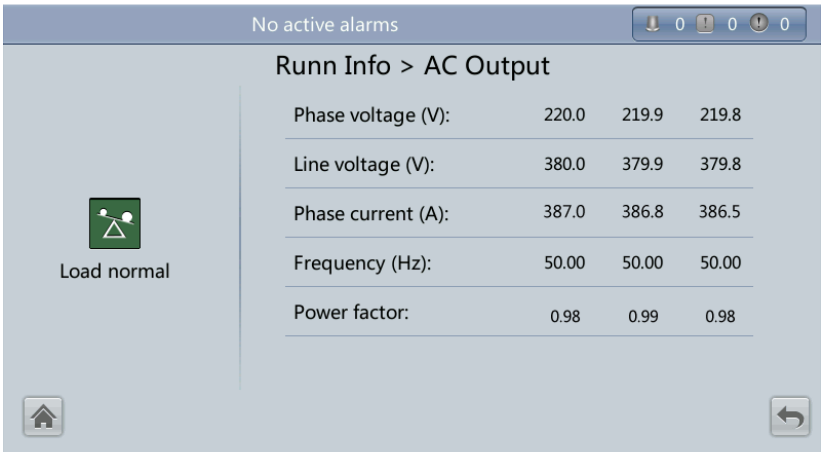
## AC Output

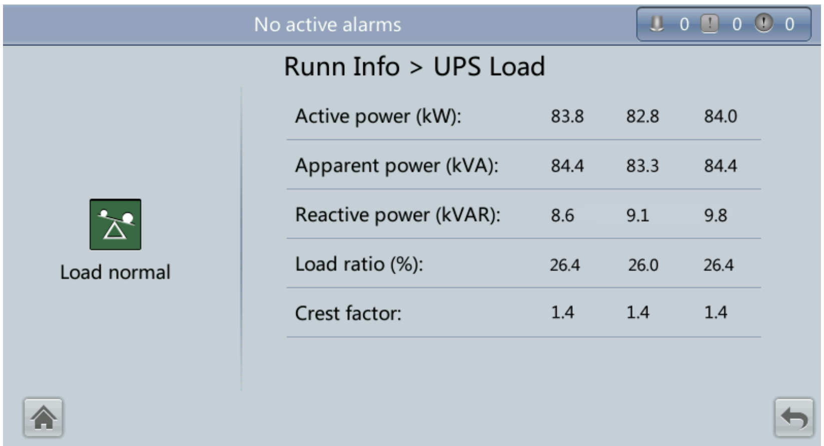
**Figure 4-8** AC Output screen




| 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. |

## UPS Load

**Figure 4-9** UPS Load screen





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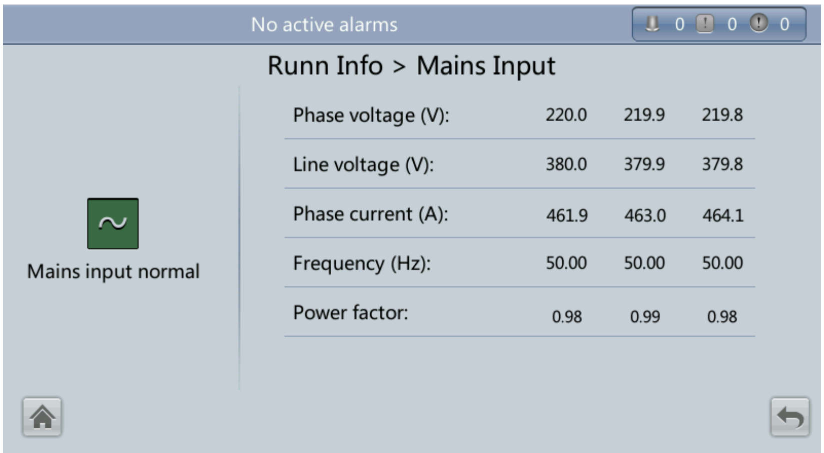
| Item | Description |
|---|---|
| **Active power (kW)** | Output active power of each phase on the UPS. |
| **Apparent power (kVA)** | Output apparent power of each phase on the UPS. |
| **Reactive power (kVAR)** | Output reactive power of each phase on the UPS, that is, square root of the difference 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 value. |

## Mains Input

**Figure 4-10** Mains Input screen




| 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. |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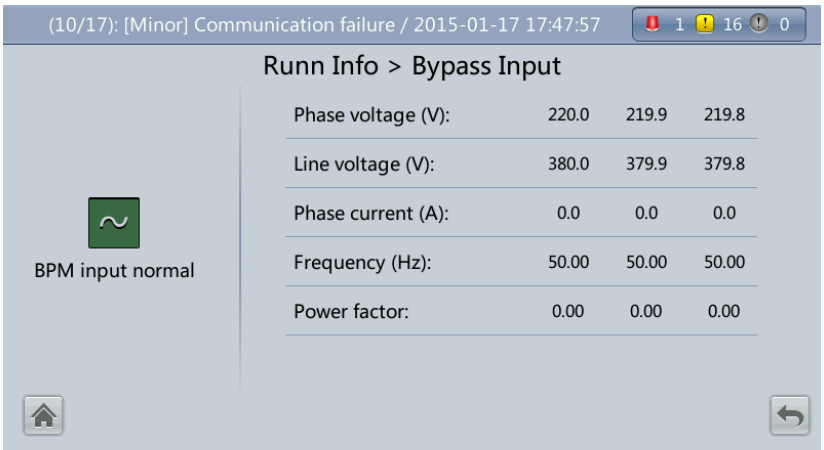
## Bypass Input

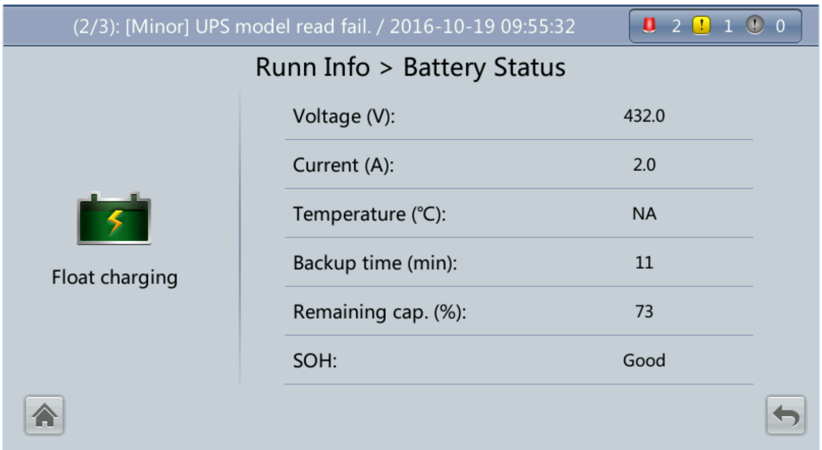
**Figure 4-11** Bypass Input screen




| 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. |

## Battery Status

**Figure 4-12** Battery Status screen





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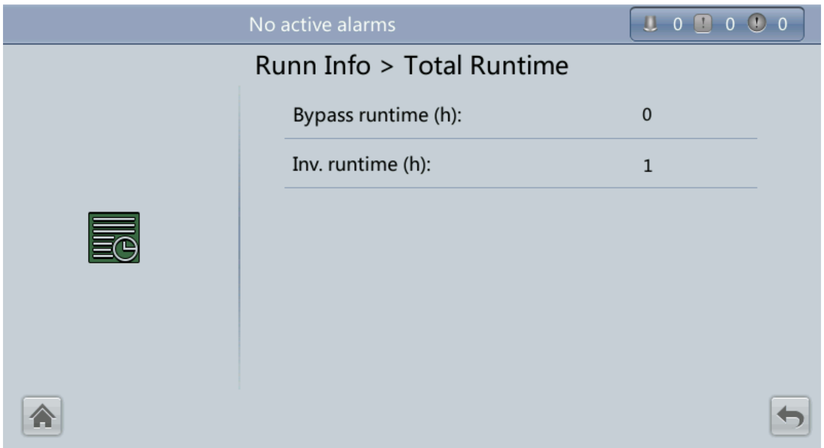
| Item | Description |
|---|---|
| **Battery Status** | The value can be **Not connected**, **Equalized charging**, **Float charging**, **Hibernating**, **discharging**, or **Not chg. or dis**. |
| **Voltage (V)** | Voltage of the battery string. |
| **Current (A)** | Current of the battery string (the current is **+** when batteries are being charged and **–** when discharged). |
| **Temperature (°C)** | Battery operating temperature (A battery sensor is required. If the sensor is not installed, **NA** is displayed). |
| **Backup time (min)** | Battery backup time estimated at the current load. |
| **Remaining cap. (%)** | Remaining battery capacity. |
| **SOH** | State of health. |

## Total Runtime

**Figure 4-13** Total Runtime screen




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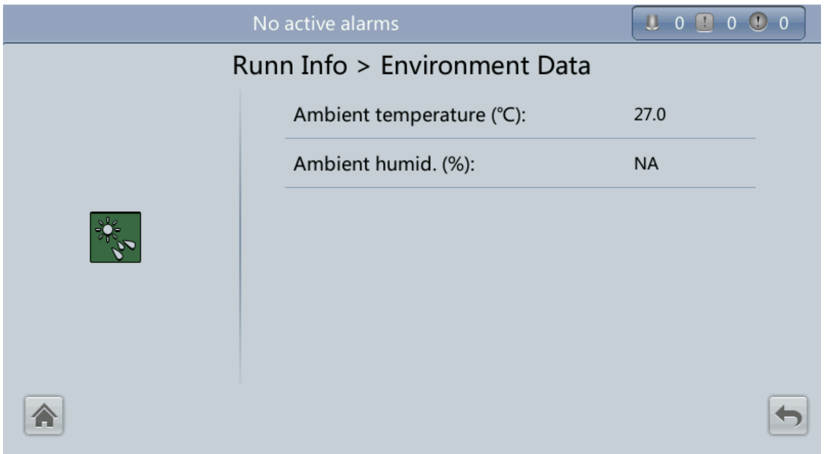
- If the value is less than 1, the value takes 0.
- If the value is greater than or equal to 1 and less than 2, the value takes 1.

## Environment Data

**Figure 4-14** Environment Data screen




| Item | Description |
|---|---|
| **Ambient temperature (℃)** | Temperature measured by the ambient temperature and humidity sensor (The sensor needs to be installed. If the sensor is not installed, the data uploaded by the bypass module is displayed.) |
| **Ambient humid. (%)** | Humidity measured by the ambient temperature and humidity sensor. If the sensor is not installed, **NA** is displayed. |

## Mod. Cur. Eql. Data

Figure 4-15 shows the **Mod. Cur. Eql. Data** screen.


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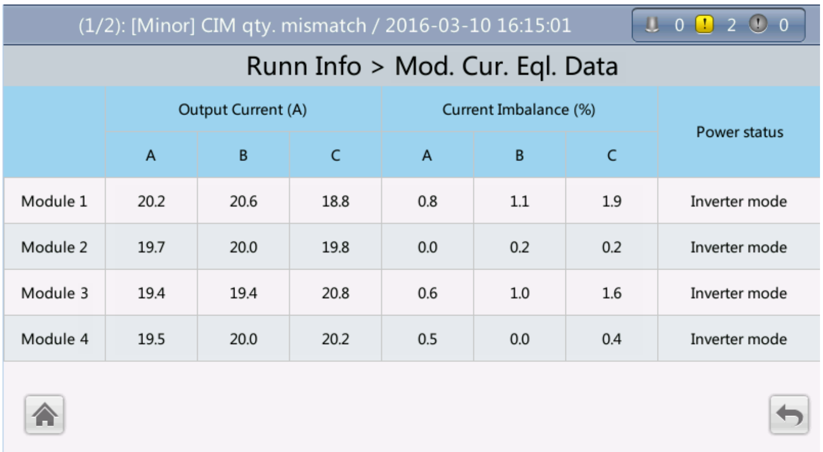
**Figure 4-15** Mod. Cur. Eql. Data screen




| | Output Current (A) | | | Current Imbalance (%) | | | Power status |
|---|---|---|---|---|---|---|---|
| | A | B | C | A | B | C | |
| Module 1 | 20.2 | 20.6 | 18.8 | 0.8 | 1.1 | 1.9 | Inverter mode |
| Module 2 | 19.7 | 20.0 | 19.8 | 0.0 | 0.2 | 0.2 | Inverter mode |
| Module 3 | 19.4 | 19.4 | 20.8 | 0.6 | 1.0 | 1.6 | Inverter mode |
| Module 4 | 19.5 | 20.0 | 20.2 | 0.5 | 0.0 | 0.4 | Inverter mode |

## Battery Detailed Data

Figure 4-16 shows the **Battery Detailed Data** screen.

**Figure 4-16** Battery Detailed Data screen


This screen details battery string data and single battery data in each battery string.

**NOTE**

The N in **String N Battery Data** should be less than or equal to 4.

Figure 4-17 shows the **Batt. String Data** screen.


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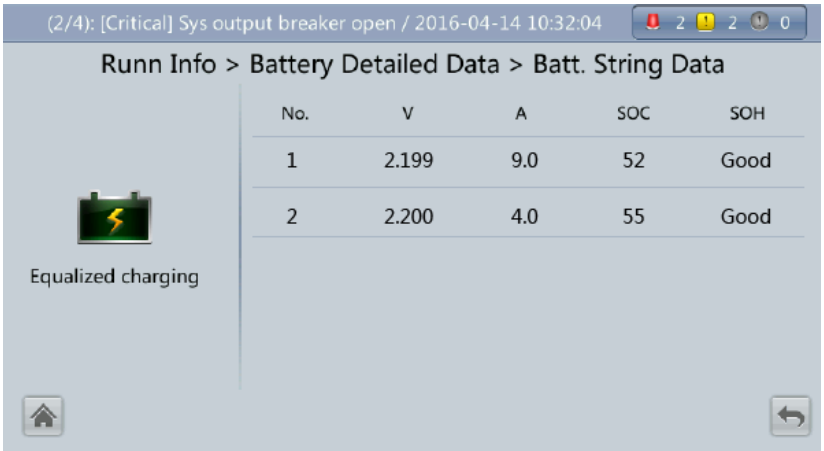
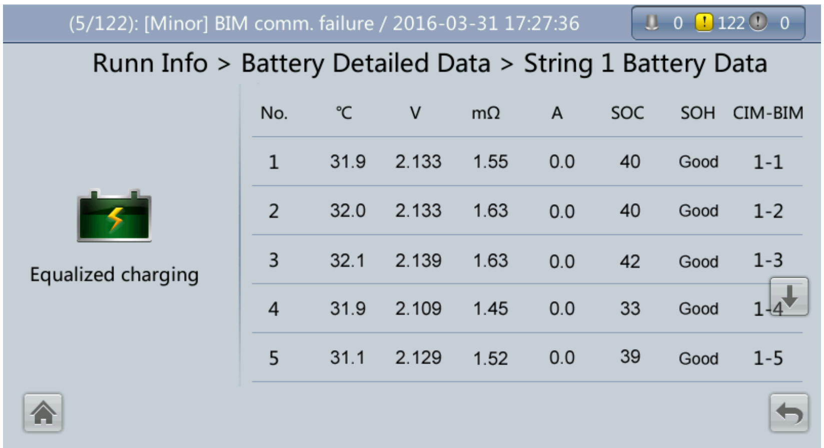
**Figure 4-17** Batt. String Data screen




This screen displays the voltages, currents, SOC, and SOH of each battery string.

Figure 4-18 shows the **String N Battery Data** screen.

**Figure 4-18** String N Battery Data screen




This screen displays the temperature, voltage, internal resistance, current, SOC, and SOH of a single battery in the battery string, and the mapping between the CIM and BIM.

### 4.1.4.3 Alarms Screen

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


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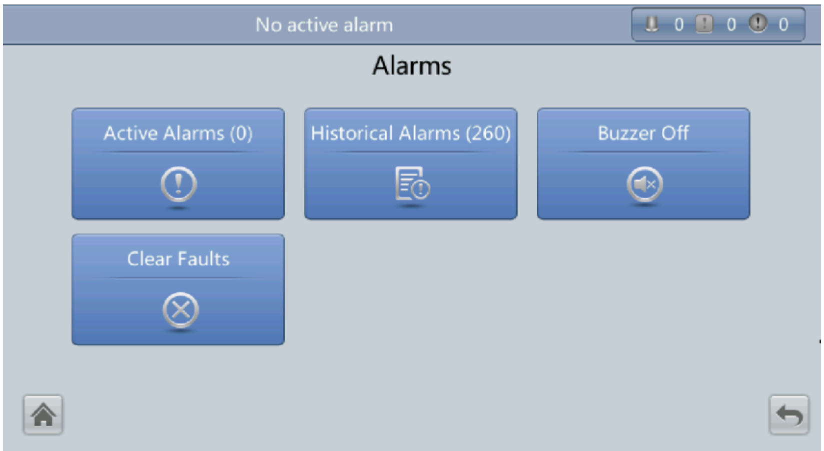
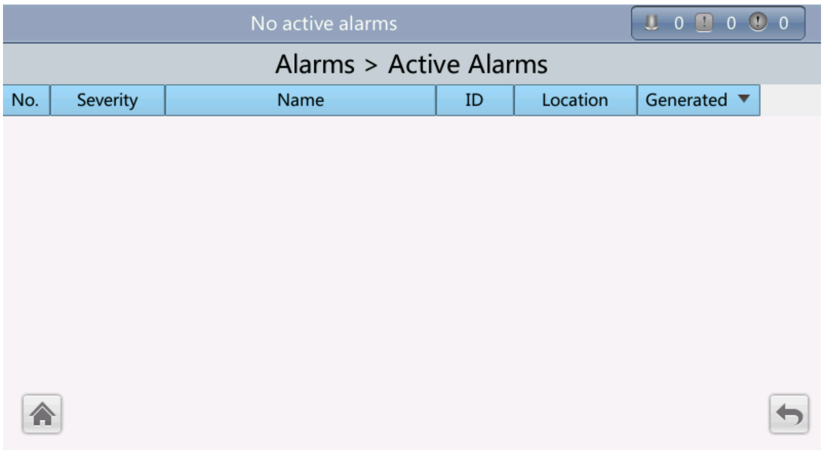
**Figure 4-19** Alarms screen




## Active Alarms

**Figure 4-20** Active Alarms screen





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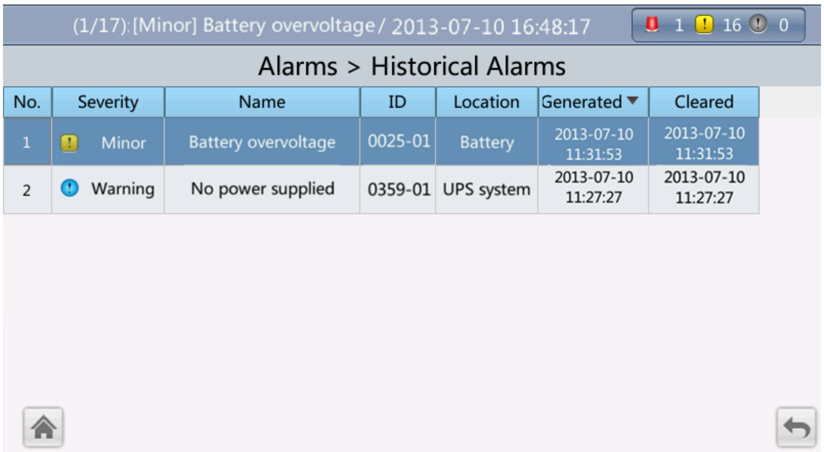
## Historical Alarms

**Figure 4-21** Historical Alarms screen




## 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.

**Figure 4-22** Buzzer Off screen



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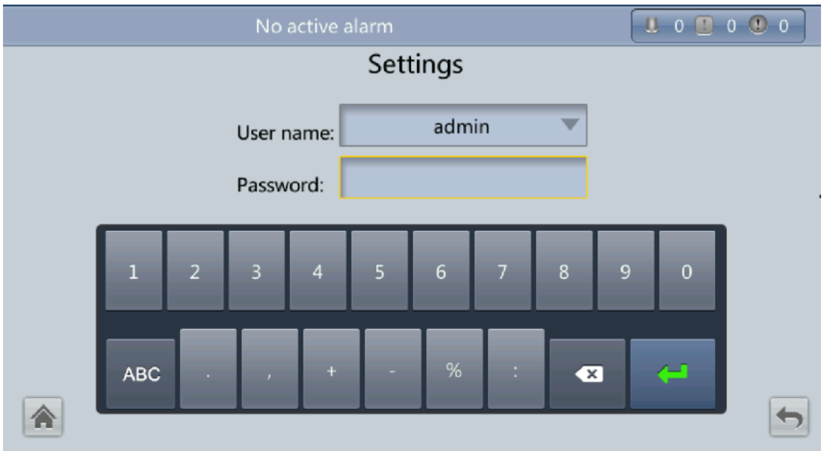
### Clear Faults

**Figure 4-23** Clear Faults screen


## 4.1.4.4 Settings Screen

On the **System Info** screen, tap . If you have not logged in, a login screen is displayed, as shown in Figure 4-24.

**Figure 4-24** Login screen




On the login screen, enter a preset user name and password, and tap  to log in. The **Settings** screen is displayed, as shown in Figure 4-25 and Figure 4-26.


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**Figure 4-25** Settings screen 1

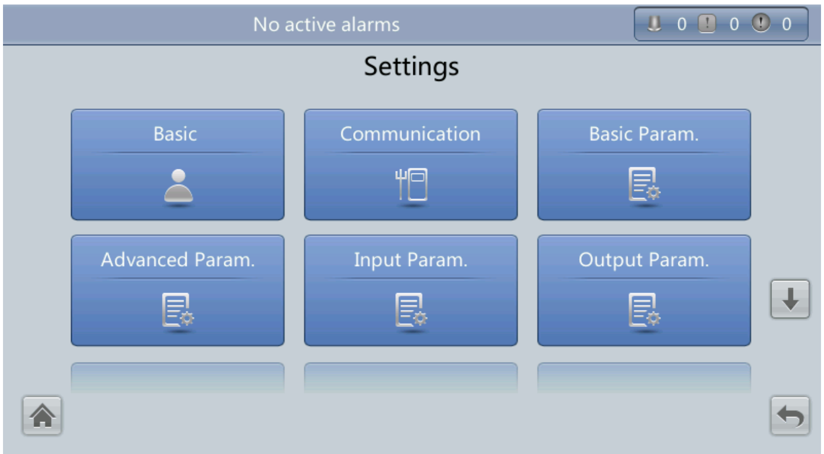
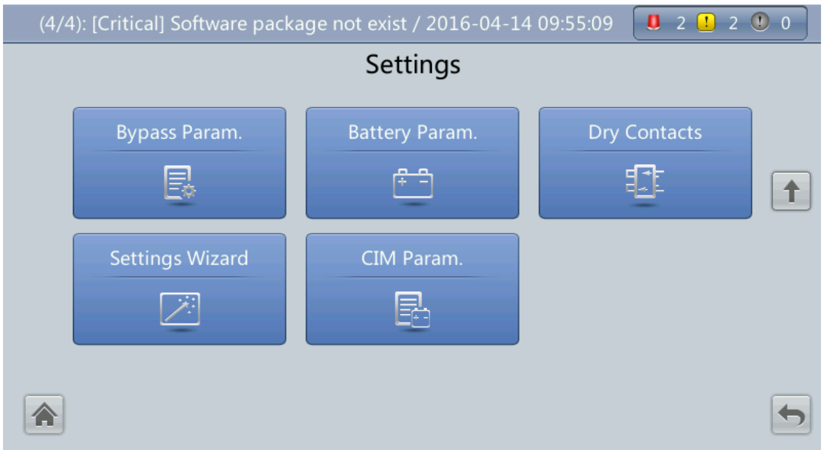



**Figure 4-26** Settings screen 2




## Basic Settings

**NOTICE**

Set the date and time correctly. Incorrect time display in running and alarm information would lead to analysis errors during maintenance or repair.


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**Figure 4-27** Basic screen 1

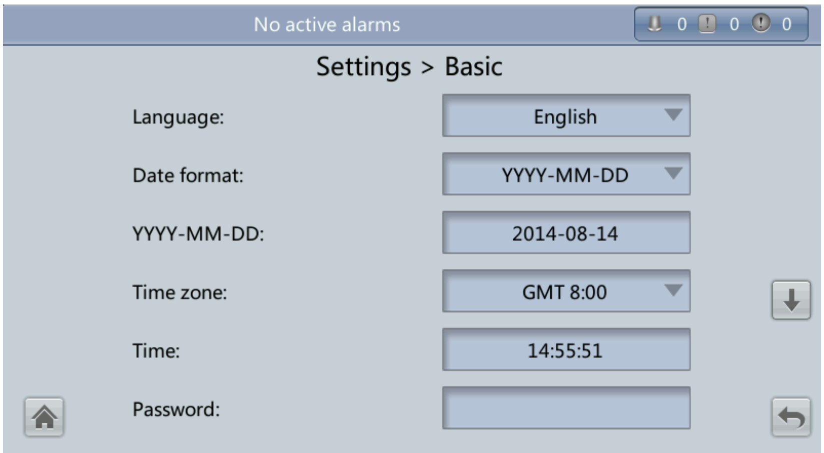
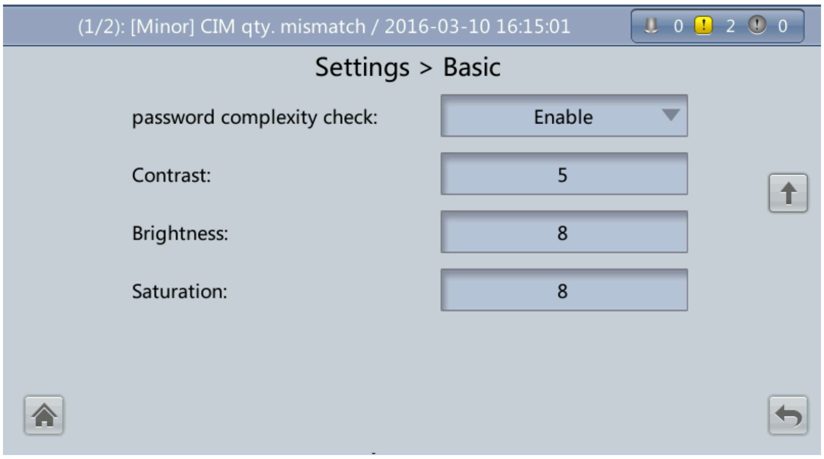



**Figure 4-28** Basic screen 2




| Item | Description |
|---|---|
| **Language** | Twelve languages are supported, including English, Chinese, Spanish, Dutch, French, German, Italian, Polish, Portuguese, Russian, Swedish, and Turkish. The default language is English. |
| **Password** | The preset password is 000001. The password can be changed. |
| **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. |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## Communications Settings

**Figure 4-29** Communication screen 1


**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 4-3** Bitwise AND operation example

| - | PC IP address (182.98.225.125) | UPS IP address (182.98.225.112) |
|---|---|---|
| PC IP address/UPS IP address | 10110110.01100010.11100001.01111101 | 10110110.01100010.11100001.01110000 |
| Subnet mask (255.255.255.192) | 11111111.11111111.11111111.11000000 | 11111111.11111111.11111111.11000000 |
| Bitwise AND operation result | 10110110.01100010.11100001.01000000 | 10110110.01100010.11100001.01000000 |

  - **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.


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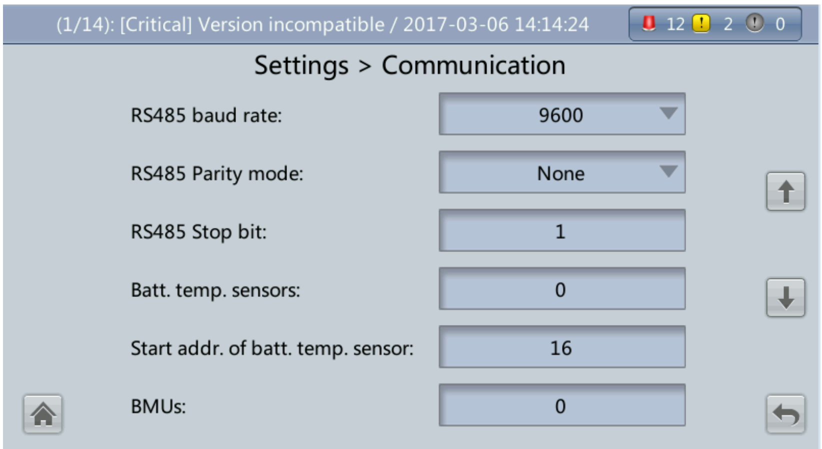
NOTE

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 |
|---|---|
| **IP address** | Set an Ethernet IP address that ranges from 1.0.0.0 to 223.255.255.255. The default value is **192.168.0.10**.<br>**NOTICE**<br>Ensure that the UPS IP address is unique on the network segment. Otherwise, the WebUI display function may not function properly. |
| **Subnet mask** | Set an Ethernet subnet mask that ranges from 0.0.0.0 to 255.255.255.255. The default value is **255.255.255.0**. |
| **Gateway** | Set an Ethernet gateway that ranges from 1.0.0.0 to 223.255.255.255. The default value is **192.168.0.1**. |
| **NAT mapping** | NAT means network address translation. If it is set to **Disable**, Internet cannot access IP addresses in the local area network (LAN). The default value is **Disable**. |
| **RS485 address/RS485 baud rate** | Set an address that ranges from 1 to 254 for this port. **RS485 baud rate** depends on the network management conditions.<br>The default values of **RS485 address** and **RS485 baud rate** are **1** and **9600** respectively. |

**Figure 4-30** Communication screen 2




| Item | Description |
|---|---|
| **RS485 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. Available parity modes include **None**, **Odd**, and **Even**. |
| **RS485 Stop bit** | Stop bit in the Modbus communication frame format. When the UPS is connected over the serial port Modbus, set this parameter based on the |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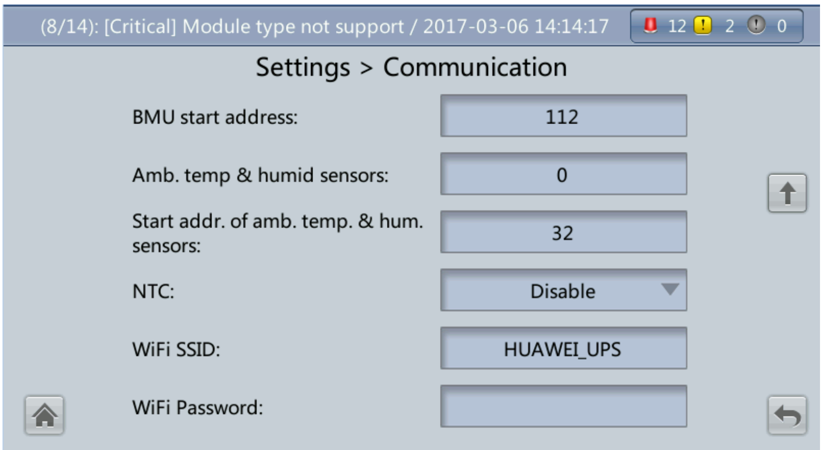
| Item | Description |
|---|---|
| | frame format that the upstream device Modbus supports. The value can be set to 1 or 2. The default value is **1**. |
| **Batt. temp. sensors** | A maximum of four battery temperature sensors can be cascaded. The default value is **0**. |
| **Start addr. of batt. temp. sensor** | Set this parameter by using the DIP switch on the battery temperature sensor. The address range is 16–28. Ensure that the address set on the LCD is the same as that set for the DIP switch. Otherwise, communication fails. |
| **BMUs** | A maximum of 12 BMUs can be cascaded. The default value is **0**. |

**Figure 4-31** Communication screen 3




| Item | Description |
|---|---|
| **BMU start address** | Use the DIP switch on the BMU to set the BMU start address to 112. Ensure that the address set on the LCD is the same as that set for the DIP switch. Otherwise, communication cannot be implemented. |
| **Amb. temp & humid sensors/Start addr. of amb. temp. & hum. sensors** | An ambient temperature and humidity sensor has the same appearance as a battery temperature sensor. The two types of sensors can be cascaded (up to four). The ambient temperature and humidity sensor address range is 32–44, which is different from the battery temperature sensor. Therefore, you can use the sensor as an ambient temperature and humidity sensor or battery temperature sensor by setting the address. |
| **NTC** | The short-distance battery temperature sensor monitors the ambient temperature near batteries, and ensures that batteries work reliably and securely. The default status is **Disable**. If a short-distance battery temperature sensor is configured, set **NTC** to **Enable**. |
| **WiFi 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 |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| Item | Description |
|---|---|
| | device to which the mobile phone is connected. |
| **WiFi Password** | The password for accessing WiFi. |

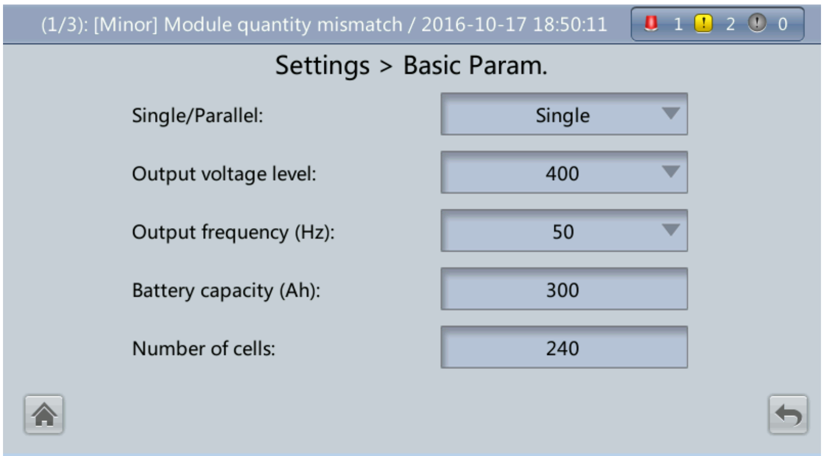
## Basic Parameters

**NOTICE**

Parameter settings must meet the actual values. Otherwise, alarms will be generated or serious faults may occur.

Set basic system and battery parameters, as shown in Figure 4-32.

**Figure 4-32** Basic Param. screen




**Output voltage level**

Indicates the system output voltage level. This parameter is configurable only after the inverter shuts down. For three-phase output, this parameter can be set to 380 V, 400 V (default), or 415 V. 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%.)

| Item | Description |
|---|---|
| **Single/Parallel** | The value for the UPS running mode can be **Single** (default) or **Parallel**. |
| **Output frequency (Hz)** | The value for the system output frequency can be 50 Hz (default) or 60 Hz. |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| Item | Description |
|---|---|
| **Battery capacity (Ah)** | The value range is 5 Ah to 9999 Ah. 600 Ah is set by default for the 400 kVA, 500 kVA, and 600 kVA UPSs, and 800 Ah is set by default for the 800 kVA UPS. |
| **Number of cells** | Each 12 V battery consists of six cells. The value range is 180 to 276. The default value is 240. |

NOTE

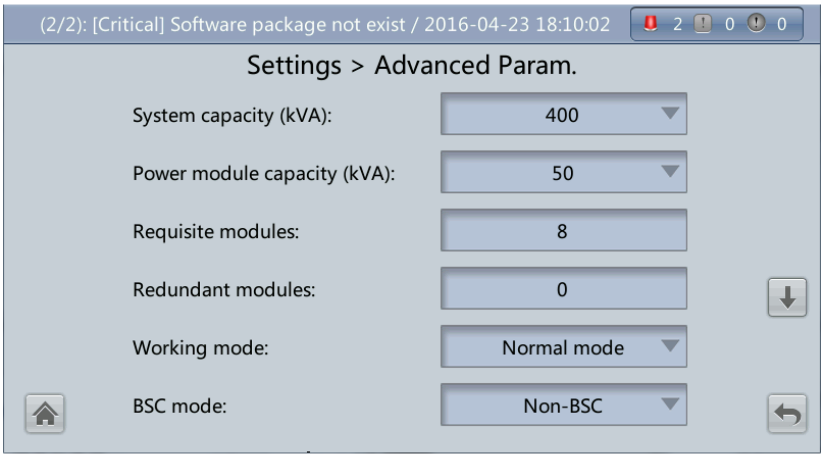
- A cell consists of electrodes and electrolytes, which is the basic unit for the battery. Each cell has a nominal voltage of 2 V. A battery is a module consisting of single or multiple cells in a shell. Each battery has a nominal voltage of 2 V or 12 V. The number of cells must be a multiple of 12 (for example, 180 and 192).
- **Cell float voltage**, **Cell equalized volt**, **Float volt. temp. comp. coef.**, and **EOD voltage threshold** are set for cells.

## Advanced Parameters

NOTICE

Set **System capacity** and **Power module capacity** according to site specifications. Incorrect settings may generate an overload alarm, which affects normal UPS running.

**Figure 4-33** Advanced Param. screen 1




| Item | Description |
|---|---|
| **System capacity (kVA)** | The rated system capacity equals the capacity of each power module multiplied by the number of requisite power modules. If this is set incorrectly, the **Module quantity mismatch** alarm will be generated. |
| **Power module** | Rated power module capacity. |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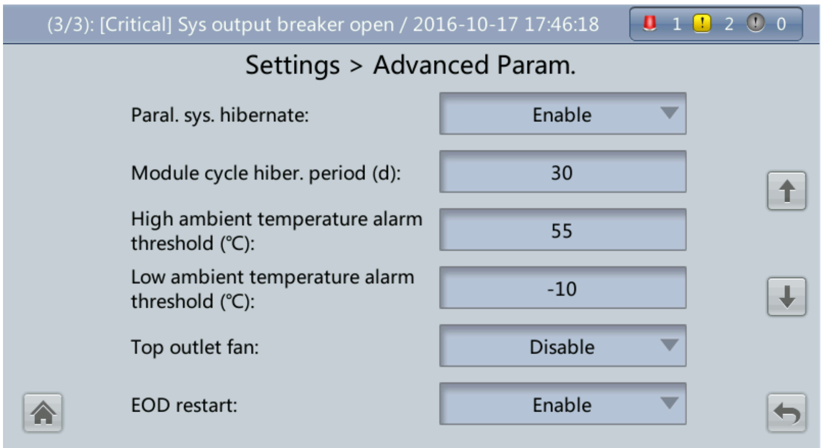
| Item | Description |
|---|---|
| **capacity (kVA)** | |
| **Requisite modules** | Matches the system capacity. |
| **Redundant modules** | Set this parameter according to load capacity and redundancy requirements. The value range is 0 to 19. The default value is **0**. |
| **Working mode** | The value can be **Normal mode** (default), **Converter mode**, **Self-load mode**, or **ECO**. |
| **BSC mode** | • The value can be **Non-BSC mode** (default) or **BSC mode** (set when the system is a dual-bus system).<br>• A dual-bus system consists of the master and slave BSC systems. You can specify the master and slave BSC systems (one master and one slave) and change the settings under the guidance of maintenance engineers. Set the master and slave BSC systems to master and slave BSC modes respectively.<br>**NOTE**<br>Ensure that the BSC signal cable between the master and slave BSC systems is properly connected and that BSC-related hardware is properly installed. |

**Figure 4-34** Advanced Param. screen 2




| Item | Description |
|---|---|
| **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. The default value is **Disable**. |
| **Module cycle hiber. period (d)** | A cycle of 1 to 100 days can be set. The parameter is set to **30 days** by default. |
| **High** | An alarm is generated when the ambient temperature reaches or exceeds |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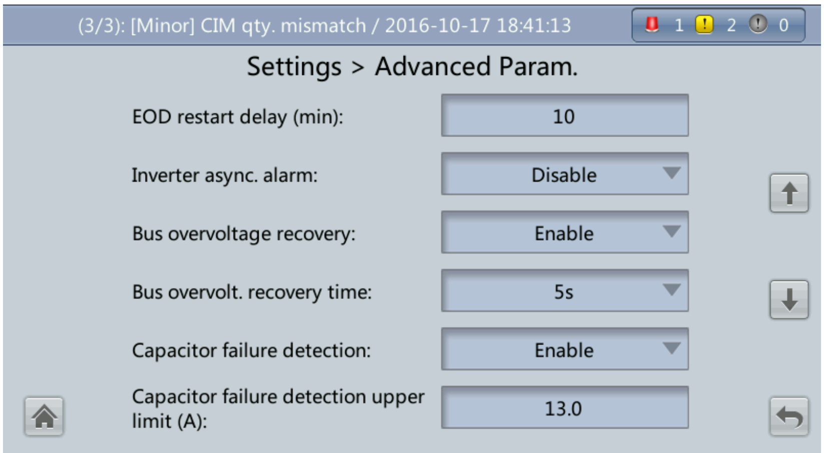
| Item | Description |
|---|---|
| **ambient temperature alarm threshold (°C)** | the threshold specified by this parameter. The value range is 40 to 60. The default value is **55**. |
| **Low ambient temperature alarm threshold (°C)** | An alarm is generated when the ambient temperature is lower than the threshold specified by this parameter. The value range is –20 to 0. The default value is **–10**. |
| **Top outlet fan** | Enable this parameter if a top outlet fan is configured. Then the fan running status can be checked. The default value is **Disable**. |
| **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 **EOD restart** is enabled, the UPS will restart as soon as the mains resumes. If **EOD restart** is disabled, clear the alarm manually or enable the restart function for the UPS. This function is enabled by default. |

**Figure 4-35** Advanced Param. screen 3




| Item | Description |
|---|---|
| **EOD restart delay (min)** | If **EOD restart** is set to **Enable**, the UPS starts working after **EOD restart delay** when the mains recovers from an EOD power failure. The value range is 1–1440 min, and the default value is 10 min. |
| **Inverter async. alarm** | Specifies whether an **Inverter asynchronous** 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 **Enable** or **Disable**. The default value is **Disable**. |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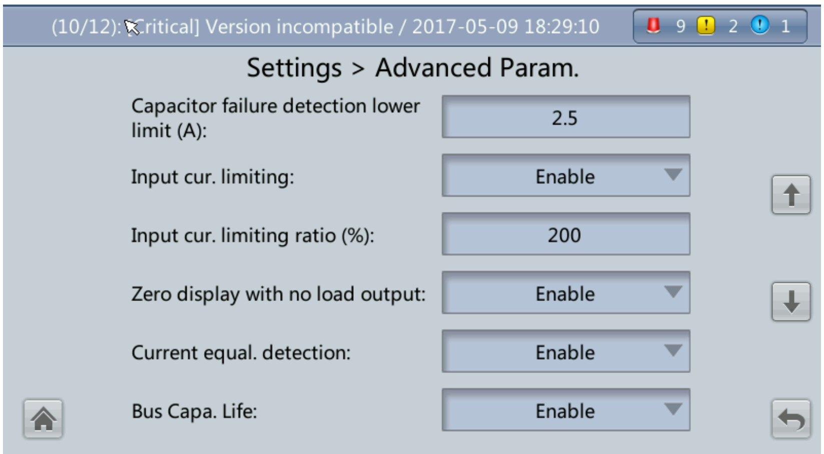
| Item | Description |
|---|---|
| **Bus overvoltage recovery** | Specifies whether to automatically clear the alarm and restart the power module when the rectifier or inverter shuts down due to a bus overvoltage alarm. If **Bus overvoltage recovery** is set to **Enable**, the bus overvoltage alarm is automatically cleared, and the rectifier and inverter automatically start when the bus voltage recovers (less than 420 V) within **Bus overvolt. recovery time**. When **Bus overvoltage recovery** is set to **Disable**, the bus overvoltage alarm cannot be automatically cleared, and the rectifier and inverter cannot automatically start. The default value is **Enable**. |
| **Bus overvolt. recovery time** | If **Bus overvoltage recovery** is set to **Enable**, the bus overvoltage alarm is automatically cleared, and the rectifier and inverter automatically start when the bus voltage recovers (less than 420 V) within **Bus overvolt. recovery time**. The default value is **5s**. |
| **Capacitor failure detection** | If **Capacitor failure detection** is set to **Enable**, the power module (power unit) performs inverter capacitor fault detection based on the settings of **Capacitor failure detection upper limit** and **Capacitor failure detection lower limit**. If the power module determines that the inverter capacitor is faulty, it shuts down the inverter to prevent the fault from expanding. The default value is **Enable**. |
| **Capacitor failure detection upper limit (A)** | The value range of **Capacitor failure detection upper limit** is 10–13 A. When the inverter capacitor current exceeds the current specified by this parameter, the power module determines that the inverter capacitor is faulty and shuts down the inverter. The default value is **13 A**. |

**Figure 4-36** Advanced Param. screen 4




| Item | Description |
|---|---|
| **Capacitor failure detection lower limit** | The value range of **Capacitor failure detection lower limit** is 0–2.5 A. When the inverter capacitor current is lower than the current specified by this parameter, the power module determines that the inverter capacitor is faulty and shuts down the inverter. If **Capacitor failure detection lower** |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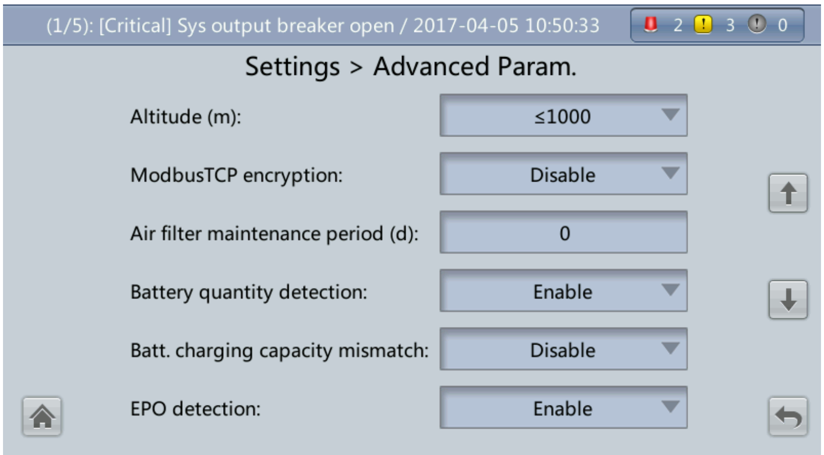
| Item | Description |
|---|---|
| **(A)** | **limit** is set to 0 A, the power module does not perform inverter capacitor fault detection. The default value is **2.5 A**. |
| **Input cur. limiting** | Specifies whether to enable or disable input current limiting to protect generators. The default value is **Disable**. |
| **Input cur. limiting ratio (%)** | Limits the input current to protect the D.G. The value can be 50%–200%. The default value is 200%. |
| **No load output shows zero** | If this parameter is set to **Enable**, the output current and output load ratio are displayed as 0 in the case of no load. If this parameter is set to **Disable**, the output current and output load ratio are not displayed as 0 in the case of no load. The default value is **Enable**. |
| **Current equal. detection** | Monitors the current differences between racks or modules. If this parameter is set to **Enable**, the **Mod. Cur. Eql. Data** can be viewed on the running information screen. This parameter is set to **Disable** by default. |
| **Bus Capa. Life** | If this parameter is set to **Enable**, the UPS detects the bus capacitor lifespan. The default value is **Disable**. |

**Figure 4-37** Advanced Param. screen 5




| Item | Description |
|---|---|
| **Altitude (m)** | Set this parameter based on the altitude of the place where the rack is used. The default value is less than or equal to 1000. |
| **ModbusTCP Encryption** | If Modbus TCP is used for communication, communication links do not implement encryption or implement encryption based on the selected encryption mode. The default value is **Enable**. |
| **Air filter maintenanc** | Specifies the rack air filter maintenance interval. If it is set to **0**, there is no reminder. The value range is 0 to 365. The default value is **0**. |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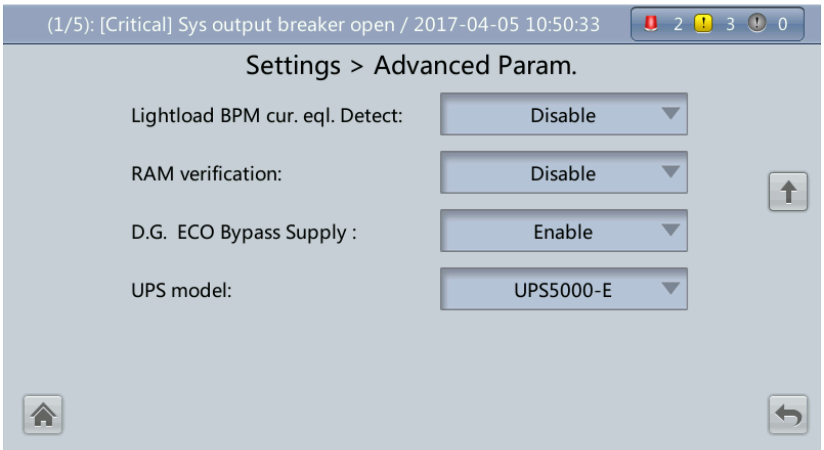
| Item | Description |
|---|---|
| **e period (d)** | |
| **Battery segment detection** | Specifies whether the alarm is enabled. An alarm is generated only when the alarm is enabled and the alarm generating conditions are met. The default value is **Enable**. |
| **Batt. charging capacity mismatch** | After this function is enabled, an alarm is generated if the configured battery capacity exceeds the charging capacity of the rack. The default value is **Enable**. |
| **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. This function is enabled by default. |

**Figure 4-38** Advanced Param. screen 6




NOTE

**UPS model** should be set by professional technical personnel of Huawei or personnel authorized by Huawei.

| Item | Description |
|---|---|
| **Lightload BPM cur. eql. Detect** | Enable or disable the light load bypass current imbalance alarm. If this parameter is set to **Enable**, 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 **Disable**, the preceding detection is not performed. Whether the bypass current is imbalanced does not affect the ECO bypass mode. The default value is **Enable**. |
| **RAM verification** | Enable or disable the memory check function. If this parameter is set to **Enable**, the control chip RAM working status is checked regularly. If this parameter is set to **Disable**, regular check is disabled. |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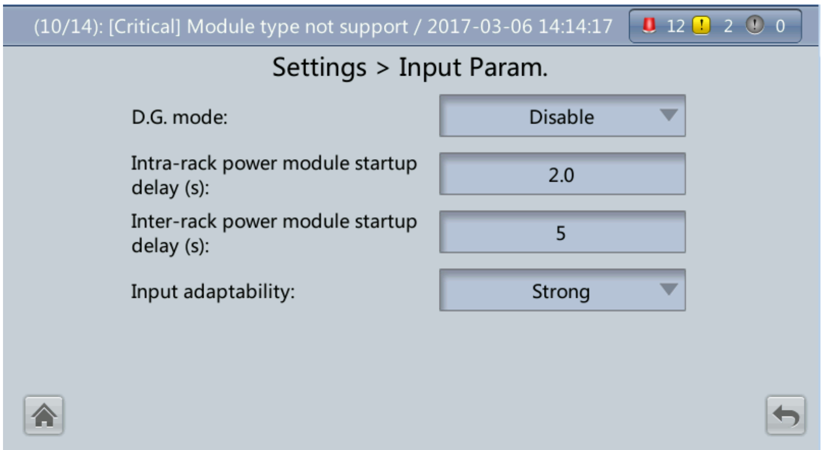
| Item | Description |
|---|---|
| **D.G. ECO BPM supply** | Specifies whether ECO bypass power supply is allowed in D.G. mode. If this parameter is set to **Enable**, the system can enter ECO bypass mode when the D.G. supplies power to the bypass and the ECO function is enabled. If this parameter is set to **Disable**, the system cannot enter ECO mode when the D.G. supplies power to the bypass. The default value is **Enable**. |

## Input Parameters

**Figure 4-39** Input Param. screen




NOTE

Retaining default input parameter settings is advised.

| Item | Description |
|---|---|
| **D.G. mode** | Set this parameter to **Enable** 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. The default value is **Disable**. |
| **D.G. power limiting (kVA)** and **D.G. charger power ratio (%)** | 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. The value range of **D.G. power limiting (kVA)** is 0–5000 kVA. The default value is 600 kVA for the 400 kVA/500 kVA UPS, and the default value is 800 kVA for the 600 kVA UPS, and the default value is 1000 kVA for the 800 kVA UPS. The value range of **D.G. charger power ratio (%)** is 0%–100%, and the default value is 0%. |
| **Intra-rack power module start delay (s)** and **Inter-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. **Intra-rack power module** |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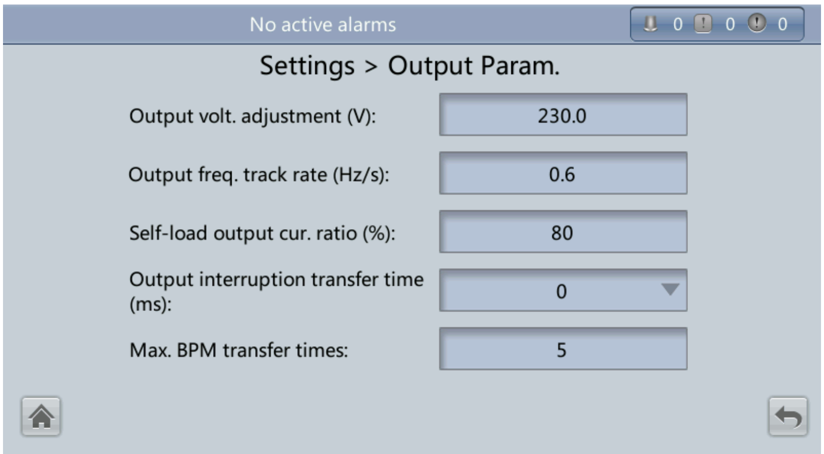
| Item | Description |
|---|---|
| | **start delay (s)** can be set to a value ranging from 0.5 to 120. The preset value of **Intra-rack power module start delay (s)** depends on the preset number of power modules. The preset value is 2.0, 1.0, and 0.5 for 1–5, 6–10, and 10–20 power modules respectively. **Inter-rack power module start delay (s)** can be set to a value ranging from 2 to 120. The preset value of **Inter-rack power module start delay (s)** is 5.0. 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. |
| **Input adaptability** | The value of **Input adaptability** can be **Strong** or **Weak**. 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. The default value is **Strong**. |

## Output Param. screen

**Figure 4-40** Output Param. screen




| Item | Description |
|---|---|
| **Output volt. adjustment (V)** | The output voltage can be adjusted based on the onsite power distribution condition to ensure a minimum difference between the output voltage and the bypass voltage. This facilitates uninterruptible transfer from normal mode to bypass mode. The voltage adjustment range is ±5%. The default value is 220.0 when the voltage is 380 V, 230.0 when the voltage is 400 V, and 240.0 when the voltage is 415 V. |
| **Output freq. track rate (Hz/s)** | • The value range is 0.1–2.0 Hz/s, and the default value is 0.6 Hz/s.<br>• This parameter can be adjusted based on site requirements. If **Output freq. track rate (Hz/s)** is slow, the inverter frequency is different from the bypass frequency when the bypass frequency changes. If output is |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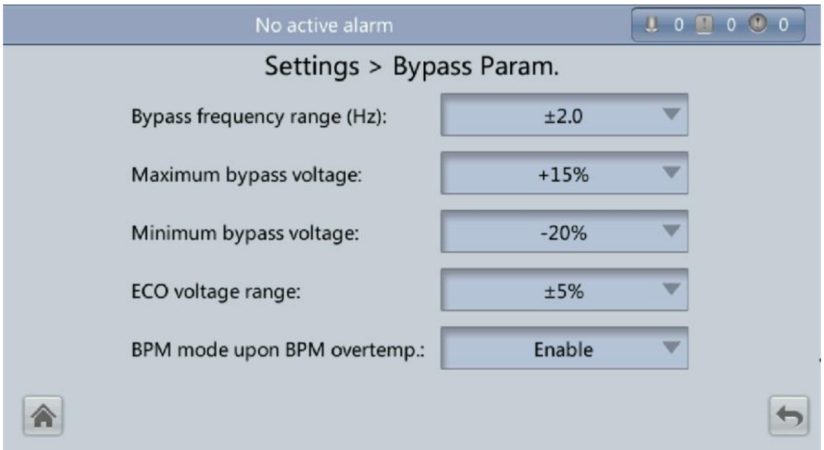
| Item | Description |
|---|---|
| | overloaded or the inverter is faulty, an interruption (less than 20 ms) occurs when the UPS transfers from normal mode to bypass mode. If **Output freq. track rate (Hz/s)** is fast, the inverter frequency is unstable. |
| **Self-load output cur. ratio (%)** | Set the percentage of the output current to the rated output current when the UPS is in self-load mode. The value can be 20%–100%, and is 80% by default. |
| **Output interruption transfer time (ms)** | The interruption for the UPS to transfer from normal mode to bypass mode is 1–2 ms, and from bypass mode to normal mode is 0–20 ms. Set this parameter based on the output interruption time acceptable to loads. The default value is 0 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. The value can be 1 to 10, and is 5 by default. |

## Bypass Parameters

**Figure 4-41** Bypass Param. Settings




| Item | Description |
|---|---|
| **Bypass frequency range (Hz)** | When the difference between the bypass input frequency and the rated frequency is greater than this value, the system determines that the bypass frequency is not normal, and that the bypass is unavailable.<br>The frequency range must be greater than the ECO frequency range. The value range is ±0.5 Hz to ±6 Hz, ±2 Hz by default. |
| **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 bypass voltage is not normal and that the bypass is unavailable.<br>**NOTE** |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| Item | Description |
|---|---|
| | • When the voltage level is 380 V, the value range is 10%, 15% (default), 20%, and 25%.<br>• When the voltage level is 400 V, the value range is 10%, 15% (default), and 20%.<br>• When the voltage level is 415 V, the value range is 10% (default) and 15%. |
| **Minimum bypass voltage** | When the difference between the bypass voltage and the rated voltage exceeds the lower threshold for the bypass voltage, the system determines that the bypass voltage is abnormal and that the bypass is unavailable. The value can be –10%, –15%, –20%, –30%, –40%, –50%, or –60%. The default value is –20%. |
| **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. The values can be ±5%, ±6%, ±7%, ±8%, ±9%, or ±10%. The default value is ±5%. |
| **BPM mode upon BPM overtemp.** | Specifies whether to start bypass mode when overtemperature occurs. The default value is **Enable**. |

## Battery Parameter Settings

**NOTICE**

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


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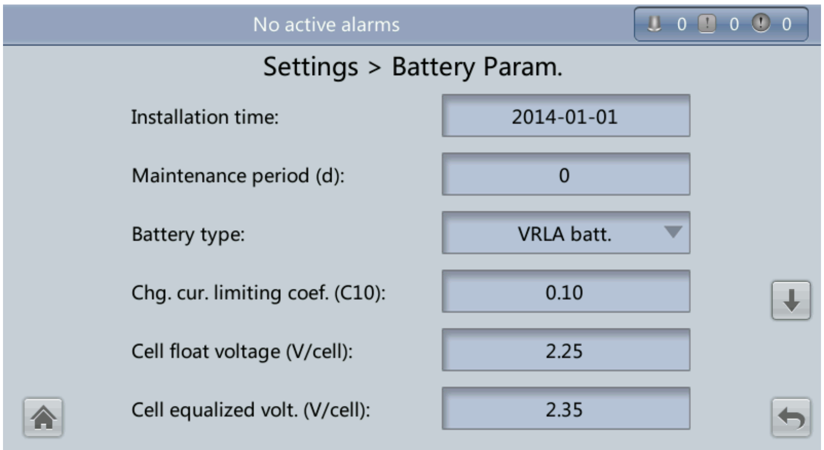
- **Battery string sharing** is unavailable when **Single/Parallel** is set as **Single**.
- **Battery string sharing** affects the actual charge current and the estimated discharge time. An incorrect setting will cause a high or low charge current, which may damage the batteries. An incorrect estimated discharge time may cause a data backup fault.
- 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**; **Dis. cur. 0.1C EOD** ≥ **Dis. cur. 0.3C EOD** ≥ **Dis. cur. 0.5C EOD** ≥ **Dis. cur. 1.0C EOD**.
- **Battery type** must meet the actual situation. Currently, only **VRLA batt.** is supported.
- **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.

**Figure 4-42** Battery Param. screen 1




| Item | Description |
|---|---|
| **Installation time** | A battery maintenance reminder is displayed when the maintenance time (counted from the installation time) comes. |
| **Maintenance period (d)** | Specifies the interval for reminding users of battery maintenance. The value range is 0 to 365. The default value is **0**. |
| **Battery type** | Set the battery type based on actual conditions. Currently, only lead-acid batteries are supported. |
| **Chg. cur. limiting coef. (C10)** | The charging current limit is a multiple of the battery capacity. The value can be 0.05–0.15, and is 0.1 by default. |
| **Cell float voltage** | The float voltage value can be 2.23–2.30 V/cell, and is 2.25 V/cell by default. |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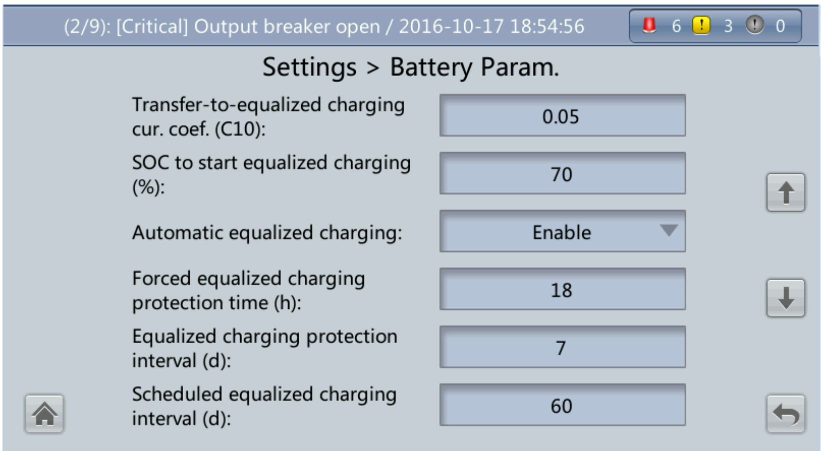
| Item | Description |
|---|---|
| **(V/cell)** | |
| **Cell equalized volt. (V/cell)** | The battery equalized voltage value can be 2.30–2.40 V/cell, and is 2.35 V/cell by default. |

**Figure 4-43** Battery Param. screen 2




| Item | Description |
|---|---|
| **Transfer-to-equalized charging cur. coef. (C10)** | The battery enters equalized charge state when the battery current exceeds this parameter value. The value range is 0.02–0.08, and is 0.05 by default. |
| **SOC to start equalized charging (%)** | If the SOC is lower than the specified value, batteries start equalized charging. The value range is 0 to 100. The default value is **70**. |
| **Automatic equalized charging** | If this parameter is set to **Enable**, the UPS automatically changes the battery management status to equalized charge based on the charge current and float charge time. The default value is **Enable**. |
| **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. The value range is 12 to 24. The default value is **18**. |
| **Equalized charging protection interval (d)** and **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 **Equalized charging protection interval**. After equalized charging is complete, scheduled equalized charging starts when the non-equalized charging time exceeds **Scheduled equalized charging interval**.<br>The value range of **Equalized charging protection interval** is 0 to 15 and the default value is **7**. The value range of **Scheduled** |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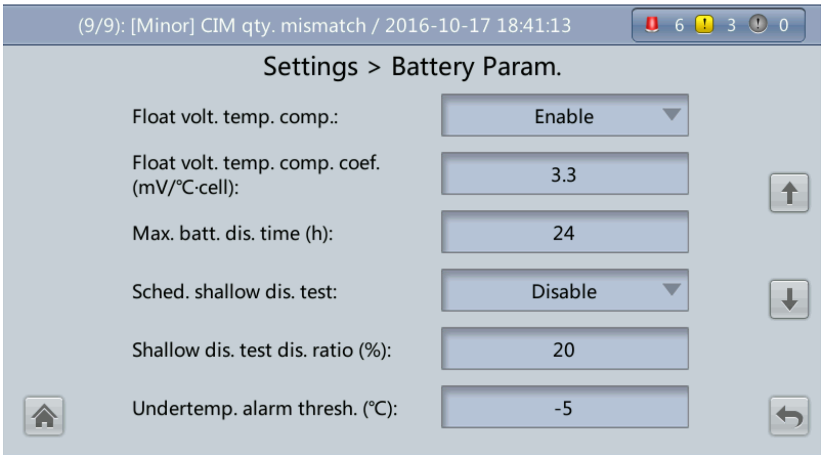
| Item | Description |
|---|---|
| | **equalized charging interval** is 30 to 180 and the default value is **60**. |

**Figure 4-44** Battery Param. screen 3




| Item | Description |
|---|---|
| **Float volt. temp. comp.** | If this parameter is set to **Enable**, the float voltage is calibrated based on the battery temperature when a battery temperature sensor is connected. The parameter is configurable in any mode. The default value is **Enable**. |
| **Float volt. temp. comp. coef. (mV/℃ cell)** | Calibration coefficient during float voltage temperature compensation. The value range is 0.0 to 6.0. The default value is **3.3**. |
| **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 discharge protection is not implemented. The default value is 24 hours. |
| **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. |
| **Shallow dis. test dis. ratio (%)** | Set the proportion of the discharge capacity to the total discharge capacity. The value can be 10%–50%, and is 20% by default. The value is configurable in any mode. |
| **Undertemp. alarm thresh. (℃)** and **Overtemp. alarm thresh. (℃)** | 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℃) is generated. The **Undertemp. alarm thresh.** can be set from –20℃ to +5℃ and the default value is |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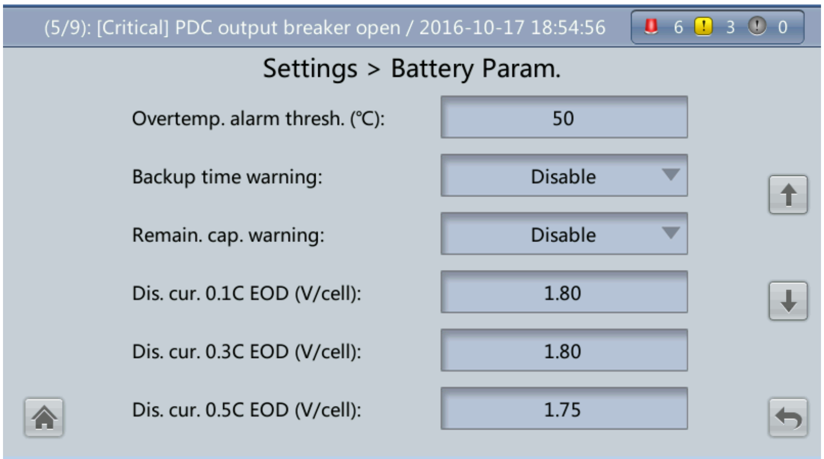
| Item | Description |
|---|---|
| | –5 ℃. The **Overtemp. alarm thresh.** can be set from 35 ℃ to 55 ℃ and the default value is 50 ℃. |

**Figure 4-45** Battery Param. screen 4




| Item | Description |
|---|---|
| **Backup time warning** | An alarm is generated if this parameter is set to **Enable** and the backup time is less than the warning threshold. The default value is **Disable**. |
| **Remain. cap. warning** | An alarm is generated if this parameter is set to **Enable** and the remaining capacity is less than the warning threshold. The default value is **Disable**. |
| **Dis. cur. 0.1C EOD (V/cell)**, **Dis. cur. 0.3C EOD (V/cell)**, **Dis. cur. 0.5C EOD (V/cell)**, and **Dis. cur. 1.0C EOD (V/cell)** | By default, **0.1C EOD (V/cell)** is set to **1.80**, **0.3C EOD (V/cell)** to **1.80**, **0.5C EOD (V/cell)** to **1.75**, and **1.0C EOD (V/cell)** to **1.60**. These values are calculated in real time based on the discharge currents. |


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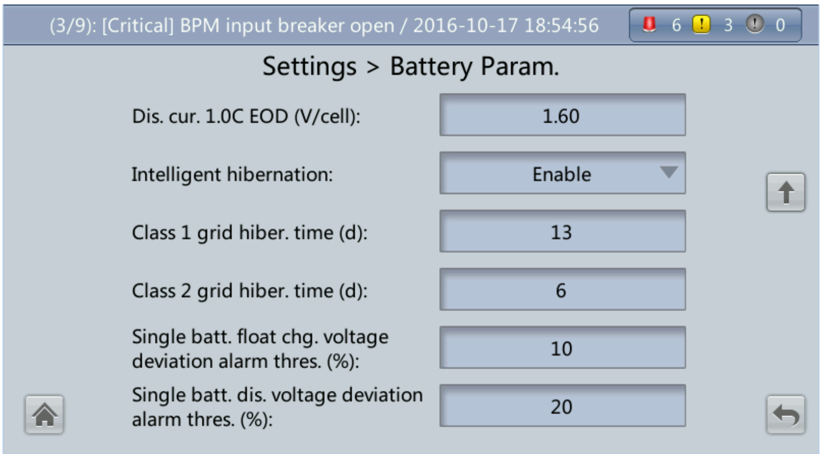
**Figure 4-46** Battery Param. screen 5




| Item | Description |
|---|---|
| **Intelligent hibernation** | If this parameter is set to **Enable**, the intelligent battery hibernation function is enabled. The default value is **Disable**. |
| **Class 1 grid hiber. time (d)** and **Class 2 grid hiber. time (d)** | Set the hibernation time based on the power grid type. In hibernation mode, batteries are not charged or discharged, which extends the battery lifespan.<br>• The **Class 1 grid hiber. time** value range is 0–30 days, and the default value is 13 days. The value 0 indicates no hibernation.<br>• The **Class 2 grid hiber. time** value range is 0–15 days, and the default value is 6 days. The value 0 indicates no hibernation. |
| **Single batt. float chg. voltage deviation alarm thres. (%)** and **Single batt. dis. voltage deviation alarm thres. (%)** | **Single batt. float chg. voltage deviation alarm thres. (%)** and **Single batt. dis. voltage deviation alarm thres. (%)** 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.<br>The value range of **Single batt. float chg. voltage deviation alarm thres. (%)** is 5 to 30 and the default value is **10**. The value range of **Single batt. dis. voltage deviation alarm thres. (%)** is 10 to 30 and the default value is **20**.<br>The calculation formula is (Charge/Discharge voltage – Average voltage)/Average voltage x 100%. |


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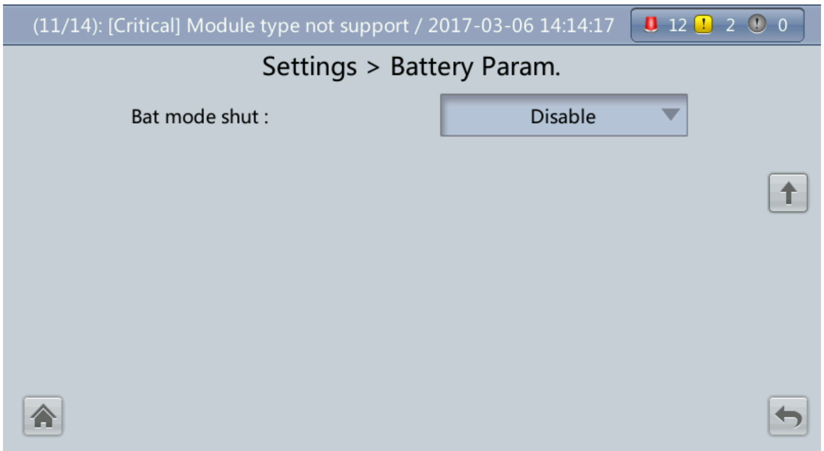
**Figure 4-47** Battery Param. screen 6




| Item | Description |
|---|---|
| **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. The default value is **Disable**. |

## Dry Contact Settings

**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 two routes of input signals and one route of output signals.

Set the dry contact parameters, as shown in Figure 4-48 to Figure 4-54.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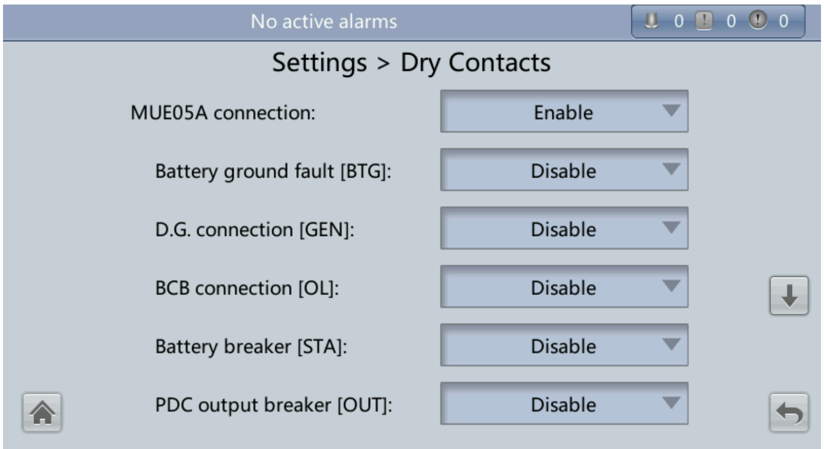
**NOTE**

The figure displays the default status.

**Figure 4-48** Dry Contacts screen 1




| Item | Description |
|---|---|
| **MUE05A connection** | MUE05A connection status. Independent input signals can be enabled only when this parameter is set to **Enable**. |
| **Batter ground fault [BTG]** | Enable or disable the battery grounding failure detection. |
| **D.G. connection [GEN]** | Enable or disable D.G. connection detection. |
| **BCB connection [OL]** | Enable or disable BCB connection detection. |
| **Batter breaker [STA]** | Enable or disable battery circuit breaker monitoring. |
| **PDC output breaker [OUT]** | Enable or disable PDC output circuit breaker monitoring. |


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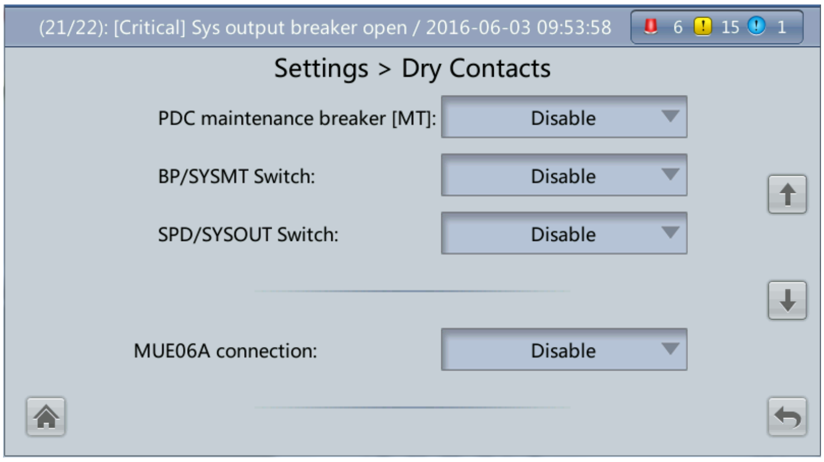
**Figure 4-49** Dry Contacts screen 2




| Item | Description |
|---|---|
| **PDC maintenance breaker [MT]** | Enable or disable PDC maintenance circuit breaker monitoring. |
| **BP/SYSMT Switch** | If the BP/SYSMT switch is set to **Enable**, 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 **Enable**, 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 **Enable**, 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 **Enable**, 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. |


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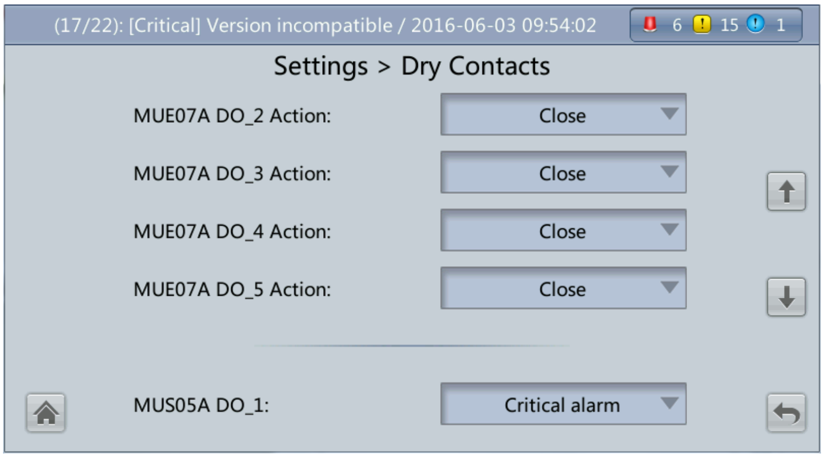
**Figure 4-50** Dry Contacts screen 3


| Item | Description |
|---|---|
| **MUE06A connection** | If this parameter is enabled, the mains and bypass backfeed protection is enabled. |
| **MUS05A DO_1 Action** | Control the status of the DO_1 dry contact on the MUS05A dry contact card. |
| **MUS05A DO_2 Action** | Control the status of the DO_2 dry contact on the MUS05A dry contact card. |
| **MUS05A DO_3 Action** | Control the status of the DO_3 dry contact on the MUS05A dry contact card. |
| **MUS05A DO_4 Action** | Control the status of the DO_4 dry contact on the MUS05A dry contact card. |

**Figure 4-51** Dry Contacts screen 4





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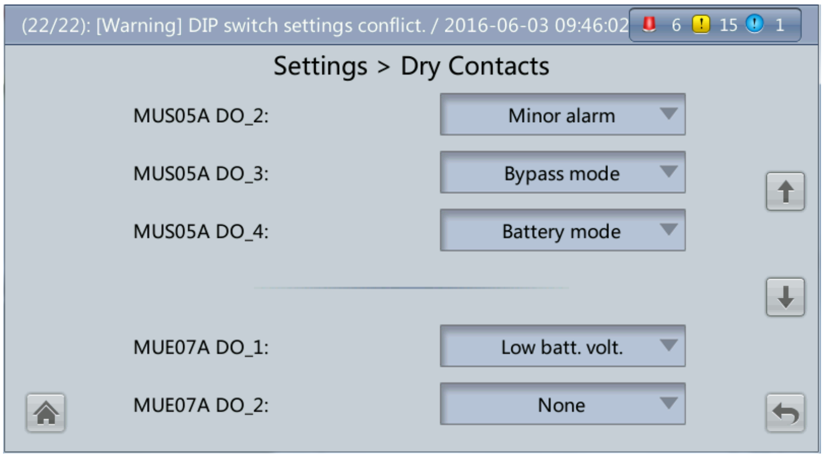
| Item | Description |
|---|---|
| **MUE07A DO_1 Action** | Control the status of the DO_1 dry contact on the MUE07 extended dry contact card. |
| **MUE07A DO_2 Action** | Control the status of the DO_2 dry contact on the MUE07 extended dry contact card. |
| **MUE07A DO_3 Action** | Control the status of the DO_3 dry contact on the MUE07 extended dry contact card. |
| **MUE07A DO_4 Action** | Control the status of the DO_4 dry contact on the MUE07 extended dry contact card. |
| **MUE07A DO_5 Action** | Control the status of the DO_5 dry contact on the MUE07 extended dry contact card. |

**Figure 4-52** Dry Contacts screen 5




| Item | Description |
|---|---|
| **MUS05A DO_1** | Corresponds to signal of the output dry contact DO_1 on the MUS05A. |
| **MUS05A DO_2** | Corresponds to signal of the output dry contact DO_2 on the MUS05A. |
| **MUS05A DO_3** | Corresponds to signal of the output dry contact DO_3 on the MUS05A. |
| **MUS05A DO_4** | Corresponds to signal of the output dry contact DO_4 on the MUS05A. |


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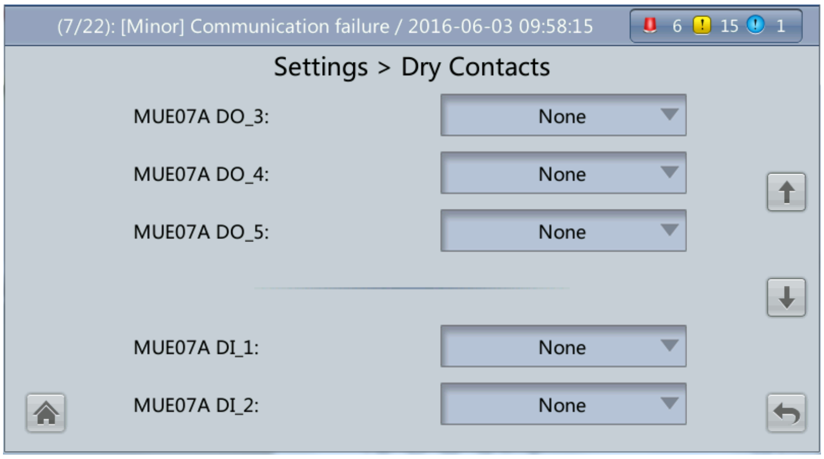
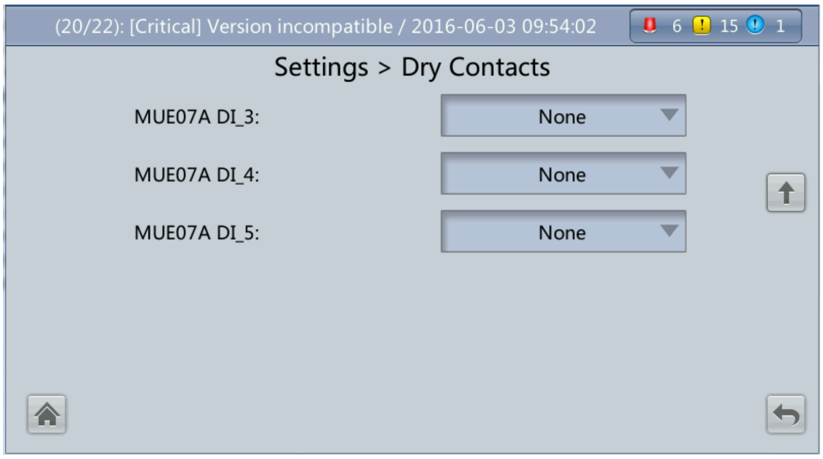
**Figure 4-53** Dry Contacts screen 6




| Item | Description |
| --- | --- |
| **MUE07A DO_1** | Corresponds to signal of the output dry contact DO_1 on the MUE07A. |
| **MUE07A DO_2** | Corresponds to signal of the output dry contact DO_2 on the MUE07A. |
| **MUE07A DO_3** | Corresponds to signal of the output dry contact DO_3 on the MUE07A. |
| **MUE07A DO_4** | Corresponds to signal of the output dry contact DO_4 on the MUE07A. |
| **MUE07A DO_5** | Corresponds to signal of the output dry contact DO_5 on the MUE07A. |

**Figure 4-54** Dry Contacts screen 7





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| Item | Description |
|---|---|
| **MUE07A DI_1** | Corresponds to signal of the input dry contact DI_1 on the MUE07A. |
| **MUE07A DI_2** | Corresponds to signal of the input dry contact DI_2 on the MUE07A. |
| **MUE07A DI_3** | Corresponds to signal of the input dry contact DI_3 on the MUE07A. |
| **MUE07A DI_4** | Corresponds to signal of the input dry contact DI_4 on the MUE07A. |
| **MUE07A DI_5** | Corresponds to signal of the input dry contact DI_5 on the MUE07A. |

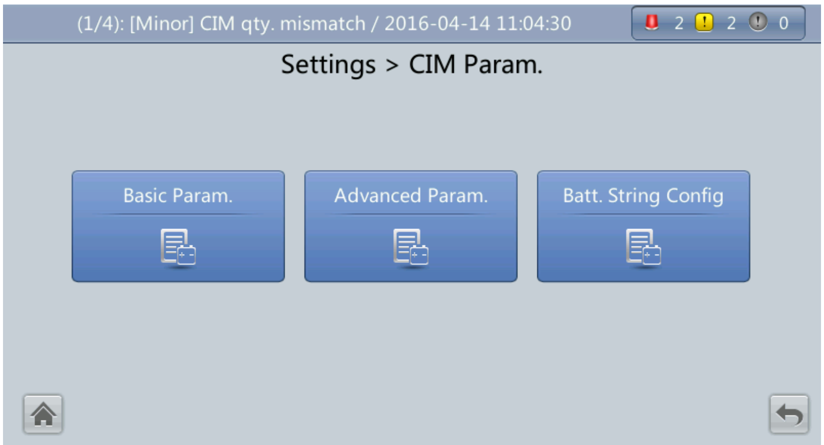
## CIM Parameters

**NOTICE**

If iBAT is configured, set the parameters in this section by referring to the document delivered with the iBAT.

Figure 4-55 shows the **CIM Param.** screen.

**Figure 4-55** CIM parameters




**NOTE**

On the **System Info** > **Settings** > **CIM Param.** > **Basic Param.** screen, if **Number of battery strings** is 0, the **Batt. String Config** is not displayed on the **CIM Param.** screen.

- Figure 4-56 and Figure 4-57 show the **Basic Param.** screen.


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**Figure 4-56** Basic Parameters 1

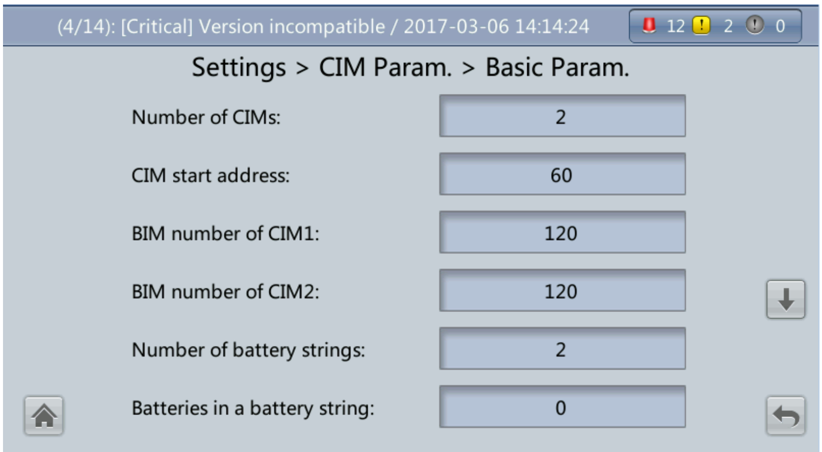
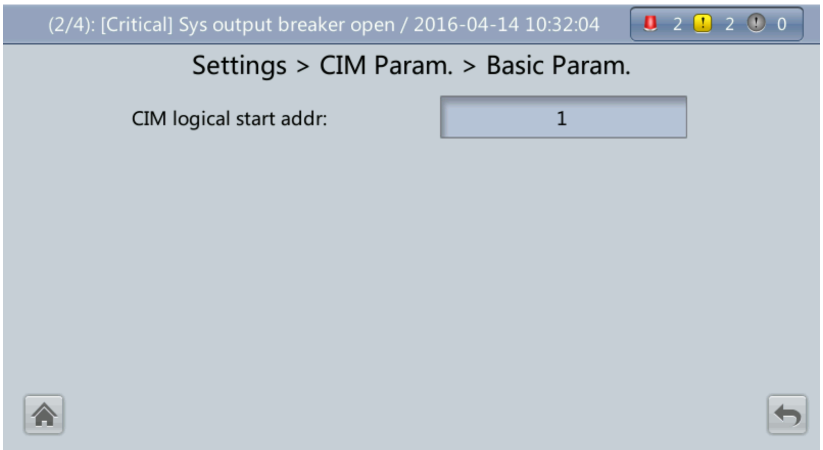



**Figure 4-57** Basic Parameters 2




| Item | Description |
|---|---|
| **Number of CIMs** | A maximum of four CIMs are supported and the default value is 0. |
| **CIM start address** | The CIM start address cannot be changed. The DIP switch should be set to 0000 for the first CIM, and the DIP switch setting for a later connected CIM should increase by 1 (binary) than that set for the previous CIM. |
| **CIM Number of BIMs** | Specifies the number of BIMs managed by the CIM. The value range is 0 to 300. The default value is 0. |
| **Number of battery strings** | Specifies the number of battery strings connected in parallel. The value range is 0 to 4. The default value is 0. |
| **Batteries in a single** | Specifies the number of batteries in a battery string. The value range is 0 to 300. The default value is 0. |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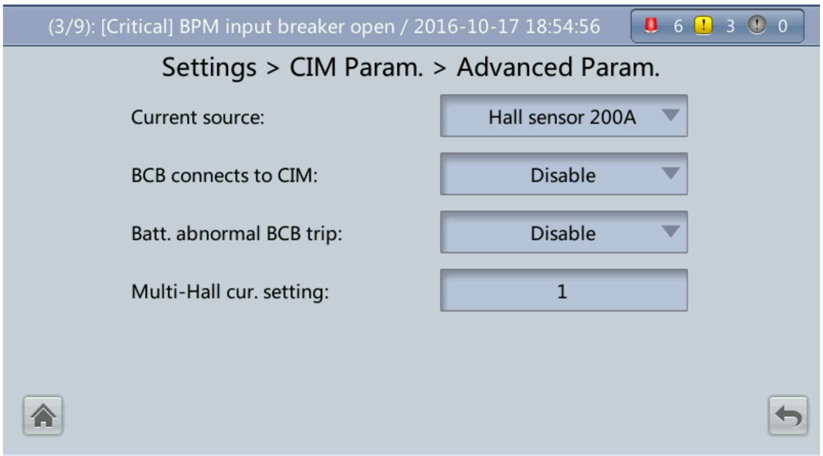
| Item | Description |
| --- | --- |
| **battery string** | |
| **CIM logical start addr** | Specifies the communication address when the northbound device queries CIM data. The value range is 0 to 124. The default value is 0. |

- Figure 4-58 shows the **Advanced Param.** screen.

**Figure 4-58** Advanced Parameters




| Item | Description |
| --- | --- |
| **Current source** | Specifies the specifications of the Hall effect sensor used to detect CIM current. The default value is **Hall sensor 200A**. |
| **BCB connects to CIM** | Specifies whether the BCB connects to the CIM. The default value is **Disable**. |
| **Batt. abnormal BCB trip** | Specifies whether BCB trips when batteries are abnormal. The default value is **Disable**. |
| **Multi-Hal l cur. setting** | **Multi-Hall cur. setting** is equal to the number of Hall effect sensors at the positive or negative terminal of a battery string (**Multi-Hall cur. setting** ≥ 1). The default value is **1**. |

- Figure 4-59 shows the battery string config screen. On this screen, the CIM No. and BIM No. can be set under each battery string.


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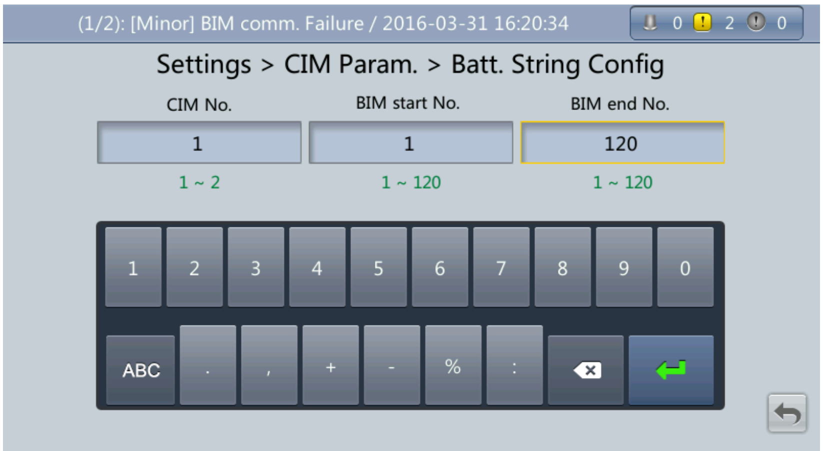
**Figure 4-59** Batt. String Config 1


Figure 4-60 shows the configuration of CIM and BIM for each battery string.

**Figure 4-60** Batt. String Config 2




## 4.1.4.5 Maintenance Screen

On the **System Info** screen, tap to display the **Maintenance** screen, as shown in Figure 4-61 and Figure 4-62. The **Maintenance** screen provides buttons such as **Battery Maint.**, **USB Operations**, **Inv. ON**, and **Inv. OFF**.

**NOTE**

If a user is not currently logged in, a dialog box will display for entering a user name and password.


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**Figure 4-61** Maintenance screen 1

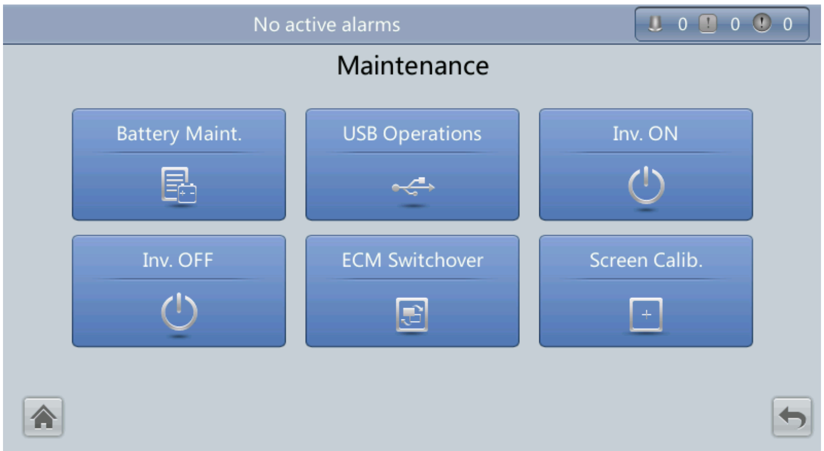
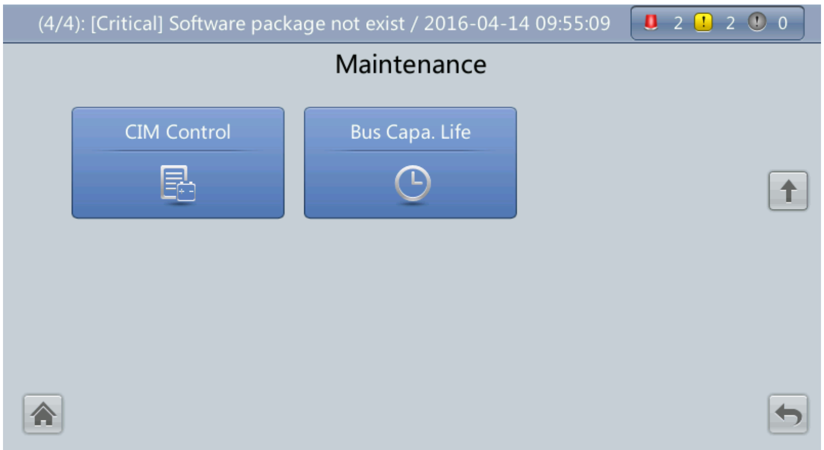



**Figure 4-62** Maintenance screen 2




**NOTE**

On the **System Info** > **Settings** > **Advanced Param.** screen, when **Bus Capa. Life** is set to **Enable**, the **Bus Capa. Life** is displayed on the **Maintenance** screen.

## Battery Maint. Screen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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.

Perform battery maintenance periodically to increase the battery lifespan and improve the UPS reliability. Battery maintenance includes **Forced Equalized Charging**, **Shallow Dis. Test**, and **Capacity Test**. The next maintenance time displayed on the screen indicates the upcoming time in which to check batteries. Figure 4-63 shows the **Battery Maint.** screen.

**Figure 4-63** Battery Maint. screen


| 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. |


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## USB Operations

**Figure 4-64** USB Operations screen 1


**Figure 4-65** USB Operations screen 2


## Inv. ON and Inv. OFF Menus

Use the LCD to start and shut down the inverter. Before the inverter starts, the system asks for confirmation to prevent misoperations. Figure 4-66 shows the **Inv. ON** screen, and Figure 4-67 shows the **Inv. OFF** screen.


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**Figure 4-66** Inv. ON screen

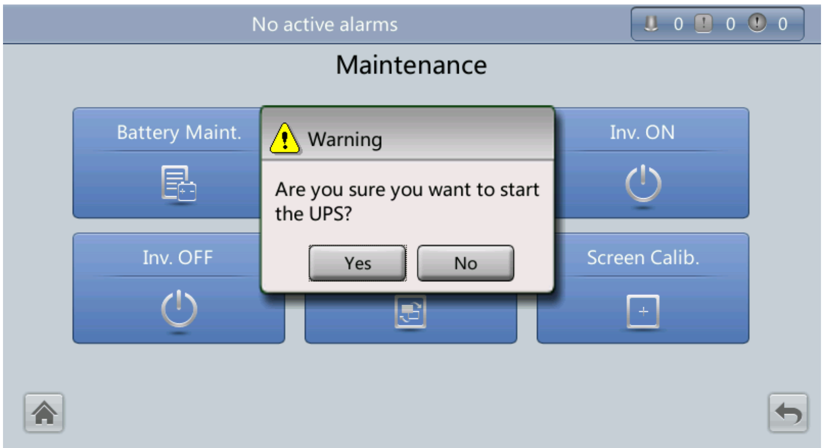


**Figure 4-67** Inv. OFF screen


| Item | Description |
|---|---|
| **Inv. ON** | The **Inv. ON** screen allows you to start the inverter manually. |
| **Inv. OFF** | The **Inv. OFF** screen allows you to shut down the inverter manually. |

## ECM Switchover


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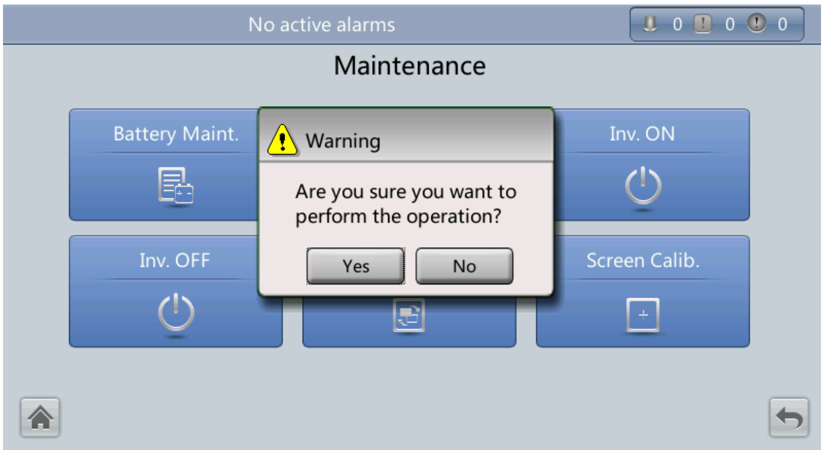
**NOTICE**

- 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, as shown in Figure 4-68 (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.

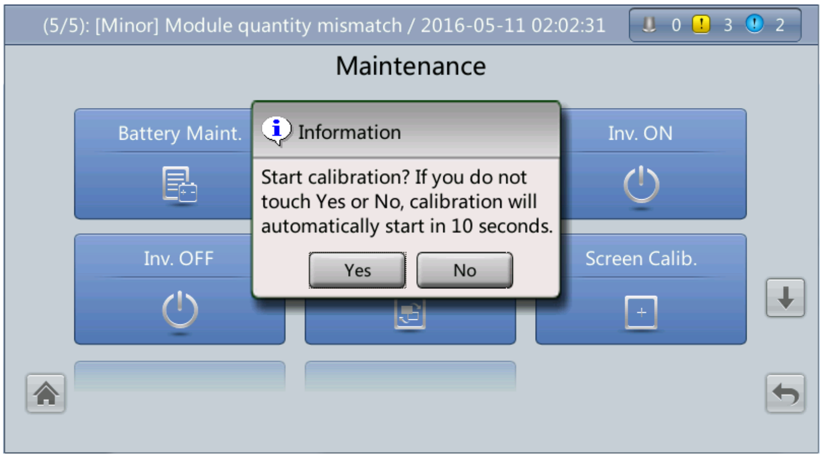
**Figure 4-68** ECM switchover




## Screen Calib. Menu

Calibrate the screen, as shown in Figure 4-69.

**Figure 4-69** Screen Calib. screen





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## CIM control

Reset the specified CIM and BIM, and sets the BIM blinking function or measures the BIM internal resistance.

**Figure 4-70** CIM control


| Item | Description |
| --- | --- |
| **Reset** | Restart a BIM or a CIM. |
| **Blink** | Make the red indicator on the BIM 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 **Measure** to start measuring the internal resistance of the selected BIM in a CIM.<br>**NOTE**<br>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.


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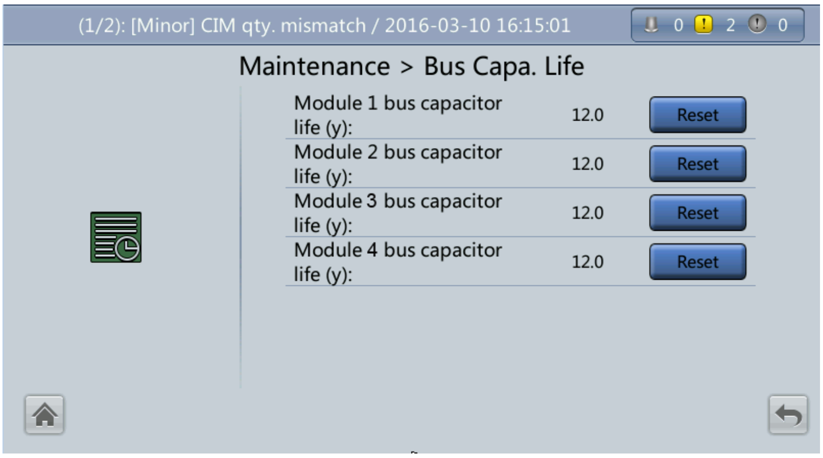
**Figure 4-71** Bus capacitor life forecast




### 4.1.4.6 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 4-72. To view version details, tap **Version Info**.

**Figure 4-72** About screen


## 4.1.5 System Status Screen

On the main screen, tap **System Status**. On the **System Status** to view the mains input, bypass input, load, and battery information, as shown in Figure 4-73.


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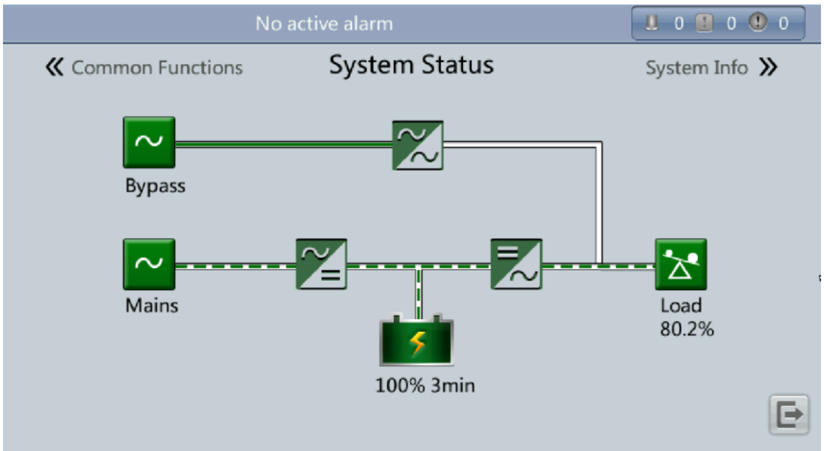
**Figure 4-73** System Status screen




# 4.1.6 Common Functions Screen

On the main screen, tap **Common Functions**. On the **Common Functions** to query the AC output, load, and mains input information, start or shut down the inverter, start or shut down the inverter, control the buzzer, and query the historical alarms, as shown in Figure 4-74 and Figure 4-75.

**Figure 4-74** Common Functions screen 1

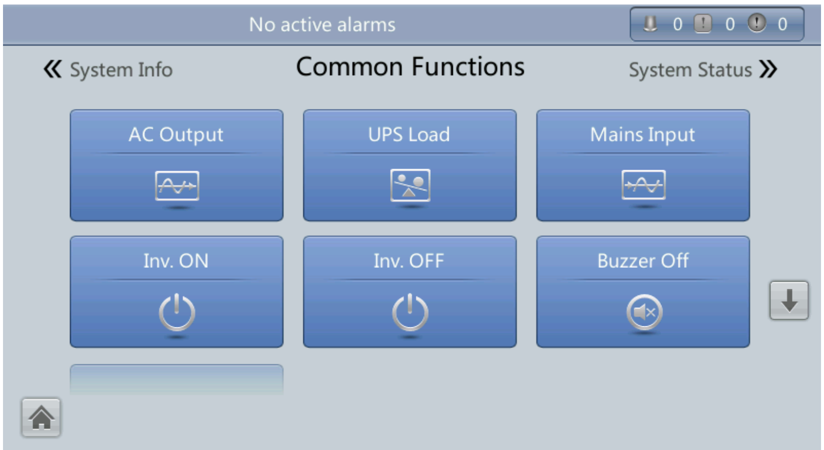




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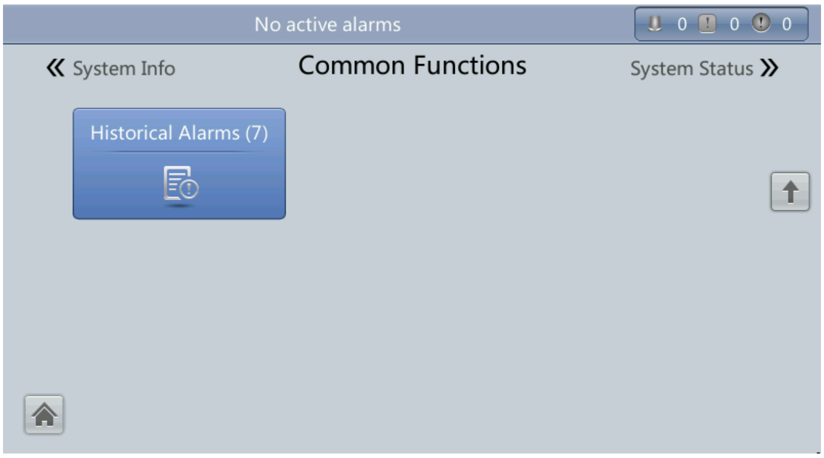
**Figure 4-75** Common Functions screen 2




# 4.2 WebUI

## 4.2.1 Login

### Context

Internet Explorer 11 is used as the example browser.

### 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**, as shown in Figure 4-76.


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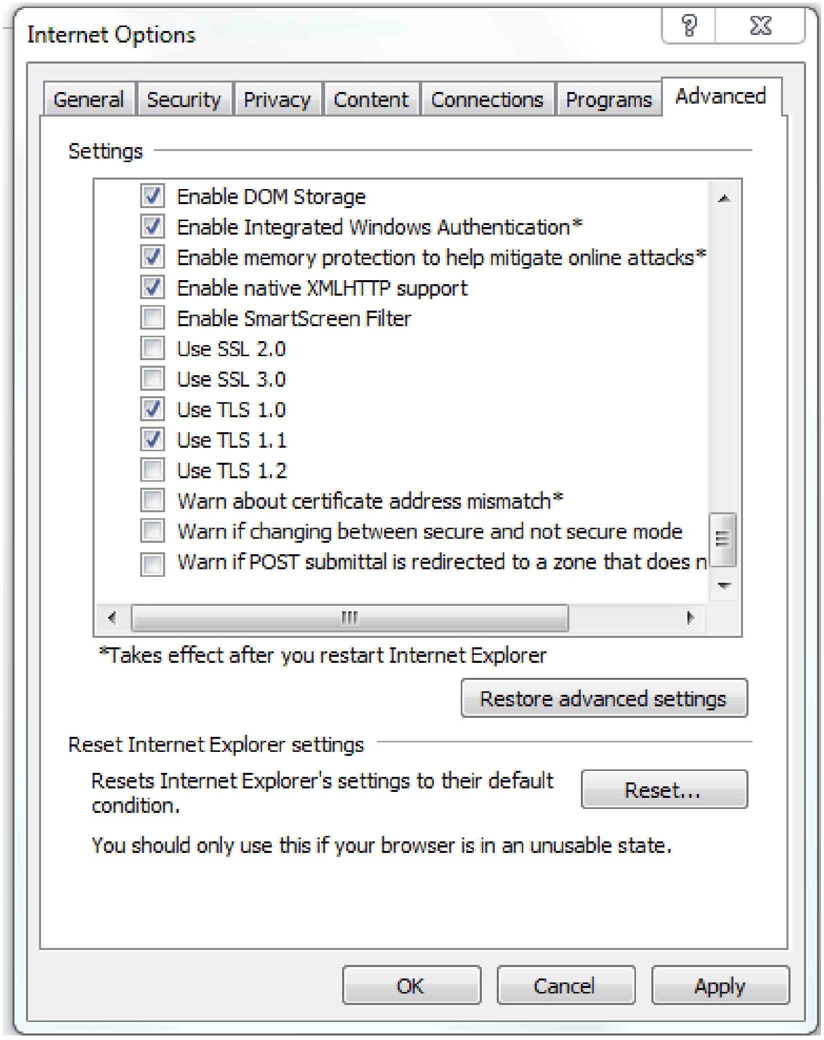
**Figure 4-76** Settings in the Internet Options dialog box




**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**. The system supports Internet Explorer 11 and Firefox 31.0. Table 4-4 describes the system users.

**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 4-4** User description

| Default User | Preset Password | | User Rights |
|---|---|---|---|
| admin (system administrator) | LCD | 000001 | Performs all operations on the LCD and WebUI, including system running information browsing, system information (historical alarms, logs, e-labels, and fault data) exporting, parameter (system parameters and battery parameters) setting, system control (startup, shutdown, troubleshooting, runtime clearing, and battery management), system |
| | WEB | Changeme | |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| Default User | Preset Password | | User Rights |
|---|---|---|---|
| | | | configuration (network parameters, user management, time and date, and site information), and system maintenance (upgrade, calibration, and variables commissioning). |
| operator (common user) | LCD | 000001 | Only browses the system running information, exports system information (historical alarms, logs, e-labels, and fault data), 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. |
| | WEB | Changeme | |
| browser (browsing user) | WEB | N/A | Only browses the system running information. |

**NOTE**

- If an incorrect password is entered three 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 Monitoring Page

After a user logs in to the WebUI, the **Monitoring** page is displayed by default. Figure 4-77 numerically labels **Monitoring** page details and Table 4-5 describes these details.


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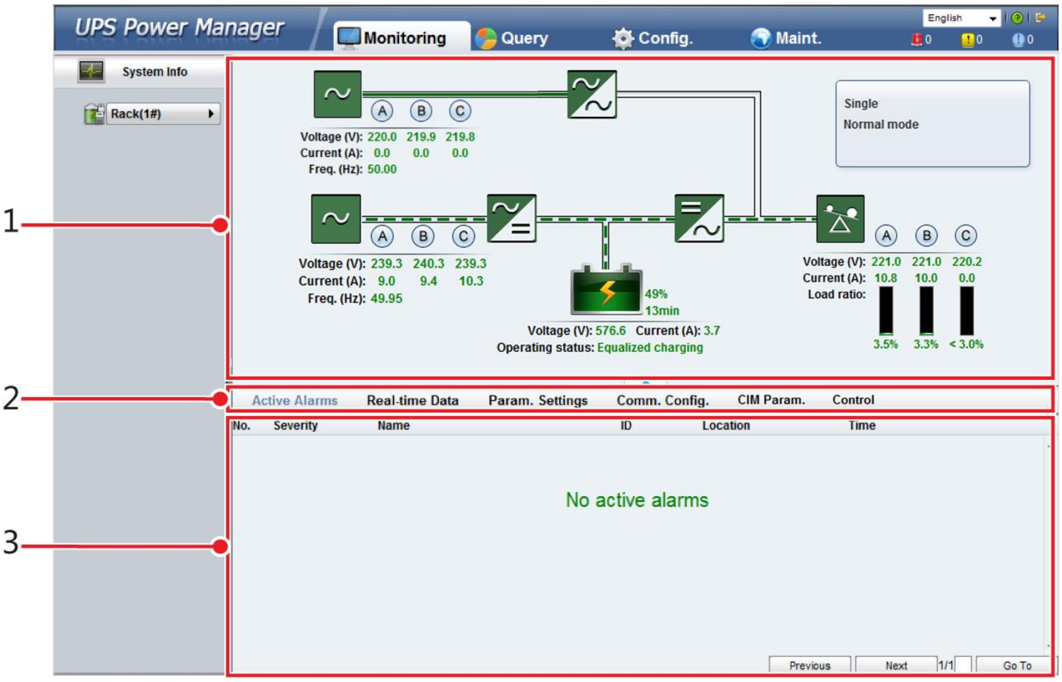
**Figure 4-77** Monitoring page




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

**Table 4-5** Monitoring page 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.<br>The **Active Alarms** page is displayed by default. |
| 3 | Information area | Displays system monitoring information. |

## 4.2.2.1 Active Alarms Page

The **Active Alarms** page details active alarms, as shown in Figure 4-78.


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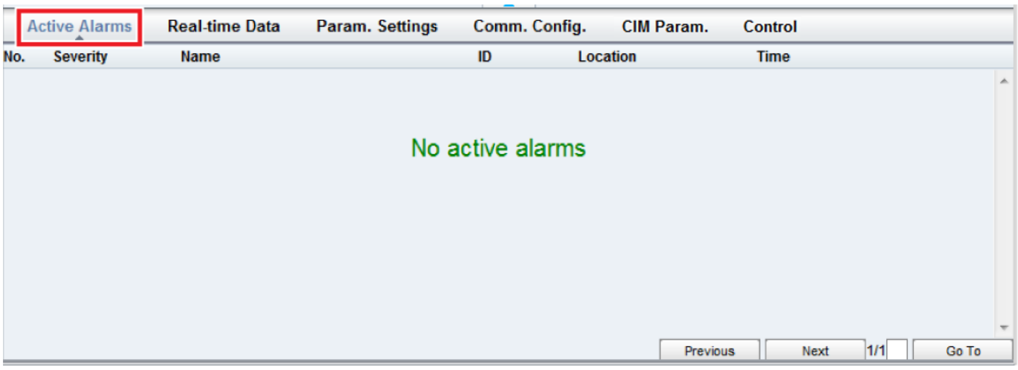
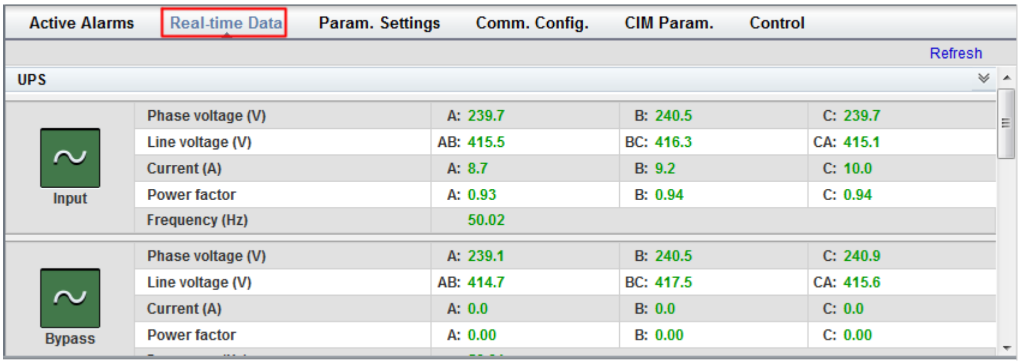
**Figure 4-78** Active Alarms page




## 4.2.2.2 Real-time Data Page

The **Real-time Data** page details real-time system running data, as shown in Figure 4-79.

**Figure 4-79** Real-time Data page




## 4.2.2.3 Param. Settings Page

Set basic parameters, advanced parameters, input parameters, output parameters, bypass parameters, battery parameters, and dry contacts on the **Param. Settings** page, as shown in Figure 4-80.


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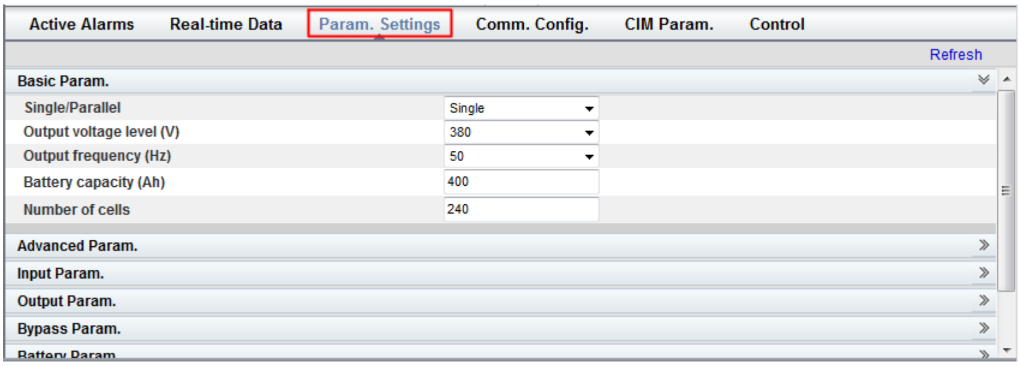
**Figure 4-80** Param. Settings page



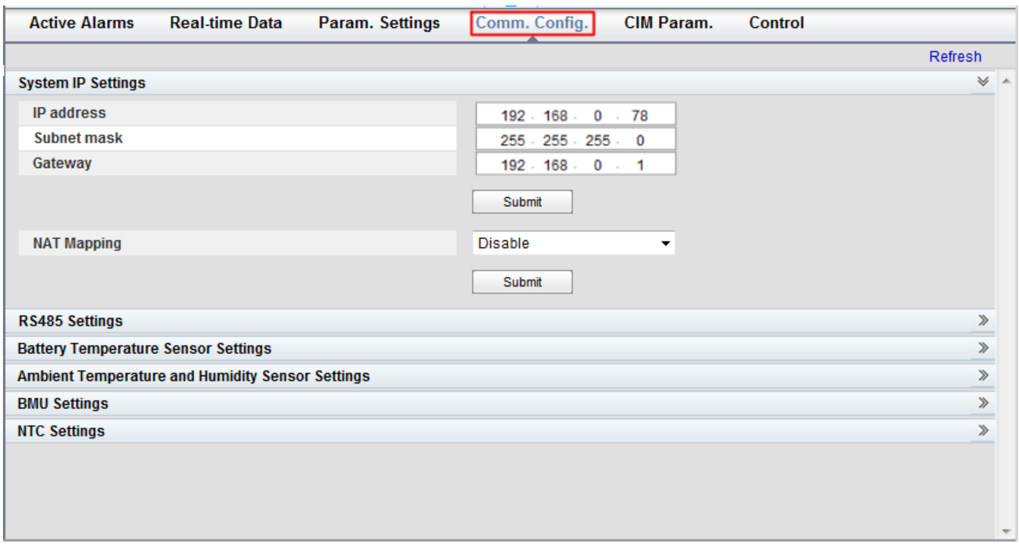

**Calib. output current if no load**

**Calib. output current if no load** can be used only when the UPS output carries no load. If this parameter is changed from **Disable** to **Enable**, the UPS will automatically calibrate the no-load output current and load rate once. If this parameter is changed from **Enable** to **Disable**, the UPS will not automatically perform calibration and the UPS operation will not be affected.

## 4.2.2.4 Comm. Config. Page

Open the **Comm. Config.** page to set communications information. SeeFigure 4-81.

**Figure 4-81** Comm. Config. page




## 4.2.2.5 CIM Parameters

Open the **CIM Param.** Screen to set basic parameters, advanced parameters, and battery string configurations, as shown in Figure 4-82.


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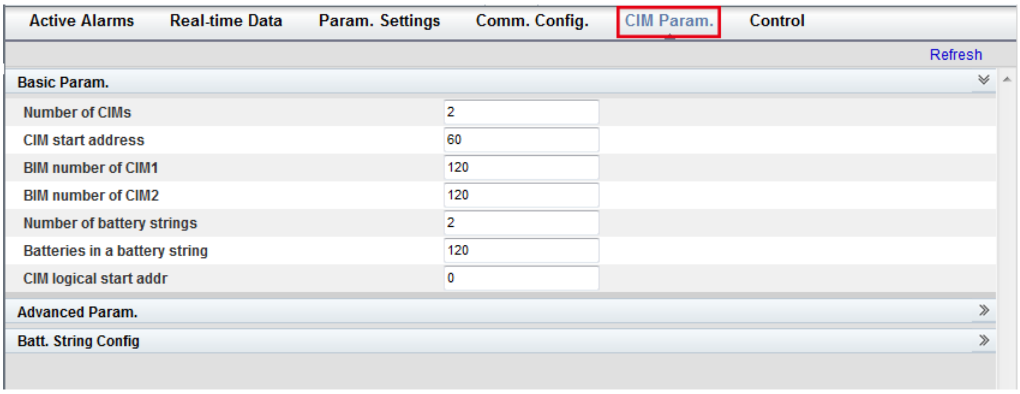
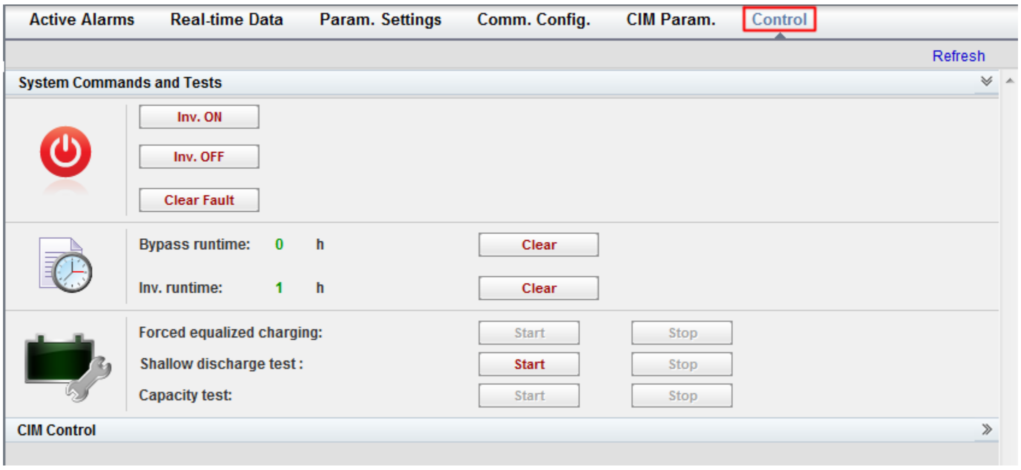
**Figure 4-82** CIM parameters




## 4.2.2.6 Control Page

Open the **Control** page to control the system running and CIM, as shown in Figure 4-83.

**Figure 4-83** Control page




# 4.2.3 Query

## 4.2.3.1 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, as shown in Figure 4-84.


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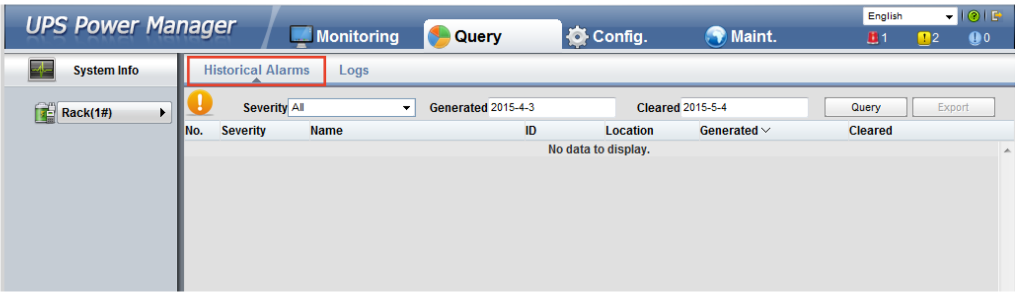
**Figure 4-84** Historical alarms



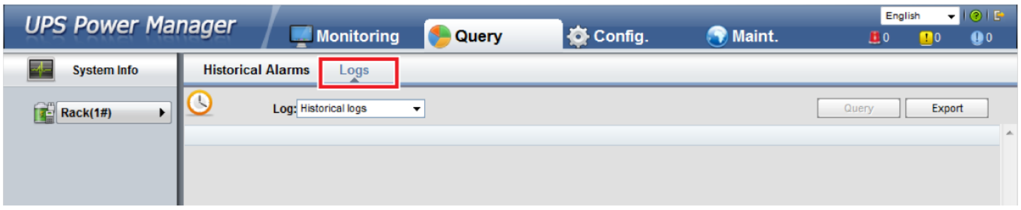

### 4.2.3.2 Logs

On the **Logs** page, you can set **Log** to **Historical logs**, **Cap. test logs**, or **Common test logs**, and query or export logs, as shown in Figure 4-85.

**NOTE**

Historical logs can be exported but not queried.

**Figure 4-85** Logs




## 4.2.4 Config.

### 4.2.4.1 User Management

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


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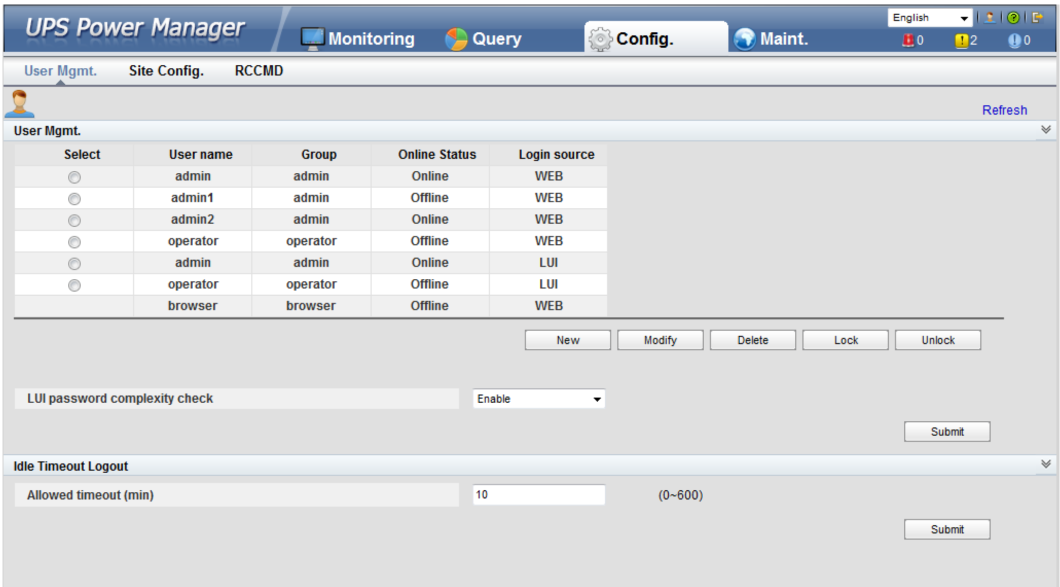
**Figure 4-86** User management




**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.

### 4.2.4.2 Site Config. Page

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


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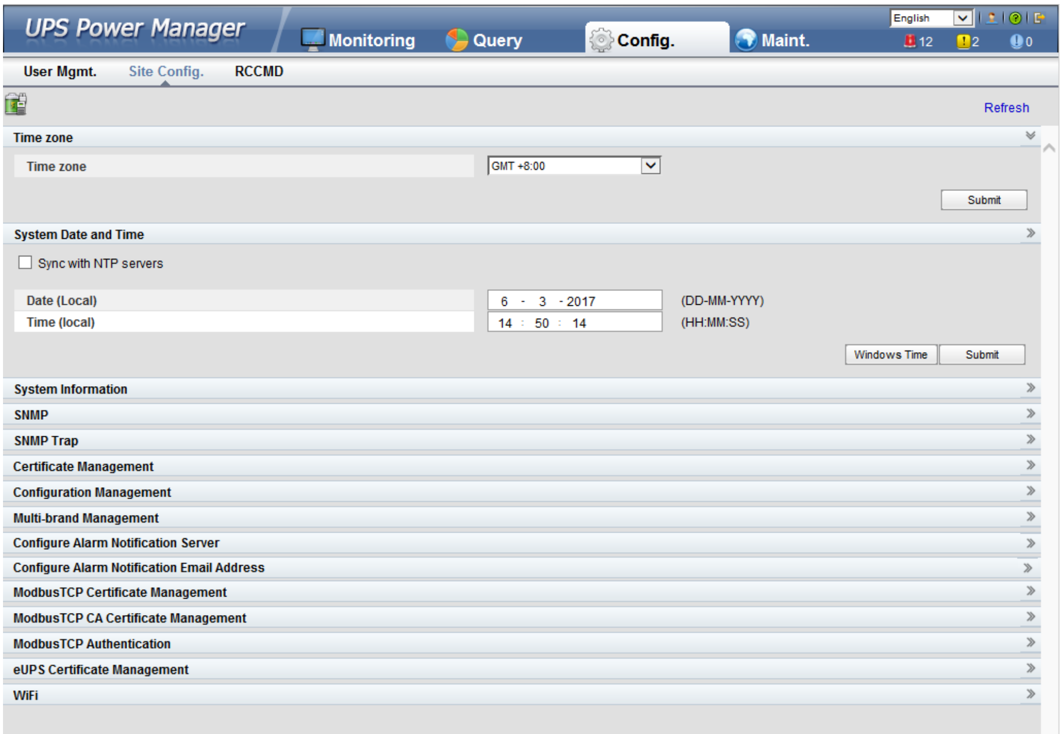
**Figure 4-87** Site Config. page




**NOTE**

- 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.
- To obtain the MIB file, choose **Config.** > **Site Config.** > **SNMP** > **Download HUAWEI_UPS_MIB**.
- **SNMP Trap** indicates the IP address of the server configured with network management system (NMS) software. 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.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- **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.
- 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.

### 4.2.4.3 RCCMD

## RCCMD

**RCCMD function** is set to **Disable** by default, as shown in Figure 4-88. 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 4-89.

**Figure 4-88** RCCMD function disabled

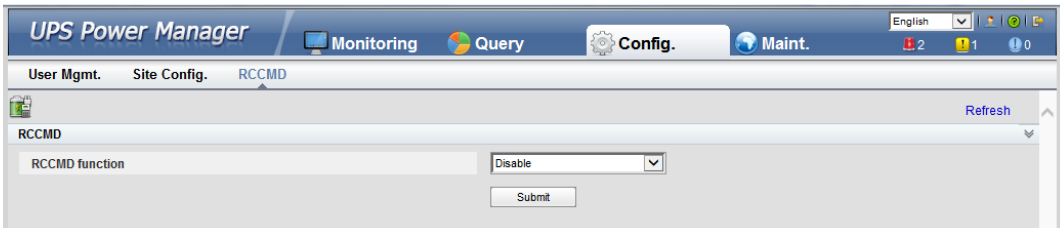



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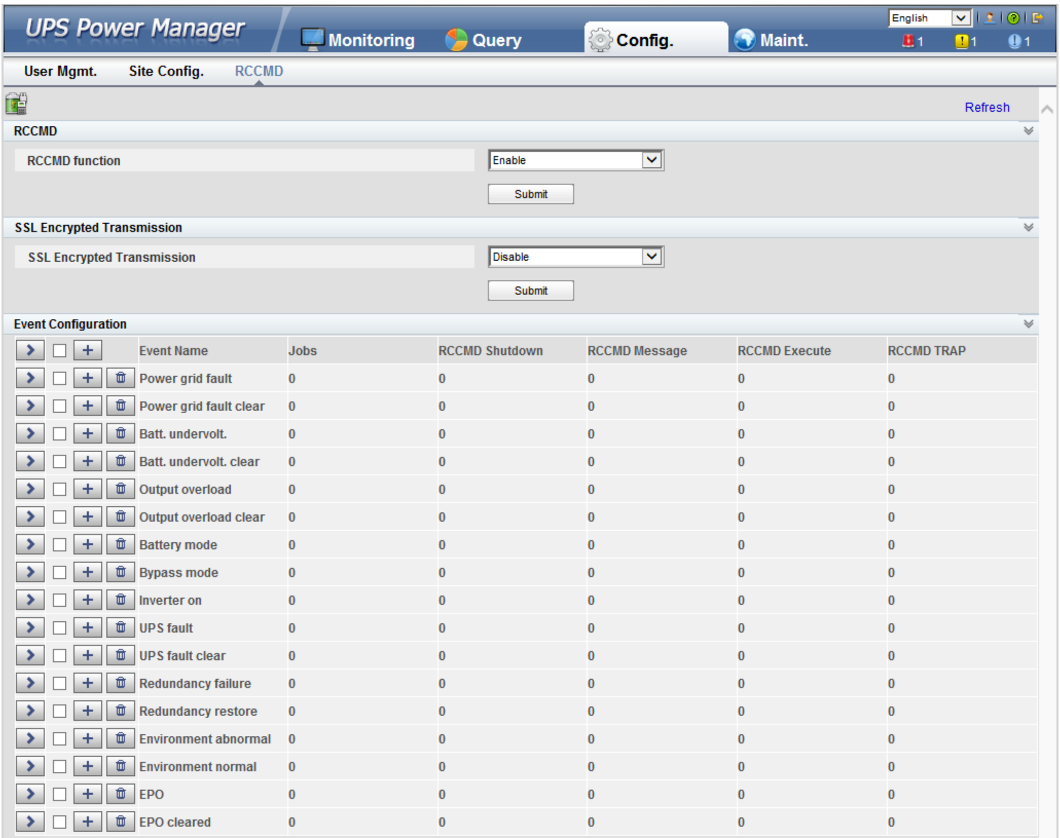
**Figure 4-89** RCCMD function enabled




## 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 4-90. If it is set to **Disable**, the RCCMD certificate controls will not be displayed on the page, as shown in Figure 4-91. If **SSL Encrypted Transmission** is set to **Disable**, a message indicating there is a risk will be displayed.


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**Figure 4-90** SSL encrypted transmission enabled by default

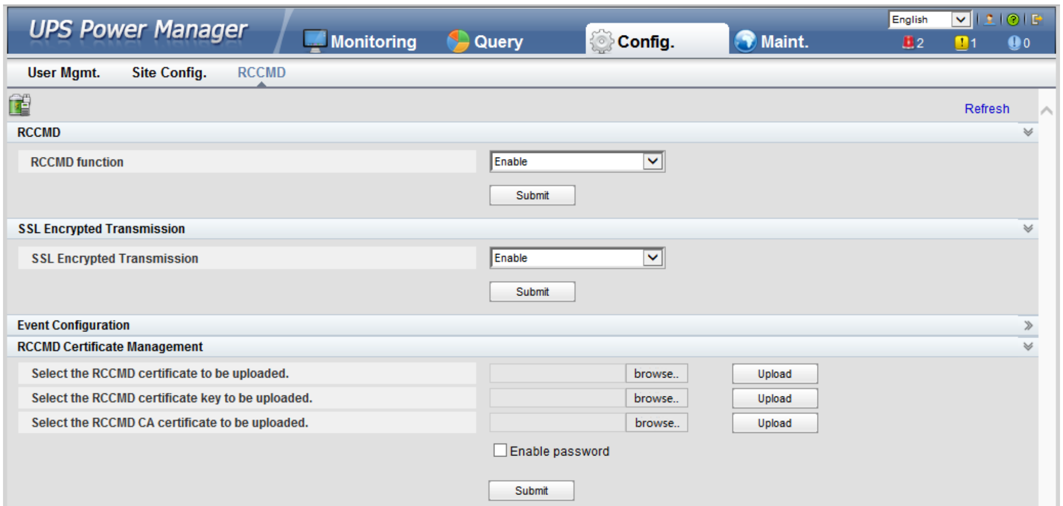
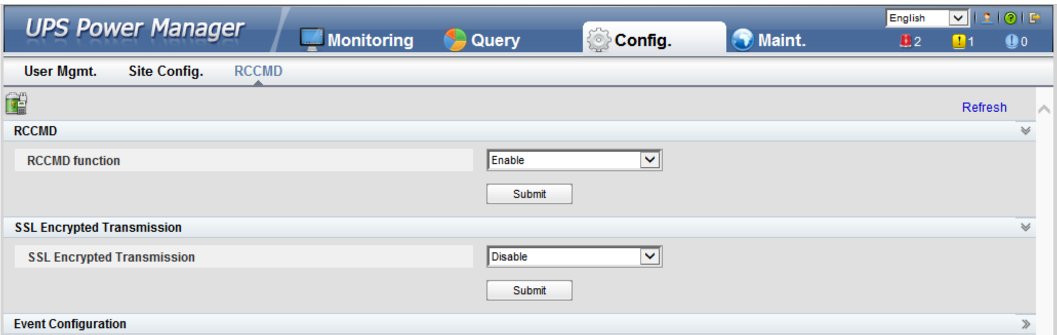



**Figure 4-91** SSL encrypted transmission disabled




## Event Configuration

The MDU supports 17 alarm events, and a maximum of 50 jobs can be added for each event, as shown in Figure 4-92. Figure 4-92 shows the buttons on the **Event Configuration** page, and Table 4-6 describes these buttons.


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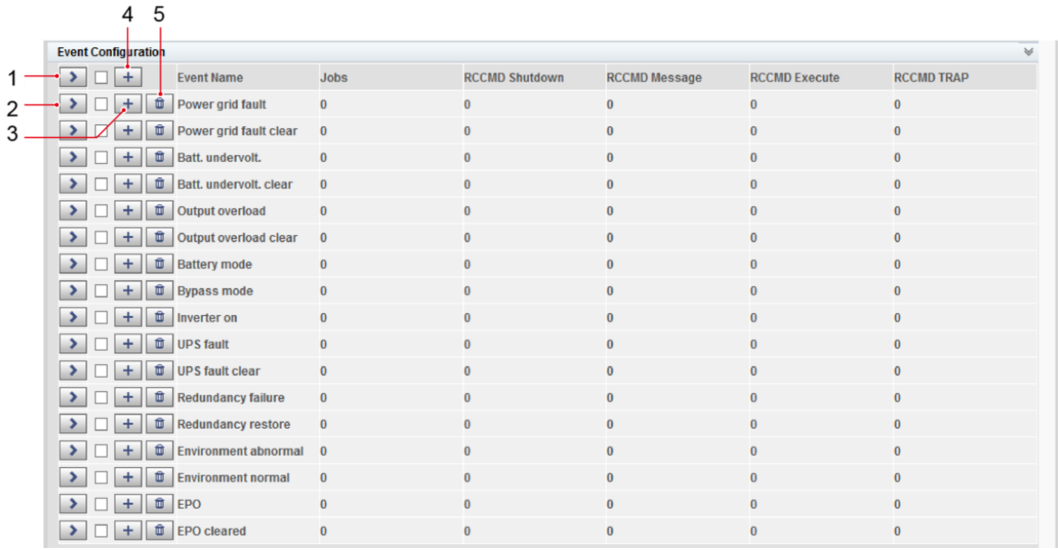
**Figure 4-92** Event configuration page




**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 4-6** 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 4-93 shows the buttons after one event is expanded and Table 4-7 describes these buttons.


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**Figure 4-93** Buttons after one event is expanded

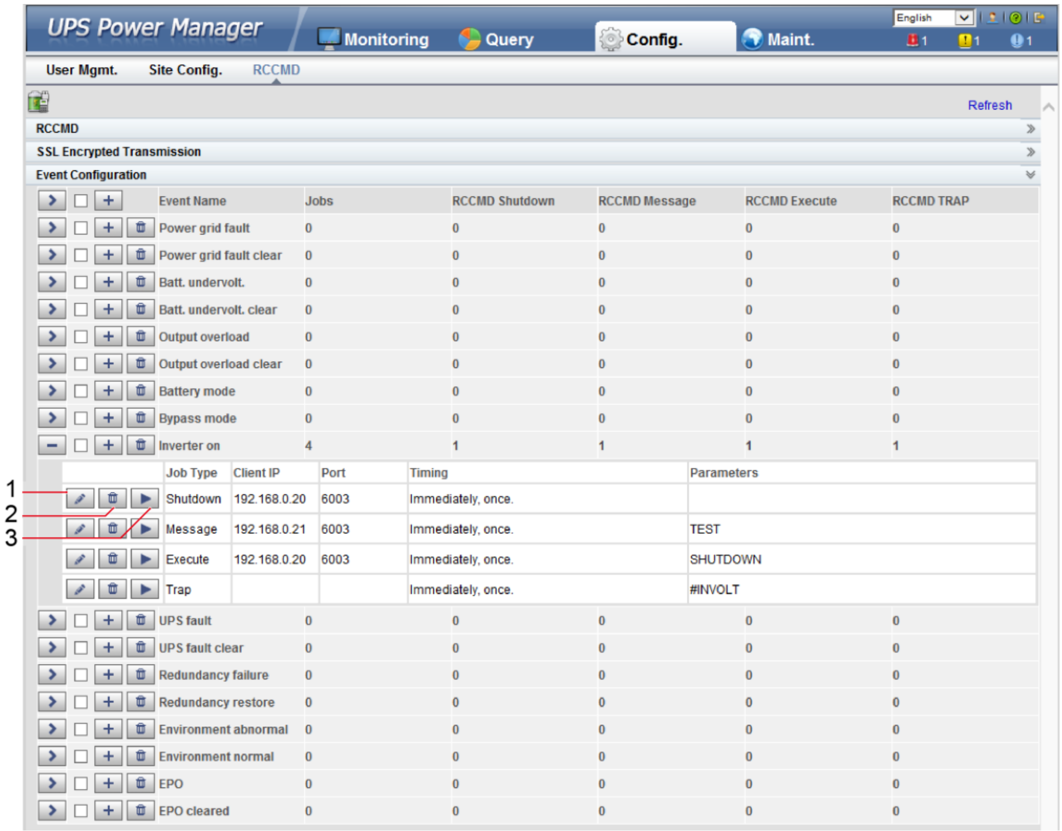

**Table 4-7** Buttons after one event is expanded

| 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.


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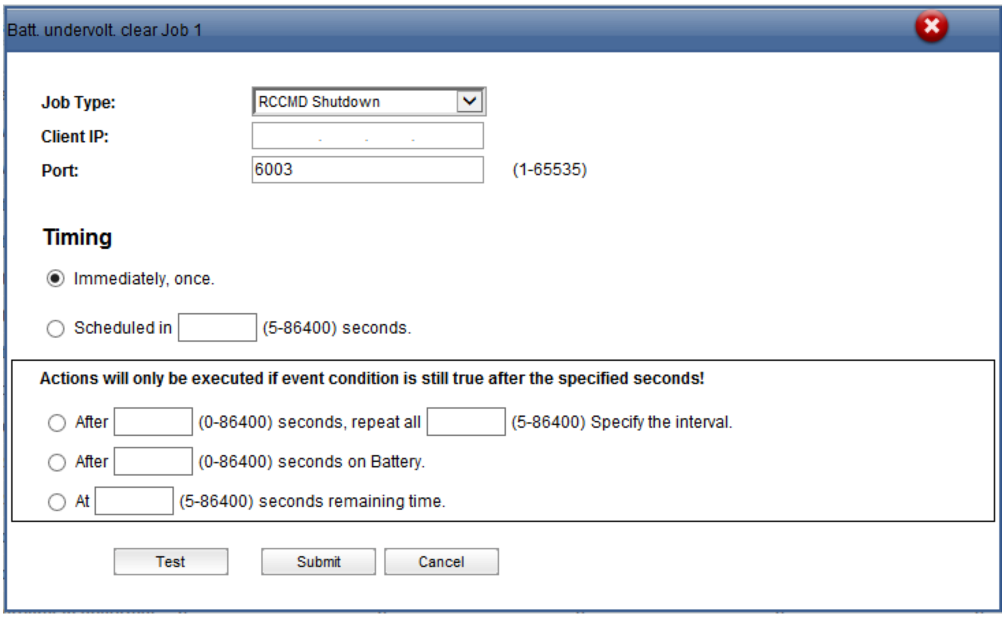
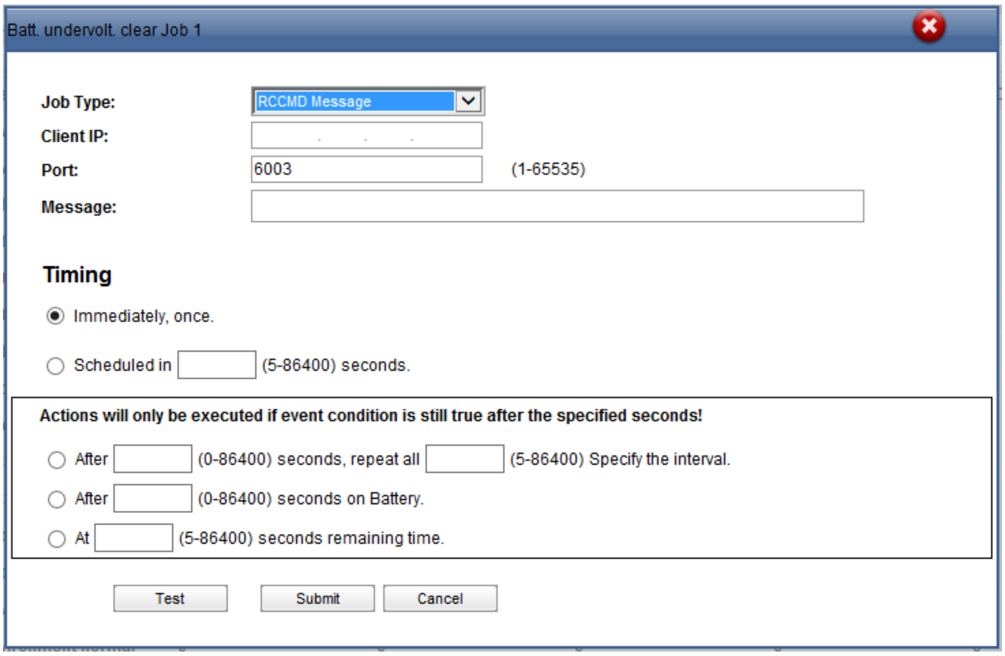
- **RCCMD Shutdown**: You need to specify the RCCMD client IP address and port. When the RCCMD client receives the job, it will shut down the computer.

**Figure 4-94** RCCMD shutdown




- **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 4-95** RCCMD message





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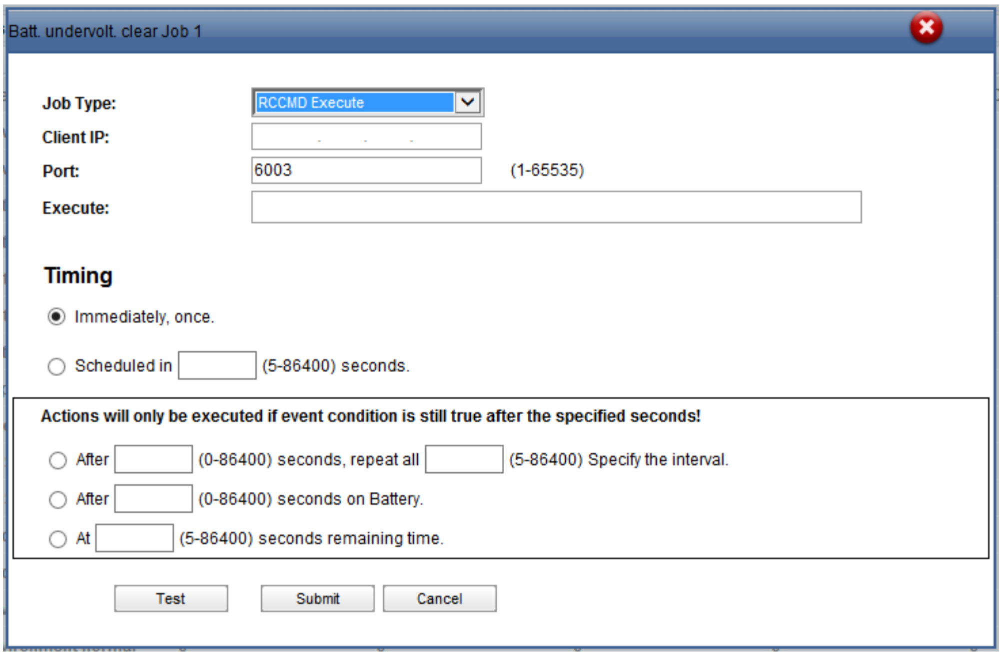
- **RCCMD Execute**: Specify the RCCMD client IP address, port, and command to be executed. For example, enter **SHUTDOWN**, and the RCCMD client will shut down the computer after receiving the command.

**Figure 4-96** RCCMD execute




- **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 4-8 lists the signal names that can be entered.


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**Figure 4-97** RCCMD TRAP

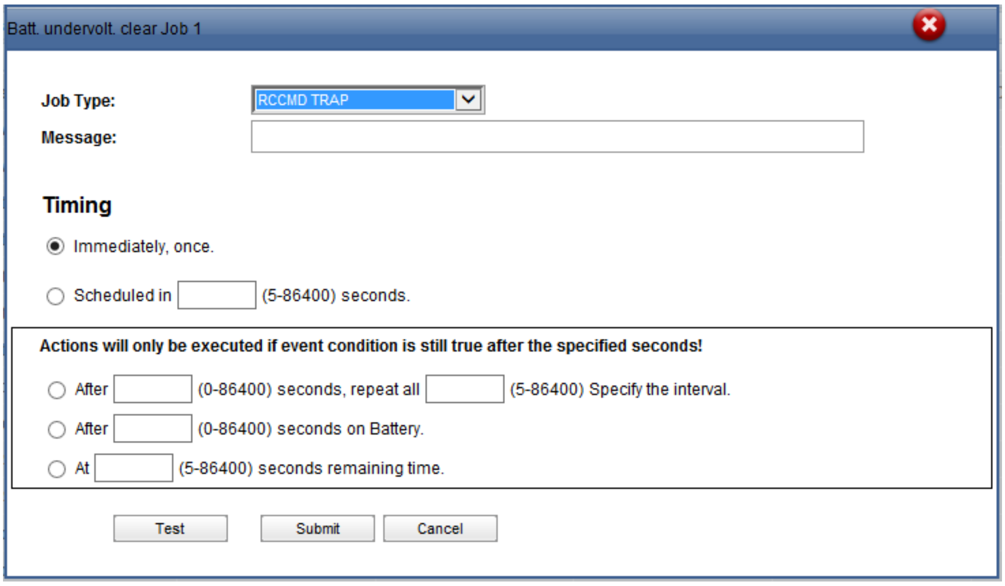


**Table 4-8** RCCMD TRAP signal

| 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 |


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| Signal Name | Description | Unit in the UPS |
|---|---|---|
| #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 4-98. 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.


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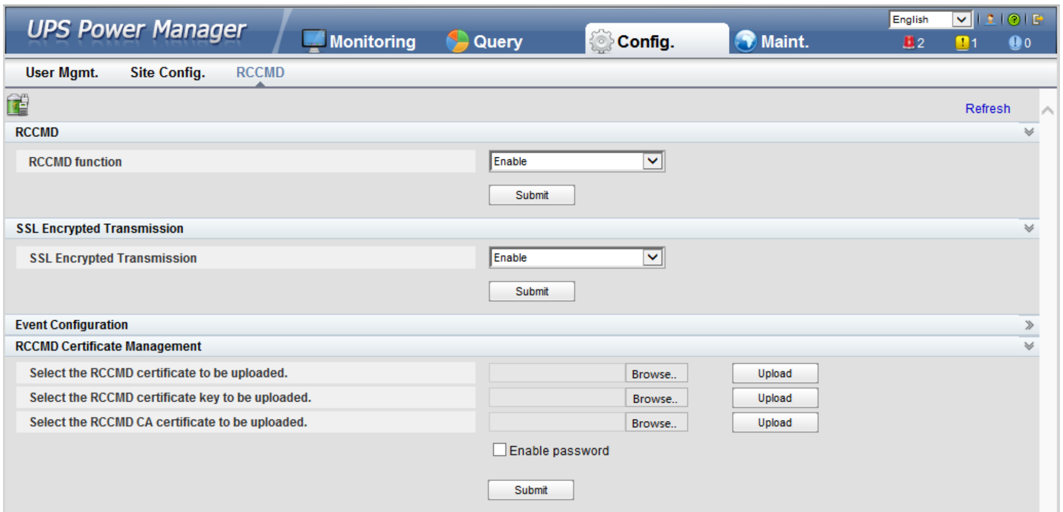
**Figure 4-98** RCCMD certificate management




NOTE

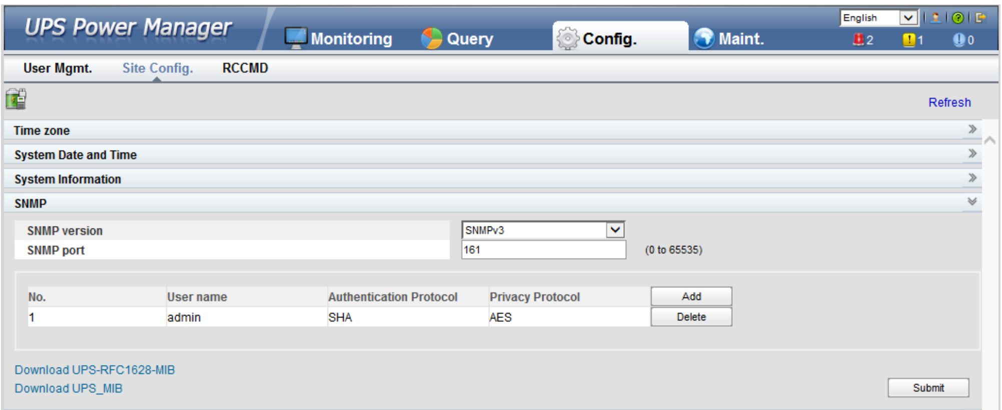
If the RCCMD certificate key has been encrypted, enable and enter the key password.

### 4.2.4.4 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 4-99** Download the MIB




NOTE

The UPS-RFC1628-MIB has more alarms than RFC1628. Download the UPS-RFC1628-MIB before using.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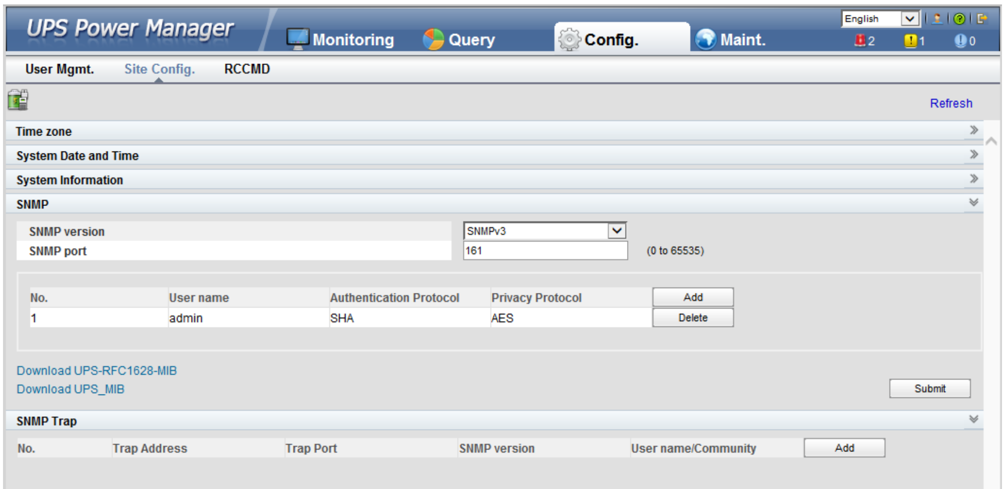
## Managing the UPS by Using the NMS

- 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 4-100.

  **Figure 4-100** 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.

# 4.2.5 Maint. Page

**NOTE**

Non-professional engineers should exercise caution when operating the maintenance page.

On the homepage, click the **Maint.** tab to open the **Maint.** page. Maintenance functions include calibration, commissioning variables, upgrade, and downloading data.


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**Figure 4-101** Calib. page

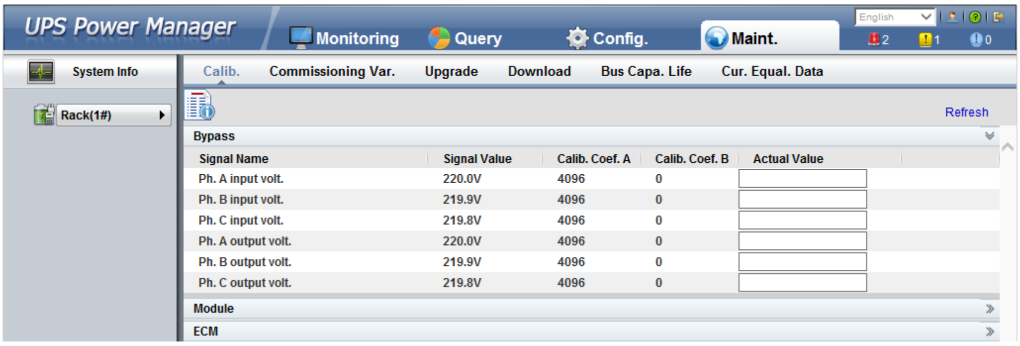


**Figure 4-102** Commissioning Var. page

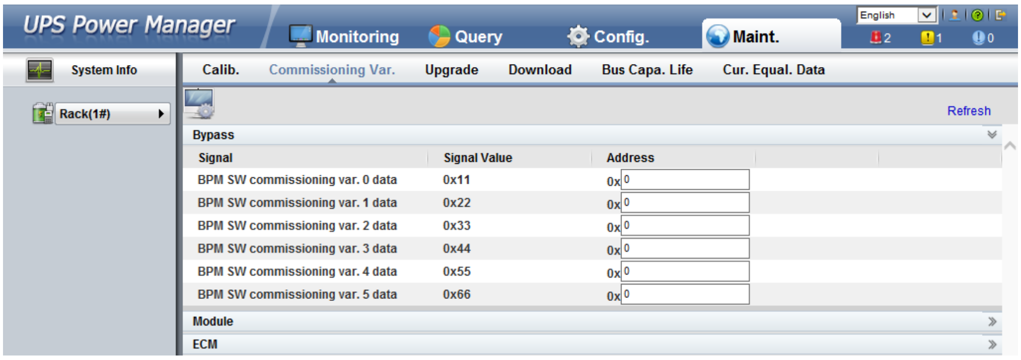


**Figure 4-103** Upgrade page

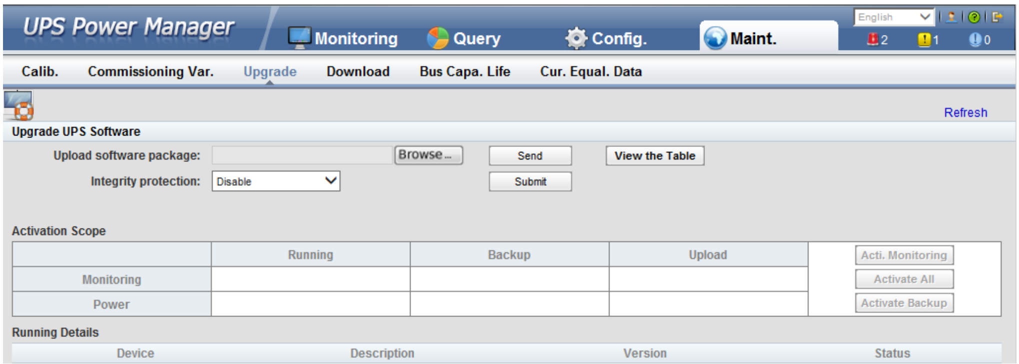



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**Figure 4-104** Download page

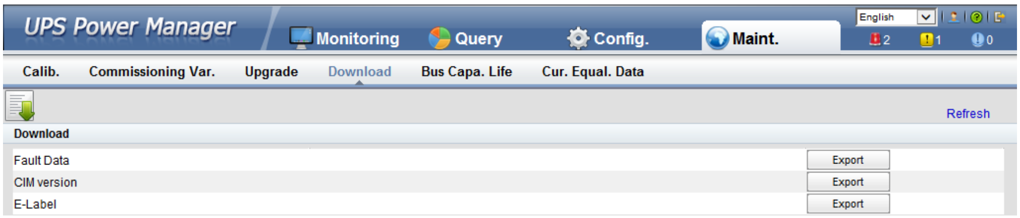



**Figure 4-105** Bus Capa. Life page

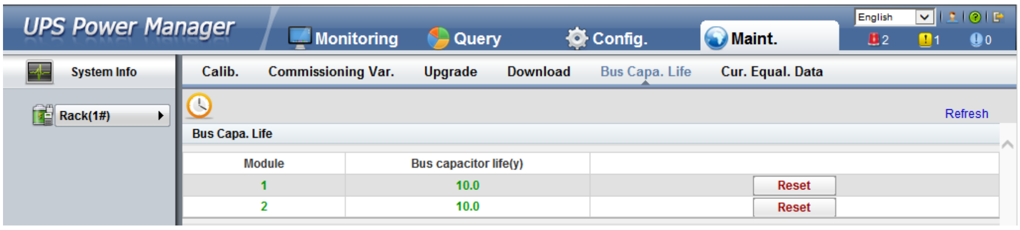
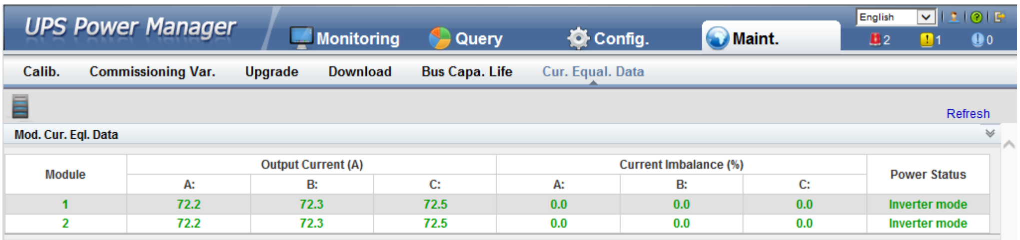



**Figure 4-106** Cur. Equal Date page




# 4.2.6 Protecting the Server by Using the RCCMD Software

## 4.2.6.1 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.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### 4.2.6.2 RCCMD Event Shutdown and Message Sending

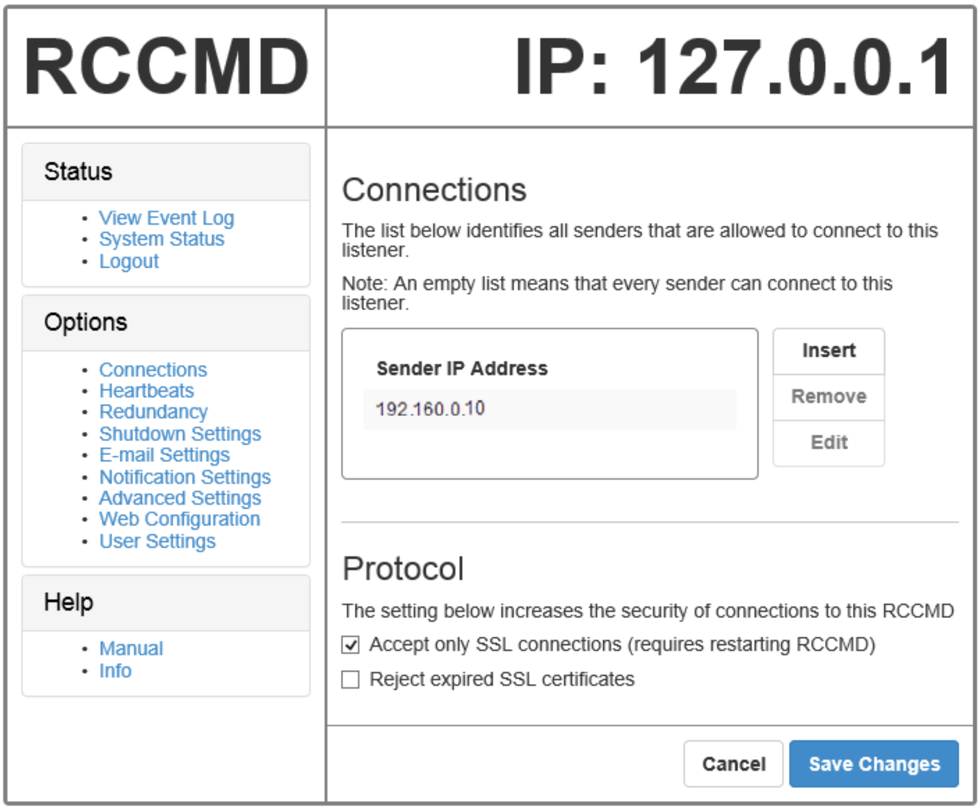
## Procedure

**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 4-107** Setting the MDU IP address and SSL encrypted transmission mode on the RCCMD client




**Step 2** On the MDU WebUI, choose **Config.** > **RCCMD**, and set **RCCMD function** to **Enable**. For details, see 4.2.4.3 RCCMD.

**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**.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**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**

### 4.2.6.3 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 4-108.

**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 4-108.


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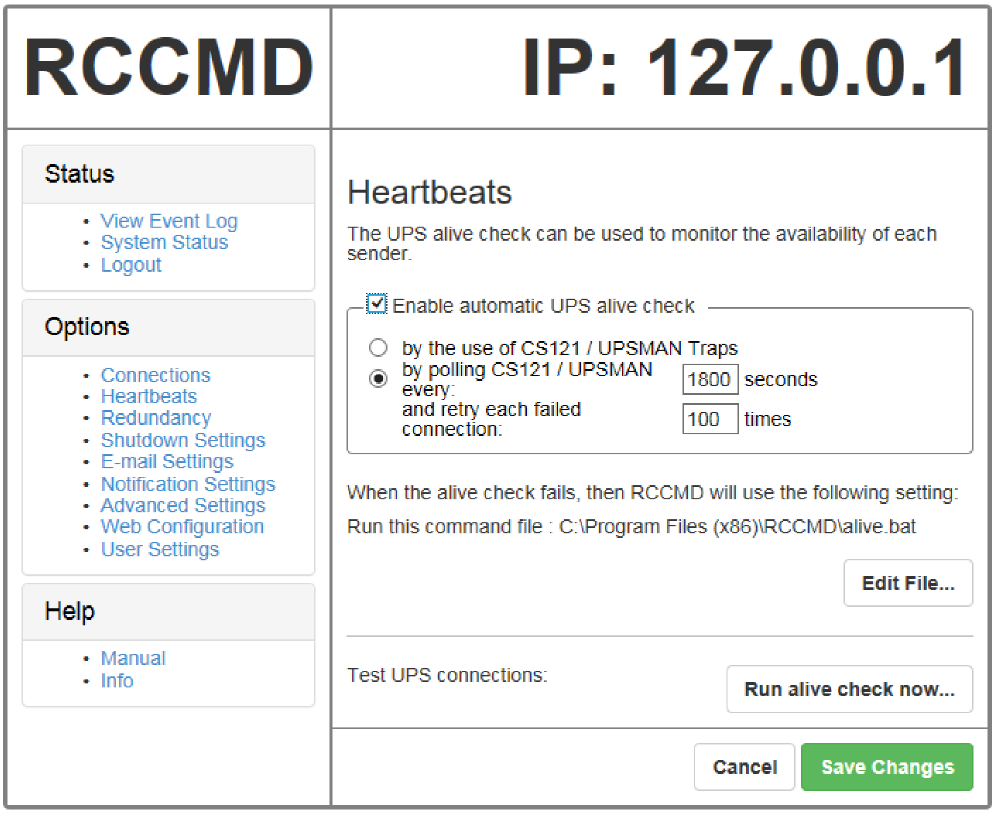
**Figure 4-108** Heartbeat detecting mode on the RCCMD client




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


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**Figure 4-109** Detecting heartbeat manually

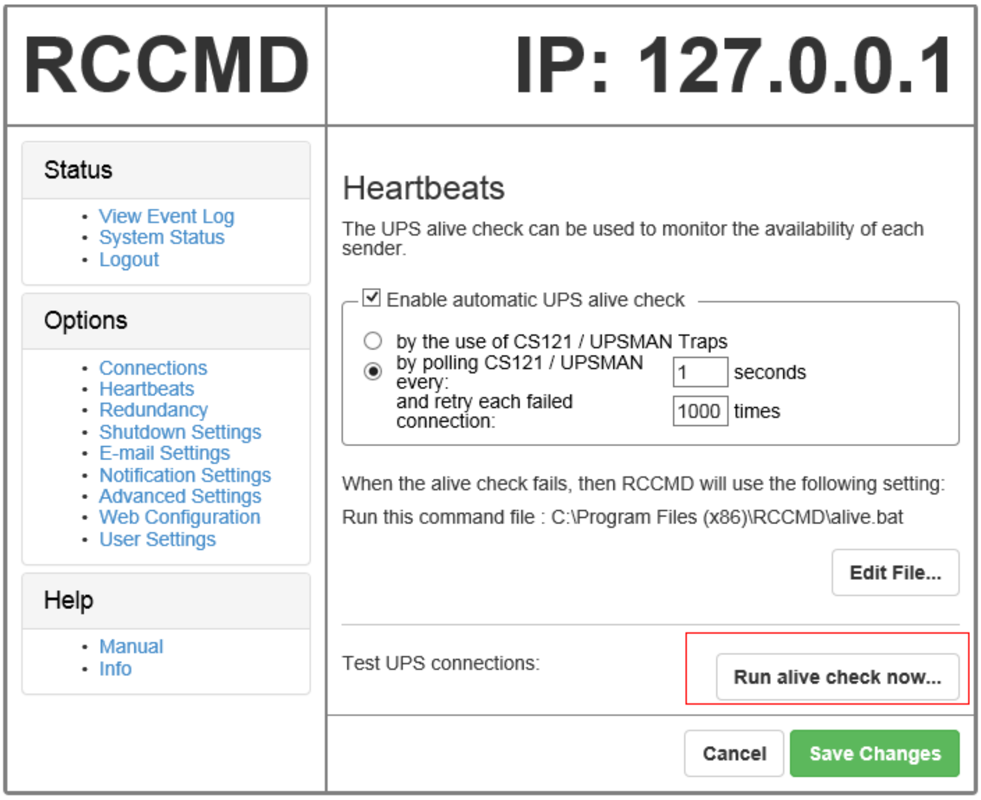
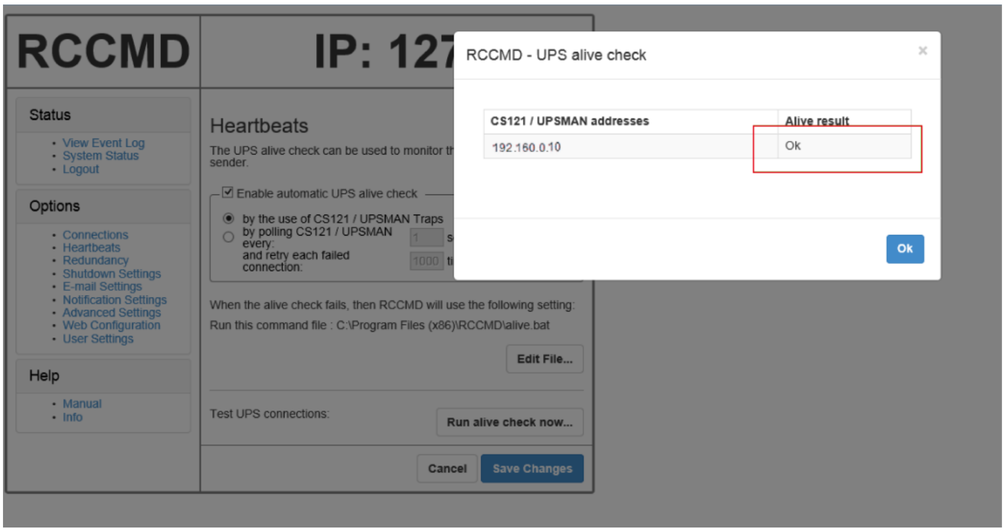



**Figure 4-110** Detecting heartbeat manually and successfully




**----End**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# 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 input switch and upstream input switch. Voltage range: 138–485 V AC (line voltage); frequency range: 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 Starting the Inverter

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

| Default User | Preset Password | |
|---|---|---|
| admin (administrator) | LCD | 000001 |


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| Default User | Preset Password | |
|---|---|---|
| | WebUI | Changeme |
| operator (common user) | LCD | 000001 |
| | WebUI | Changeme |
| browser (browsing user) | WebUI | - |

### 5.1.2.1 Initial Startup

**Step 1** After the MDU starts properly, set the language, time and date, network parameters, and system 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. When you set battery parameters, note the following:


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- Set **Battery capacity** correctly after double check. Incorrect settings affect the charging power. When battery strings are shared, the battery capacity of each UPS is the total capacity of battery strings. When no battery string is shared, the battery capacity of each UPS is the capacity of battery strings connected to the single UPS. If you are not sure how to determine the battery capacity, contact Huawei technical support.
- High or low charging power tends to shorten the battery lifespan, or even damages batteries.
- **Number of cells** indicates the number of 2 V DC batteries in a battery string connected to the UPS. (If 12 V batteries are configured, the number of cells equals to the number of batteries multiplied by 6. If 2 V batteries are configured, the number of cells equals to the number of batteries.) This parameter affects the charge voltage and discharge time. Incorrect setting will cause a high or low charge voltage, which greatly shortens the battery lifespan. In addition, the UPS may shut down in advance during discharging, which may result in data backup failure.

**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.


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- 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.

**Table 5-2** Battery parameter setting example

| Battery Specifications | Number of Batteries | Number of Battery Strings | Number of Cells | Battery Capacity |
|---|---|---|---|---|
| 150 Ah/12 V | 36 batteries in series | Two battery strings connected in parallel | 36 x 6 = 216 | 150 Ah + 150 Ah = 300 Ah |
| 300 Ah/2 V | 192 batteries in series | Two battery strings connected in parallel | 192 x 1 = 192 | 300 Ah + 300 Ah = 600 Ah |
| 300 Ah/12 V | 40 batteries in series | Three battery strings connected in parallel | 40 x 6 = 240 | 300 Ah + 300 Ah + 300 Ah = 900 Ah |
| 300 Ah/2 V | 240 batteries in series | Four battery strings connected in parallel | 240 x 1 = 240 | 300 Ah + 300 Ah + 300 Ah + 300 Ah = 1200 Ah |

**Step 2** After you set parameters on the **Settings Wizard** screen, the MDU 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**

If dry contact signals are connected to the system, choose **System Info** > **Settings** > **Dry contacts** and check that the connected dry contacts have been enabled and that the disconnected dry contacts have been disabled.

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

**----End**


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NOTICE

- If you do not need to use the app to start the inverter, choose **System Info** > **Maintenance** > **Inv. ON** on the MDU.
- The **Service Expert** app can be downloaded from Google Play and can run on Android. User interfaces displayed in this document correspond to the app version V100R001C00B055 and are for reference only.
- For offline startup, enter the barcode and the verification code on the mobile phone app. The app automatically generates a startup password for the UPS. Then enter the password on the MDU screen to start the UPS.
- For online startup, activate the startup password on the mobile phone app to start the UPS.
- If the initial startup verification passes, startup verification is not required afterwards.
- After factory settings are restored, re-verification for startup is required.

## Online Startup

**Step 1** Insert a WiFi module into the USB port on the MDU.

**Step 2** Enable the mobile phone WLAN, search for the UPS WiFi signal, and connect to the WiFi signal. The default value of **WiFi SSID** is **UPS_WiFi**.

NOTE

The initial WiFi password is **Changeme** by default. You can change the password by choosing **System Info** > **Settings** > **Communication** > **WiFi Password** on the MDU.

**Step 3** Open the **Service Expert** app on the mobile phone.

**Step 4** On the home screen of the app, tap **Power-on password activation** to access the **Set Startup** screen. After setting parameters, tap **Login**.


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**Figure 5-2** Setting startup commissioning

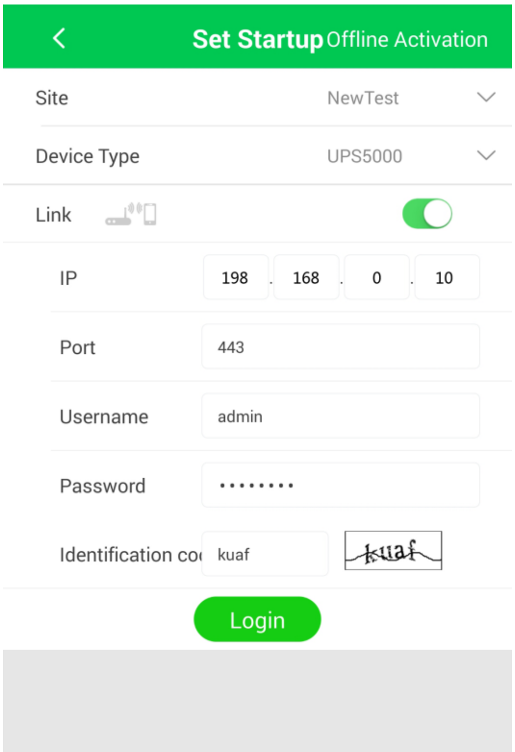


**Table 5-3** Parameter description

| Item | Setting Method |
|---|---|
| Site | Select the site as required. |
| Device Type | Select the device that needs to be connected. Select **UPS5000** in this situation. |
| Link | Enable the connection between the device and the WiFi network. |
| IP | UPS IP address, which can be obtained from the MDU. |
| Port | The port number is **443** by default and can be modified. If the UPS is managed using the app, the port number must be set to **443**. |
| Username, Password | Same as the user name and password of WebUI accounts. |

**Step 5** After login, tap **Power-on password activation** on the screen. In the displayed dialog box, tap **OK** to start the UPS.


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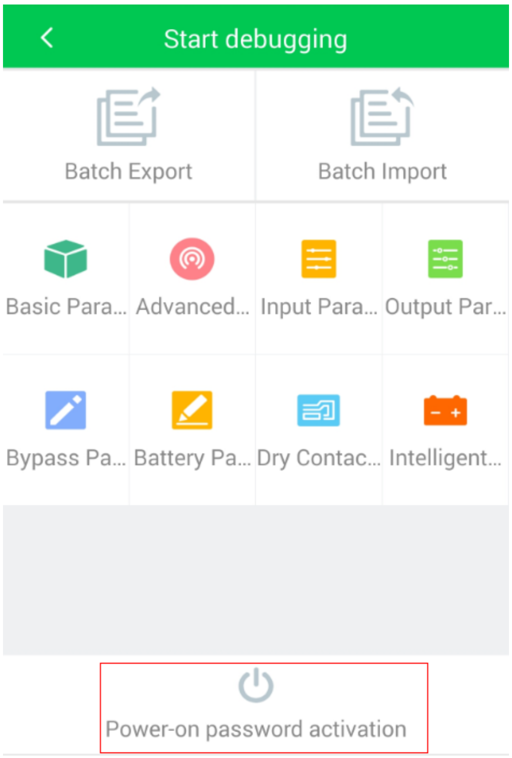
**Figure 5-3** Power-on password activation




**----End**

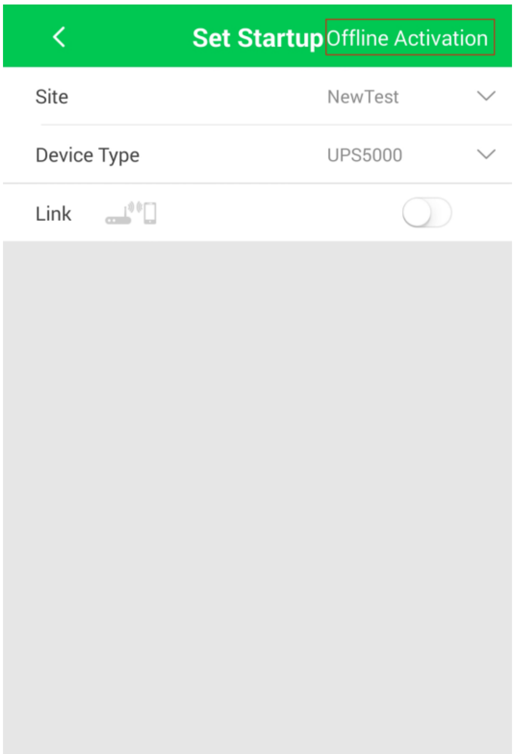
## Offline Startup

**Step 1** Open the **Service Expert** app on the mobile phone.

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

**Step 3** Set **Site** and **Device Type** as required, and tap **Offline Activation**.

**Figure 5-4** Offline activation




**Step 4** On the MDU, choose **System Info** > **Maintenance** > **Inv. ON**. You can obtain the **Bar code** and **Verification code** from the screen, as shown in the following figure.

**Figure 5-5** Offline startup


NOTE

The values of the **BarCode** and **Codes** in the figure are for reference only. The actual values prevail.

**Step 5** Enter **BarCode** and **Codes** obtained from the MDU on the **Offline Activation** screen. Tap **Generate PWD** to generate a startup password.


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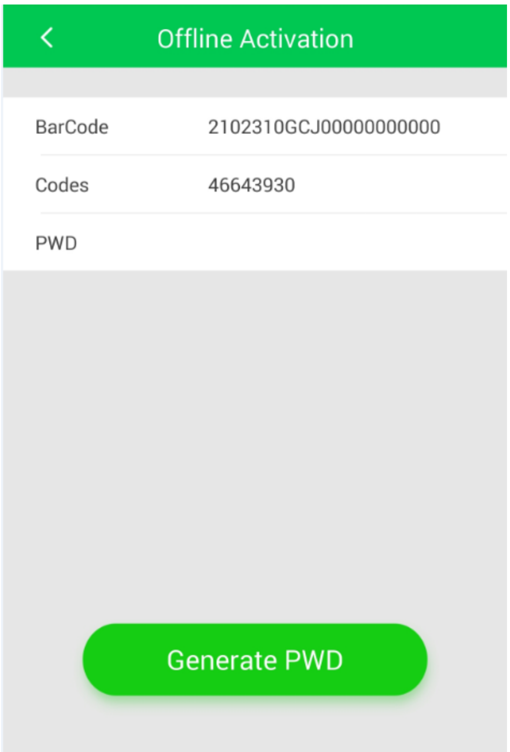
**Figure 5-6** Generating a password




**NOTICE**

If the entered startup password is incorrect, you need to tap **Inv. ON** again on the MDU to obtain a new verification code, and then generate a password on the app.

**Step 6** Enter the generated startup password in Figure 5-5 to start the UPS.

**----End**

## 5.1.2.2 Non-initial Startup

### 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, enter the user name and password.

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

**----End**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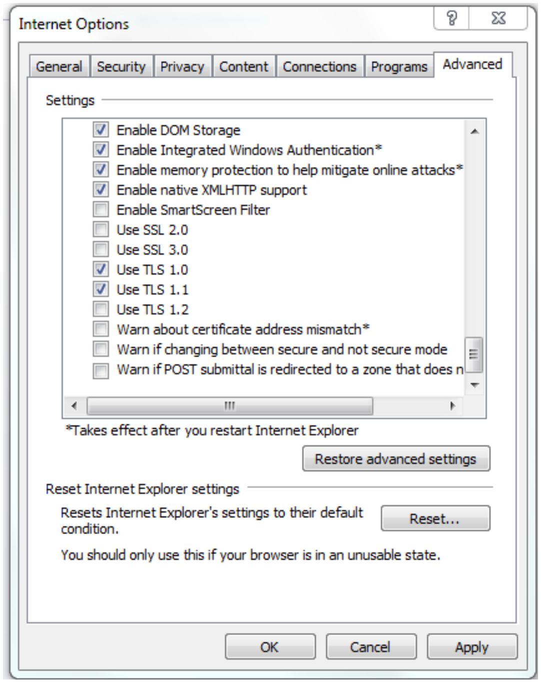
## Starting the UPS on the WebUI

**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 5-7** 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**.

**Figure 5-8** Logging in to the WebUI


**Step 5** On the home page of the WebUI, choose **Monitoring** > **Control**, click **Inv. ON**, and confirm the operation to start the inverter.


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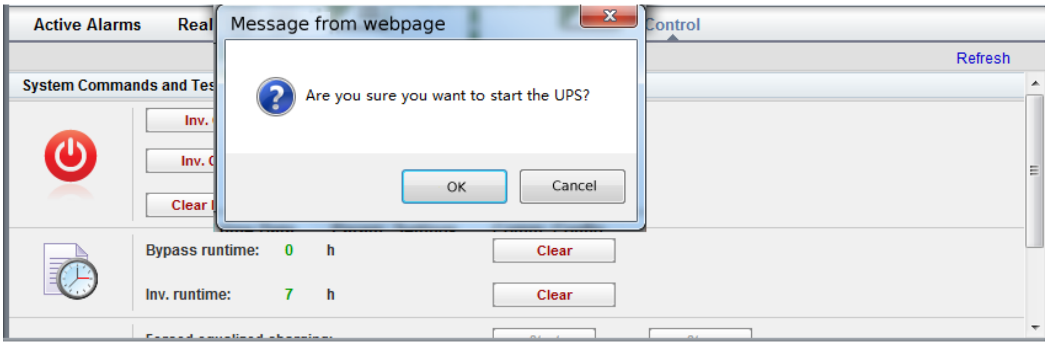
**Figure 5-9** Starting the inverter




**NOTE**

If the power unit 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 unit, or you perform shutdown or rectify faults) and the unit can be started, the unit responds to the startup command.

**----End**

## 5.1.3 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**

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

### Prerequisites

A BCB box is installed.

### Procedure

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


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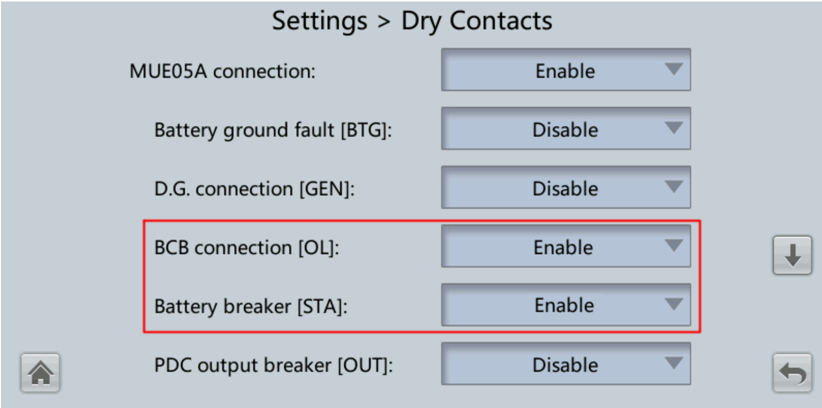
**Figure 5-10** BCB connection setting




**----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
  a. On the main screen, tap **Common Functions**. Tap **Inv. OFF**.
  b. If no user is logged in, enter a user name and password, and tap  on the login screen displayed.
  c. In the displayed dialog box, tap **Yes** to shut down the inverter.


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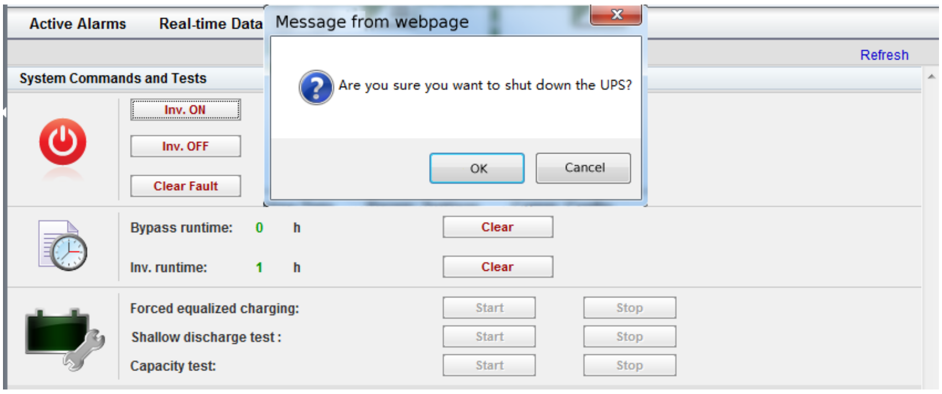
**Figure 5-11** Inv. OFF screen


**NOTE**

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

- On the WebUI
  a. In the browser, enter the UPS IP address in the address box.
  b. On the login page, select a display language, enter a **User name** and **Password**, and click **Login**.
  c. On the homepage, choose **Monitoring** > **Control**, and click **Inv. OFF**. In the displayed dialog box, click **OK** to shut down the inverter.

**Figure 5-12** Shutting down the inverter




After the inverter shuts down, the UPS works in bypass mode if the bypass is normal, as shown in Figure 5-13; the UPS supplies no power and the loads power off if the bypass is abnormal, as shown in Figure 5-14.


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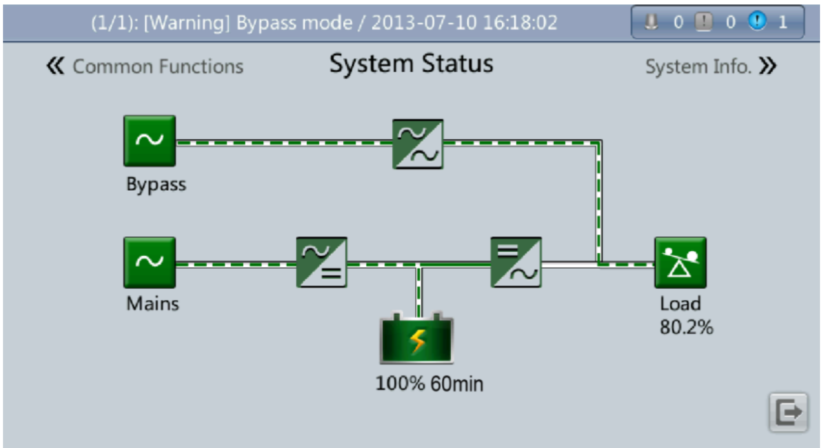
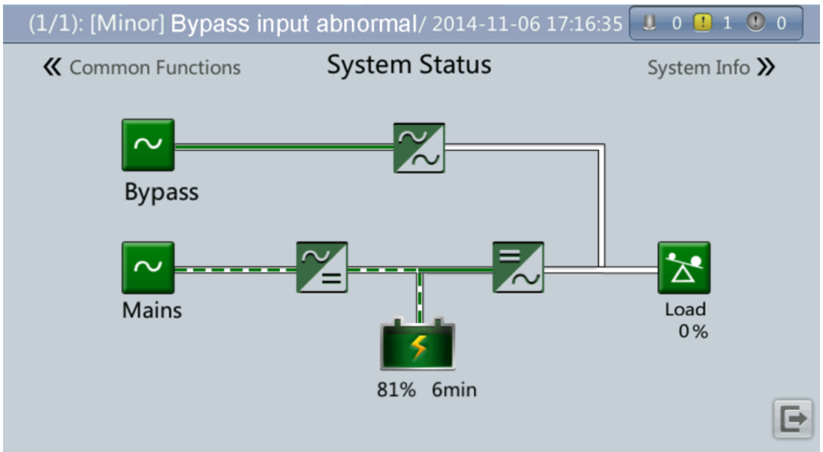
**Figure 5-13** Normal bypass




**NOTE**

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

**Figure 5-14** 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 external output switches.

**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 internal mains input switch, bypass input switch, and output switch.
2. Open the external mains and bypass input switches.

**Step 5** For a UPS in standard configuration, open the external mains and bypass input switches.

**----End**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# 5.3 Starting the UPS in Battery Mode

## Procedure

**Step 1** Use a multimeter to check that the absolute voltages of positive and negative battery strings are greater than a certain value (2 x Number of cells) to ensure that the batteries are connected properly.

**Step 2** Open the mains 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 (2 x Number of cells), 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

## 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. The transfer time is less than 4 ms under typical working conditions and less than 20 ms under poor working conditions.


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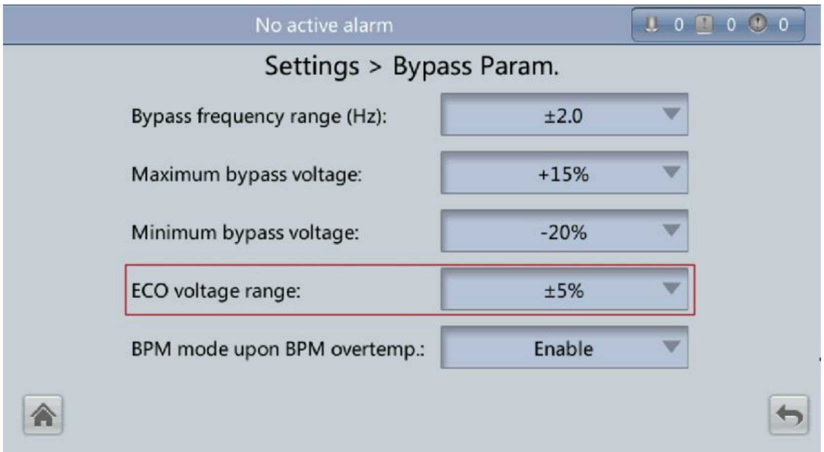
- Both a single UPS and the parallel system support the ECO mode for higher efficiency.
- To avoid frequent transfer between ECO mode and normal mode, do not set the ECO mode when the bypass input is unstable or is sensitive to load changes.
- ECO mode is not recommended when the load is less than 10%.
- Before transferring the UPS to ECO mode, ensure that the bypass module works properly.

## Procedure

**Step 1** Manually shut down the inverter to transfer the UPS to bypass mode.

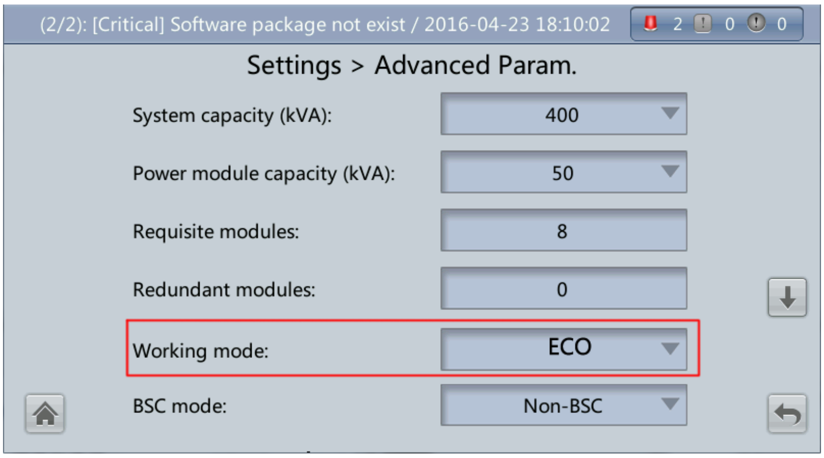
**Step 2** Select a value (**±5%**, **±6%**, **±7%**, **±8%**, **±9%**, or **±10%**) from the **ECO voltage range** drop-down list box.

**Figure 5-15** Setting ECO voltage range




**Step 3** Set **Working mode** to **ECO**. Information indicating that the UPS works in ECO mode is displayed on the LCD.

**Figure 5-16** Setting ECO mode




**Step 4** Manually start the inverter.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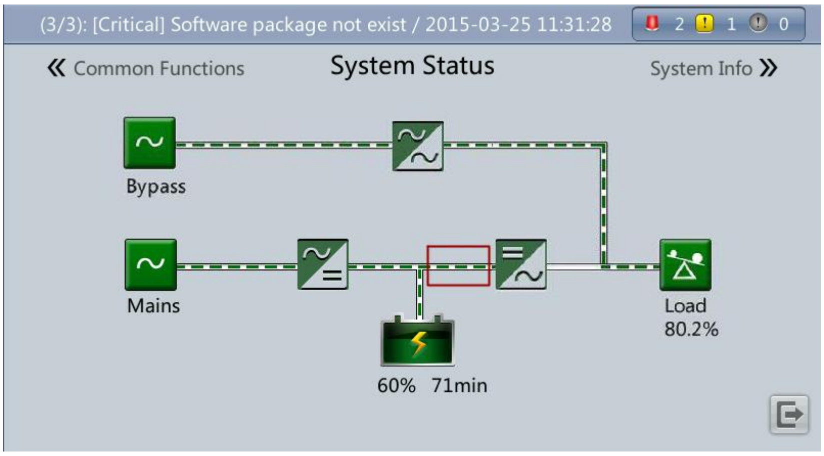
**NOTICE**

After the inverter starts, the UPS still works in bypass mode and the inverter is on standby. Figure 5-17 shows the power flow displayed on the **System Status** screen. If the bypass is not normal, the inverter supplies power immediately. If the inverter is not started, the UPS may be disconnected.

**Figure 5-17** System Status screen




**----End**

# 5.6 Testing Batteries

## 5.6.1 Forced Equalized Charging Test

### Context

**NOTICE**

Before a forced equalized charging test, ensure that: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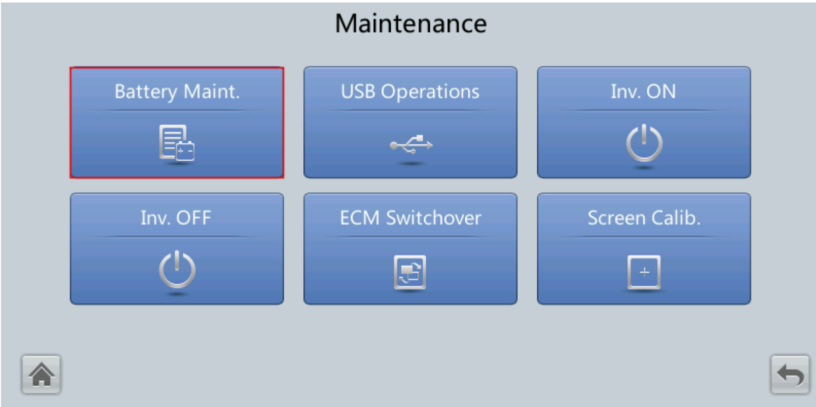
- The mains input is normal.
- Batteries are properly connected.
- Batteries are not in the equalized charging state.

## Procedure

**Step 1** On the main screen of the LCD, tap **System Info**. Tap . The **Maintenance** screen is displayed.

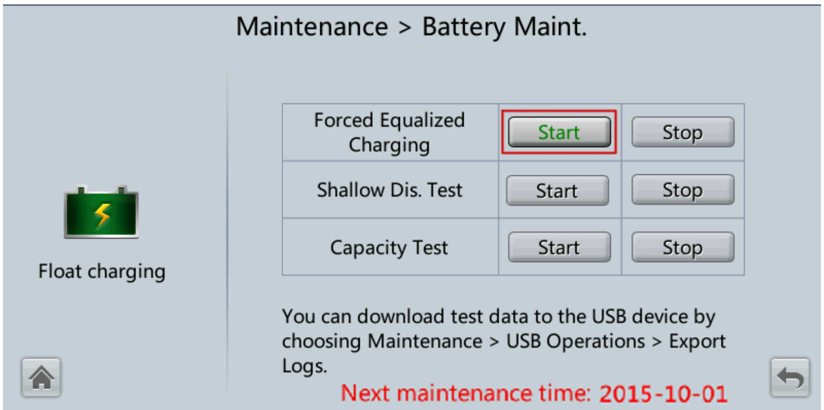
**Step 2** On the **Maintenance** screen, tap **Battery Maint.**.

**Figure 5-18** Maintenance




**Step 3** Tap **Start** next to **Forced Equalized Charging** to start a forced equalized charging test.

**Figure 5-19** 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.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**----End**

## 5.6.2 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 Param.** 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** and tap  to access the **Maintenance** screen.

**Step 2** On the **Maintenance** screen, tap **Battery Maint**.

**Step 3** Tap **Start** next to **Shallow Dis. Test** to start a shallow discharge test.

**Figure 5-20** Starting a shallow discharge test



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**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**

## 5.6.3 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 main screen of the LCD, tap **System Info**. Tap . The **Maintenance** screen is displayed.

**Step 2** On the **Maintenance** screen, tap **Battery Maint.**.

**Step 3** Tap **Start** next to **Capacity Test** to start a capacity test.


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**Figure 5-21** 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**

# 5.6.4 Test Data Download

## 5.6.4.1 Download over the LCD

### Procedure

**Step 1** Insert a USB flash drive into the USB port on the MDU.

**Step 2** On the main screen of the LCD, choose **System Info**. Tap . The **Maintenance** screen is displayed.

**Step 3** Choose **USB Operations** > **Export Logs**, and select a log download path.


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**Figure 5-22** Downloading logs


**Step 4** Tap **Next**. In the displayed dialog box, tap **Yes** to download data.

**Figure 5-23** Confirming the path


**----End**

## 5.6.4.2 Download over the WebUI

### Procedure

**Step 1** Log in to the WebUI.

**Step 2** Choose **Query** > **Logs**, select logs from the **Log** drop-down list box, then click **Export** to export logs.


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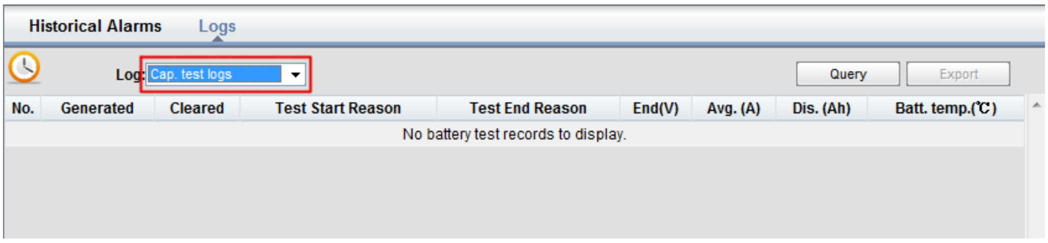
**Figure 5-24** Logs




**----End**

# 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 5-25 and Figure 5-26 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 5-27 and Figure 5-28.

The **Maint. breaker closed** alarm is displayed in the alarm list, as shown in Figure 5-29. The UPS transfers to maintenance bypass mode.


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**Figure 5-25** Locked maintenance bypass switch (400 kVA UPS and 500 kVA UPS)

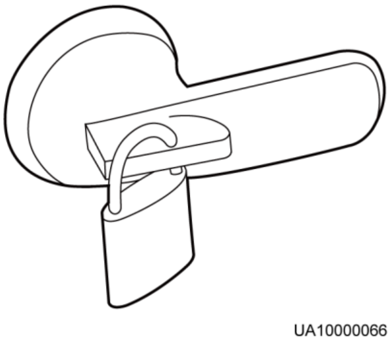



**Figure 5-26** Locked maintenance bypass switch (600 kVA UPS)

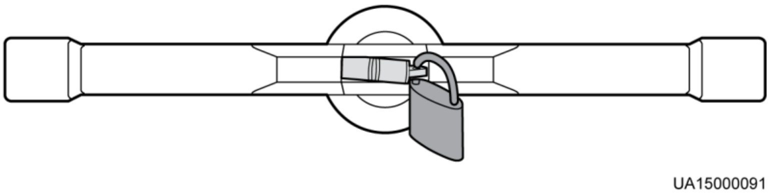



**Figure 5-27** Closing the maintenance bypass switch (400 kVA UPS in full configuration)

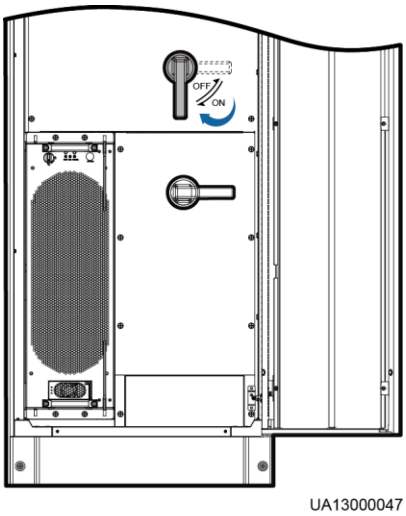
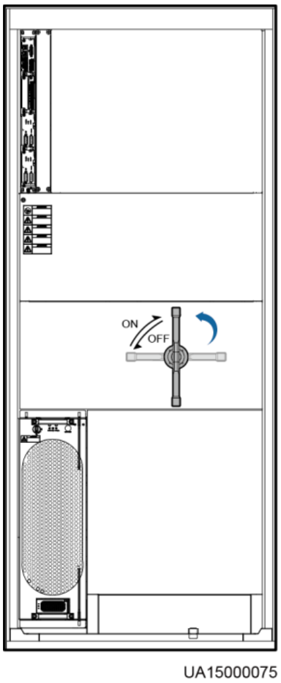


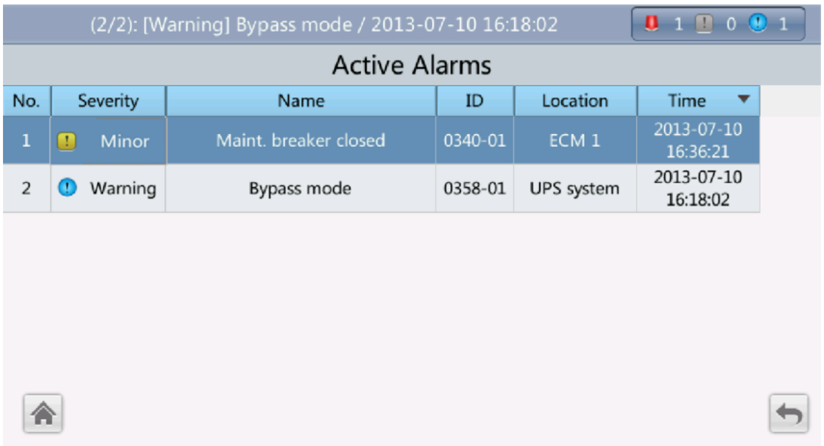
**Figure 5-28** Closing the maintenance bypass switch (600 kVA UPS in standard configuration)




NOTE

- Figure 5-27 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 5-28 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.

**Figure 5-29** Maint. breaker closed alarm




NOTE

After the UPS transfers to maintenance bypass mode, the **Maint. breaker closed** and **Bypass mode** alarms are displayed on the LCD.

**----End**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# 5.8 Transferring from Maintenance Bypass Mode to Normal Mode

## Context

**NOTICE**

Before you transfer 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.

Turn the maintenance bypass switch from the ON position to the OFF position, as shown in Figure 5-30 and Figure 5-31.

The **Maint. breaker closed** alarm disappears from the alarm list. Check whether the UPS works in bypass mode by viewing the system running status diagram on the LCD or WebUI.

**Figure 5-30** Opening the maintenance bypass switch (400 kVA UPS in full configuration)

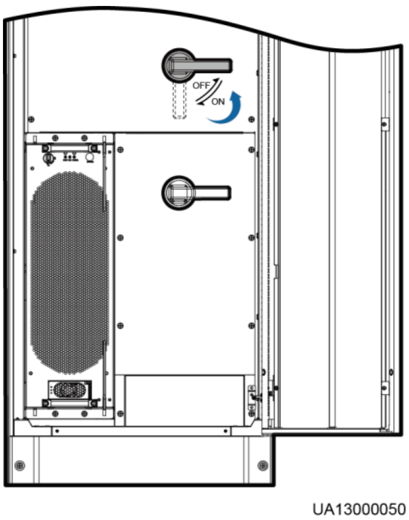



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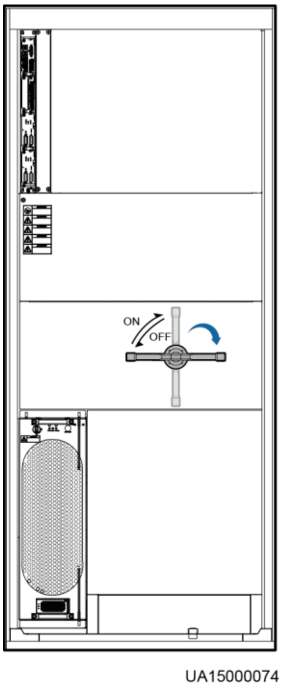
**Figure 5-31** Opening the maintenance bypass switch (600 kVA UPS in standard configuration)




NOTE

Figure 5-30 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 5-31 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.

**Step 2** Start the inverter.

**----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 EPO button connected to the dry contact card or remove the 4-pin terminal from the EPO port on the dry contact card.


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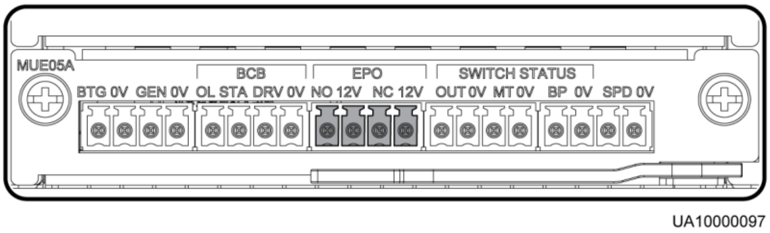
**Figure 5-32** EPO ports




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.

  **Figure 5-33** Clearing faults


- On the WebUI

  Choose **Monitoring** > **Control** > **System Commands and Tests** and click **Clear Fault**. The EPO alarm is cleared successfully.


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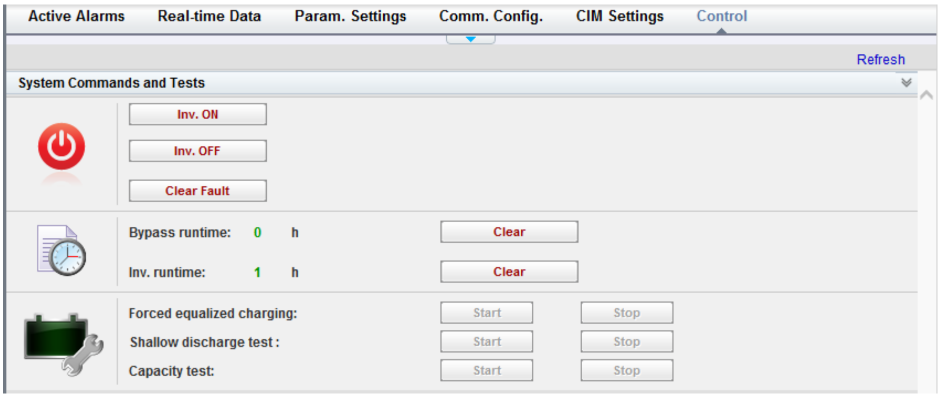
**Figure 5-34** Clearing faults




**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** and tap **Active Alarms** to check that the EPO alarm is cleared.

- Viewing active alarms on the WebUI

  Choose **Monitoring** > **Active Alarms** to check that the EPO alarm is cleared.

**Step 4** Start the inverter.

**----End**

# 5.11 Exporting Data

## Prerequisites

You have logged in to the WebUI.

## Context

The following data can be exported:

- Historical alarms
- Logs
- E-Label
- CIM version
- Fault Data

**NOTE**

This topic describes how to export historical alarms.

## Procedure

**Step 1** Choose **Query** > **Historical Alarms**, and set **Severity**, **Generated**, and **Cleared**.


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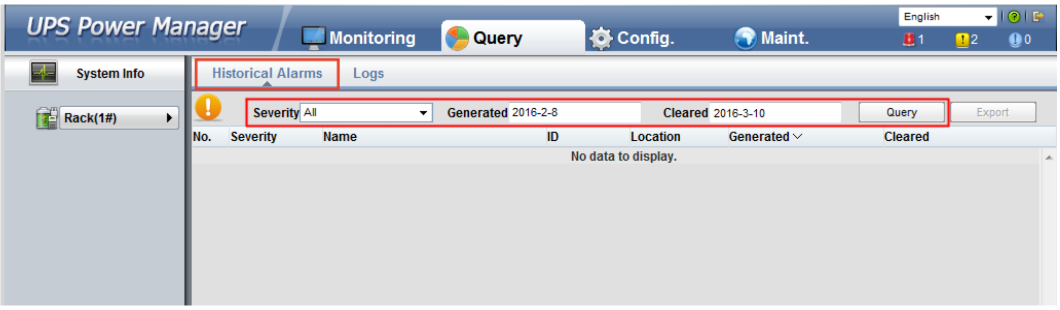
**Figure 5-35** Querying historical alarms

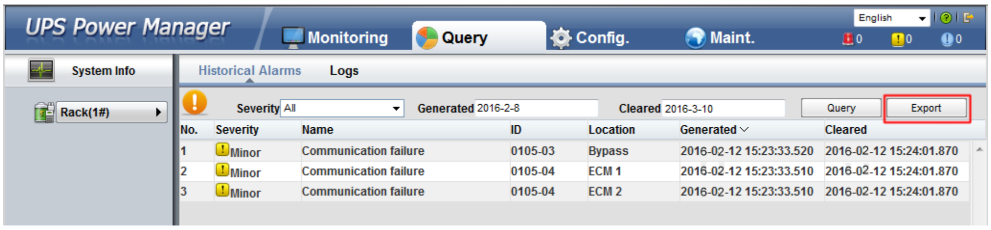



NOTE

You do not need to query logs. Choose **Query** > **Logs**, click **Export**, and save the file.

**Step 2** Click **Query**, and you can see the corresponding historical alarms.

**Figure 5-36** Exporting historical alarms




**Step 3** Click **Export** and save the displayed webpage.

**----End**

# 5.12 Setting Hibernation Mode

When the load power is small and stable, the inverters in some power modules shut down so that these power modules can enter hibernation state and the other power modules bear all the load power. This improves the system efficiency, reduces power consumption, and increases the power module service life. Use the LCD or WebUI to set hibernation mode.

**NOTICE**

Before starting hibernation mode: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- 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 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.

## 5.12.1 LCD

### Procedure

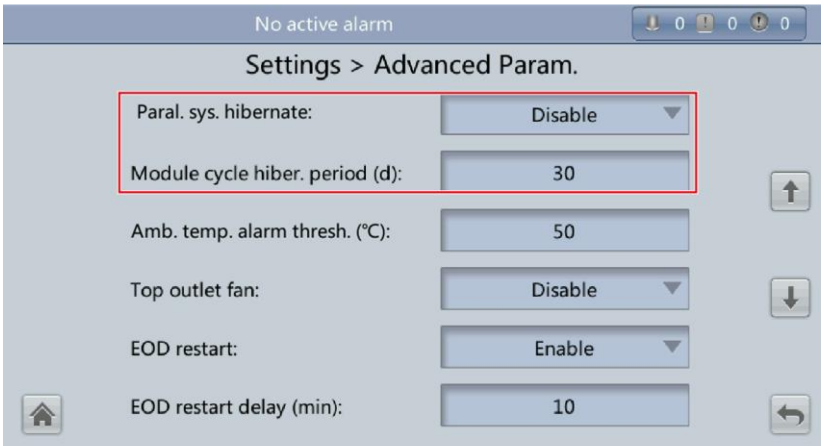
**Step 1** On the main screen, tap **System Info** and . The **Settings** screen is displayed.

**NOTE**

If you have not logged in, enter a user name and password, and tap on the login screen displayed.

**Step 2** Tap **Advanced Param.**. Tap or to browse the parameters, as shown in Figure 5-37.

**Figure 5-37** Hibernation parameters on the LCD




**Step 3** On the LCD, set **Paral. sys. hibernate** to **Enable**. A confirmation message is displayed, as shown in Figure 5-38.


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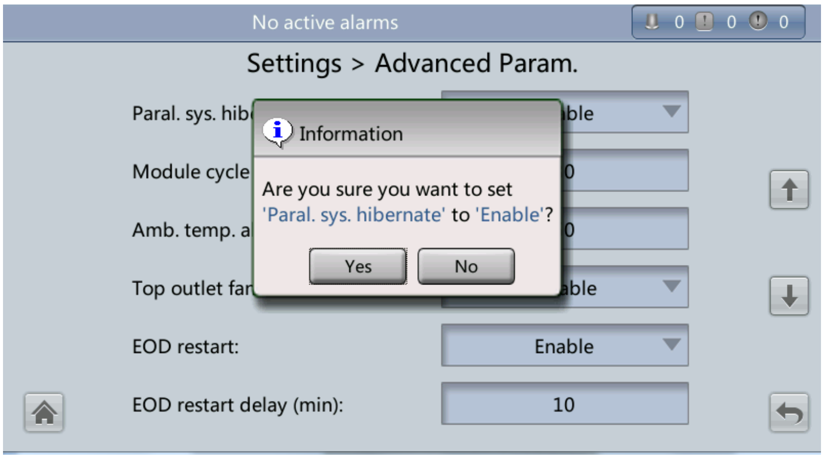
**Figure 5-38** Confirmation message




**Step 4** Check that the load power is stable (that is, no transient surge results in overload, which may cause the UPS to transfer to bypass mode), and tap **Yes**.

**Step 5** Set **Module cycle hiber. period (d)** to an integer ranging from **1** to **100**. The default value is **30**.

**----End**

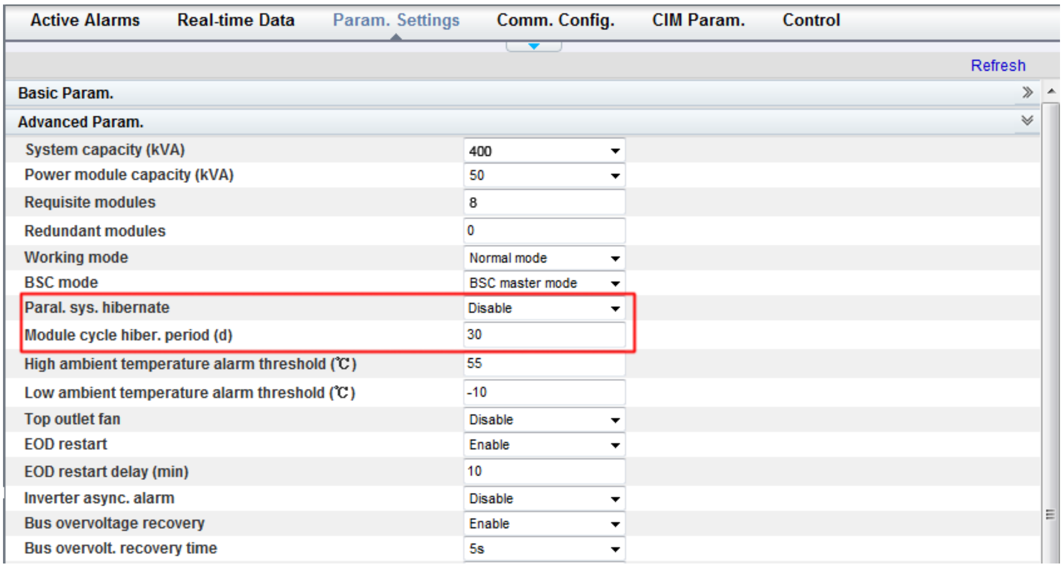
## 5.12.2 WebUI

### Procedure

**Step 1** On the login page, enter a user name and password, and click **Login**.

**Step 2** Choose **Monitoring** > **Param. Settings** > **Advanced Param.**, as shown in Figure 5-39.

**Figure 5-39** Hibernation parameters on the WebUI





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**Step 3** On the WebUI, set **Paral. sys. hibernate** to **Enable**, and click **Submit**.

NOTE

Click **Submit** after you set the parameter on the WebUI.

**Step 4** Set **Module cycle hiber. period (d)** to an integer ranging from **1** to **100**. The default value is **30**.

**----End**


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# 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 | • Ambient temperature: 0–40 ℃<br>• Humidity: 0–95% RH (non-condensing)<br>• Rodent-proof measures have been taken for the equipment room.<br>• The equipment room is airtight. | • If the humidity or temperature is abnormal, check the air conditioner status.<br>• Put rodent-proof baffle plates at the door of the UPS equipment room.<br>• Check that the equipment room is airtight and not in a direct ventilation environment. |
| Power grid environment | • Input voltage: 380 V AC, 400 V AC, or 415 V AC (line | • If the input voltage is abnormal, check the power grid |


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| Check Item | Expected Result | Troubleshooting |
|---|---|---|
| | voltage)<br>• Output voltage: 380 V AC, 400 V AC, or 415 V AC (tolerance ±1%, line voltage)<br>• Frequency: 40–70 Hz | status and input cable connection.<br>• If the output voltage is abnormal, check the UPS running status and check whether an alarm is generated. |
| 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 | The insulation layer of cables is intact and terminals are free from black marks | • Replace the cables.<br>• Secure the output |


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| Check Item | Expected Result | Troubleshooting |
|---|---|---|
| power distribution cabinet) | and noticeable sparks. | terminals. |
| Cables and circuit breaker through-current capacity | The circuit breakers and cables meet load requirements.<br>The actual cable through-current capacity is greater than the circuit breaker specifications. | • Replace the circuit breaker.<br>• Replace the cable. |

To prevent system failures caused by the deterioration of some key UPS components, you are advised to check the key components on a regular basis and replace them within the service life.

**Table 6-4** Service life parameters for replaceable components and recommended replacement intervals

| Key Component | Design Service Life | Recommended Replacement Interval |
|---|---|---|
| Power module | 15 years | 10 years |
| Bypass module | 15 years | 10 years |
| Fan | 15 years | 10 years |
| LCD screen | 10 years | 8 years |

# 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:


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- 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 6-5** Monthly maintenance

| Item | Expected Result | Troubleshooting |
| --- | --- | --- |
| Battery management alarm | No battery management alarm is generated. | Identify the cause of an alarm based on the alarm information. |
| Battery appearance | 1. The surface is clean and tidy without stains.<br>2. The battery terminals are intact.<br>3. Batteries are free from damage and cracks.<br>4. Batteries are free from acid leakage.<br>5. Batteries are not deformed or bulged. | If the battery appearance is abnormal, contact Huawei technical support. |
| Battery operating temperature | 1. The ambient battery temperature is 25±5 ℃.<br>2. The battery operating temperature is lower than battery temperature +20 ℃.<br>3. Battery charge and discharge conditions meet the requirements specified in the battery specifications. | 1. Identify the cause of an abnormal battery operating temperature.<br>2. If the fault persists, contact Huawei technical support. |
| Charge voltage of battery string | • Equalized charging voltage: (2.35 V/cell ±1%) x number of battery cells | 1. If the voltage drop between the battery string output terminals and the battery input terminals at the UPS side is greater than |


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| Item | Expected Result | Troubleshooting |
|---|---|---|
| | • Float charging voltage: (2.25 V/cell ±1%) x number of battery cells | 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.<br>2. Check whether the equalized charging voltage and float charging voltage are correctly set for the UPS.<br>3. If the fault persists, contact Huawei technical support. |

## 6.2.3 Quarterly Maintenance

**Table 6-6** 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℃. | 1. Install the temperature sensor in the correct position.<br>2. Replace the battery temperature sensor. |
| 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 | • Equalized charging voltage: 2.35 V/cell ± 0.02 V/cell<br>• Float charging voltage: 2.25 V/cell ±0.02 V/cell | 1. Check whether the equalized charging voltage and float charging voltage of a battery are normal.<br>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.<br>3. If the fault persists, contact |


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| Item | Expected Result | Troubleshooting |
|---|---|---|
| | | Huawei technical support. |
| Shallow discharge test (recommended) | Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally. | 1. If the batteries cannot discharge normally, locate the fault (for abnormal alarms, see the alarm list).<br>2. If the fault persists, contact Huawei technical support. |

## 6.2.4 Annual Maintenance

**Table 6-7** 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. | 1. Locate the cause when an exception is identified.<br>2. If the fault persists, contact Huawei technical support. |
| Battery connection reliability | 1. Each battery terminal is connected reliably. (When battery strings are powered off, check the reliability of each terminal in the order from positive terminals to negative terminals.)<br>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.) | 1. Rectify any abnormal connection.<br>2. If the fault persists, contact Huawei technical support. |


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# 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 | The rectifier is not working, and the bus | The mains voltage exceeds the upper | Check whether the mains voltage exceeds |


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| Case | Symptom | Possible Cause | Measure |
|---|---|---|---|
| is not normal. | voltage is not boosted. | threshold 280 V or is less than the lower threshold 80 V. | the threshold. If yes, contact the electric 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. |
| | | Inverter overtemperature occurs. | Install more air conditioners or ventilation devices to ensure normal temperatures inside the equipment room. |
| | | 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. | Clear the bypass transfer times on the LCD. |
| 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. |


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**NOTE**

For details about component replacement and maintenance involved in Troubleshooting and Alarm List, consult Huawei maintenance engineers.


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# 8 Technical Specifications

## 8.1 Physical Parameters

<table>
<tr><th>Physical Parameters</th><th>400 kVA</th><th>500 kVA</th><th>600 kVA</th><th>800 kVA</th></tr>
<tr><td>Cabling mode</td><td colspan="4">Cables are routed from the top or bottom.</td></tr>
<tr><td>Protection level</td><td colspan="4">IP20 (IP21 can be reached by configuring IP21 components.)</td></tr>
<tr><td>Dimensions (H x W x D)</td><td colspan="2">2000 mm x 1200 mm x 850 mm</td><td>2000 mm x 1400 mm x 850 mm</td><td>2000 mm x 2400 mm x 850 mm</td></tr>
<tr><td>Communication</td><td colspan="4">Supports dry contacts, RS485 ports, and FE ports. Supports Simple Network Management Protocol (SNMP).</td></tr>
<tr><td>Weight</td><td>UPS5000-E-400K-SM: 670 kg<br>UPS5000-E-400K-FM: 710 kg</td><td>UPS5000-E-500K-SM: 810 kg<br>UPS5000-E-500K-FM: 830 kg</td><td>UPS5000-E-600K-SM: 1040 kg<br>UPS5000-E-600K-FM: 1090 kg</td><td>UPS5000-E-800K-SM: 1520 kg<br>UPS5000-E-800K-FM: 1600 kg</td></tr>
</table>

## 8.2 Internal Switch Parameters

| UPS | Maintenance bypass switch | Mains input switch | Bypass input switch | Output switch |
|---|---|---|---|---|
| UPS5000-E-400K-SM | 1000 V AC/630 A/3P | - | - | - |
| UPS5000-E-400K-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-500K-SM | 1000 V AC/800 A/3P | - | - | - |


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| UPS | Maintenance bypass switch | Mains input switch | Bypass input switch | Output switch |
|---|---|---|---|---|
| UPS5000-E-500K-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-600K-SM | 1000 V AC/1000 A/3P | - | - | - |
| UPS5000-E-600K-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-800K-SM | 1000 V AC/1250 A/3P | - | - | - |
| UPS5000-E-800K-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 | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Operating temperature | 0–40 ℃ | | | |
| Storage temperature | –40 ℃ to +70 ℃ | | | |
| Relative humidity | 0%–95% RH (non-condensing) | | | |
| Altitude | 0–1000 m<br>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 | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Safety regulations | EN62040-1: 2013<br>IEC62040-1: 2013<br>YD/T2165-2010 | | | |
| EMC | EN62040-2<br>IEC62040-2 | | | |


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| Safety and EMC | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| | IEC61000-2-2<br>IEC61000-4-2<br>IEC61000-4-4<br>IEC61000-4-5<br>EN61000-4-3<br>EN61000-4-6<br>IEC61000-4-8 | | | |

# 8.5 Mains Input Electrical Specifications

| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Input system | Three-phase, four-wire, and PE | | | |
| Rated input voltage | 380 V AC, 400 V AC, or 415 V AC (line voltage) | | | |
| Input voltage | • 80–280 V AC (phase voltage)<br>• At 40 ℃: 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.<br>• At 30 ℃: 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. | | | |
| Rated frequency | 50 Hz or 60 Hz | | | |
| Input frequency | 40–70 Hz | | | |
| Input PF | • > 0.99 (full load)<br>• > 0.98 (half load) | | | |
| THDi | • THDi < 3% (full linear load)<br>• THDi < 5% (full non-linear load) | | | |

# 8.6 Bypass Input Electrical Specifications

| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Input system | Three-phase, four-wire, and PE | | | |
| Rated input | 380 V AC, 400 V AC, or 415 V AC (line voltage) | | | |


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| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| 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 use different power sources. | | | |

# 8.7 Battery Specifications

| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Battery voltage | 360–528 V DC (12 V batteries, 30–44 batteries, 40 by default); If there are 36–44 batteries, output power is not derated. If there are 34 batteries, output power is derated to 0.9. If there are 32 or 30 batteries, output power is derated to 0.8. | | | |
| Battery management | Intelligent battery management | | | |
| One-button cold start | In the case of a mains failure, batteries can start the UPS to power loads. | | | |
| Battery string sharing | Battery string sharing is supported in a parallel system. No battery string is shared by default. | | | |
| Charge voltage | • Equalized voltage: 2.3–2.4 V/Cell, default: 2.35 V/Cell (30–42 batteries)<br>• Equalized voltage: 2.3–2.35 V/Cell, default: 2.35 V/Cell (44 batteries)<br>• Float voltage: 2.23–2.3 V/Cell, default: 2.25 V/Cell (30–44 batteries) | | | |

# 8.8 Output Electrical Specifications

| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Output system | Three-phase, four-wire, and PE | | | |
| Voltage | 380 V AC, 400 V AC, or 415 V AC (tolerance ±1%) (line voltage) | | | |
| Frequency | • In normal mode, the mains frequency is synchronous with the bypass input frequency.<br>• In battery mode, the frequency is 50 Hz or 60 Hz (tolerance | | | |


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| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| | ±0.05%). | | | |
| Total harmonic distortion of output voltage (THDv) | • ≤ 1% (full linear load)<br>• ≤ 4% (full non-linear load) | | | |
| Output PF | 1 | | | |
| Transfer time | • 0 ms (uninterruptible transfer)<br>• ≤ 20 ms (interruptible transfer) | | | |
| Output voltage unbalance | Voltage unbalance: ±3%; phase unbalance: ±2 ° | | | |
| Overload capability | Inverter overload capability:<br>• 100% < load ≤ 110%: transfer to bypass mode after 60 minutes<br>• 110% < load ≤ 125%: transfer to bypass mode after 10 min<br>• 125% < load ≤ 150%: transfer to bypass mode after 1 min<br>• Load > 150%: transfer to bypass mode after 200 ms | | | |

# 8.9 System Electrical Specifications

| Item | 400 kVA | 500 kVA | 600 kVA | 800 kVA |
|---|---|---|---|---|
| Redundancy design | The auxiliary power supplies, centralized controllers, and parallel signals use redundancy design. | | | |
| ECO | Supported | | | |


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# A (Optional) TN-C System Application

If the TN-C system is adopted, short-circuit the input N and PE. Figure A-1 and Figure A-2 show cable connections for short-circuiting the input N and PE for different UPS models. Table A-1 lists the recommended cross-sectional areas for cables.

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)

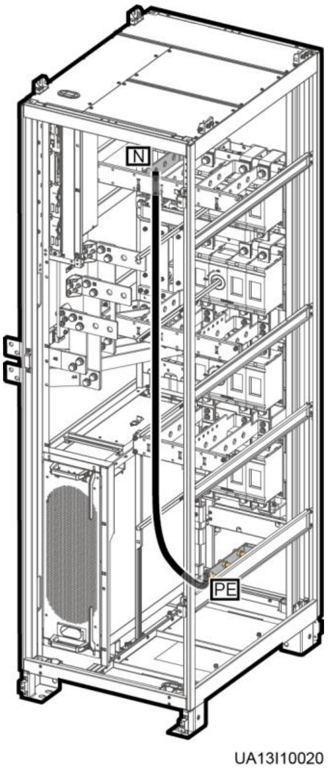

**Figure A-2** Short-circuiting the input N and PE (800 kVA UPS)

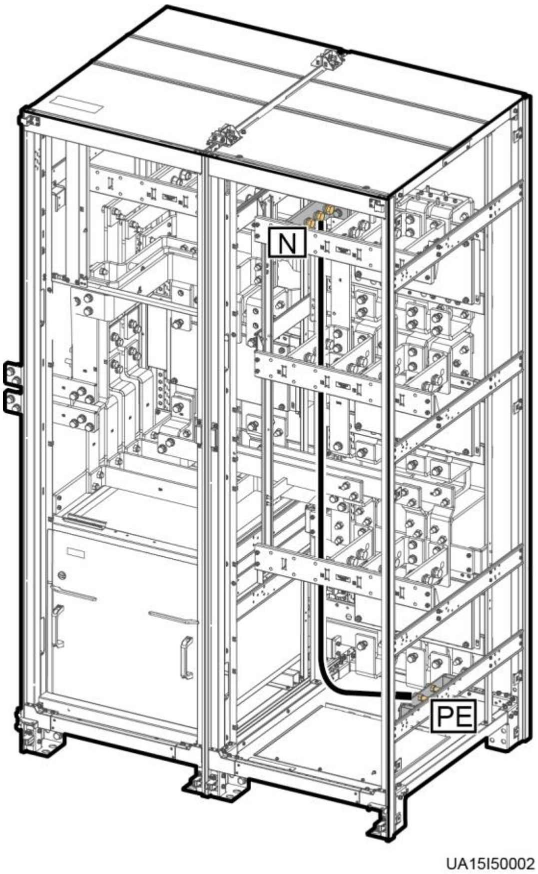


**Table A-1** Recommended cross-sectional areas for cables

| Model | Current (A) | Recommended Cross-Sectional Area (mm²) |
|---|---|---|
| 400kVA | 710.8 | 240 |
| 500kVA | 888.5 | 240 |
| 600kVA | 1066.2 | 240 |
| 800kVA | 1421.6 | 240 |


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# B Menu Hierarchy

## B.1 Menus on the LCD

| Level-1 Menu | Level-2 Menu | Level-3 Menu | Level-4 Menu |
|---|---|---|---|
| System Info | Runn Info | AC Output | - |
| | | UPS Load | - |
| | | Mains Input | - |
| | | Bypass Input | - |
| | | Battery Status | - |
| | | Module Data | - |
| | | Total Runtime | - |
| | | Environment Data | - |
| | Alarms | Active Alarms | - |
| | | Historical Alarms | - |
| | | Buzzer Off | - |
| | | Clear Faults | - |
| | Settings | Basic | - |
| | | Communication | - |
| | | Basic Param. | - |
| | | Advanced Param. | - |
| | | Input Param. | - |
| | | Output Param. | - |
| | | Bypass Param. | - |
| | | Battery Param. | - |


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| Level-1 Menu | Level-2 Menu | Level-3 Menu | Level-4 Menu |
|---|---|---|---|
| | | Dry Contacts | - |
| | | Settings Wizard | - |
| | | CIM Param. | Basic Param. |
| | | | Advanced Param. |
| | Maintenance | Battery Maint. | - |
| | | USB Operations | Remove USB |
| | | | Upgrade Software |
| | | | Load Config. |
| | | | Export Config. |
| | | | Export Logs |
| | | | Export E-labels |
| | | | Export Alarms |
| | | | Multi-brand |
| | | | Fault Data |
| | | | CIM Version |
| | | Inv. ON | - |
| | | Inv. OFF | - |
| | | ECM Switchover | - |
| | | Screen Calib. | - |
| | | CIM Maint. | - |
| | About | Model | - |
| | | Manufacturer | - |
| | | Monitoring Version | - |
| | | Power Version | - |
| | | Version Info | - |
| Common Functions | AC Output | Phase voltage | - |
| | | Line voltage | - |
| | | Phase current | - |
| | | Frequency | - |
| | | Power factor | - |


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| Level-1 Menu | Level-2 Menu | Level-3 Menu | Level-4 Menu |
|---|---|---|---|
| | UPS Load | Active power | - |
| | | Apparent power | - |
| | | Reactive power | - |
| | | Load ratio | - |
| | | Crest factor | - |
| | Mains Input | Phase voltage | - |
| | | Line voltage | - |
| | | Phase current | - |
| | | Frequency | - |
| | | Power factor | - |
| | Inv. ON | - | - |
| | Inv. OFF | - | - |
| | Buzzer Off | - | - |
| | Historical Alarms | - | - |
| System Status | Bypass | - | - |
| | Mains | - | - |
| | Load | - | - |
| | Battery | - | - |

# B.2 Menus on the WebUI

| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| Monitoring | Active Alarms | N/A | N/A | N/A |
| | Real-time Data | UPS | Input | Phase voltage |
| | | | | Line voltage |
| | | | | Current |
| | | | | Power factor |
| | | | | Frequency |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | Bypass | Phase voltage |
| | | | | Line voltage |
| | | | | Current |
| | | | | Power factor |
| | | | | Frequency |
| | | | Output | Phase voltage |
| | | | | Line voltage |
| | | | | Current |
| | | | | Power factor |
| | | | | Frequency |
| | | | | Crest factor |
| | | | | Load ratio |
| | | | | Active power |
| | | | | Apparent power |
| | | | | Reactive power |
| | | | | System active power |
| | | | | System apparent power |
| | | | | System reactive power |
| | | | Battery | Voltage |
| | | | | Current |
| | | | | Bus voltage |
| | | | | Battery temperature |
| | | | | Backup time |
| | | | | Remaining capacity |
| | | | | SOH |
| | | | Environment Data | Ambient temperature |
| | | | | Ambient humidity |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | Module | Rectifier | Phase voltage |
| | | | | Line voltage |
| | | | | Current |
| | | | | Power factor |
| | | | | Frequency |
| | | | | Zero sequence current |
| | | | | Bus voltage |
| | | | | Battery voltage |
| | | | | Battery current |
| | | | Inverter | Phase voltage |
| | | | | Line voltage |
| | | | | Current |
| | | | | Inductance current |
| | | | | Output phase voltage |
| | | | | Frequency |
| | | | | Active power |
| | | | | Apparent power |
| | | | | Reactive power |
| | | | | Power factor |
| | | | | Load ratio |
| | | | | Crest factor |
| | | Battery String | N/A | N/A |
| | Param. Settings | Basic Param. | Single/Parallel | N/A |
| | | | Voltage level | N/A |
| | | | Output frequency | N/A |
| | | | Battery capacity | N/A |
| | | | Number of cells | N/A |
| | | Advanced Param. | System capacity | N/A |
| | | | Power module | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | capacity | |
| | | | Requisite modules | N/A |
| | | | Redundant modules | N/A |
| | | | Working mode | N/A |
| | | | BSC mode | N/A |
| | | | Paral. sys. hibernate | N/A |
| | | | Module cycle hiber. period | N/A |
| | | | High ambient temperature alarm threshold | N/A |
| | | | Low ambient temperature alarm threshold | N/A |
| | | | Top outlet fan | N/A |
| | | | EOD restart | N/A |
| | | | EOD restart delay | N/A |
| | | | Inverter async. alarm | N/A |
| | | | Bus overvoltage recovery | N/A |
| | | | Bus overvolt. recovery time | N/A |
| | | | Capacitor failure detection | N/A |
| | | | Capacitor failure detection upper limit | N/A |
| | | | Capacitor failure detection lower limit | N/A |
| | | | Input cur. limiting | N/A |
| | | | Input cur. limiting ratio | N/A |
| | | | No-load output shows zero | N/A |
| | | | Current equal. detection | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | Bus Capa. Life | N/A |
| | | | Altitude | N/A |
| | | | Modbus TCP encryption | N/A |
| | | | Air filter maintenance period | N/A |
| | | | Batt. charging capacity mismatch | N/A |
| | | | Battery segment detection | N/A |
| | | | EPO detection | N/A |
| | | | Lightload BPM cur. eql. Detect | N/A |
| | | | Collect real-time site waveform | N/A |
| | | | RAM verification | N/A |
| | | | D.G. ECO Bypass Supply | N/A |
| | | | UPS model | N/A |
| | | Input Param. | D.G. mode | N/A |
| | | | D.G. power limiting | N/A |
| | | | D.G. charger power ratio | N/A |
| | | | Intra-rack power module start delay | N/A |
| | | | Inter-rack power module start delay | N/A |
| | | | Input adaptability | N/A |
| | | Output Param. | Output volt. adjustment | N/A |
| | | | Outp. transf. interrupt time | N/A |
| | | | Self-load output cur. ratio | N/A |
| | | | Output interruption transfer time | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | Max. BPM transfer times | N/A |
| | | Bypass Param. | Bypass frequency range | N/A |
| | | | Maximum bypass voltage | N/A |
| | | | Minimum bypass voltage | N/A |
| | | | ECO voltage range | N/A |
| | | | BPM mode upon BPM overtemp | N/A |
| | | Battery Param. | Installation time | N/A |
| | | | Maintenance period | N/A |
| | | | Battery type | N/A |
| | | | Chg. cur. limiting coef. | N/A |
| | | | Cell float voltage | N/A |
| | | | Cell equalized volt | N/A |
| | | | Transfer-to-equalized charging cur. coef. | N/A |
| | | | SOC to start equalized charging | N/A |
| | | | Automatic equalized charging | N/A |
| | | | Forced equalized charging protection time | N/A |
| | | | Equalized charging protection interval | N/A |
| | | | Scheduled equalized charging interval | N/A |
| | | | Float volt. temp. comp. | N/A |
| | | | Float volt. temp. comp. coef. | N/A |
| | | | Max batt. dis.time | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | Sched. shallow dis. test | N/A |
| | | | Sched. shallow dis. test time | N/A |
| | | | Sched. shallow dis. test interval | N/A |
| | | | Shallow dis. test dis. ratio | N/A |
| | | | Undertemp. alarm thresh. | N/A |
| | | | Overtemp. alarm thresh. | N/A |
| | | | Backup time warning | N/A |
| | | | Backup time warn. thresh. | N/A |
| | | | Remain. cap. warning | N/A |
| | | | Remain. cap. warn. thresh. | N/A |
| | | | Dis.cur.0.1C EOD | N/A |
| | | | Dis. cur.0.3C EOD | N/A |
| | | | Dis. cur.0.5C EOD | N/A |
| | | | Dis. cur.1.0C EOD | N/A |
| | | | Intelligent hibernation | N/A |
| | | | Class 1 grid hiber. time | N/A |
| | | | Class 2 grid hiber. time | N/A |
| | | | Intelligent hibernation | N/A |
| | | | Single batt. float chg. voltage deviation alarm thres. | N/A |
| | | | Single batt. dis. voltage deviation | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | alarm thres. | |
| | | | Bat mode shut | N/A |
| | | Dry Contacts | MUE05A connection | N/A |
| | | | Battery ground fault | N/A |
| | | | D.G. connection | N/A |
| | | | BCB connection | N/A |
| | | | Battery breaker | N/A |
| | | | PDC output breaker | N/A |
| | | | PDC maintenance breaker | N/A |
| | | | BP/SYSMT Switch | N/A |
| | | | BP/SYSMT switch function | N/A |
| | | | SPD/SYSOUT Switch | N/A |
| | | | SPD/SYSOUT switch function | N/A |
| | | | MUE06A connection | N/A |
| | | | MUS05A DO_1 Action | N/A |
| | | | MUS05A DO_2 Action | N/A |
| | | | MUS05A DO_3 Action | N/A |
| | | | MUS05A DO_4 Action | N/A |
| | | | MUE07A DO_1 Action | N/A |
| | | | MUE07A DO_2 Action | N/A |
| | | | MUE07A DO_3 Action | N/A |
| | | | MUE07A DO_4 Action | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | MUE07A DO_5 Action | N/A |
| | | | MUS05A DO_1 | N/A |
| | | | MUS05A DO_2 | N/A |
| | | | MUS05A DO_3 | N/A |
| | | | MUS05A DO_4 | N/A |
| | | | MUE07A DO_1 | N/A |
| | | | MUE07A DO_2 | N/A |
| | | | MUE07A DO_3 | N/A |
| | | | MUE07A DO_4 | N/A |
| | | | MUE07A DO_5 | N/A |
| | | | MUE07A DI_1 | N/A |
| | | | MUE07A DI_2 | N/A |
| | | | MUE07A DI_3 | N/A |
| | | | MUE07A DI_4 | N/A |
| | | | MUE07A DI_5 | N/A |
| | Comm. Config. | System IP Settings | IP address | N/A |
| | | | Subnet mask | N/A |
| | | | Gateway | N/A |
| | | | NAT mapping | N/A |
| | | RS485 Settings | Address | N/A |
| | | | Baud Rate | N/A |
| | | | Parity mode | N/A |
| | | | Stop bit | N/A |
| | | Battery Temperature Sensor Settings | Start addr. of batt. temp. sensor | N/A |
| | | | Batt. temp. sensors | N/A |
| | | Ambient Temperature and Humidity Sensor Settings | Start address of ambient temperature and humidity sensors | N/A |
| | | | Ambient temperature and | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | humidity sensors | |
| | | BMU Settings | BMU start address | N/A |
| | | | BMUs | N/A |
| | | NTC Settings | NTC | N/A |
| | CIM Param. | Basic Param. | Number of CIMs | N/A |
| | | | CIM start address | N/A |
| | | | CIM1 number of BIM1 | N/A |
| | | | Number of battery strings | N/A |
| | | | Batteries in a battery string | N/A |
| | | | CIM logical start addr | N/A |
| | | Advanced Param. | Current source | N/A |
| | | | BCB connects to CIM | N/A |
| | | | Batt. abnormal BCB trip | N/A |
| | | | Multi-Hall cur. setting | N/A |
| | | Batt. String Config | N/A | N/A |
| | Control | System Commands and Tests | Inv. ON | N/A |
| | | | Inv. OFF | N/A |
| | | | Clear Fault | N/A |
| | | | Bypass runtime (Clear) | N/A |
| | | | Inv. runtime (Clear) | N/A |
| | | | Forced equalized charging (Start, Stop) | N/A |
| | | | Shallow discharge test (Start, Stop) | N/A |
| | | | Capacity Test (Start, Stop) | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | CIM Control | CIM No. | N/A |
| | | | BIM No. | N/A |
| | | | Reset (CIM, BIM) | N/A |
| | | | Blink (Start, Stop) | N/A |
| | | | Internal resistance (Measure) | N/A |
| Query | Alarm History | Query | N/A | N/A |
| | | Export | N/A | N/A |
| | Logs | Historical log | N/A | N/A |
| | | Cap. test log | N/A | N/A |
| | | Common test log | N/A | N/A |
| Config. | User Mgmt. | User Mgmt. | New | N/A |
| | | | Modify | N/A |
| | | | Delete | N/A |
| | | | Lock | N/A |
| | | | Unlock | N/A |
| | | | LUI password complexity check | N/A |
| | | Idle Timeout Logout | Allowed timeout | N/A |
| | Site Config. | Time zone | Time zone | N/A |
| | | System Date and Time | Date (Local) | N/A |
| | | | Time (Local) | N/A |
| | | System Information | Name | N/A |
| | | | Location | N/A |
| | | | Contact information | N/A |
| | | SNMP | SNMP version | N/A |
| | | | SNMP port | N/A |
| | | SNMP Trap | No. | N/A |
| | | | Trap addr. | N/A |
| | | | Trap port | N/A |

| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | SNMP version | N/A |
| | | | User name/Community | N/A |
| | | Certificate Management | Upload | N/A |
| | | | Password | N/A |
| | | | Confirm password | N/A |
| | | | Export certificate | N/A |
| | | Configuration Management | Upload configuration file | N/A |
| | | | Export configurations | N/A |
| | | Multi-brand Management | Upload | N/A |
| | | Configure Alarm Notification Server | Email server IP address | N/A |
| | | | Sender's email | N/A |
| | | | SMTP port | N/A |
| | | | Secure connection (TLS encryption) | N/A |
| | | | User account authentication required when sending a mail | N/A |
| | | Configure Alarm Notification Email Address | No. | N/A |
| | | | Email | N/A |
| | | | Language | N/A |
| | | | Alarm Severity | N/A |
| | | | Scheduled Notifi. | N/A |
| | | ModbusTCP Certificate Management | Upload | N/A |
| | | | Password | N/A |
| | | | Confirm password | N/A |
| | | ModbusTCP CA Certificate Management | Upload | N/A |
| | | ModbusTCP | Authentication | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | Authentication | New password | N/A |
| | | | Confirm password | N/A |
| | | eUPS Certificate Management | Upload | N/A |
| | | | Password | N/A |
| | | | Confirm password | N/A |
| | | WiFi | SSID | N/A |
| | | | New password | N/A |
| | RCCMD | RCCMD | RCCMD function | N/A |
| | | SSL Encrypted Transmission | SSL Encrypted Transmission | N/A |
| | | Event Configuration | N/A | N/A |
| | | RCCMD Certificate Management | Select the RCCMD certificate to be uploaded | N/A |
| | | | Select the RCCMD certificate key to be uploaded | N/A |
| | | | Select the RCCMD CA certificate to be uploaded | N/A |
| Maint. | Calib | Bypass | Ph. A input volt. | N/A |
| | | | BPM ph. B input volt. | N/A |
| | | | BPM ph. C input volt. | N/A |
| | | | Ph. A output volt. | N/A |
| | | | Ph. B output volt. | N/A |
| | | | Ph. C output volt. | N/A |
| | | Module | Ph. A input volt. | N/A |
| | | | Ph. B input volt. | N/A |
| | | | Ph. C input volt. | N/A |
| | | | Ph. A input cur. | N/A |
| | | | Ph. B input cur. | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | Ph. C input cur. | N/A |
| | | | Pos. bus volt. | N/A |
| | | | Neg. bus volt. | N/A |
| | | | Zero sequence cur. | N/A |
| | | | Pos. batt. volt. | N/A |
| | | | Pos. batt. chg. volt. | N/A |
| | | | Pos. batt. chg. cur. | N/A |
| | | | Pos. batt. dis. cur. | N/A |
| | | | Neg. batt. volt. | N/A |
| | | | Neg. batt. chg. volt. | N/A |
| | | | Neg. batt. chg. cur. | N/A |
| | | | Neg. batt. dis. cur. | N/A |
| | | | Inv. ph. A volt. | N/A |
| | | | Inv. ph. B volt. | N/A |
| | | | Inv. ph. C volt. | N/A |
| | | | Ph. A output volt. | N/A |
| | | | Ph. B output volt. | N/A |
| | | | Ph. C output volt. | N/A |
| | | | Inv. ph. A cur. | N/A |
| | | | Inv. ph. B cur. | N/A |
| | | | Inv. ph. C cur. | N/A |
| | | | Inv. ph. A induc. cur. | N/A |
| | | | Inv. ph. B induc. cur. | N/A |
| | | | Inv. ph. C induc. cur. | N/A |
| | | ECM | BPM ph. A input volt. | N/A |
| | | | BPM ph. B input volt. | N/A |
| | | | BPM ph. C input volt. | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | Rack ph. A output cur. | N/A |
| | | | Rack ph. B output cur. | N/A |
| | | | Rack ph. C output cur. | N/A |
| | | | Rack ph. A output volt. | N/A |
| | | | Rack ph. B output volt. | N/A |
| | | | Rack ph. C output volt. | N/A |
| | Commissioning Var. | Bypass | BPM SW commissioning var. 0 data | N/A |
| | | | BPM SW commissioning var. 1 data | N/A |
| | | | BPM SW commissioning var. 2 data | N/A |
| | | | BPM SW commissioning var. 3 data | N/A |
| | | | BPM SW commissioning var. 4 data | N/A |
| | | | BPM SW commissioning var. 5 data | N/A |
| | | Module | Rec. SW commissioning var. 0 data | N/A |
| | | | Rec. SW commissioning var. 1 data | N/A |
| | | | Rec. SW commissioning var. 2 data | N/A |
| | | | Rec. SW commissioning var. | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | 3 data | |
| | | | Rec. SW commissioning var. 4 data | N/A |
| | | | Rec. SW commissioning var. 5 data | N/A |
| | | | Inv. SW commissioning var. 0 data | N/A |
| | | | Inv. SW commissioning var. 1 data | N/A |
| | | | Inv. SW commissioning var. 2 data | N/A |
| | | | Inv. SW commissioning var. 3 data | N/A |
| | | | Inv. SW commissioning var. 4 data | N/A |
| | | | Inv. SW commissioning var. 5 data | N/A |
| | | ECM | ECM SW commissioning var. 0 data | N/A |
| | | | ECM SW commissioning var. 1 data | N/A |
| | | | ECM SW commissioning var. 2 data | N/A |
| | | | ECM SW commissioning var. 3 data | N/A |
| | | | ECM SW commissioning var. 4 data | N/A |
| | | | ECM SW commissioning var. | N/A |


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| Level–1 Menu | Level–2 Menu | Level–3 Menu | Level–4 Menu | Level–5 Menu |
|---|---|---|---|---|
| | | | 5 data | |
| | Upgrade | Upgrade UPS Software | N/A | N/A |
| | Download | Download | Fault Data | N/A |
| | | | CIM version | N/A |
| | | | E-Label | N/A |


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# C Alarm List

| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| 0001-1 | Mains voltage abnormal | Minor | • Cable connections are incorrect.<br>• The mains is not normal.<br>• The power module is faulty. | 1. Check whether cables to mains are disconnected, loose, or incorrectly connected.<br>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. |
| 0001-2 | | | • Cable connections are incorrect.<br>• The mains is not normal.<br>• The mains input fuse for the power module is blown. | 1. Check whether cables to mains are disconnected, loose, or incorrectly connected.<br>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. |
| 0001-3 | | | The mains is not normal. | Check the mains. |
| 0004-1 | Mains ph. Reversed | Minor | Cable connections are incorrect. | Verify the cable connections. |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| 0005-1 | Mains neutral absent | Minor | Cable connections are incorrect. | 1. Secure or connect the neutral wire to the cabinet if it is loose or disconnected.<br>2. Check that the neutral wire to the power distribution system is normal. |
| 0006-1 | Mains undervoltage | Minor | • The mains is not normal.<br>• The power module sampling circuit is not normal. | 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 | • The bypass voltage range is not correctly set.<br>• The bypass input voltage is not normal. | 1. Check the bypass input voltage or cable connections with a multimeter.<br>2. Check the voltage system and bypass voltage thresholds configured on the LCD. |
| 0010-2 | | | • The bypass frequency range is not correctly set.<br>• The bypass input frequency is not normal. | 1. Check the bypass input voltage or cable connections with a multimeter.<br>2. Check the bypass input frequency. Check the rated frequency and frequency range configured on the LCD. |
| 0011-1 | Bypass phase reversed | Minor | The phase sequence of the | Check whether the cable phase sequence is correct using a multimeter. If no multimeter is |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | three-phase bypass input is reversed. | available, exchange the positions of any two cables. |
| 0012-1 | Bypass neutral absent | Minor | The neutral wire of bypass input is not installed properly. | 1. Secure or connect the neutral wire to the cabinet if it is loose or disconnected.<br>2. Check that the neutral wire to the power distribution system is normal. |
| 0020-1 | Battery connected reversely | Critical | Batteries are not properly installed. | 1. Check whether battery polarities are correctly installed by using a multimeter. If no, correct the installation.<br>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. |
| 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 | • There is no battery string.<br>• The battery string is not properly installed.<br>• The power module battery fuse is blown. | 1. Check that battery cables are correctly connected.<br>2. Check that the battery terminal voltage is normal.<br>3. Check that the battery fuse in the power module is intact. |
| 0025-1 | Battery overvoltage | Minor | • The configured number of batteries | 1. Check whether battery parameters are correctly set.<br>2. If they are correctly set, certain batteries may be faulty.<br>3. Check whether the battery |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | is less than the actual number.<br>• The battery neutral wire is not installed properly. | neutral wire is correctly connected. |
| 0026-1 | Low battery voltage | Minor | • Battery discharge results in low battery voltage.<br>• The battery neutral wire is not installed properly.<br>• The charger is faulty. | 1. If the low battery voltage alarm is generated in battery mode, check whether the mains voltage recovers. If yes, charge batteries immediately.<br>2. Check whether the battery neutral wire is correctly connected.<br>3. 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. |
| 0530-1 | Battery ground fault | Critical | • The battery string is not properly grounded.<br>• The battery ground monitoring cable is faulty.<br>• The dry contact board is faulty. | 1. Check whether the positive and negative terminals of the battery string are grounded or have sufficient resistance to the ground.<br>2. Check whether the battery grounding failure detector is faulty by replacing it with a new one.<br>3. 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. |
| 0032-1 | Battery overvoltage | Critical | • The battery | 1. Check the battery voltage.<br>2. Check that the configured |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | protection | | voltage is greater than the upper threshold.<br>• The configured number of batteries is less than the actual number.<br>• The actual number of batteries does not meet requirements. | number of batteries matches the actual number.<br>3. Check that the actual number of batteries meets requirements. |
| 0036-2 | Battery maintenance reminder | Warning | The time for maintenance arrives. | Maintain the batteries. |
| 0037-1 | Battery undervoltage | Critical | • The UPS has worked in battery mode for an extended amount of time.<br>• The charger is faulty. | 1. Check whether the battery voltage is normal.<br>2. Check whether the output is overloaded.<br>3. Check whether any battery is damaged. If yes, replace the battery.<br>4. Check whether any battery charger generates an alarm. If yes, replace the faulty module. |
| 0040-7 | Rectifier abnormal | Critical | • The fan for the power module is not functioning properly.<br>• The air channel | 1. Check that the air channel for the module is free from blockage.<br>2. Check whether the fans are functioning properly. Replace the power module if the fans are faulty. |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | for the power module is obstructed. | |
| 0043-1 | Fan abnormal | Critical | • The fan for the power module is abnormal.<br>• The fan monitoring cable for the power module is not working properly. | Replace the faulty power module. |
| 0043-2 | | | The fan is faulty. | Check the fan or replace the bypass module. |
| 0043-3 | | | • The fan is faulty.<br>• The fan monitoring cable is faulty. | 1. Replace the fan.<br>2. Check the fan monitoring cable. |
| 0043-4 | | | | |
| 0047-1 | Not ready | Critical | The ready switch is OFF. | Close the ready switch. |
| 0060-4 | Inverter abnormal | Critical | • A load short-circuit occurs.<br>• A short circuit occurs inside the module. (This fault seldom occurs.) | 1. Check load cable distributions.<br>2. If load cable distributions are normal, replace the power module. |
| 0061-2 | Inverter alarm | Minor | • The I2C bus is not | 1. Rectify the fault and check whether the alarm is cleared.<br>2. If the alarm is generated again, |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | normal.<br>• The E2PROM is faulty. | replace the power module. |
| 0061-7 | Inverter alarm | Minor | The bypass waveform is not normal. | • If not all modules generate the alarm, start the UPS, transfer it to normal mode, and replace the faulty module.<br>• 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. |
| 0564-1 | Overload timeout | Critical | • The load is excessive.<br>• Derating reduces the rated system power.<br>• The module is damaged. | 1. Check that there is no overload.<br>2. Check that the module power is not derated due to a fan fault.<br>3. If the alarm persists, replace the power module. |
| 0565-1 | Load impact transfer-to-bypass | Minor | • A large-power RCD load is instantly connected, or the output load short-circuits.<br>• The inverter bridge short-circuits. | 1. Check the load.<br>2. If the load is normal, replace the power module. |
| 0566-1 | Output overload | Minor | • The load is excessive. | 1. Check that there is no overload.<br>2. Check that the module power is not derated due to a fan fault. |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
| --- | --- | --- | --- | --- |
| | | | • Derating reduces the rated system power.<br>• The module is damaged. | 3. If the alarm persists, replace the power module. |
| 0570-4 | BPM module abnormal | Critical | • The bypass fan is not functioning properly, or the air channel is blocked.<br>• The ambient temperature exceeds the upper threshold.<br>• The load is excessive. | 1. Check the bypass fan and air channel. If the fan is faulty, replace it.<br>2. Check that the ambient temperature has not exceeded 40 ℃.<br>3. Check that there is no overload. |
| 0583-1 | Inter-rack par. cable abnormal | Critical | • The inter-rack parallel system CAN bus is disconnected or short-circuited.<br>• Only one rack works in a parallel system.<br>• An ECM is faulty. | 1. Check the inter-rack parallel system CAN bus.<br>2. Rectify the disconnection or short-circuit fault.<br>3. Replace the ECM. |
| 0583-4 | | | The inter-rack | Replace the inter-rack parallel |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | industrial frequency synchronization cable is broken. | cable. |
| 0583-5 | | | The inter-rack carrier synchronization cable is broken. | |
| 0583-6 | | | • The intra-rack INVBYP cable is broken.<br>• The parallel CAN bus is broken. | |
| 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. |
| 0087-1 | System transfer-to- | Warning | The neighboring | Check the reason why the neighboring UPS transfers to |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | bypass | | UPS is not normal, and transfers to bypass mode. | 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 | • The load is excessive.<br>• The rack capacity setting is not appropriate. | • Check the load and remove some loads or expand the UPS power capacity if the UPS is overloaded.<br>• Check that the configured rack capacity meets requirements. |
| 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 | Critical | The bypass input circuit | The running status is displayed. No further measures are required. |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | input breaker open | | breaker on the PDC is OFF. | |
| 0338 | PDC output breaker open | Critical | The output circuit breaker on the PDC is OFF. | 1. Check that all UPS output circuit breakers are ON.<br>2. On the LCD, check that **PDC output breaker open** alarm has disappeared. If the alarm persists, tap the **Clear Fault** button to clear the alarm. |
| 0341 | PDC Maint. breaker closed | Minor | The maintenance circuit breaker on the PDC is ON. | The running status is displayed. No further measures are required. |
| 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 | • The load is excessive.<br>• The configured number of redundant racks is incorrect. | 1. Reduce the load.<br>2. Decrease the configured number of redundant racks. |
| 0095-1 | Insuffi. redundancy | Minor | • The load is | 1. Reduce the load.<br>2. Decrease the configured number |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | excessive.<br>• The configured number of redundant modules is incorrect. | of redundant modules. |
| 0096-1 | ECO volt. Abnormal | Minor | • The ECO bypass voltage or frequency is out of the preset range.<br>• The ECO bypass voltage or frequency range is incorrectly set.<br>• The bypass input sequence is reverse or the neutral wire is disconnected. | 1. Check the bypass input voltage and frequency.<br>2. Check that the rated voltage, rated frequency, ECO bypass voltage range, and frequency range are correctly set.<br>3. Check that the bypass cables and circuit breakers are correctly connected. |
| 0098-1 | Bypass current not shared | Minor | • The output and input circuit breakers are OFF.<br>• The length of the bypass input or output cables is incorrect. | 1. Check that the output and bypass input circuit breakers on each rack are ON.<br>2. Check that bypass input and output power cables on each rack meet the length requirements.<br>3. Rectify any bypass SCR open-circuit. |


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| Alarm ID (Alarm ID-Cause ID) | Alarm Name | Severity | Cause | Solution |
|---|---|---|---|---|
| | | | • The bypass SCR open-circuits. | |
| 0150-1 | Inverter asynchronous | Minor | • The bypass frequency changes fast.<br>• The output frequency track rate is incorrectly set. | 1. Check that the bypass output frequency does not change fast.<br>2. Check that the **Output freq. track rate** is properly set. |
| 0101-1 | BSC signal abnormal | Minor | • The dual bus connector is loose.<br>• Parameters are set incorrectly. | 1. Check the dual bus connector.<br>2. Check the parameter settings. |
| 0102-1 | Maint. breaker misoperation | Critical | The user operation is incorrect. | 1. Shut down the inverter and then close the maintenance circuit breaker.<br>2. After maintenance, open the maintenance circuit breaker and then start the inverter. |
| 0380 | In self-check | Warning | The inverter is in self-check. | Wait until the inverter self-check is complete. |


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# D Acronyms and Abbreviations

**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 |
| **CM** | control module |

**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 |


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| | |
|---|---|
| | Commission |
| **L** | |
| **LCD** | liquid crystal display |
| **M** | |
| **MDU** | monitor display unit |
| **P** | |
| **PE** | protective earthing |
| **PDU** | power distribution unit |
| **R** | |
| **RS485** | Recommend Standard 485 |
| **S** | |
| **SOC** | state of charge |
| **STS** | static transfer switch |
| **SNMP** | Simple Network Management Protocol |
| **T** | |
| **THDi** | total distortion of the input current waveform |
| **THDv** | total harmonic distortion of output voltage |
| **U** | |
| **UPS** | uninterruptible power system |
| **USB** | Universal Serial Bus |
| **V** | |
| **VRLA** | valve-regulated lead acid battery |


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