



UPS5000-E-(25 kVA-75 kVA)-BF

User Manual

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About This Document

Purpose

This document describes the UPS5000-E-(25 kVA–75 kVA) in terms of its features, performance, 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
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Symbol	Description
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
 NOTE	Calls attention to important information, best practices and tips. 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 04 (2018-01-03)

Added the instructions for startup over the app.

Issue 03 (2017-10-30)

Updated the output electrical specifications and typical configuration.

Issue 02 (2017-08-10)

Updated the pictures of unpacking.

Issue 01 (2017-03-10)

This issue is the first release.

Contents

About This Document	ii
1 Safety Precautions	1
1.1 General Safety	1
1.2 Electrical Safety	3
1.3 Operating Environment.....	6
1.4 Battery Safety	6
1.5 Mechanical Safety	9
1.6 Laying Out Cables	10
2 Overview	11
2.1 Model Description	11
2.2 Working Principle	11
2.2.1 Conceptual Diagram	12
2.2.2 Working Modes.....	12
2.2.2.1 Normal Mode.....	12
2.2.2.2 Bypass Mode	13
2.2.2.3 Battery Mode	14
2.2.2.4 Maintenance Bypass Mode.....	15
2.2.2.5 ECO Mode.....	16
2.3 Overview	17
2.3.1 Structure.....	17
2.3.2 Power Module.....	19
2.3.3 Bypass Module	21
2.3.4 Battery Module	22
2.3.5 Surge Protection Box	23
2.3.6 Control Module.....	24
2.3.6.1 Overview	24
2.3.6.2 ECM.....	24
2.3.6.3 Dry contact card.....	26
2.3.6.4 CAN Expansion Card	29
2.3.6.5 Monitoring interface card	31
2.3.7 MDU	37
2.4 Typical configurations	39

2.4.1 Single UPS	40
2.4.2 N+X Parallel System	40
2.4.3 Dual-Bus System	40
2.5 Optional Components	41
3 Installation.....	42
3.1 Installation Preparations	42
3.1.1 Site	42
3.1.1.1 Weight and Dimensions	42
3.1.1.2 Installation Environment.....	43
3.1.1.3 Installation Clearances	44
3.1.2 Tools and Instruments	44
3.1.3 Preparing Power Cables.....	46
3.1.4 Unpacking and Checking.....	49
3.2 Installing a Single UPS	53
3.2.1 Installing the Cabinet	53
3.2.2 Installing Optional Components	57
3.2.2.1 Installing Antiseismic Kits.....	57
3.2.2.2 IP21 component	59
3.2.2.3 Installing a Top Outlet Kit	59
3.2.2.4 Connecting an Ambient T/H Sensor	65
3.2.3 Routing Cables.....	66
3.2.3.1 UPS Cable Connection Reference	66
3.2.3.2 Bottom Cable Routing	67
3.2.4 Remote EPO	78
3.2.5 Connecting Communications Cables.....	79
3.2.6 (Optional) Installing a Battery Cabinet.....	79
3.3 Installing a Parallel System.....	80
3.3.1 Installing the UPSs	80
3.3.2 Connecting Power Cables	82
3.3.3 Connecting Signal Cables	84
3.4 Installing Batteries	86
3.5 Installation Verification.....	92
4 User Interface	97
4.1 LCD Interface	97
4.1.1 LCD Menu	97
4.1.1.1 Menu Hierarchy	97
4.1.1.2 Initial Startup	97
4.1.1.3 Main Menu screen	98
4.1.2 System Info Screen	100
4.1.2.1 Module Data Screen.....	100
4.1.2.2 Runn Info Screen	100

4.1.2.3 Alarms Screen	106
4.1.2.4 Settings Screen	108
4.1.2.5 Maintenance Screen	129
4.1.2.6 About Screen	135
4.1.3 System Status Screen	135
4.1.4 Common Functions Screen	136
4.2 WebUI	137
4.2.1 Login	137
4.2.2 Monitoring Page	139
4.2.2.1 Active Alarms Page	140
4.2.2.2 Real-time Data Page	141
4.2.2.3 Param. Settings Page	141
4.2.2.4 Comm. Config. Page	142
4.2.2.5 Control Page	142
4.2.3 Query Page	143
4.2.3.1 Historical Alarms Page	143
4.2.3.2 Logs Page	143
4.2.4 Config. Page	144
4.2.4.1 User Management	144
4.2.4.2 Site Config. Page	144
4.2.4.3 RCCMD	146
4.2.4.4 Managing the UPS by Using the NMS Complying with RFC1628 Standard	155
4.2.5 Maint. Page	156
4.2.6 Protecting the Server by Using the RCCMD Software	158
4.2.6.1 Introduction to the Software	158
4.2.6.2 RCCMD Event Shutdown and Message Sending	158
4.2.6.3 UPS Alive Check Function	160
5 Operations	163
5.1 Powering On and Starting the UPS	163
5.1.1 Powering On the UPS	163
5.1.2 Starting the Inverter	163
5.1.2.1 Initial Startup	164
5.1.2.2 Non-initial Startup	170
5.1.3 Powering On Loads	172
5.2 Shutting Down and Powering Off the UPS	173
5.3 Starting the UPS in Battery Mode	175
5.4 Transferring to Bypass Mode	176
5.5 Setting ECO Mode	176
5.6 Testing Batteries	179
5.6.1 Forced Equalized Charging Test	179
5.6.2 Shallow Discharge Test	180

5.6.3 Capacity Test.....	181
5.6.4 Test Data Download.....	182
5.6.4.1 Download over the LCD.....	182
5.6.4.2 Download over the WebUI.....	183
5.7 Transferring to Maintenance Bypass Mode.....	184
5.8 Transferring from Maintenance Bypass Mode to Normal Mode.....	186
5.9 Performing EPO.....	187
5.10 Clearing the EPO State.....	188
5.11 Exporting Data.....	191
5.12 Setting Hibernation Mode.....	192
5.12.1 LCD.....	193
5.12.2 WebUI.....	194
6 Routine Maintenance.....	196
6.1 UPS Maintenance.....	196
6.1.1 Monthly Maintenance.....	196
6.1.2 Quarterly Maintenance.....	197
6.1.3 Annual Maintenance.....	197
6.2 Battery Maintenance.....	198
6.2.1 Precautions for Battery Maintenance.....	199
6.2.2 Monthly Maintenance.....	199
6.2.3 Quarterly Maintenance.....	200
6.2.4 Annual Maintenance.....	200
7 Troubleshooting.....	201
8 Technical Specifications.....	204
8.1 Physical Specifications.....	204
8.2 Environmental Specifications.....	204
8.3 Safety Regulations and EMC.....	205
8.4 Mains Input Electrical Specifications.....	205
8.5 Bypass Input Electrical Specifications.....	206
8.6 Battery Specifications.....	206
8.7 Output Electrical Specifications.....	207
8.8 System Electrical Specifications.....	208
8.9 Internal Switch Parameters.....	208
A Menu Hierarchy.....	209
A.1 Menus on the LCD.....	209
A.2 Menus on the WebUI.....	211
B (Optional) TN-C System Application.....	225
C Alarm List.....	226
D Acronyms and Abbreviations.....	241

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.

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.

- 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



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.

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



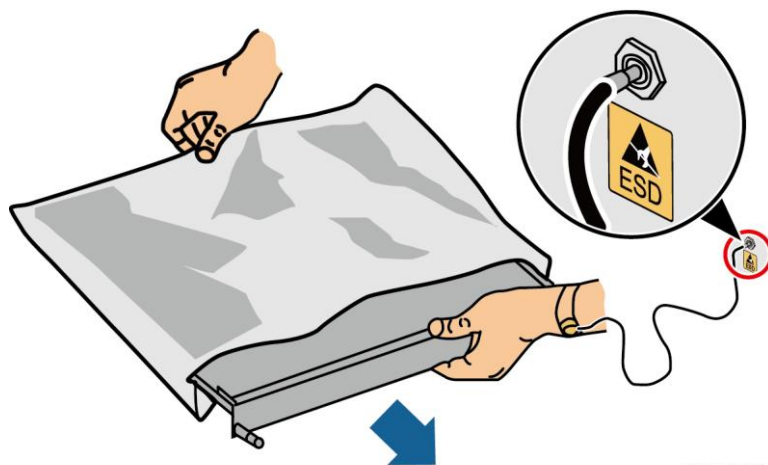
NOTICE

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.



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.

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 °C, 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.

1.5 Mechanical Safety

Moving Sharp Objects



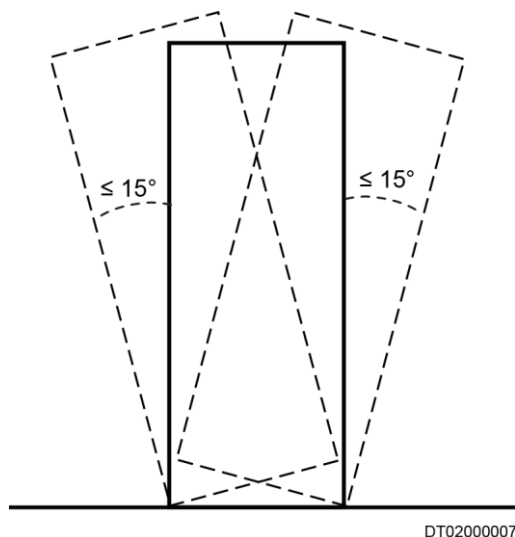
Wear protective gloves when moving sharp objects.

Moving Heavy Objects



- 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



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 °C (32 °F). Handle cables with caution, especially at lower temperatures.
- Before laying out cables that have been stored in temperatures lower than 0 °C (32 °F), 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.

2 Overview

2.1 Model Description

This document describes the following product model: UPS5000-E-75K-BF.

Figure 2-1 shows a UPS model number and Table 2-1 describes the model number.

Figure 2-1 Model number

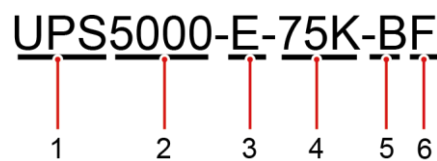


Table 2-1 Model number details

No.	Item	Description
1	Product category	UPS
2	Product family	5000
3	UPS subcategory	E series
4	Output capacity	75K: output capacity of 75 kVA (compatible with 50 kVA and 25 kVA)
5	Configuration type	B: with built-in batteries
6	Configuration type	F: mains switch in full configuration

2.2 Working Principle



NOTE

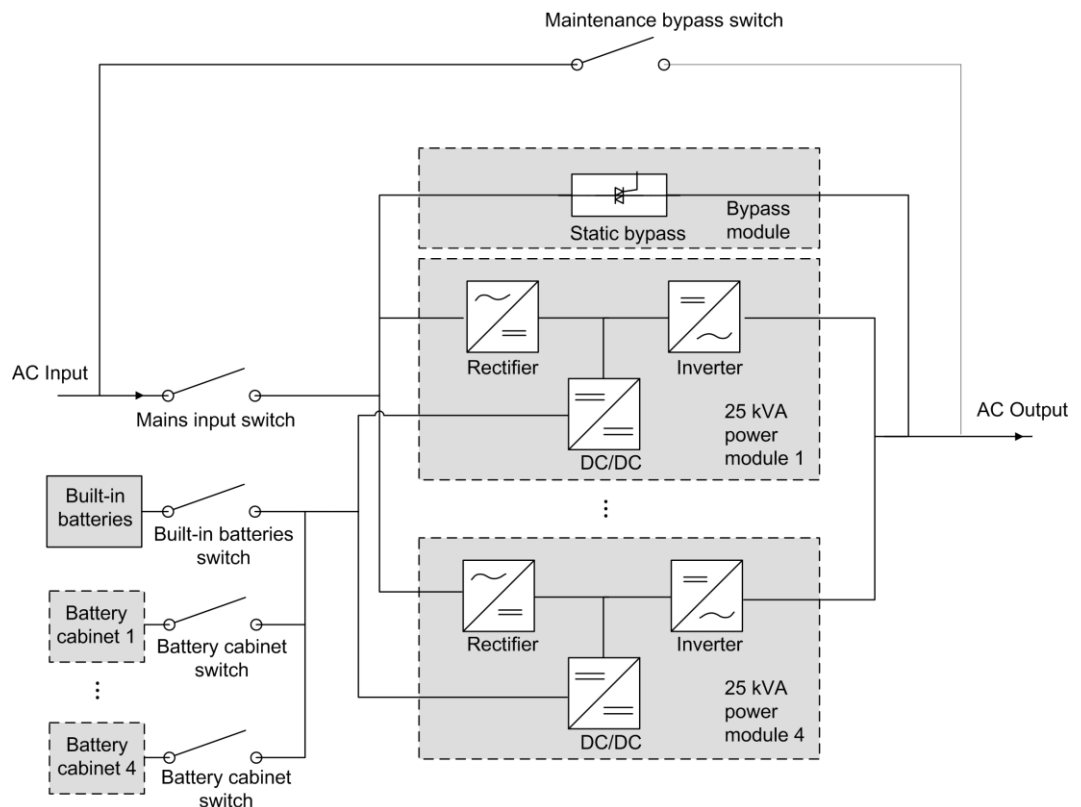
- → indicates an input mode.

- → indicates the energy flow direction.

2.2.1 Conceptual Diagram

The UPS5000 is an online UPS with a modular design that facilitates maintenance and capacity expansion. All modules are under intelligent digital signal processing (DSP) control. A power module consists of a rectifier and an inverter. The power module converts inputs into pure, high-quality sine wave outputs by using high-frequency switching. Figure 2-2 shows a conceptual diagram for the UPS.

Figure 2-2 UPS conceptual diagram

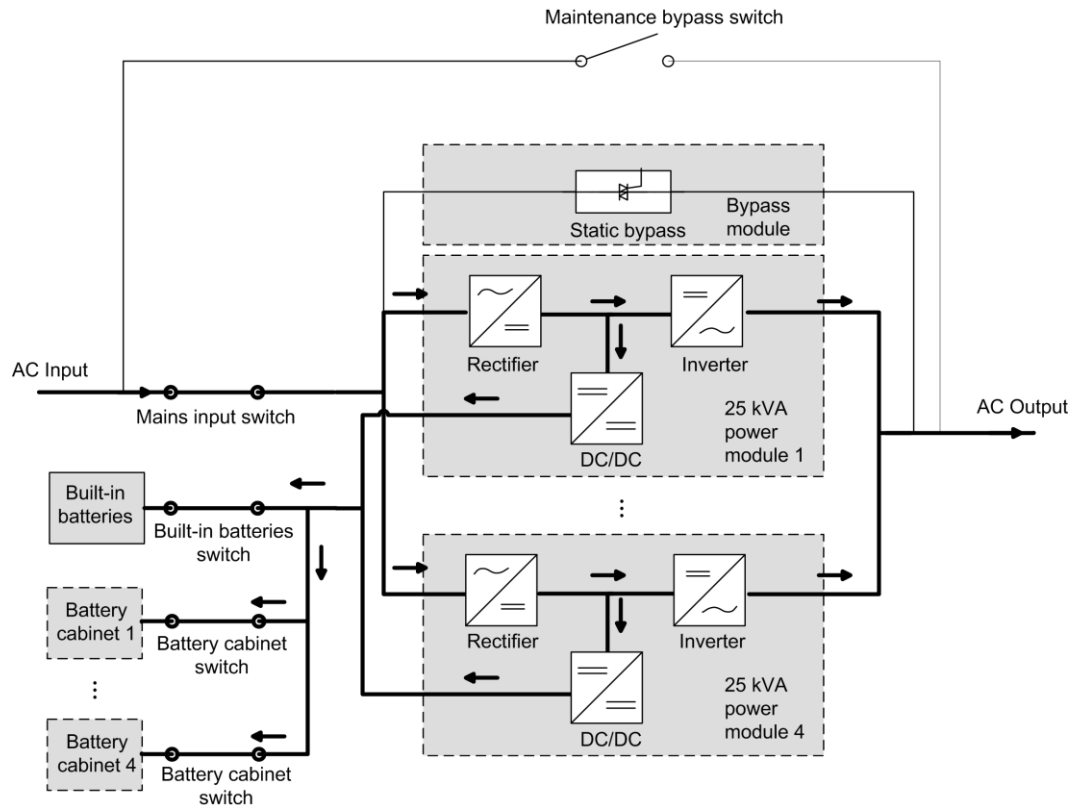


2.2.2 Working Modes

2.2.2.1 Normal Mode

In normal mode, the rectifier converts AC power into DC power, then the inverter converts DC power into high-precision AC outputs. The conversions protect loads from interference such as input harmonics, glitches, and voltage transients. Figure 2-3 shows a conceptual diagram of the UPS working in normal mode.

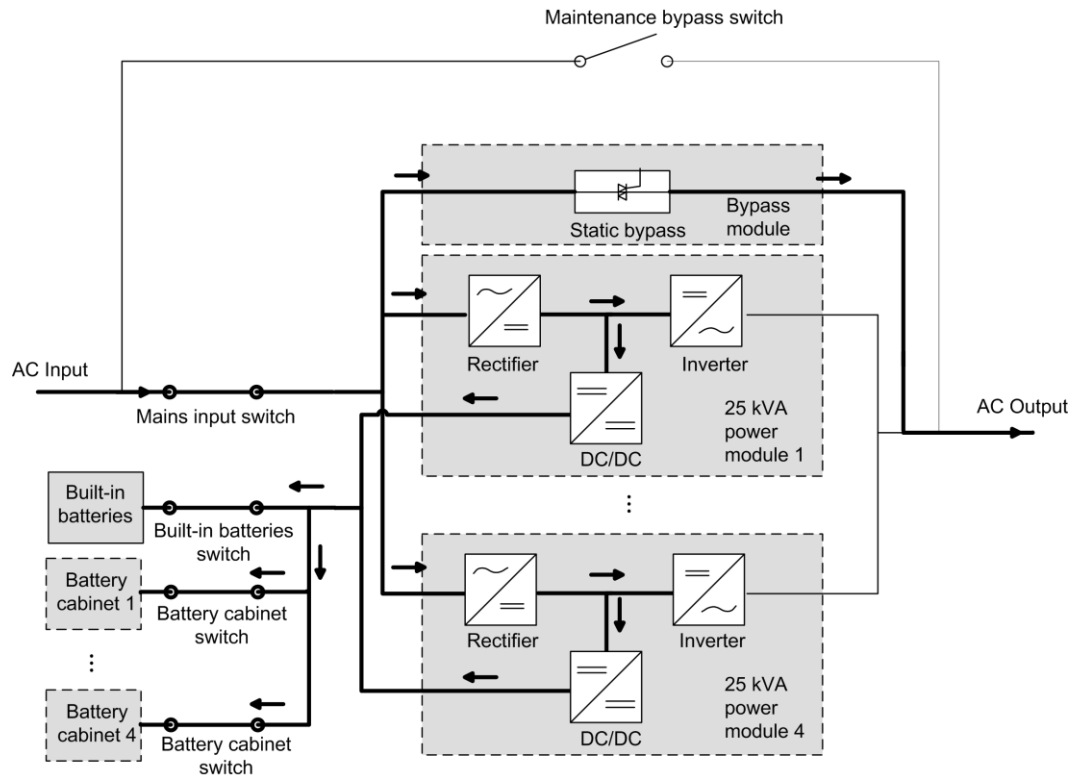
Figure 2-3 UPS conceptual diagram in normal mode



2.2.2.2 Bypass Mode

The UPS automatically transfers to bypass mode upon detecting power module overtemperature, overload, or other faults that may cause the inverter to shut down. The bypass power supply is not protected by the UPS which means it may be affected by mains outage, and incorrect AC voltage or frequency. Figure 2-4 shows a conceptual diagram of the UPS working in bypass mode.

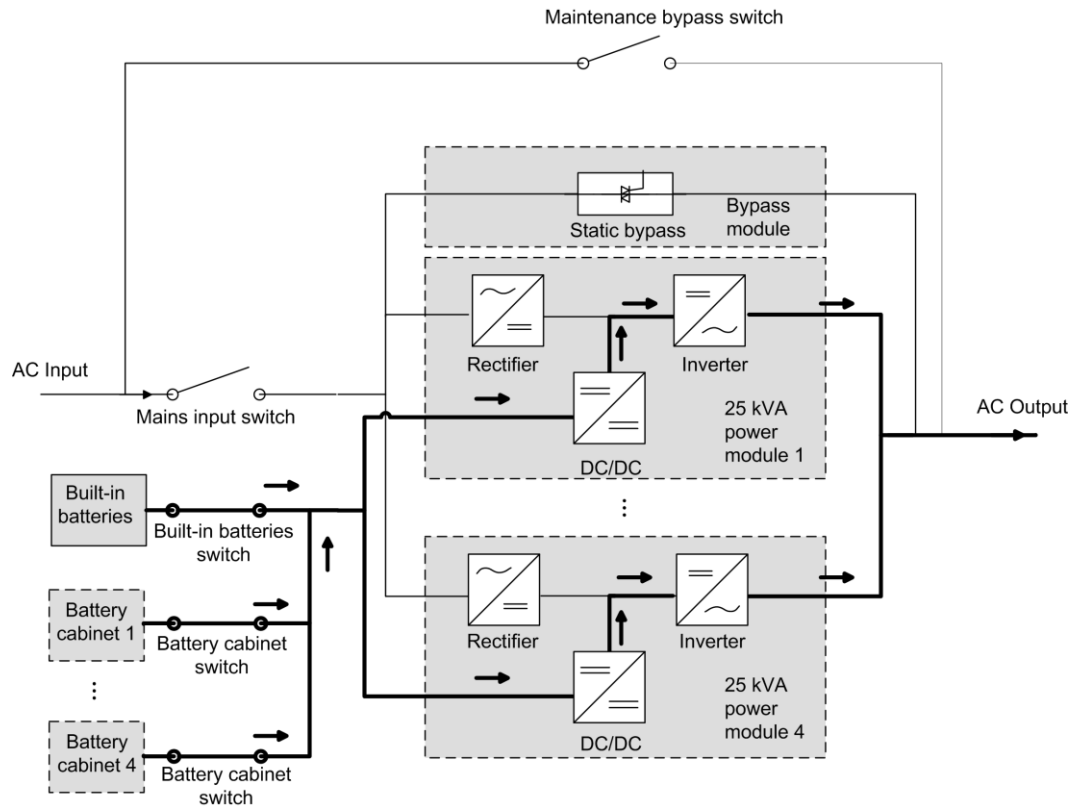
Figure 2-4 UPS conceptual diagram in bypass mode



2.2.2.3 Battery Mode

If the AC input voltage is not normal, the UPS transfers to battery mode to obtain power from batteries. The inverter then converts the power into AC outputs. [Figure 2-5](#) shows a conceptual diagram of the UPS working in battery mode.

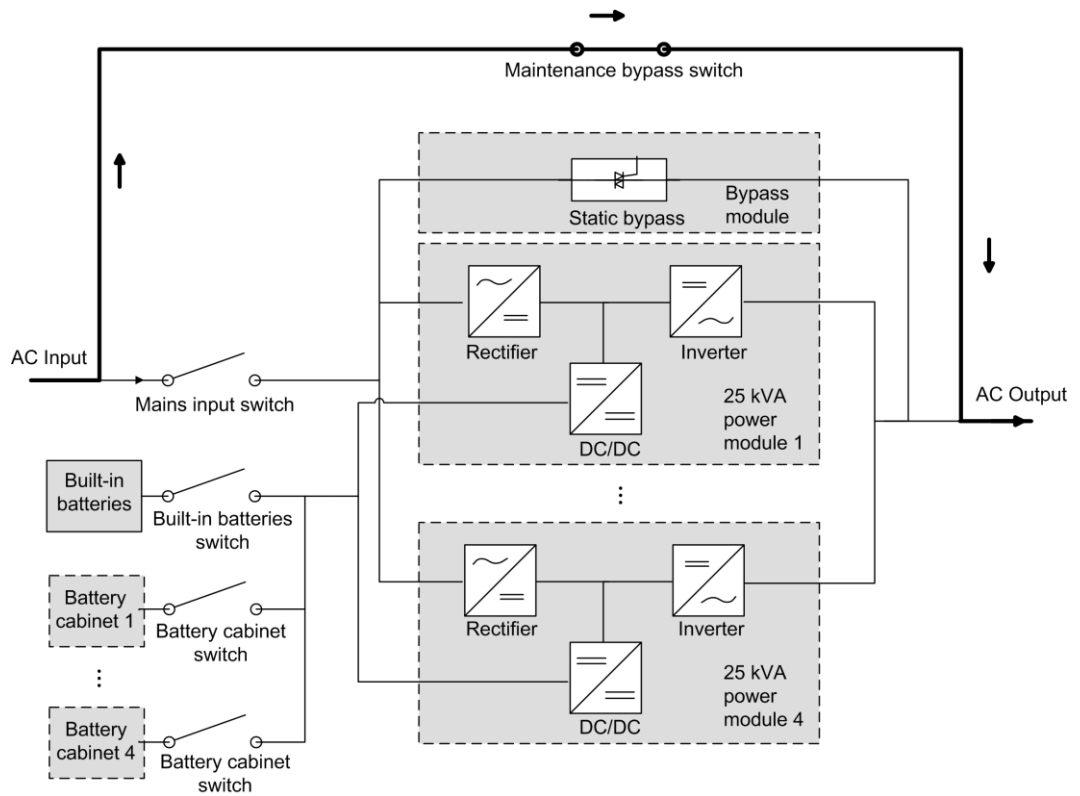
Figure 2-5 UPS conceptual diagram in battery mode



2.2.2.4 Maintenance Bypass Mode

In maintenance bypass mode, the current flows through maintenance bypass circuits, instead of the power module and bypass module. UPS maintenance can be performed in this mode. [Figure 2-6](#) shows a conceptual diagram of the UPS working in maintenance bypass mode.

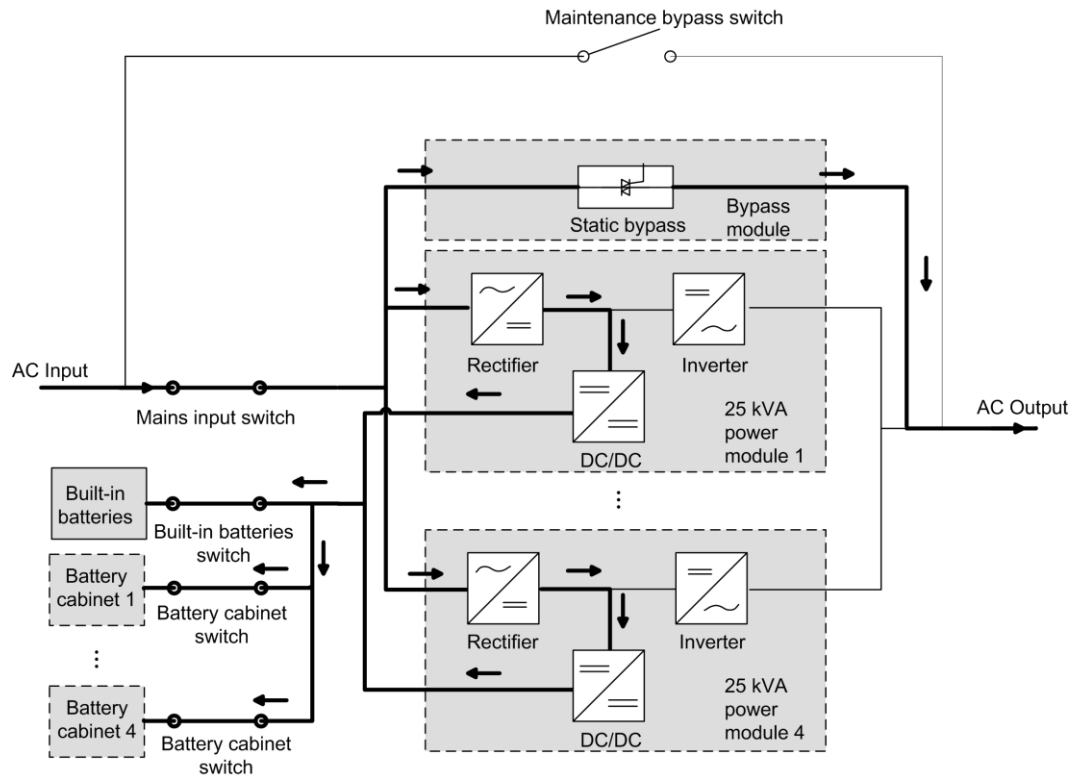
Figure 2-6 UPS conceptual diagram in maintenance bypass mode



2.2.2.5 ECO Mode

The energy control operation (ECO) mode is an energy-saving mode that can be configured on the LCD or web user interface (WebUI). In ECO mode, when the bypass input voltage is within the ECO voltage range, the static bypass switch turns on, and the bypass supplies power. When the bypass input 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 charging the batteries using a charger. Using ECO mode provides a higher efficiency. [Figure 2-7](#) shows a conceptual diagram of the UPS working in ECO mode.

Figure 2-7 UPS conceptual diagram in ECO mode



NOTE

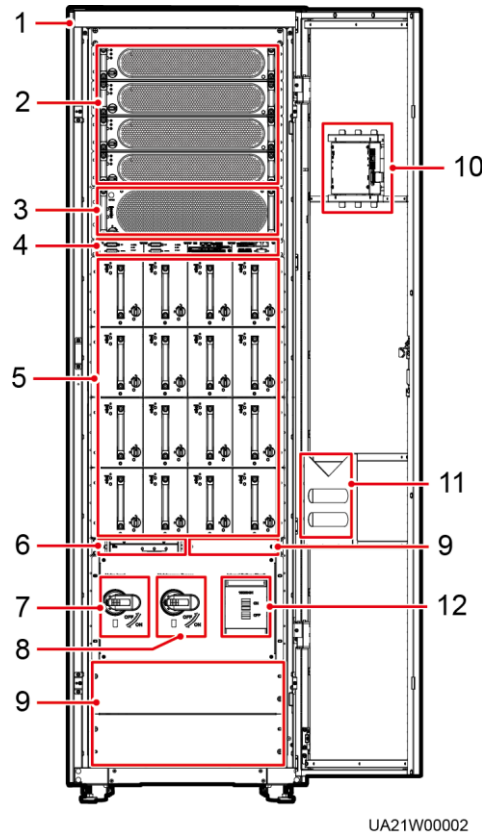
Manual startup is required to ensure that the inverter is in standby state and the power flow has reached the inverter.

2.3 Overview

2.3.1 Structure

Figure 2-8 shows the front view of a UPS.

Figure 2-8 Front view (with the door open)



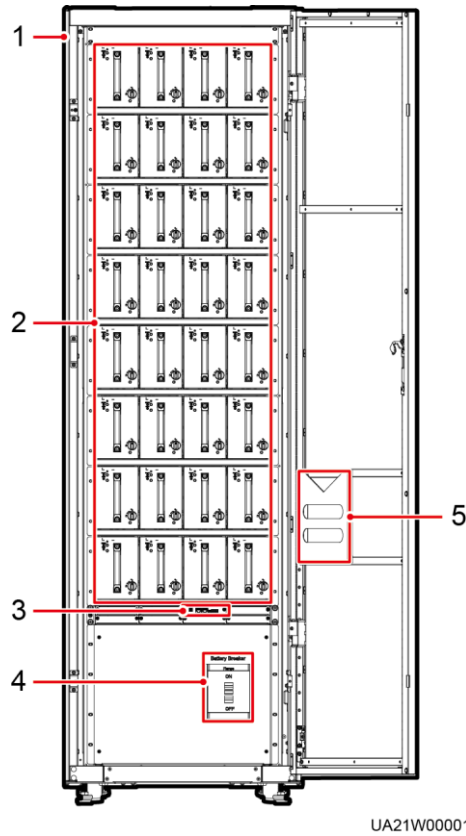
- | | | | |
|--------------------|-----------------------------------|-------------------|-------------------------------|
| (1) Cabinet | (2) Power module | (3) Bypass module | (4) Control module |
| (5) Battery module | (6) Surge protective device (SPD) | (7) Input switch | (8) Maintenance bypass switch |
| (9) Filler panel | (10) MDU | (11) Folder | (12) Internal battery switch |

NOTE

The product structure of a 75 kVA UPS in full configuration with 3+1 modules is used as an example.

[Figure 2-9](#) shows the front view of a battery cabinet.

Figure 2-9 Battery cabinet (with the door open)



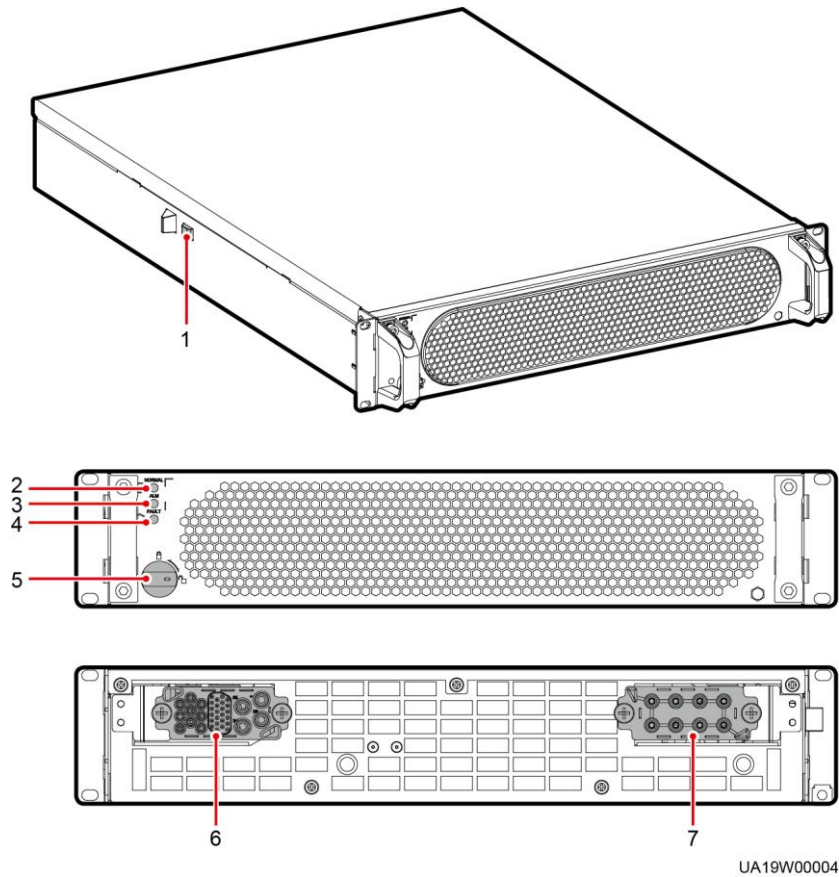
- (1) Cabinet
- (2) Battery module
- (3) CAN expansion card
- (4) Battery switch
- (5) Folder

2.3.2 Power Module

Appearance

Figure 2-10 shows a power module.

Figure 2-10 Power module



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

Functions

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

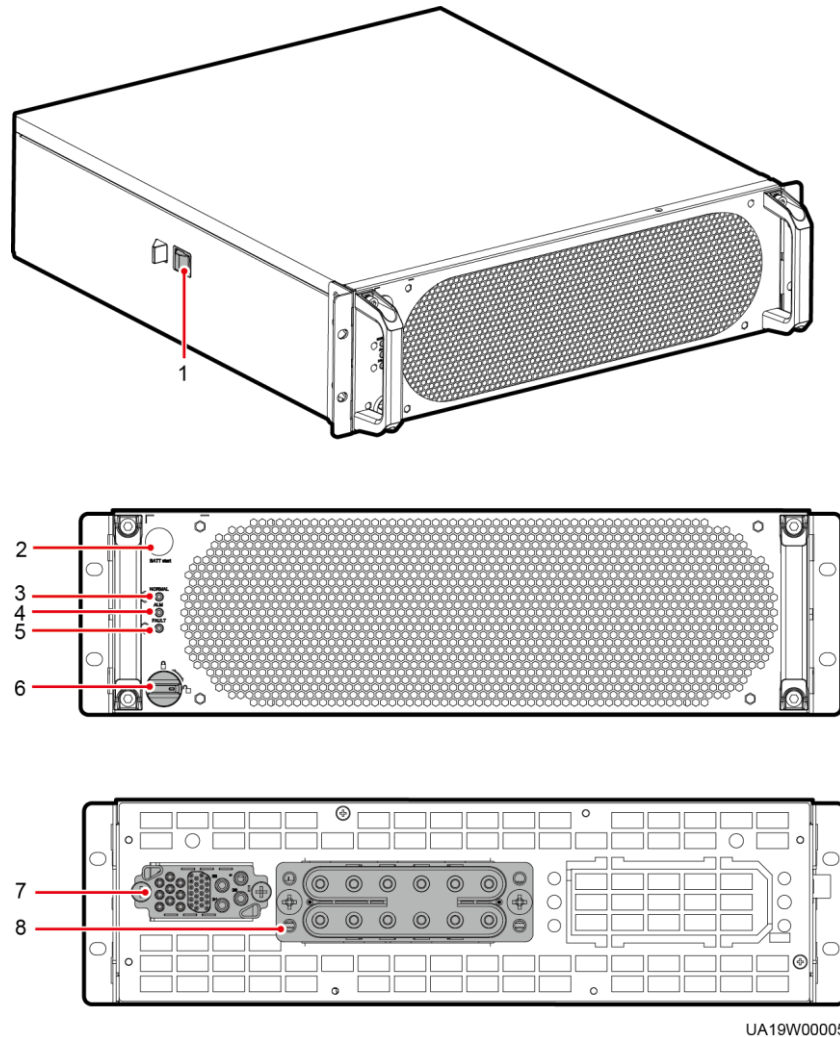
Specifications

- Dimensions (H x W x D): 86 mm x 442 mm x 620 mm
- Weight: < 21 kg
- Rated output capacity: 25 kVA/25 kW
- Power density: 17.2 W/inch³

2.3.3 Bypass Module

Appearance

Figure 2-11 Bypass module



- | | | | |
|----------------------|-------------------------------|-------------------|----------------------------|
| (1) Positioning lock | (2) Battery cold start button | (3) Run indicator | (4) Alarm indicator |
| (5) Fault indicator | (6) Ready switch | (7) Signal port | (8) Input and output ports |

Functions

The UPS is set to ECO mode and the bypass voltage is within the specified range.

The power module is overloaded for a period longer than the maximum allowed period.

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

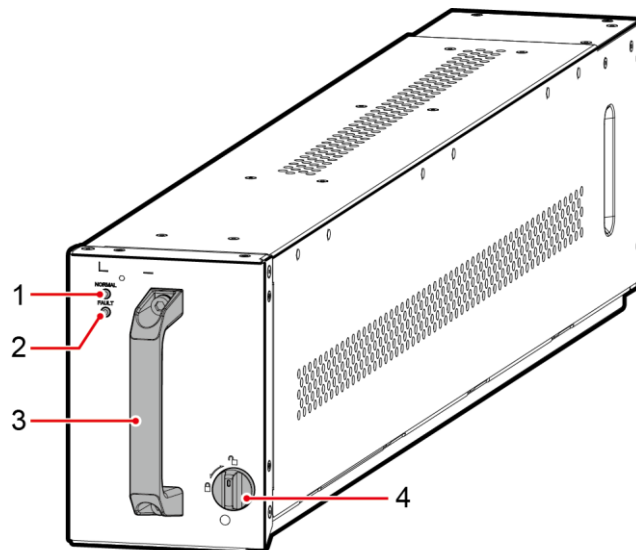
- Dimensions (H x W x D): 130 mm x 442 mm x 500 mm
- Weight < 25 kg
- Maximum output power: 125 kW

2.3.4 Battery Module

Appearance

Figure 2-12 and Figure 2-13 show battery modules.

Figure 2-12 Front view of a battery module



UA21W00004

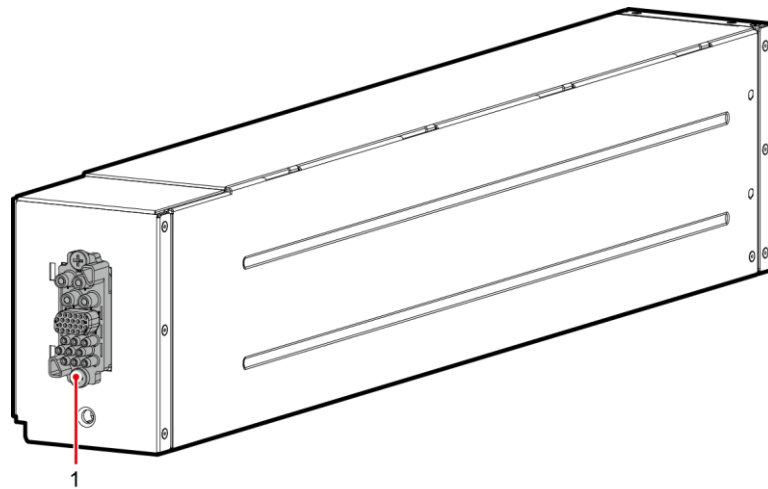
(1) Normal indicator

(2) Fault indicator

(3) Handle

(4) Positioning lock

Figure 2-13 Rear view of a battery module



UA19W00006

(1) Connector

Functions

- The battery module is pluggable.
- The battery module can house ten 7 Ah–9 Ah/12 V lead-acid batteries. The battery dimensions (H x W x D) are 151 mm x 94 mm x 65 mm.
- The front panel has status indicators which can show the faulty status of the module.
- A battery module is configured with a battery detection unit which detects the battery module status in real time and reports data to the MDU through CAN.

Specifications

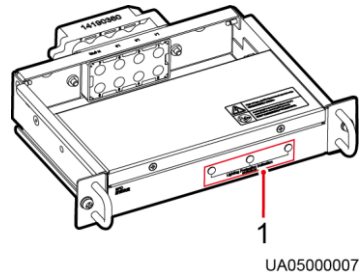
- Dimensions (H x W x D): 160 mm x 108 mm x 786 mm
- Weight:
 - < 6 kg (excluding batteries)
 - < 36 kg (including batteries)

2.3.5 Surge Protection Box

The surge protection box is used to improve the surge protection function for the UPS. It applies to the power system with three-phase, four-wire, and PE. If the surge protection box is configured, the UPS can provide 5 kA surge protection.

The three indicators on the surge protection box indicate its working status. When the UPS is powered on and the surge protection box runs properly, all the three indicators are steady on. If any indicator is off, the surge protection box is faulty. [Figure 2-14](#) shows a surge protection box.

Figure 2-14 Surge protection box

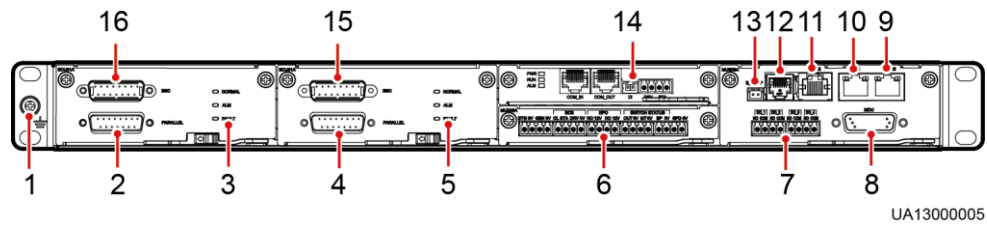


(1) Working status indicators

2.3.6 Control Module

2.3.6.1 Overview

Figure 2-15 Signal panel on the control module



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



NOTE

Ports are protected by a security mechanism.

2.3.6.2 ECM

Appearance

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

Figure 2-16 ECM

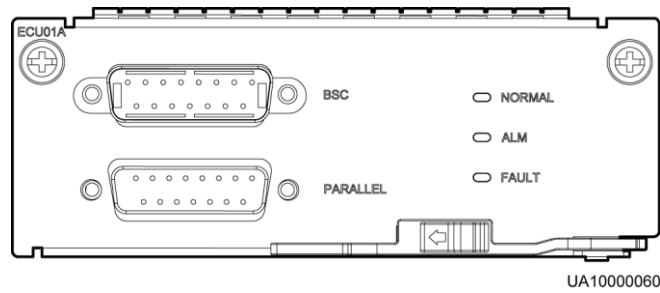


Table 2-2 Ports on the ECM

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



NOTE

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

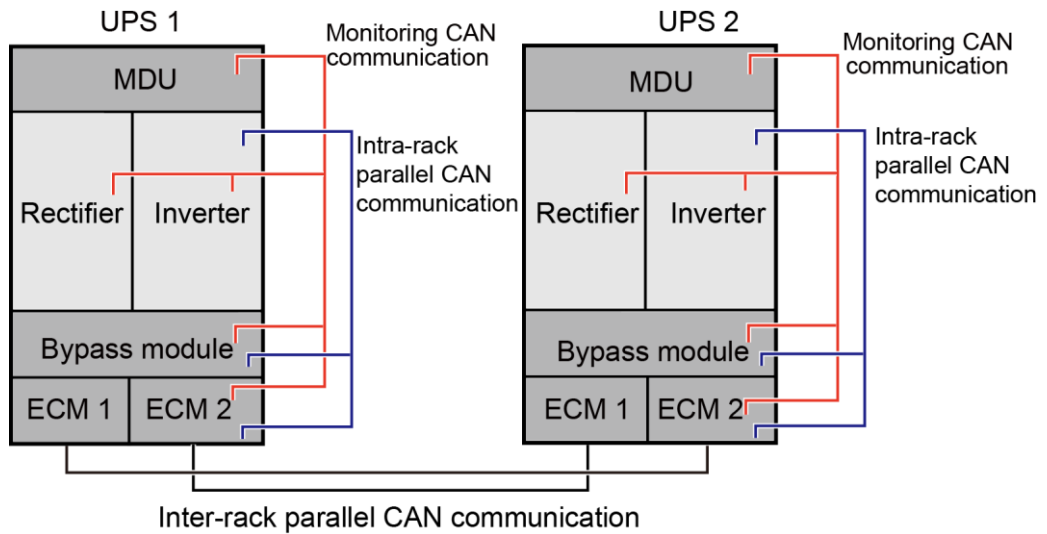
Table 2-3 Indicator description

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.

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 control area network (CAN) communication: monitoring CAN communication, intra-rack parallel CAN communication, and inter-rack parallel CAN communication.

Figure 2-17 Logical connections for CAN communication



Specifications

- Hot-swappable
- 1 U high

2.3.6.3 Dry contact card

Appearance

Figure 2-18 Dry contact card

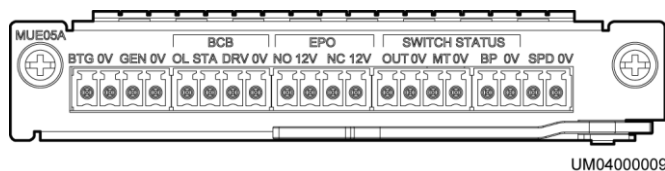


Table 2-4 Ports on the dry contact card

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

Silk Screen	Description	Status	Initial Status
SWITCH STATUS_MT	Port for monitoring the maintenance circuit breaker	<ul style="list-style-type: none"> • Disconnected: circuit breaker ON • Connected: circuit breaker OFF 	Disconnected
SWITCH STATUS_0V	Port for signal ground		
SWITCH STATUS_BP	Port for monitoring the bypass input circuit breaker	<ul style="list-style-type: none"> • Connected: circuit breaker ON • Disconnected: circuit breaker OFF 	Connected
SWITCH STATUS_0V	Port for signal ground		
SPD	Port for monitoring the input AC surge protective device (SPD)	<ul style="list-style-type: none"> • Connected: SPD enabled • 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 mm² to 1.5 mm².

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).

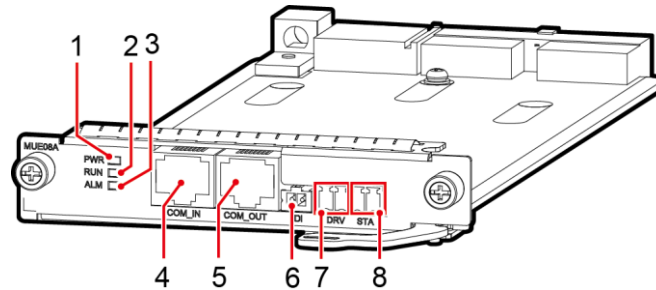
Specifications

- Hot-swappable
- 0.5 U high

2.3.6.4 CAN Expansion Card

Appearance

Figure 2-19 CAN expansion card

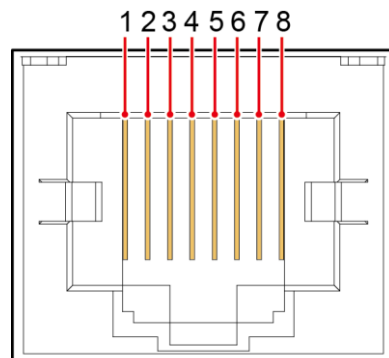


UA21W00005

- | | | | |
|---------------------------------|-------------------|---------------------|--------------------------------|
| (1) Power indicator | (2) Run indicator | (3) Alarm indicator | (4) COM_IN communications port |
| (5) COM_OUT communications port | (6) DI port | (7) BCB_DRV port | (8) BCB_STA port |

Figure 2-20 and Table 2-5 describe the COM_IN and COM_OUT pin definitions.

Figure 2-20 COM_IN and COM_OUT pins



UA21W00006

Table 2-5 COM_IN and COM_OUT pin definition

Port	Pin	Description	Function
COM_IN	1	N/A	Cascades multiple cabinets over northbound CAN communication and sends signals to the MDU for displaying
	2	N/A	
	3	N/A	
	4	N/A	

Port	Pin	Description	Function
	5	N/A	and uploading.
	6	N/A	
	7	CANH	
	8	CANL	
COM_OUT	1	N/A	
	2	N/A	
	3	N/A	
	4	N/A	
	5	N/A	
	6	N/A	
	7	CANH	
	8	CANL	

Figure 2-21 and Table 2-6 describe the DI pin definitions.

Figure 2-21 DI pins

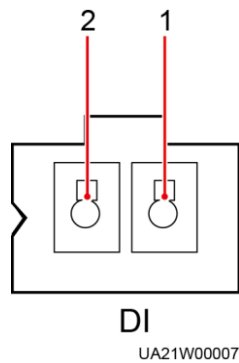


Table 2-6 DI pin definition

Port	Pin	Description	Function
DI	1	DI_IN	Supports battery fault DI detection.
	2	DI_GND	

Figure 2-22 and Table 2-7 describe the DRV and STA pin definitions.

Figure 2-22 DRV and STA pins

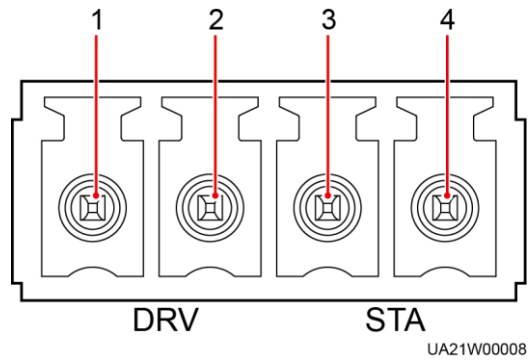


Table 2-7 DRV and STA pin definition

Port	Pin	Description	Function
DRV	1	+30V	30 V (internal signal)
	2	30V_DRV2	
STA	3	BCB_STATE1	BCB switch status signal (internal signal)
	4	BCB_STATE2	



NOTE

The DRV and STA signal cables cannot be reversely connected.

Functions

- Supports battery fault DI detection.
- Supports separated CAN communication between cabinets.
- Supports BCB trip and status detection in the cabinets.

Specifications

- Hot-swappable
- 0.5 U high

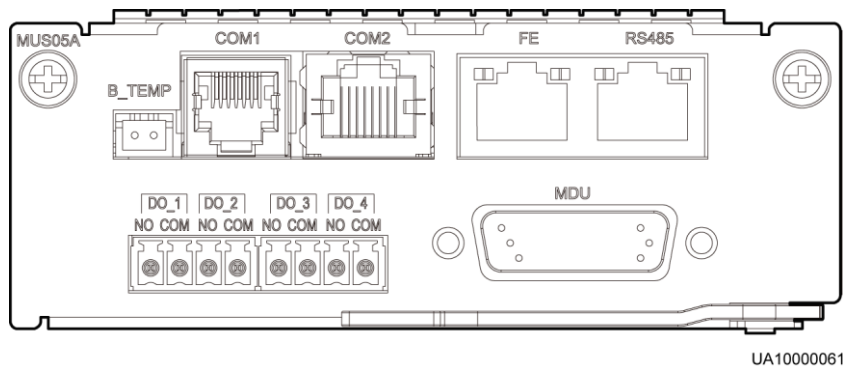
2.3.6.5 Monitoring interface card

Appearance

 **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 and MDU communication fails. 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.
- Only once being set will dry contact signals take effect. Set unused dry contact signals to the unused state on the LCD.
- In a parallel system, ensure that used dry contacts properly connect to each UPS.

Figure 2-23 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 2-8 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, battery mode, or low battery voltage.
	COM	
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	

Port	Silk Screen	Description
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 a BMU.
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 mm².
- RS485 cables and FE cables must be shielded cables.

Figure 2-24 and Figure 2-25 are recommended wiring methods for DO ports.

Figure 2-24 Wiring method 1

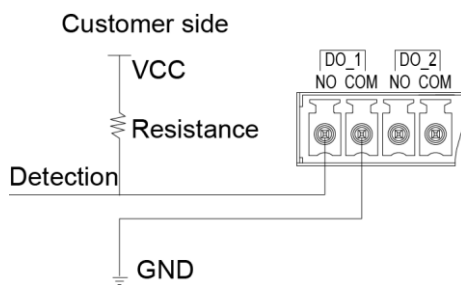


Figure 2-25 Wiring method 2

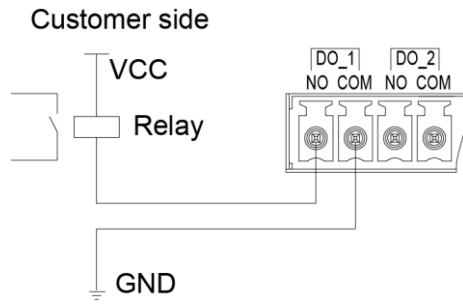


Figure 2-26 and Table 2-9 describe the COM1 pin definitions.

Figure 2-26 COM1 pins



Table 2-9 COM1 pin definition

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

Figure 2-27 and Table 2-10 describe the COM2 pin definitions.

Figure 2-27 COM2 pins

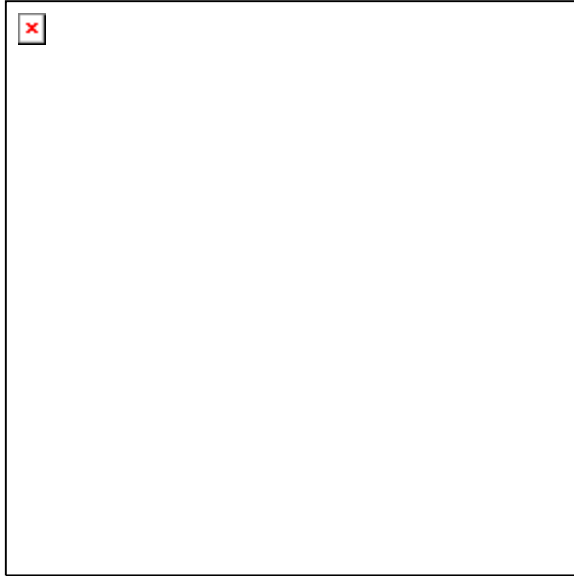


Table 2-10 COM2 pin definition

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

Figure 2-28 and Table 2-11 describe the RS485 pin definitions.

Figure 2-28 RS485 pins

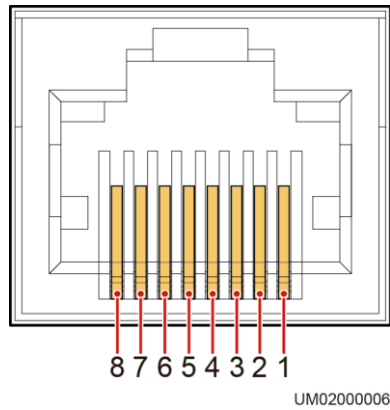


Table 2-11 RS485 pin definition

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-.

Functions

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, battery monitoring unit (BMU) port, FE port, battery temperature monitoring port, and network management port. MDU functions include monitoring of the UPS, allowing users to set parameters, command delivery, information reports, and UPS key information and parameters displayed on the LCD.

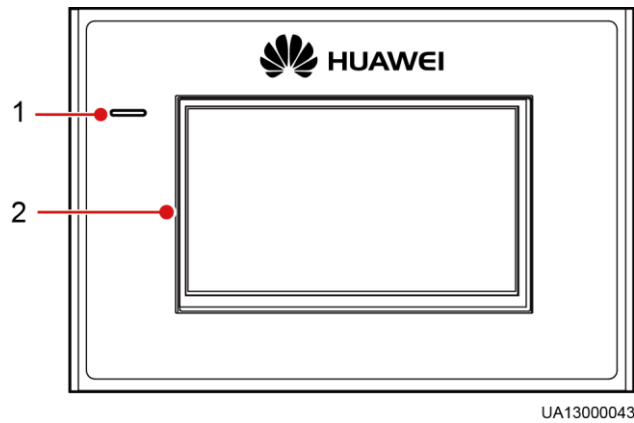
Specifications

- Hot-swappable
- 1 U high

2.3.7 MDU

Appearance

Figure 2-29 MDU



(1) Status indicator

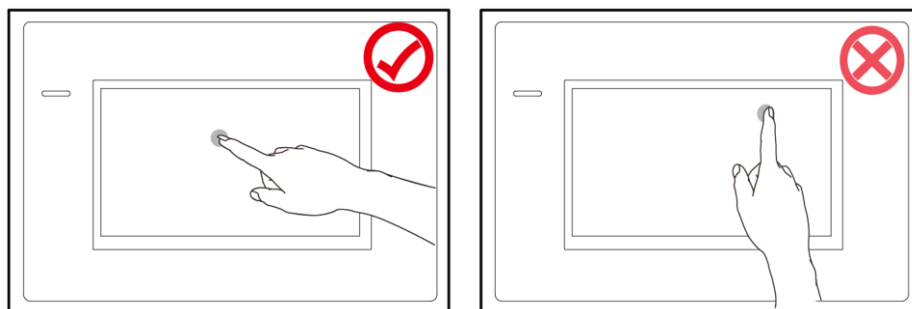
(2) LCD touchscreen



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 2-30 Touching the LCD



UA13000044

Table 2-12 Status indicator

Status	Color	Meaning
--------	-------	---------

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



NOTE

The indicator on the 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 2-31 LCD screen ports

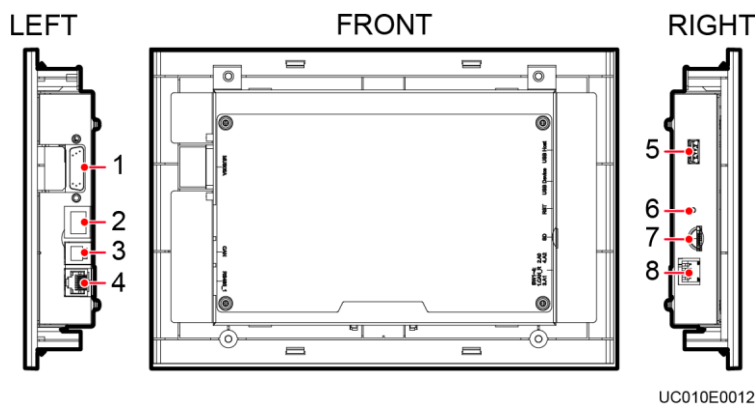


Table 2-13 Description of LCD screen ports

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

No.	Port Name	Description
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 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 2-14 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. 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.

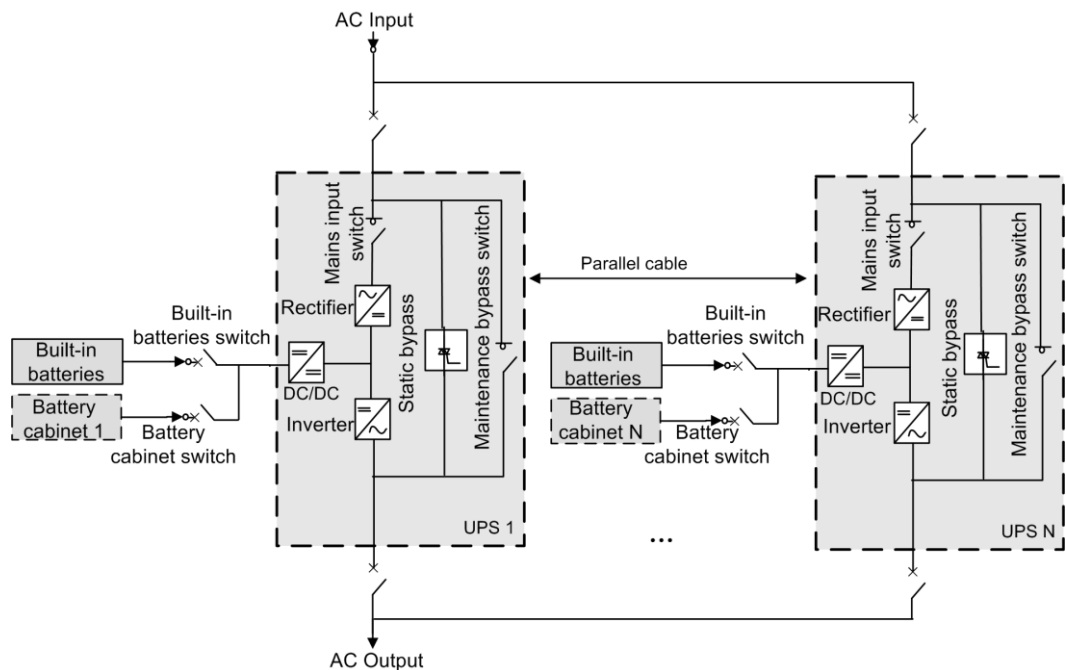
2.4.1 Single UPS

The UPS 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. Figure 2-2 shows a conceptual diagram of a single UPS.

2.4.2 N+X Parallel System

In an N+X 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 2-32 shows a conceptual diagram of an N+X parallel system.

Figure 2-32 Conceptual diagram of an N+X parallel system



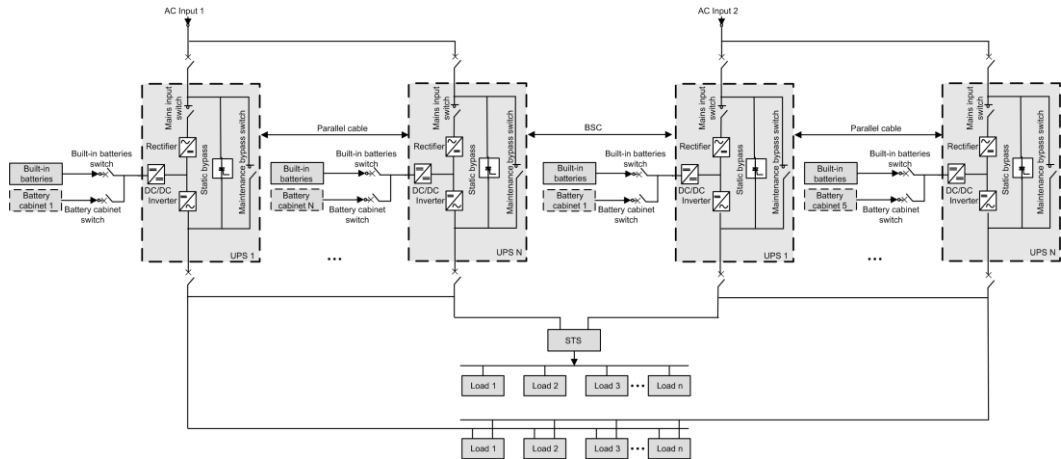
NOTE

Each UPS supports a maximum of four battery cabinets connected in parallel. Figure 2-32 uses each UPS connecting to one battery cabinet as an example.

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. The UPS systems work in normal mode or bypass mode. Figure 2-33 shows a conceptual diagram of a dual-bus system.

Figure 2-33 Conceptual diagram of a dual-bus system



NOTE

Each UPS supports a maximum of four battery cabinets connected in parallel. Figure 2-33 uses each UPS connecting to one battery cabinet as an example.

2.5 Optional Components

Component	Model	Function
Battery cabinet	ESS-480-72BCN1	Provides battery wiring terminals and can be cascaded.
Antiseismic kit	N/A	Reinforces the cabinet so that the cabinet meets the requirements of 9 degree seismic fortification intensity.
Top outlet kit	N/A	When the UPS is installed against the wall, install the top outlet kit to ensure heat dissipation.
IP21 component	N/A	Prevents water from dropping into the cabinet, protecting the cabinet to IP21.
Ambient temperature and humidity sensor	N/A	Monitors the ambient temperature and humidity, and can be applied to batteries.
BSC cable	5 m, 10 m, 15 m or 60 m	Transmits bus synchronization signals in a dual-bus system.
Parallel cable	5 m, 10 m, or 15 m	Connects UPSs in parallel.

3 Installation

3.1 Installation Preparations

3.1.1 Site

3.1.1.1 Weight and Dimensions

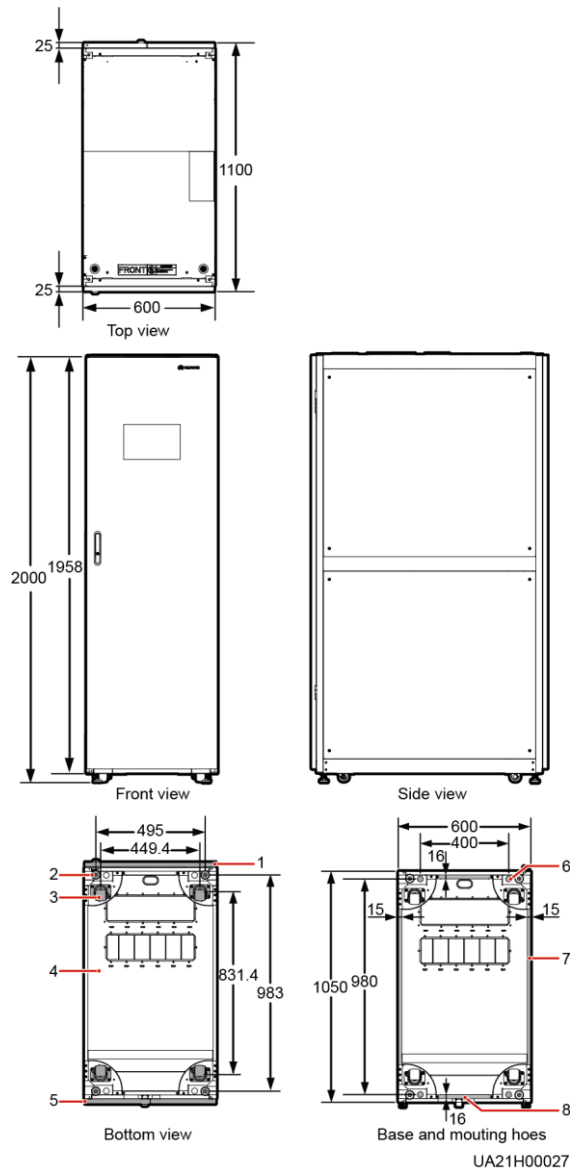
Ensure that the floor or installation support can bear the weight of the UPS, batteries, and battery racks. The weight of batteries and battery racks depends on the UPS configuration for the site. [Table 3-1](#) lists the UPS weight.

Table 3-1 UPS weight

Model	Weight
UPS cabinet (UPS5000-E-75K-BF)	<ul style="list-style-type: none">• 25 kVA (full configuration): 890 kg• 50 kVA (full configuration): 910 kg• 75 kVA (full configuration): 930 kg• Battery module:<ul style="list-style-type: none">- < 6 kg (excluding batteries)- < 36 kg (including batteries)
Battery cabinet (ESS-480-72BCN1)	<ul style="list-style-type: none">• Battery cabinet (full configuration): 1400 kg• Battery module:<ul style="list-style-type: none">- < 6 kg (excluding batteries)- < 36 kg (including batteries)

[Figure 3-1](#) shows the installation dimensions.

Figure 3-1 Dimensions (unit: mm)



- | | | | |
|----------------|----------------------------|------------|---------------|
| (1) Front door | (2) Foot | (3) Caster | (4) Base |
| (5) Rear panel | (6) Base installation hole | (7) Beam | (8) Side post |



NOTE

The UPS and battery cabinet have same installation dimensions, except the covers for routing cables at bottom. UPS cabinet is shown as an example.

3.1.1.2 Installation Environment

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

- The optimal operating temperatures for valve-regulated lead-acid batteries (VRLA batteries) are 20–30 °C. Operating temperatures higher than 30 °C shorten the battery lifespan and operating temperatures lower than 20 °C reduce the battery backup time.

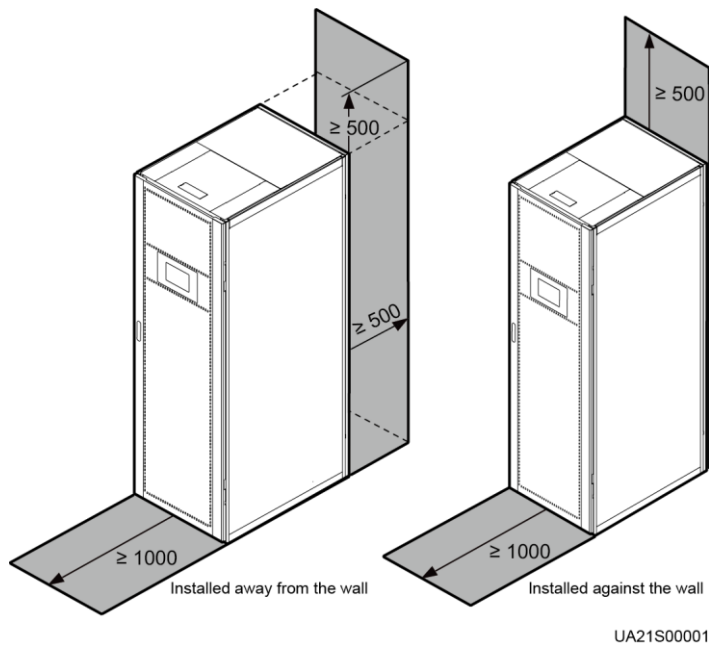
3.1.1.3 Installation Clearances

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

- Reserve a clearance of at least 1000 mm from the front of the cabinet.
- Reserve a clearance of at least 500 mm from the top of the cabinet.
- When a top outlet kit is installed (no antiseismic kit is installed), you can install the cabinet against a wall. When no top outlet kit is added, keep a clearance of at least 200 mm from the rear of the cabinet. If you need to perform operations at the rear of the cabinet, keep a clearance of at least 500 mm.

See [Figure 3-2](#).

Figure 3-2 Reserved clearances (unit: mm)



3.1.2 Tools and Instruments


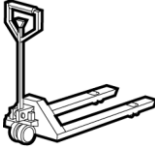


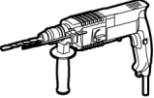
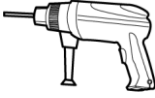
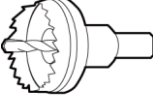

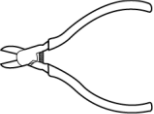
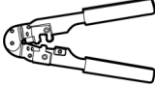
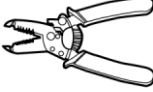

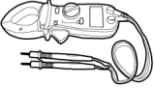




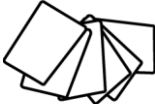
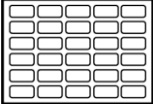

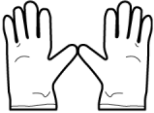





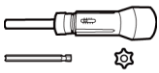
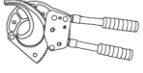



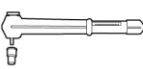


CAUTION

Insulate installation tools to prevent electric shocks.

Prepare the following tools and meters indicated in [Table 3-2](#) for installation.

Table 3-2 Tools and meters

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

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



NOTE

Table 3-2 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 Preparing 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.

Table 3-3 and Table 3-4 lists the recommended cross-sectional areas for UPS power cables and battery cabinet power cables.

Table 3-3 Recommended cross-sectional areas for UPS power cables

Item			UPS5000-E-75K-BF		
			25 kVA	50 kVA	75 kVA
Input	Input current (A)		47	94	141
	Recommended cross-sectional area (mm ²)	L1	4 x 10	4 x 25	4 x 50
		L2			
L3					

Item			UPS5000-E-75K-BF		
			25 kVA	50 kVA	75 kVA
		N			
Output	Output current (A)		38	76	114
	Recommended cross-sectional area (mm ²)	U	4 x 10	4 x 16	4 x 35
		V			
		W			
N (When the UPS connects to a non-linear load, increase the cross-sectional area.)					
Ground cable	Recommended cross-sectional area (mm ²)	PE	16	16	25

Table 3-4 Recommended cross-sectional areas for battery cabinet power cables

Item			ESS-480-72BCN1		
			For 25 kVA UPS	For 50 kVA UPS	For 75 kVA UPS
Battery input	Battery nominal discharge current (480 V; forty 12 V batteries) (A)		55	110	164
	Battery maximum discharge current when forty 12 V batteries or two hundred and forty 2 V batteries (1.67 V/cell) stop discharging (A)		66	132	197
	Recommended cross-sectional area (mm ²)	+	3 x 35	3 x 50	3 x 95
N					
-					
Ground cable	Recommended cross-sectional area (mm ²)	PE	16	16	25



NOTE

When selecting, connecting, and routing power cables, follow local safety regulations and rules.

When the external conditions change, for example, the cable layout or ambient temperatures, perform verification in accordance with the IEC-60364-5-52 or the 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.

When the primary loads are non-linear loads, increase the cross-sectional areas of the neutral wires 1.5–1.7 times.

When the mains input and bypass input share a power source, configure input power cables as mains input power cables. In addition, cables listed in [Table 3-3](#) apply only to the following conditions:

- Cable routing mode: For the UPS5000-E-(25 kVA-75 kVA), the cables are installed along the wall or on the floor (IEC-60364-5-52 C standards).
- The ambient temperature is 30 °C.
- The AC voltage loss is less than 3%, and the DC voltage loss is less than 1%. The recommended cable diameters in [Table 3-3](#) meet the basic through-current requirements. Users should evaluate the line voltage loss based on the actual cable length. If the voltage loss exceeds the requirements, increase the cable diameter properly.
- The cables are single- or multi-core 90 °C soft power cables with a copper conductor.

[Table 3-5](#) and [Table 3-6](#) lists the requirements for power cable terminals of the UPS and battery cabinet.

Table 3-5 Power cable connector requirements for the UPS

Port Description	Connection Method	Bolt Specifications	Bolt Hole Diameter	Torque
Input	Crimped OT terminals	M10	11 mm	26 N·m
Battery input	Crimped OT terminals	M12	13 mm	46 N·m
Output	Crimped OT terminals	M10	11 mm	26 N·m
PE	Crimped OT terminals	M8	9 mm	13 N·m

Table 3-6 Power cable connector requirements for the battery cabinet

Port Description	Connection Method	Bolt Specifications	Bolt Hole Diameter	Torque
Battery input	Crimped OT terminals	M12	13 mm	46 N·m
PE	Crimped OT terminals	M8	9 mm	13 N·m
		M10	11 mm	26 N·m

[Table 3-7](#) lists the recommended upstream input switch configurations for the UPS.

Table 3-7 Upstream input switch configurations

Upstream Input	UPS5000-E-75K-BF
----------------	------------------

Switch	25 kVA	50 kVA	75 kVA
Input	63 A/3P	100 A/3P	160 A/3P

Table 3-8 Recommended upstream input and downstream output circuit breakers

Model	UPS Capacity	Component	Specifications	Manufacturer
UPS5000-E-7 5K-BF	25 kVA	Input circuit breaker	T1N160 TMD R63 FFC 3P	ABB (recommended when the short-circuit current where the switch is located is less than 6 kVA.)
	50 kVA	Input circuit breaker	T1N160 TMD R100 FFC 3P	
	75 kVA	Input circuit breaker	T1N160 TMD R160 FFC 3P	



NOTE

- The input upstream circuit breakers recommended in [Table 3-8](#) are for reference only.
- If multiple loads are connected, specifications for branch circuit breakers must not exceed the recommended specifications.
- The circuit breaker selection principle is to protect loads and cables, and the cascading principle is to realize specific protection.

3.1.4 Unpacking and Checking

Context



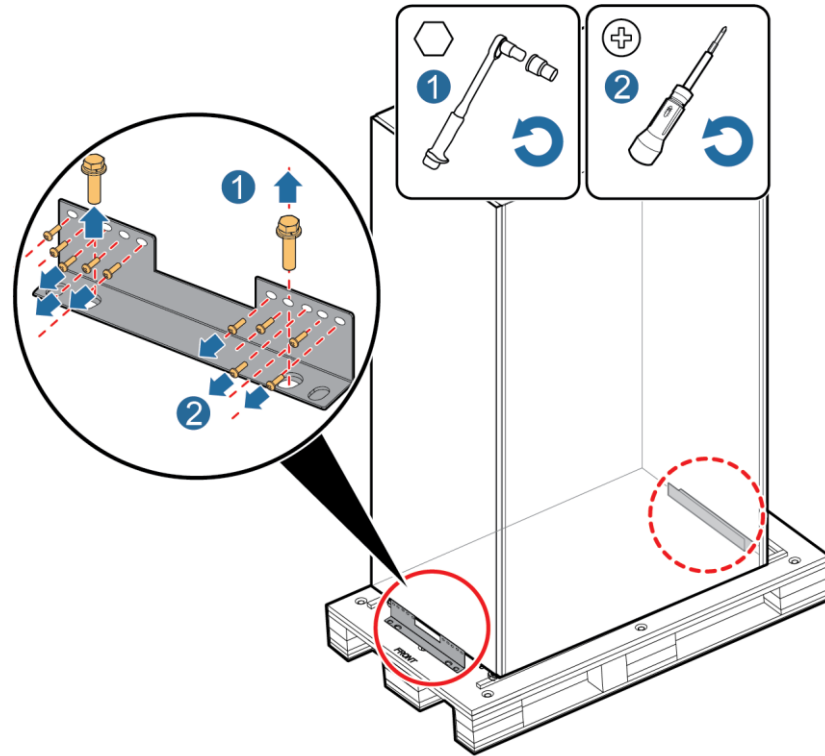
NOTICE

- 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.
 - Visually inspect the UPS appearance for shipping damage. If it is damaged, notify the carrier immediately.
 - To prevent the UPS from falling over, secure it to a 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.
 - 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.
 - If the UPS installation environment is in poor condition and the UPS will be stored for a long time after it is unpacked, wrap the UPS with the original plastic coat to prevent dust.
-

Procedure

- Step 1** Use a pallet truck to transport the UPS to the installation position.
- Step 2** Remove the UPS outer packing.
- Step 3** After verifying that the UPS is intact, remove the L-shaped brackets securing the cabinet and the pallet.

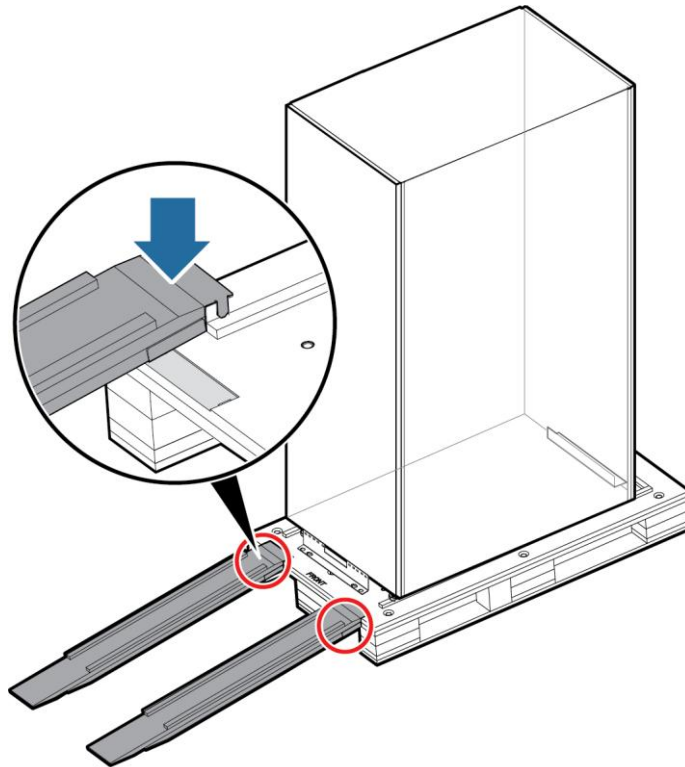
Figure 3-3 Removing the L-shaped bracket



UA21H00031

Step 4 Insert the two sliding plates under the pallet.

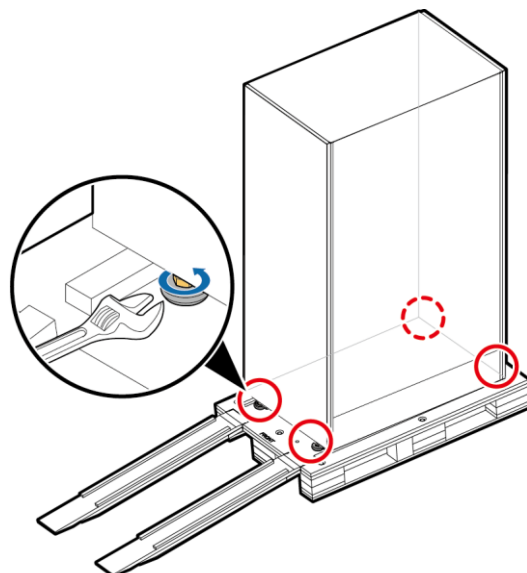
Figure 3-4 Installing the sliding plates



UA21H00032

Step 5 Raise the four anchor bolts to the highest position using an adjustable wrench.

Figure 3-5 Raising the leveling feet



UA06000061

Step 6 Move the UPS over its castors near the installation position.

----End

3.2 Installing a Single UPS

3.2.1 Installing the Cabinet

Secured Installation

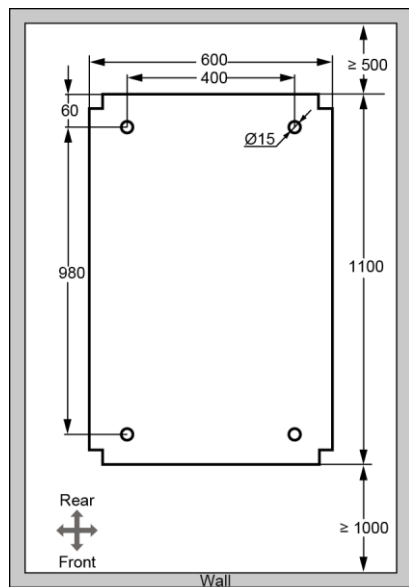


DANGER

Before removing the rear cover from the cabinet, ensure that battery modules have not been installed to prevent electric shocks.

- Step 1** Determine the position for installing the cabinet. Mark mounting holes based on the drawings delivered with the UPS cabinet, as shown in [Figure 3-6](#).

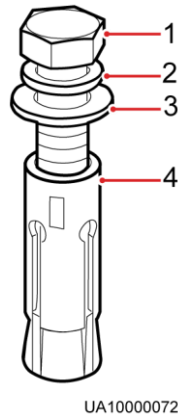
Figure 3-6 Mounting holes (unit: mm)



UA21H00033

- Step 2** Use a hammer drill to drill four holes for installing expansion bolts and then install four expansion bolts in the holes. [Figure 3-7](#) shows expansion bolt composition. [Figure 3-8](#) shows how to install an expansion bolt.

Figure 3-7 Expansion bolt composition



UA10000072

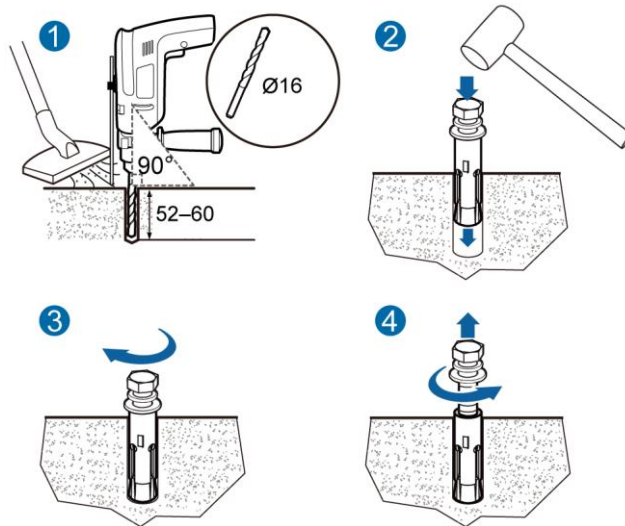
- (1) M12 bolt (2) Spring washer (3) Flat washer (4) Expansion sleeve



NOTICE

Knock the expansion bolts into the holes until the expansion tube completely fits into the hole. The expansion sleeves must be completely buried under the ground to facilitate subsequent installation.

Figure 3-8 Installing expansion bolts (unit: mm)



UA10000073

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

4. Remove the bolt, spring washer, and flat washer.

Step 3 Move the cabinet over its castors to the installation position.

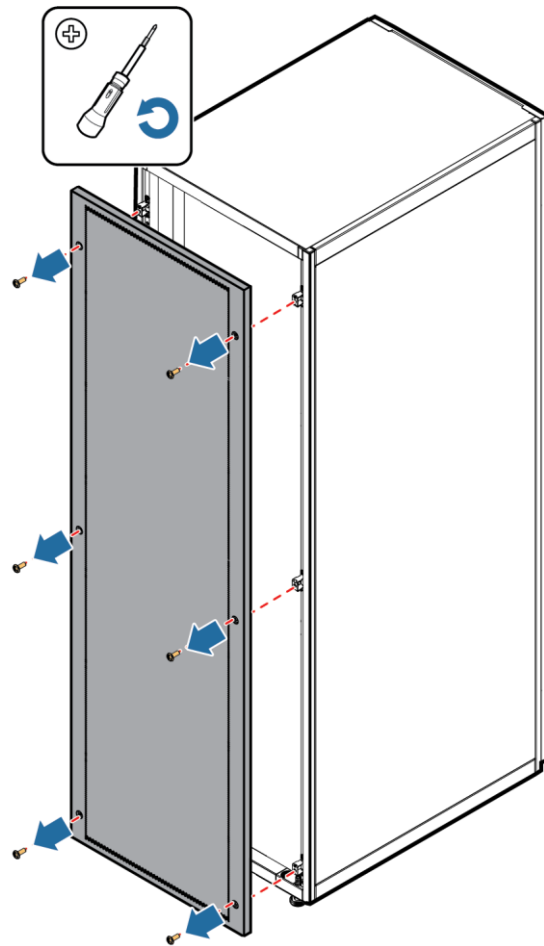
Step 4 (Optional) If the castors of the UPS need to be lifted from the ground, perform [Step 1](#) to [Step 2](#) in [Non-Secured Installation](#).

Step 5 Remove the rear panel of the cabinet, as shown in [Figure 3-9](#), and then open the front door.



To prevent electric shocks, ensure that battery modules are not installed before removing the rear cover from the cabinet.

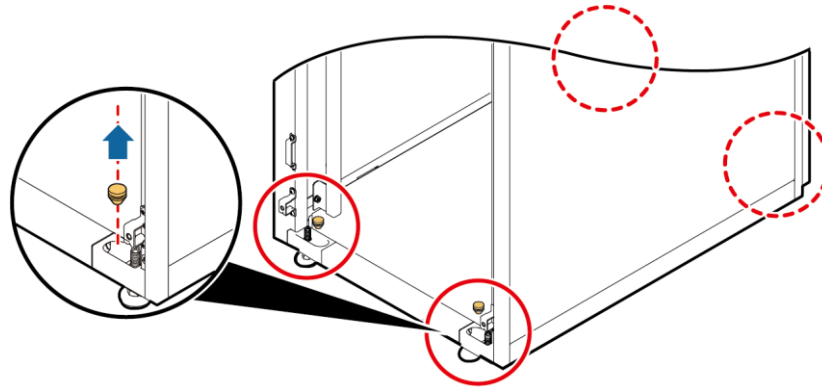
Figure 3-9 Removing the rear panel



UA21H00019

Step 6 Remove the four rubber plugs from the bottom of the cabinet (two on the front and two at the back).

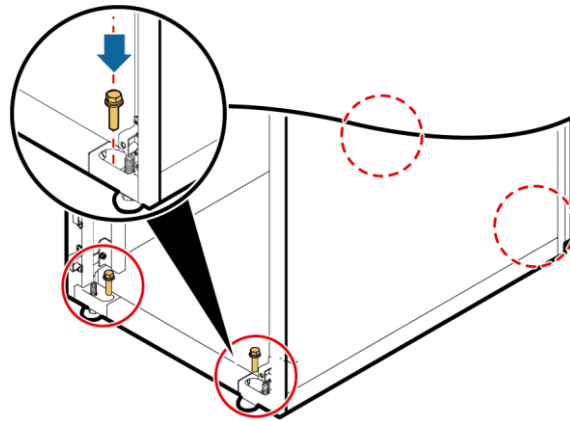
Figure 3-10 Removing rubber plugs



UA21H00015

Step 7 Insert four M12x15 expansion bolts into the expansion bolt holes in the floor, and tighten the expansion bolts, as shown in [Figure 3-11](#).

Figure 3-11 Tightening expansion bolts



UA21H00020

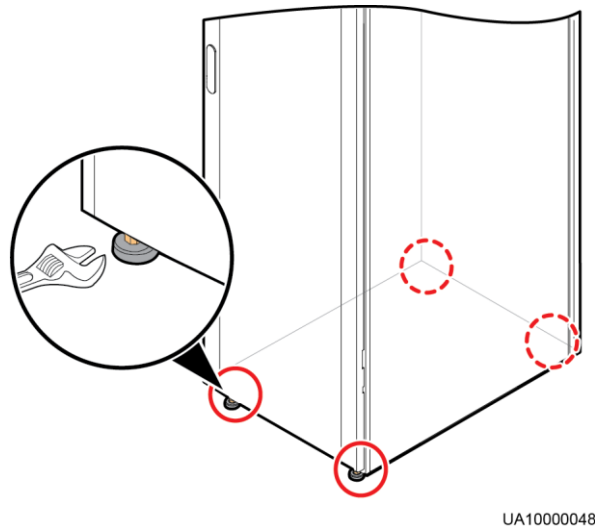
Step 8 Reinstall the rear panel of the cabinet.

----End

Non-Secured Installation

Step 1 Lower the four leveling feet at the bottom of the cabinet by using a wrench until all the four castors at the bottom are lifted from the ground and the leveling feet bear the whole cabinet weight, as shown [Figure 3-12](#).

Figure 3-12 Castors off the floor



Step 2 Check whether the bottom of the cabinet is horizontal by using a level. If the cabinet is not leveled, adjust the leveling feet.

----End

3.2.2 Installing Optional Components

3.2.2.1 Installing Antiseismic Kits

Context



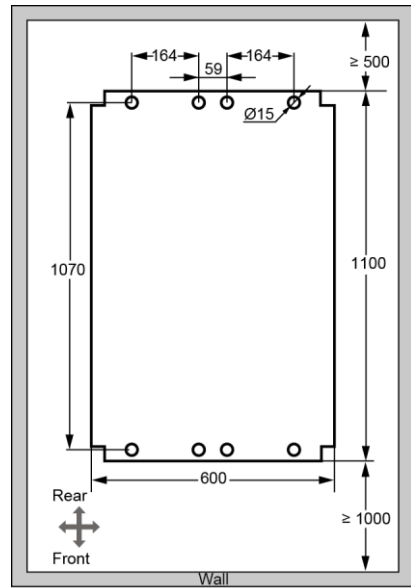
DANGER

Before removing the rear cover from the cabinet, ensure that battery modules have not been installed to prevent electric shocks.

Procedure

Step 1 Determine the installation positions for the antiseismic kits based on the delivered marking-off template, and mark mounting holes, as shown in [Figure 3-13](#).

Figure 3-13 Installation dimensions (unit: mm)

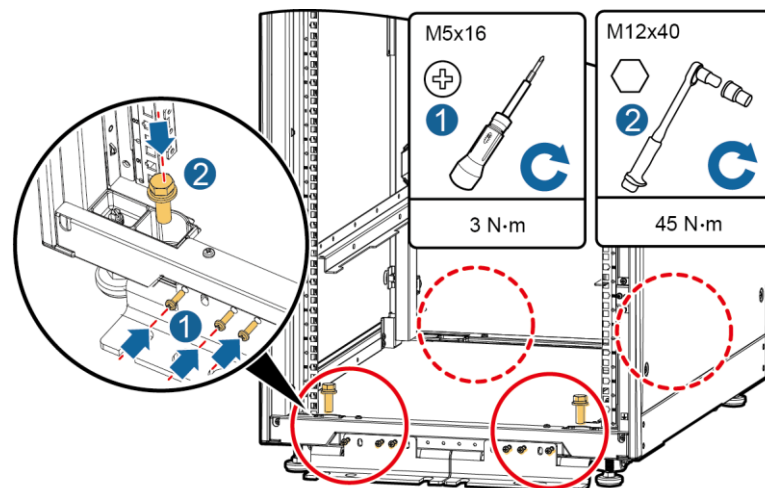


UA21H00055

Step 2 See [Step 2](#) to [Step 6](#) in section [Secured Installation](#) in [3.2.1 Installing the Cabinet](#).

Step 3 Secure the two antiseismic kits at the front and rear of the cabinet to the cabinet, as shown in [Figure 3-14](#).

Figure 3-14 Securing the antiseismic kits to the cabinet



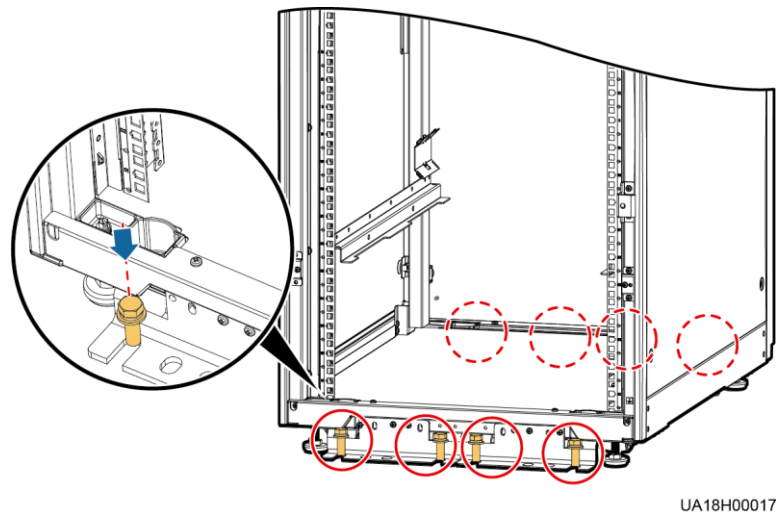
UA18H00016

Step 4 Reinstall the rear panel.

Step 5 Adjust the cabinet position so that the expansion bolt holes are aligned with the eight holes at the bottom of the cabinet.

Step 6 Secure antiseismic kits to the floor at both the front and rear of the cabinet by using eight M12 expansion bolts. The positioning is shown in [Figure 3-15](#).

Figure 3-15 Securing the antiseismic kits to the floor

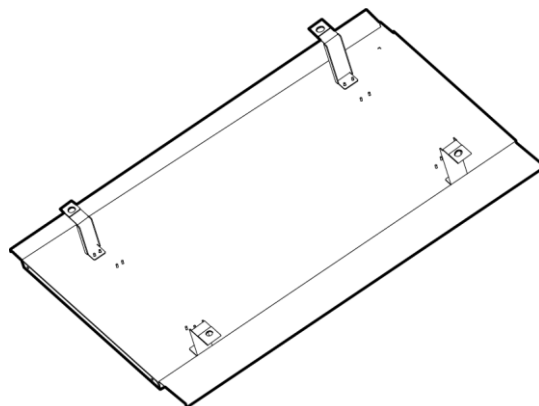


----End

3.2.2.2 IP21 component

IP21 component installing on the top of the cabinet, it prevents water from dropping into the cabinet, protecting the cabinet to IP21.

Figure 3-16 IP21 component



3.2.2.3 Installing a Top Outlet Kit

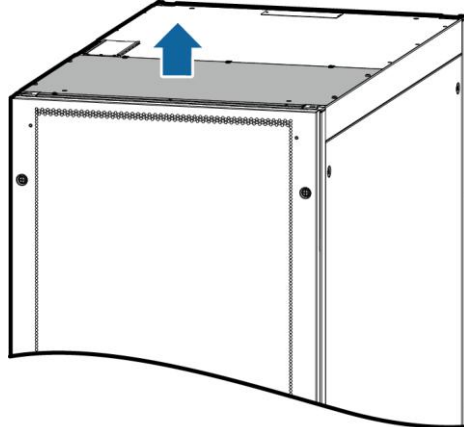
Context

When the UPS is installed against the wall, install the top outlet kit to ensure heat dissipation.

Procedure

Step 1 Remove the top cover from the UPS cabinet rear.

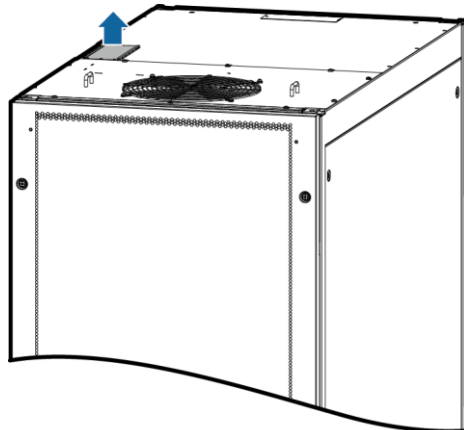
Figure 3-17 Removing the top cover



UA21H00047

Step 2 Remove the small cable covers from the top of the UPS cabinet.

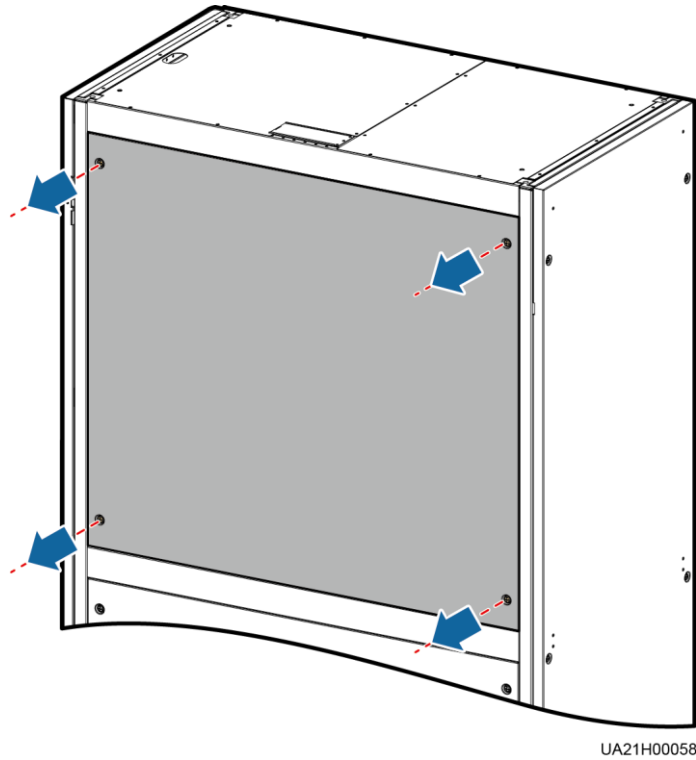
Figure 3-18 Removing the small cable covers



UA21H00049

Step 3 Remove the side panel near the small cable covers from the top of the UPS cabinet.

Figure 3-19 Removing the side panel



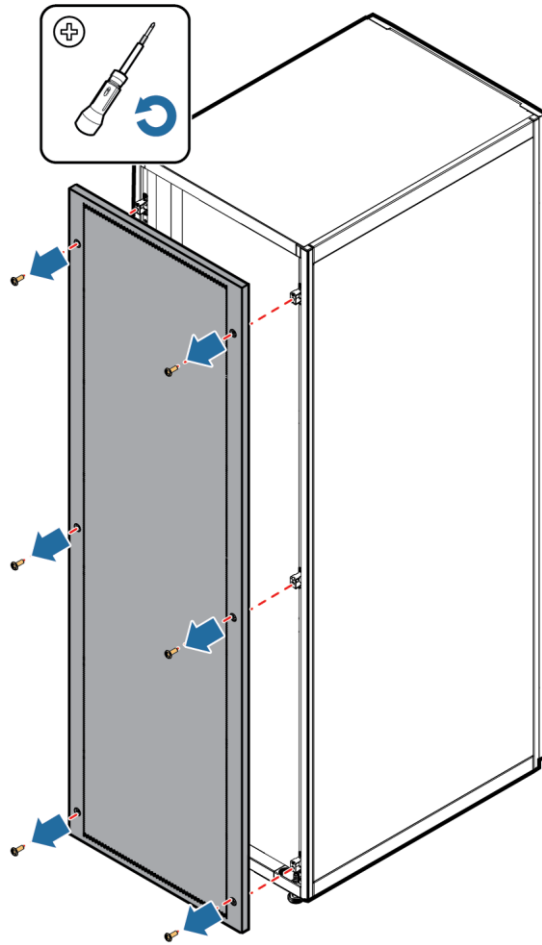
Step 4 Remove the rear panel of the cabinet.



DANGER

To prevent electric shocks, ensure that battery modules are not installed before removing the rear cover from the cabinet.

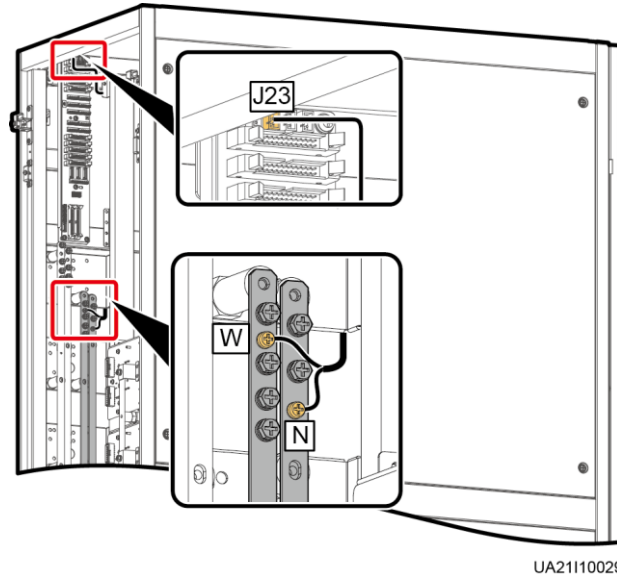
Figure 3-20 Removing the rear panel



UA21H00019

Step 5 Install the power cable and signal cable to the top outlet kit in the UPS cabinet.

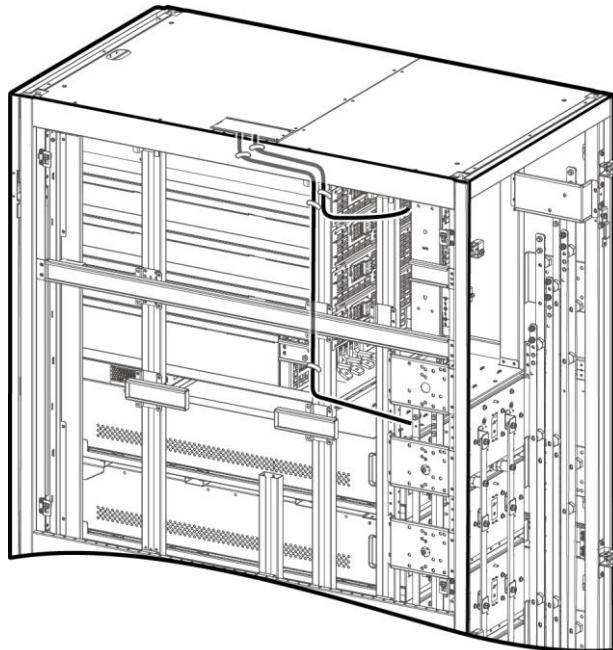
Figure 3-21 Installing cables



UA21110029

Step 6 Route cables.

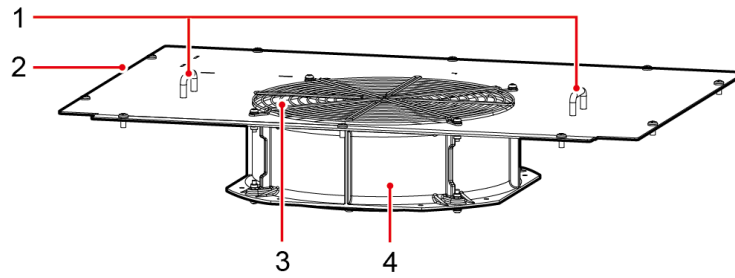
Figure 3-22 Routing Cables



UA21110028

Step 7 Install the top outlet kit.

Figure 3-23 Top outlet kit



UA13W00001

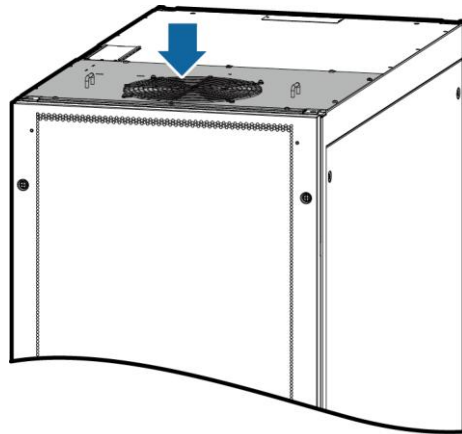
(1) Handle

(2) Fan installation plate

(3) Fan net

(4) Fan

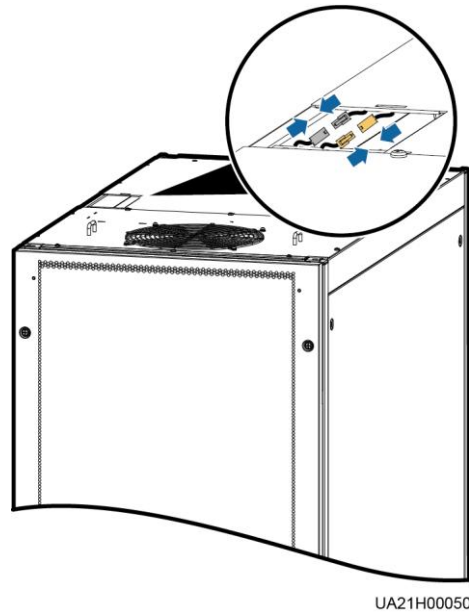
Figure 3-24 Installing the top outlet kit



UA21H00048

Step 8 Connect the power cable and signal cable to the top outlet kit. After connecting the cables, reinstall the small cable covers on the top of the UPS cabinet, the side panel, and the rear panel.

Figure 3-25 Connecting the power cable and signal cable



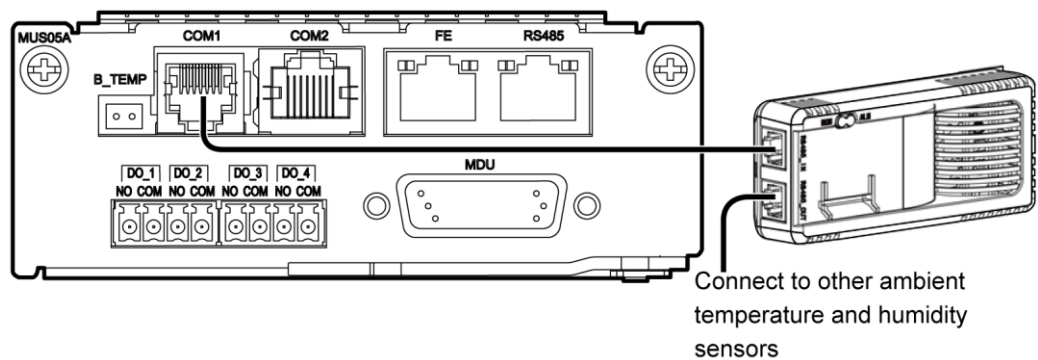
----End

3.2.2.4 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 3-26 Connecting a UPS and an ambient T/H sensor



UB060E0003

 **NOTE**

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

----End

3.2.3 Routing Cables

3.2.3.1 UPS Cable Connection Reference

Context



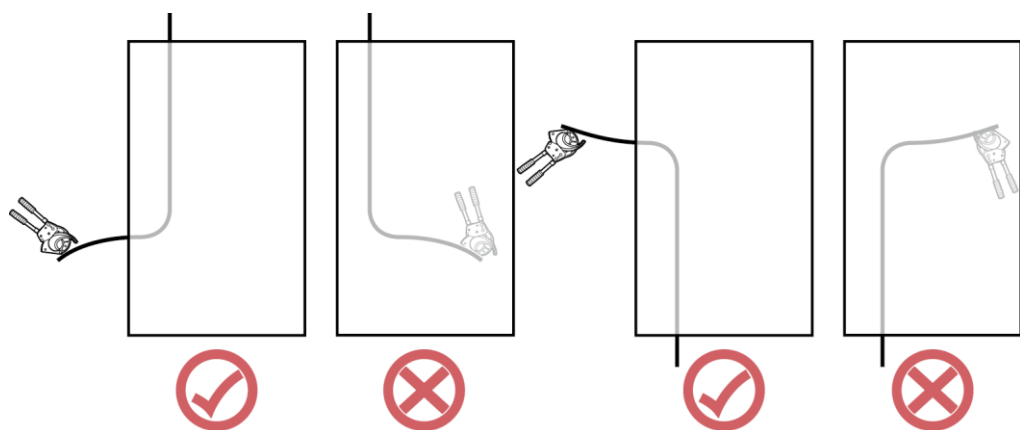
CAUTION

- 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.

Figure 3-27 Preparing a cable terminal outside the cabinet



UA21110068



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

3.2.3.2 Bottom Cable Routing

Context



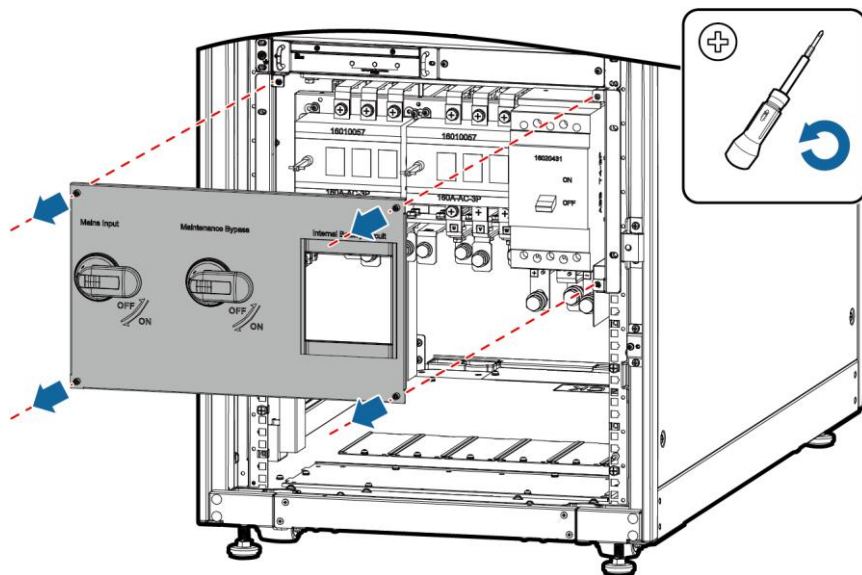
NOTICE

- Before connecting cables, ensure that battery modules have not been installed to prevent electric shocks.
- If you route cables through the bottom of the cabinet, ensure sufficient space.
- The battery switch in the UPS cabinet is used to control internal battery strings and cannot control external battery strings.

Procedure

- Step 1** Before connecting cables, ensure that battery modules are not installed and that the external input switch, input switch inside the UPS, and battery switch are OFF.
- Step 2** Open the front door and remove the cover from the power distribution subrack, as shown in [Figure 3-28](#).

Figure 3-28 Removing the cover

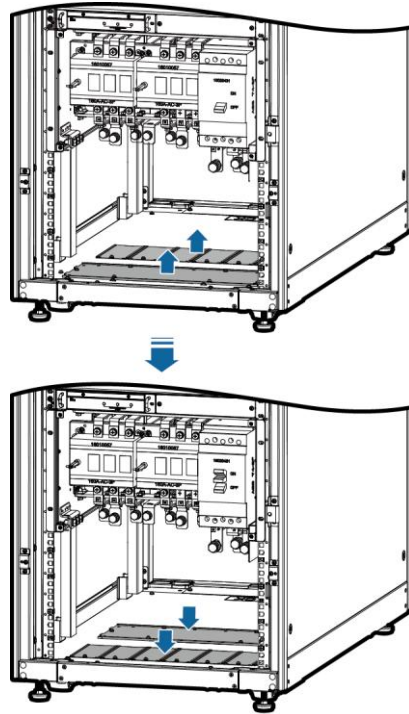


UA21H00008

- Step 3** Determine the cabling mode.
- Remove small covers for routing cables.
 - a. Install the large cover in the position of small covers and install the small covers in the position of the large cover.

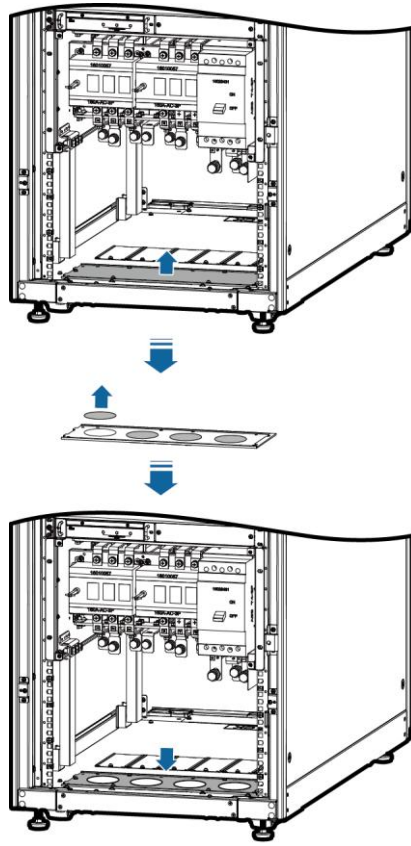
- b. Remove small covers from the bottom based on site requirements.

Figure 3-29 Removing small covers for routing cables



- Drill holes on the large cover for routing cables.
 - a. Remove the large cover from the cabinet bottom and drill holes based on site requirements.
 - b. Reinstall the large cover.

Figure 3-30 Drilling holes on the large cover for routing cables



UA21H00016

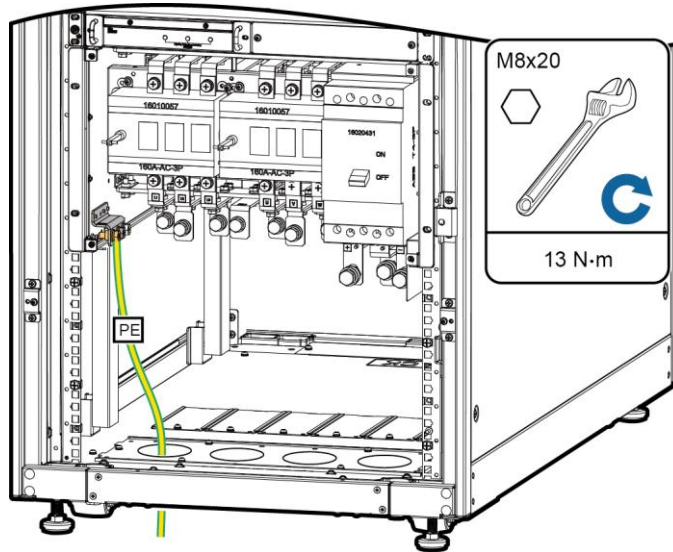


NOTE

When you choose to route cables by drilling holes, drill holes on the bottom plate, and paste grommet strip to the hole edge to protect cables.

Step 4 Connect ground cables.

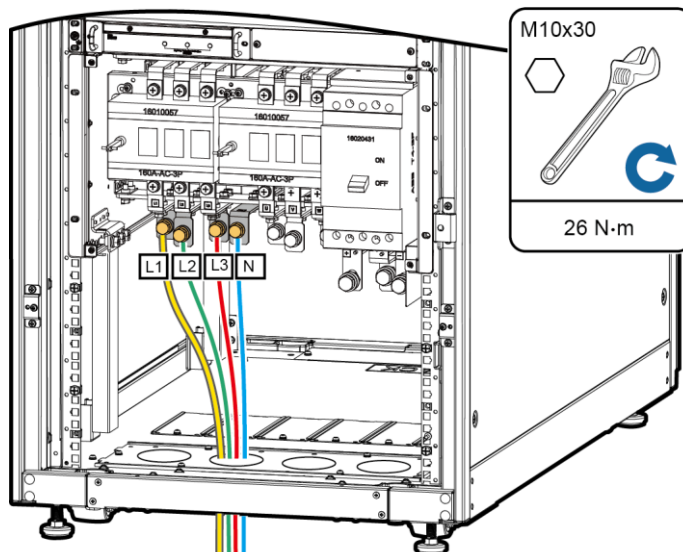
Figure 3-31 Connecting a ground cable



UA21110002

Step 5 Connect the input cables to the input power distribution wiring terminals L1, L2, L3, and N in sequence.

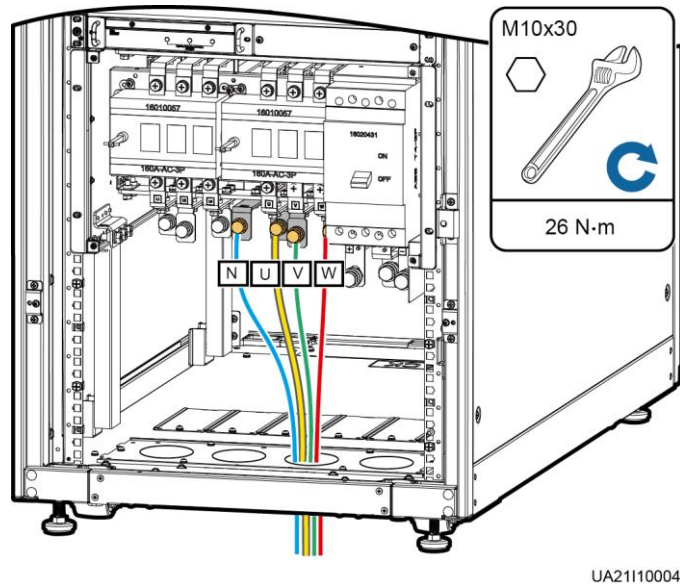
Figure 3-32 Connecting AC input power cables



UA21110005

Step 6 Connect the output cables to the output power distribution wiring terminals N, U, V, and W in sequence.

Figure 3-33 Connecting AC output power cables



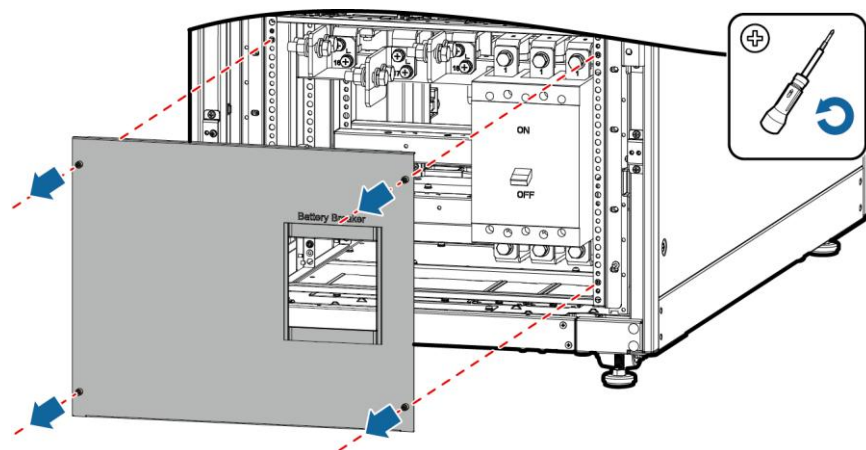
NOTE

The AC input neutral wire and AC output neutral wire need to be crimped on the two sides of the terminal.

Step 7 (Optional) If external battery strings are connected, connect the battery cables

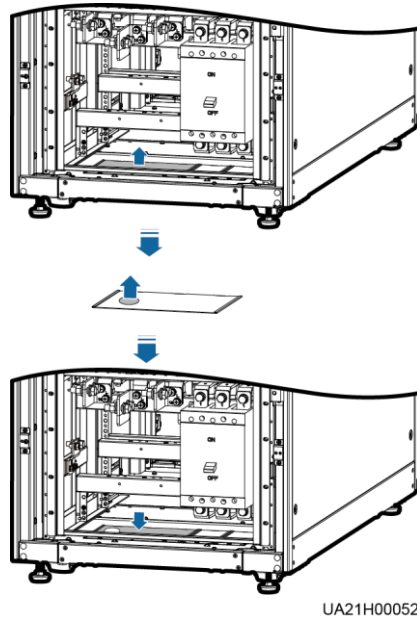
1. Ensure that the battery switches in the UPS cabinet and battery cabinet are OFF and that battery modules are not installed.
2. Remove the cover from the power distribution subrack.

Figure 3-34 Removing the cover



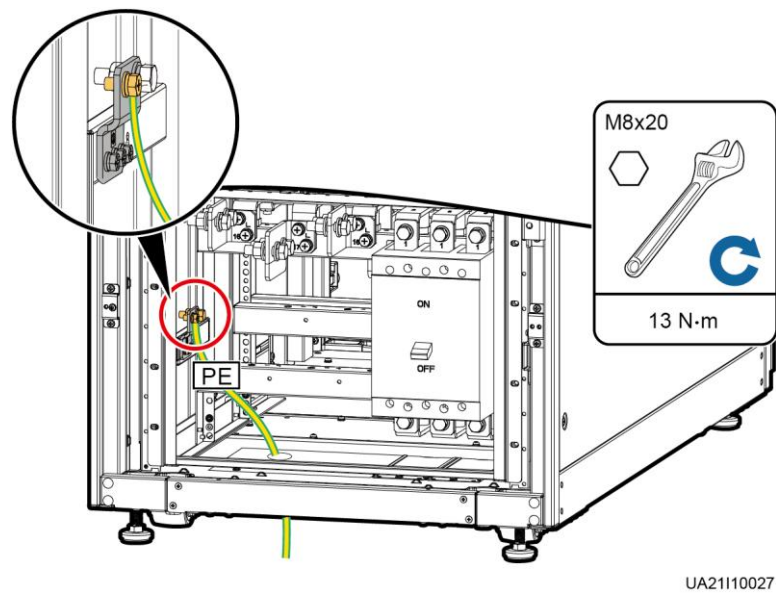
3. Remove the large cover from the battery cabinet bottom, drill holes based on site requirements, and reinstall the large cover in the cabinet.

Figure 3-35 Removing the large cover and drilling holes



4. Connect the ground cable of battery cabinet.

Figure 3-36 Connecting the ground cable of battery cabinet

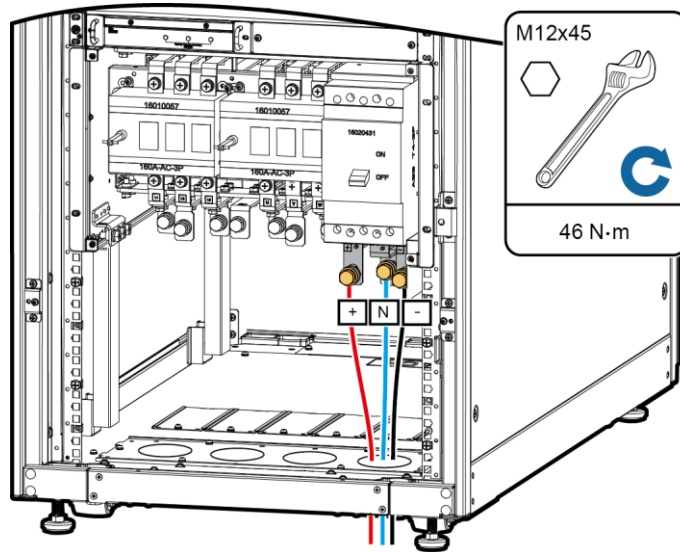


NOTE

There are two type of bolts M8 and M10, connect the ground cable based on site conditions.

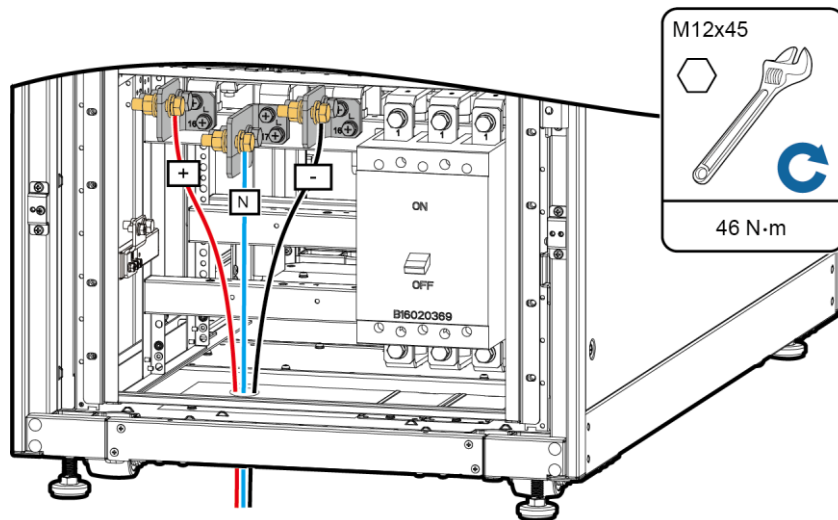
5. Connect one end of the battery cable to the battery wiring terminals +, N, and – in the UPS cabinet, as shown in [Figure 3-37](#). Connect the other end to the terminals +, N, and – in the battery cabinet, as shown in [Figure 3-38](#).

Figure 3-37 Connecting the battery cable to the UPS



UA21110003

Figure 3-38 Connecting the battery cable to the battery cabinet

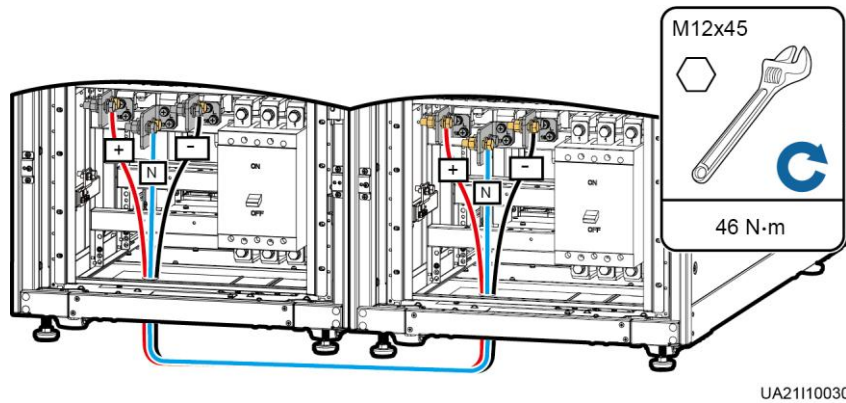


UA21110001

NOTE

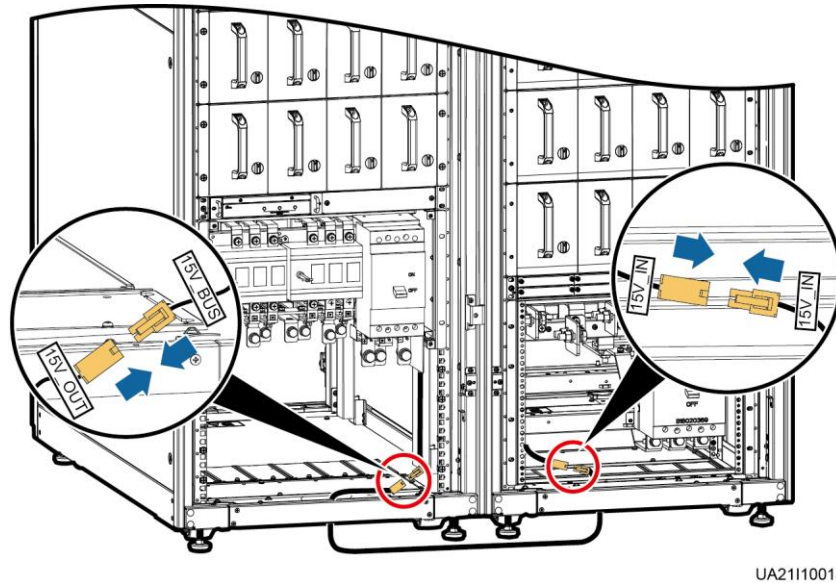
This document describes how to connect battery cabinets and UPS5000-E-75K-BF as an example. A maximum of four battery cabinets can be connected in parallel. If there is more than one battery cabinet, connect them in parallel by using cables, the following figure shows two battery cabinets connect in parallel.

Figure 3-39 Battery cabinets connect in parallel



6. Connect the 15 V power cable between the battery cabinet and UPS cabinet.

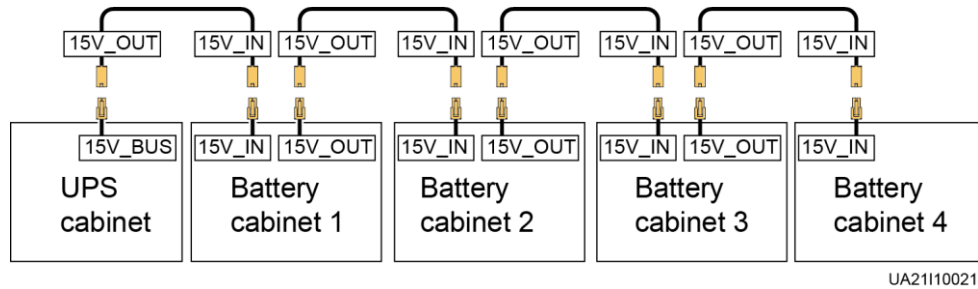
Figure 3-40 Connecting the 15 V power cable (one battery cabinet)



NOTE

This document describes how to connect battery cabinets and UPS5000-E-75K-BF as an example. A maximum of four battery cabinets can be connected in parallel. If there is more than one battery cabinet, connect them as the figure below.

Figure 3-41 Connecting the 15 V power cable (four battery cabinets)



- Set the DIP switches of CAN expansion card. The following shows the position of DIP switch. [Table 3-9](#) shows the status of the DIP switches.

Figure 3-42 The position of DIP switch

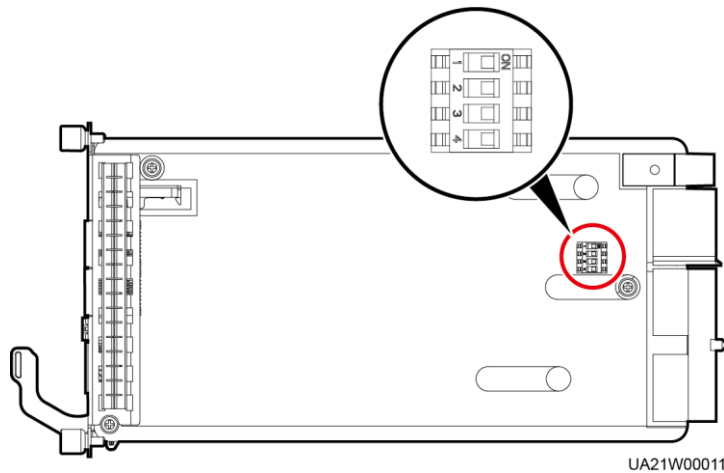
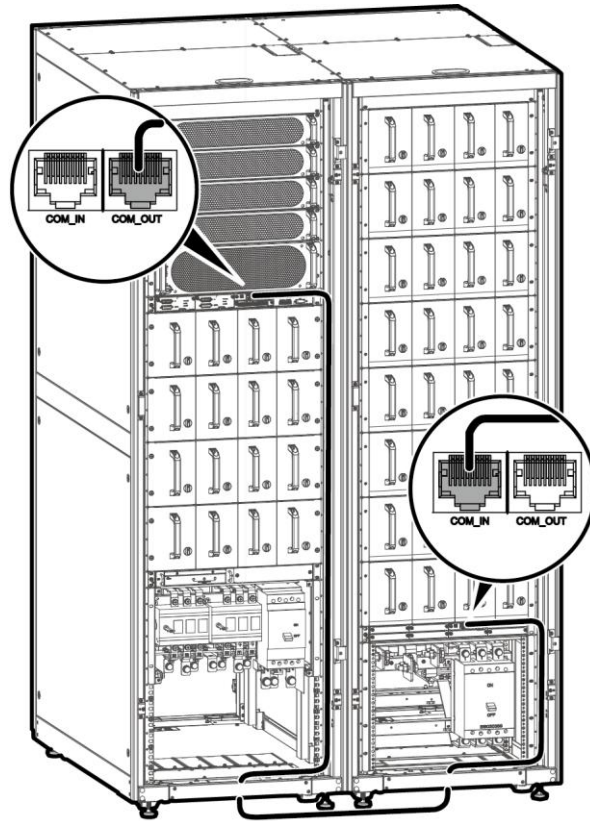


Table 3-9 The status of the DIP switches

Address of the CAN Expansion Card	DIP2 Switch Status	DIP3 Switch Status	DIP4 Switch Status
UPS cabinet address	ON	ON	ON
Battery cabinet 1 address	OFF	ON	ON
Battery cabinet 2 address	ON	OFF	ON
Battery cabinet 3 address	OFF	OFF	ON
Battery cabinet 4 address	ON	ON	OFF

8. Connect the communications cable between the CAN expansion card in the battery cabinet and that in the UPS cabinet.

Figure 3-43 Connecting the communications cable between CAN expansion cards (one battery cabinet)

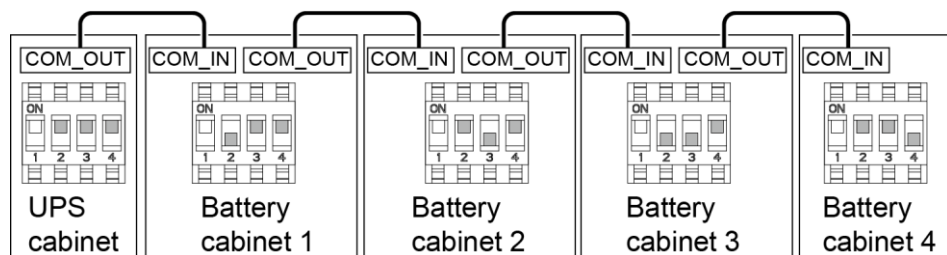


UA21110017

NOTE

This document describes how to connect battery cabinets and UPS5000-E-75K-BF as an example. A maximum of four battery cabinets can be connected in parallel. If there is more than one battery cabinet, connect them as the figure below.

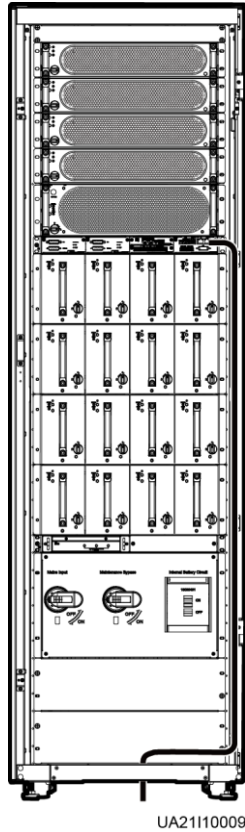
Figure 3-44 Connecting the communications cable between CAN expansion cards (four battery cabinets)



UA21110022

Step 8 The signal cables are routed in and out from the bottom and the top. Route the left signal cables along the left side of the cabinet and the right signal cables along the right side of the cabinet, and then bind the cables to the cabinet, as shown in [Figure 3-45](#) and [Figure 3-46](#).

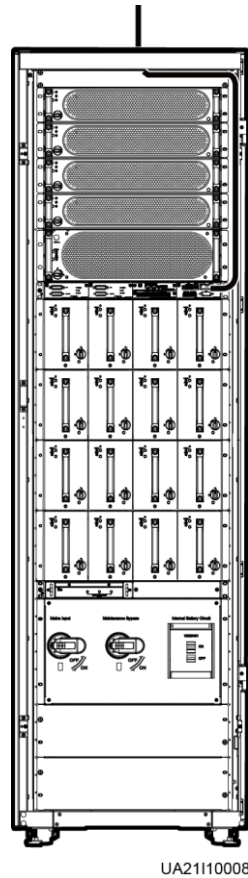
Figure 3-45 Routing signal cables from the bottom of the cabinet



NOTE

The number and color of signal cable in the figure is for reference only.

Figure 3-46 Routing signal cables from the top of the cabinet



NOTE

The number and color of signal cable in the figure is for reference only.

----End

3.2.4 Remote EPO



NOTICE

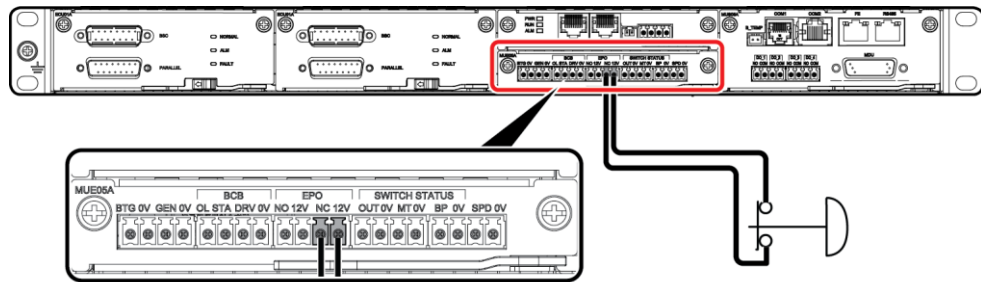
- Huawei does not provide the EPO switch or cable. If the cable is required, the recommended cable is 22 AWG.
- Equip the EPO switch with a protective cover to prevent misoperations, and cover the cable with protective tubing.
- Triggering EPO will shut down the rectifier, inverter, charger, and static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

Connect the requisite EPO switch to UPS dry contacts.

- [Figure 3-47](#) shows the cable connections for an NC EPO switch.

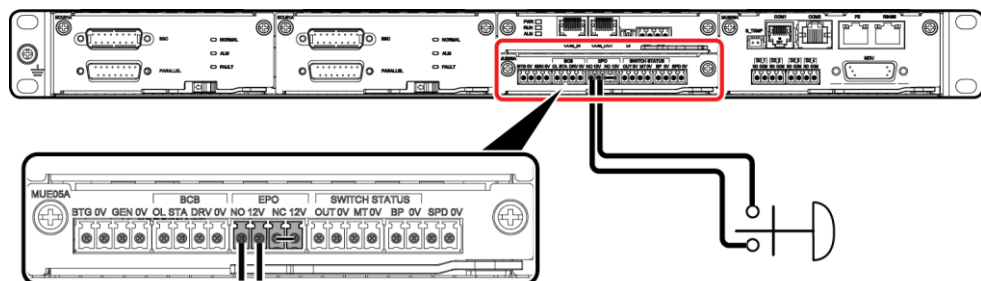
- [Figure 3-48](#) shows the cable connections for an NO EPO switch.

Figure 3-47 Cable connection for an NC EPO switch



UA21110026

Figure 3-48 Cable connection for an NO EPO switch



UA21110025

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.

3.2.5 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

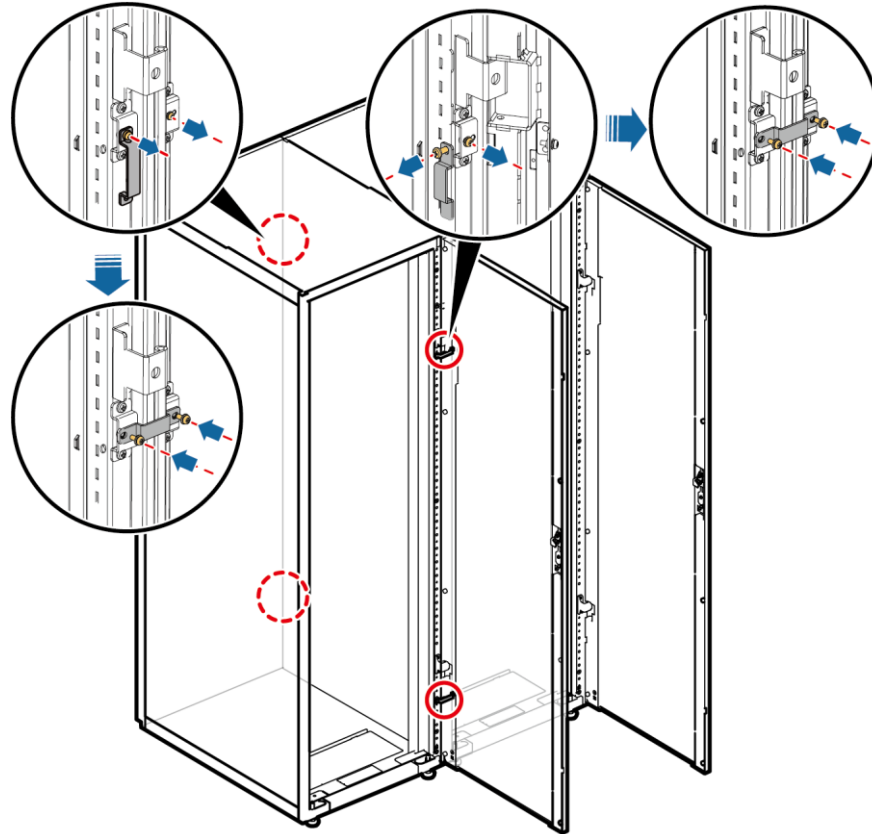
3.2.6 (Optional) Installing a Battery Cabinet

Procedure

Step 1 A battery cabinet is installed in the way as the UPS cabinet.

Step 2 Use connecting kits to connect the UPS cabinet and battery cabinet.

Figure 3-49 Installing connecting kits



UA21H00057

Step 3 Install battery modules after cables are connected.



NOTICE

To prevent electric shocks, install battery modules after cables are connected.

----End

3.3 Installing a Parallel System

3.3.1 Installing the UPSs

Context



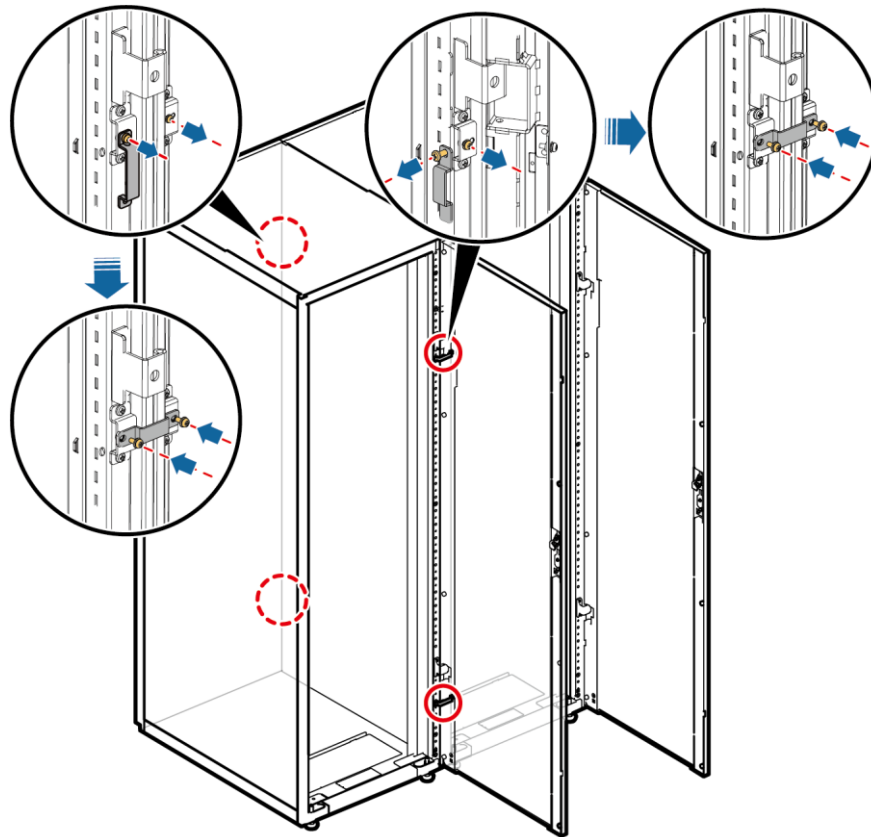
NOTICE

Connect parallel plates to reinforce the cabinet combination.

Procedure

- Step 1** Install the UPSs in a parallel system using the single UPS installation methods. For details, see [3.2 Installing a Single UPS](#).
- Step 2** Unscrew the connecting kit and put it through the reserved holes to connect the two UPSs and then tighten the screws on the kit, as shown in [Figure 3-50](#).

Figure 3-50 Connecting parallel plates



UA21H00057



NOTE

You also need to connect parallel plates at the rear of the UPS.

----End

3.3.2 Connecting Power Cables

Procedure

- Step 1** Ground each UPS in a parallel system separately, and connect power cables and battery cables.
- Step 2** Based on the site configurations, select a parallel connection method to connect cables for the parallel system. [Figure 3-51](#) shows a typical conceptual diagram for a 1+1 parallel system, and [Figure 3-52](#) shows the cable connections for this system.

Figure 3-51 Conceptual diagram of a 1+1 parallel system

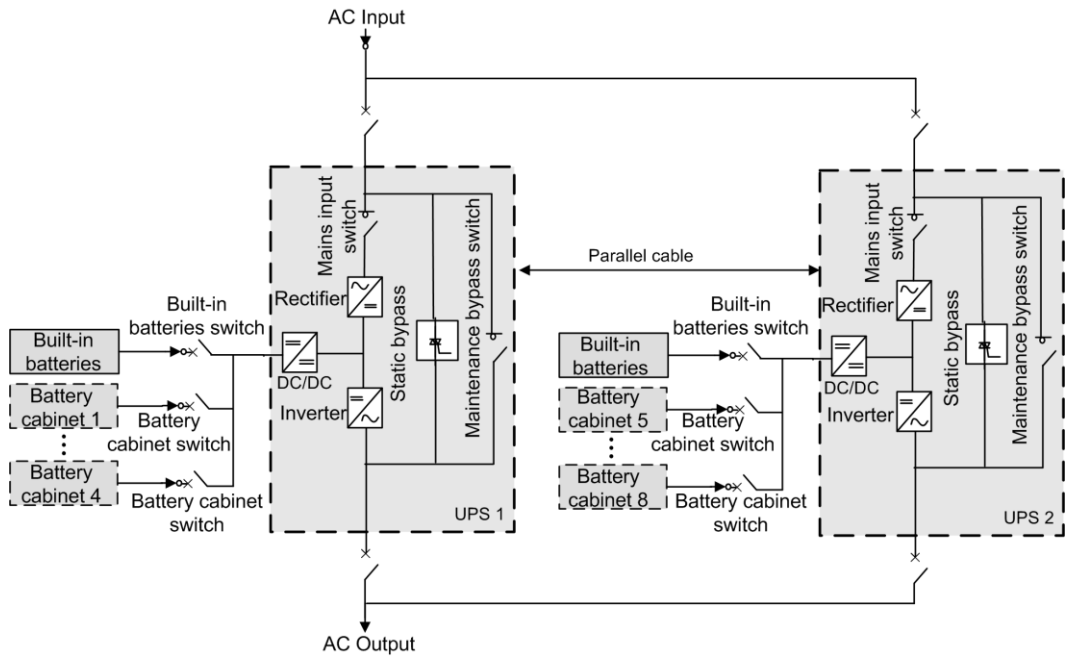
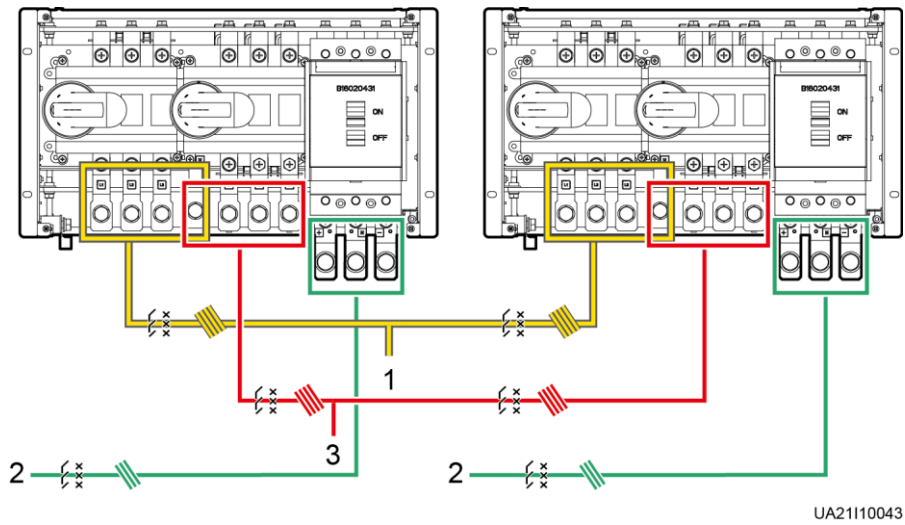


Figure 3-52 Cable connections for a 1+1 parallel system



- (1) Input power cables
- (2) (Optional) Battery cables (If external battery strings are connected, connect the battery cables)
- (3) Output power cables

Figure 3-53 shows a typical conceptual diagram for a dual-bus system consisting of two UPS systems, and Figure 3-54 show the cable connections for this system.

Figure 3-53 Conceptual diagram of a dual-bus system

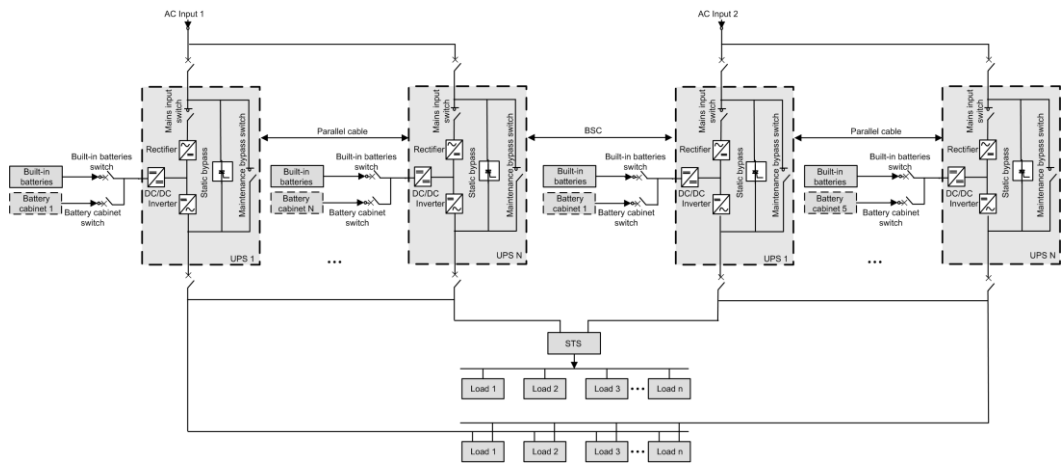
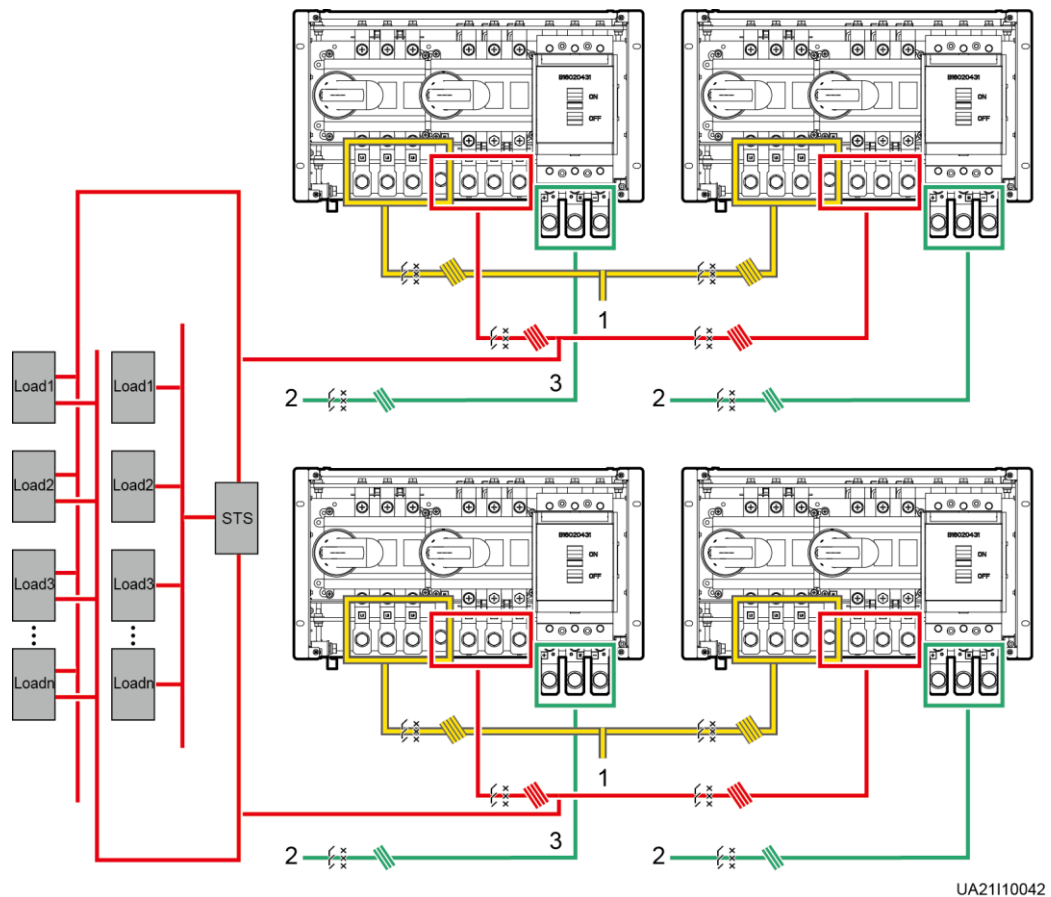


Figure 3-54 Cable connections for a dual-bus system



UA21110042

- (1) Input power cables (2) (Optional) Battery cables (If external battery strings are connected, connect the battery cables) (3) Output power cables

----End

3.3.3 Connecting Signal Cables

Context

This topic describes how to connect signal cables as a loop for four UPSs in a parallel system.

Procedure

Step 1 Connect the parallel ports on the UPSs in the parallel system over parallel cables.

- [Figure 3-55](#) and [Figure 3-56](#) show the topology diagram and cable connections for the N+X parallel system.

Figure 3-55 Topology diagram of an N+X parallel system

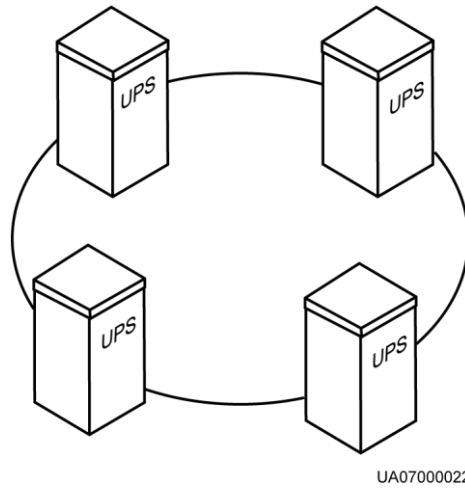
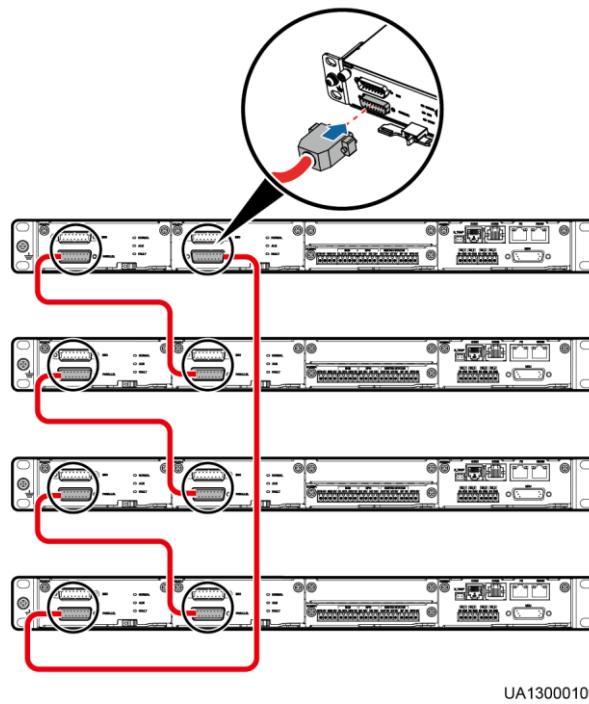
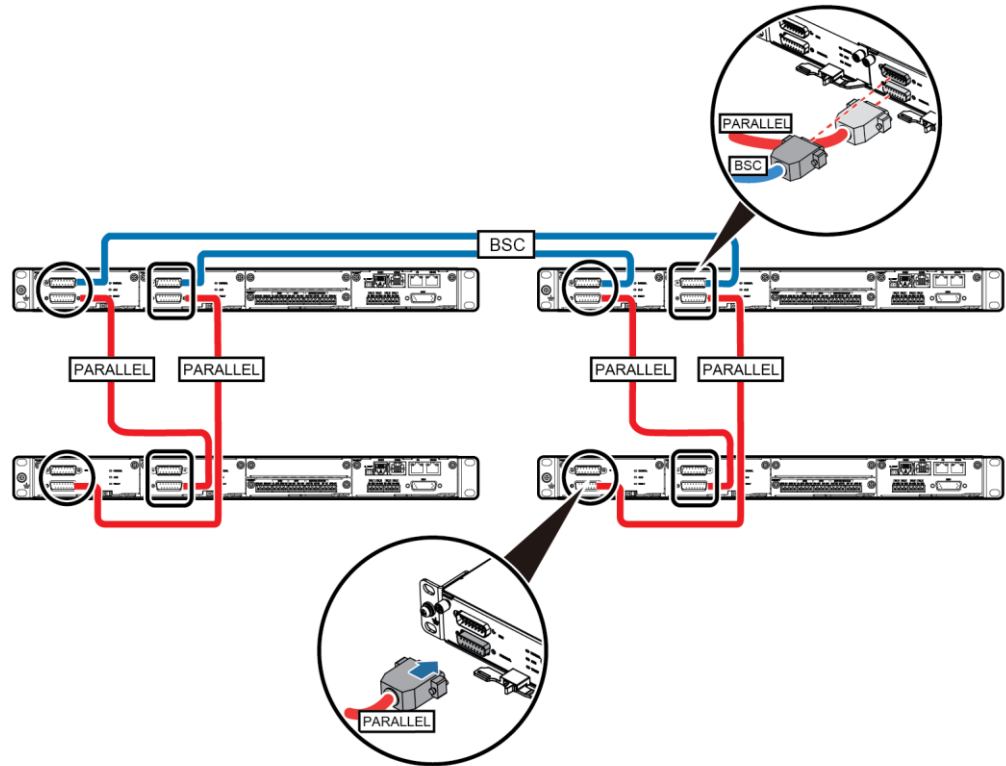


Figure 3-56 Connecting signal cables in a parallel system consisting of four UPSs



- Connect cables to BSC ports in the UPS systems. [Figure 3-57](#) shows how to connect signal cables in a dual-bus system.

Figure 3-57 Connecting signal cables in a dual-bus system



UA13000108

Step 2 Connecting the signal cables to each single UPS in a parallel system.

----End

3.4 Installing Batteries

Installing Battery Modules



DANGER

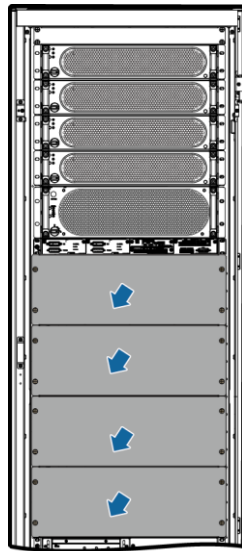
- To prevent electric shocks, install battery modules after cables are connected.
- To prevent electric shocks, ensure that the rear cover of the cabinet has been installed before installing battery modules.
- Before installing battery modules, carefully read the battery safety precautions.
- Place the battery modules in a correct way to prevent vibrations and shocks.
- Install the battery modules from the lower layer to the upper layer to prevent falling over due to top-heaviness.

Step 1 Remove filler panels.



NOTE

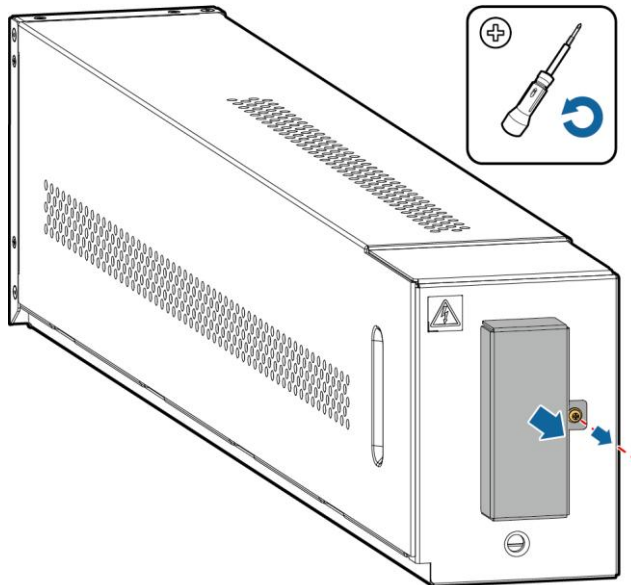
The following figure shows how to install 16 battery modules (four strings) as an example. Four filler panels need to be removed.



UA21H00038

Step 2 Remove the protective cover from the rear of the battery.

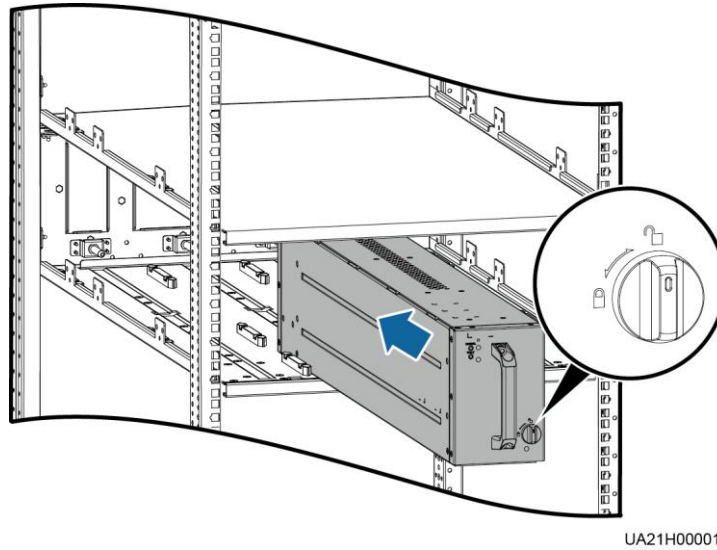
Figure 3-58 Removing the protective cover



UA21H00007

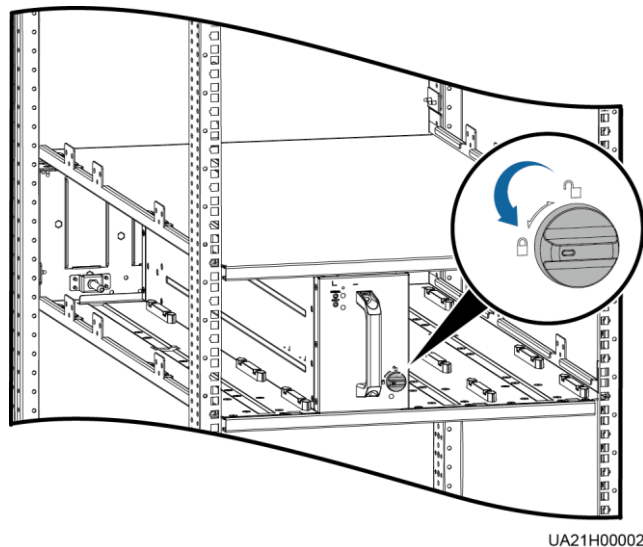
Step 3 When the positioning lock on the battery module is in the unlocked state, insert the battery module.

Figure 3-59 Inserting the battery module



Step 4 Turn the positioning lock on the battery module to the locked state.

Figure 3-60 Turning the switch to the locked state



Step 5 Install battery modules one by one from the bottom layer to the top layer in the preceding way. (One battery string consists of four battery modules at the same layer. When installing battery modules, ensure that the number of configured battery strings is greater than or equal to the number of power modules plus 1.)

----End

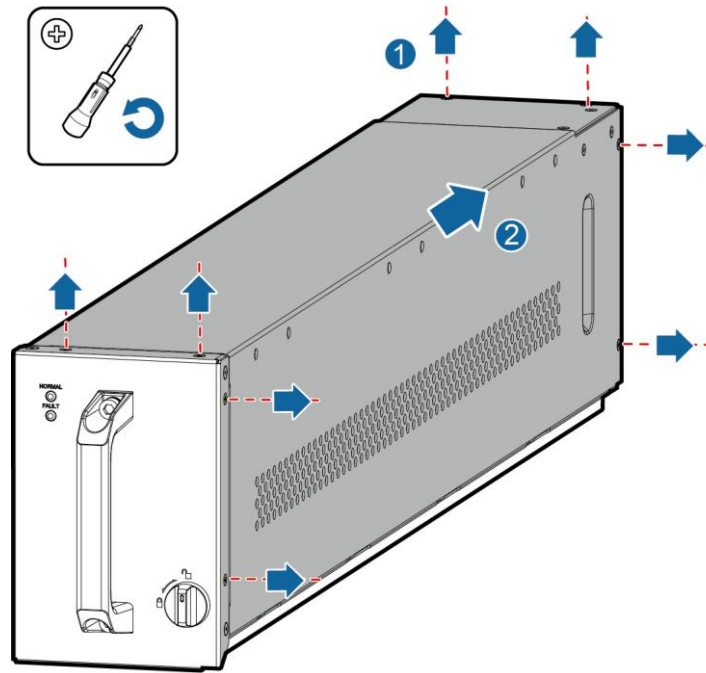
(Optional) Assembling a Battery Module

 **NOTICE**

If battery modules are empty, assemble them by performing the following steps.

- Step 1** Remove the screws securing the upper cover of the battery module, and remove the upper cover by pushing it backwards.

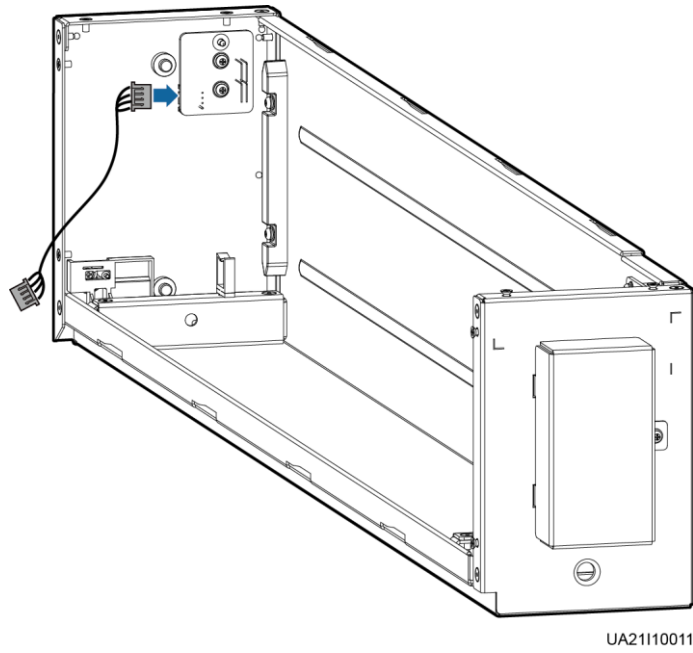
Figure 3-61 Removing the upper cover



UA21H00018

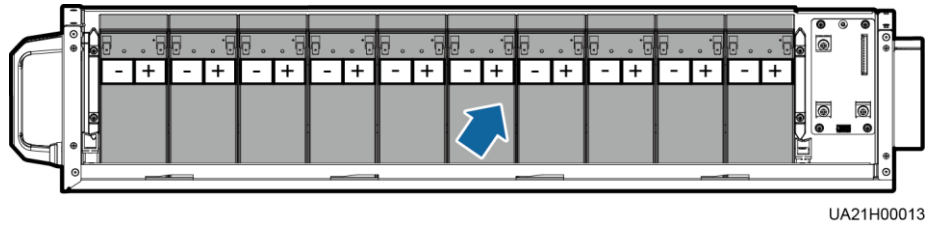
- Step 2** Connect a signal cable to the indicator plate in the front of the battery module.

Figure 3-62 Connecting the signal cable to the indicator plate



Step 3 Install batteries.

Figure 3-63 Installing batteries

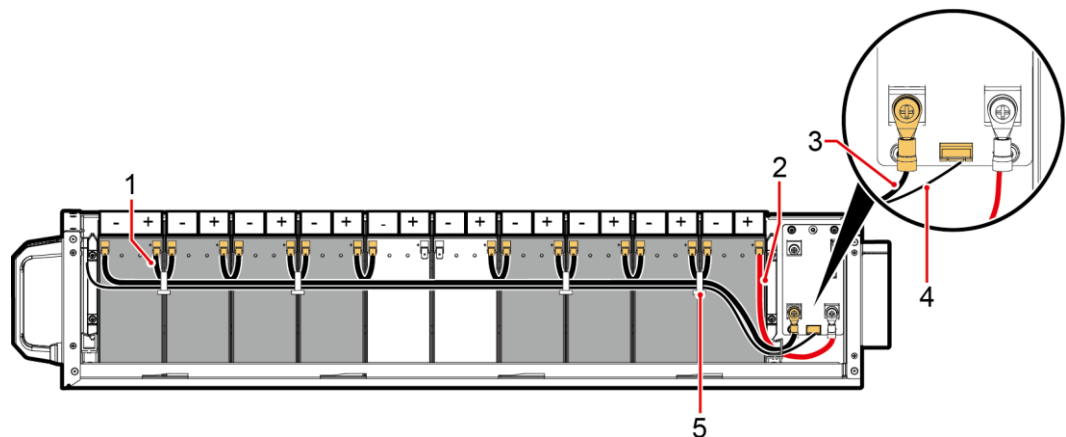


Step 4 Install and bind the cables.

 **NOTICE**

- Ensure that the positive and negative battery cables are correctly connected to avoid short circuits.
- Temporarily do not connect the cables between the two batteries in the middle of the battery string so that a battery loop is not formed and operations can be performed with power off.
- The following figure shows the directions of the positive and negative OT terminals of batteries on the detection board.

Figure 3-64 Installing cables



UA21110006

(1) Cable between batteries

(2) Cable between the positive terminal of the battery string and the detection board

(3) Cable between the negative terminal of the battery string and the detection board

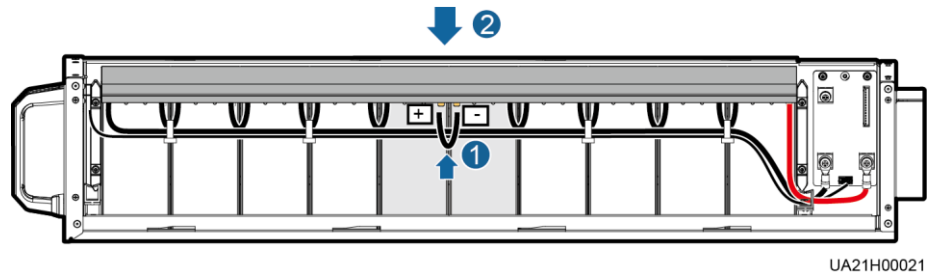
(4) Signal cable for the indicator plate

(5) Cable tie

Step 5 Connect the cable between the two batteries in the middle of the battery string, then bind cables with a cable tie.

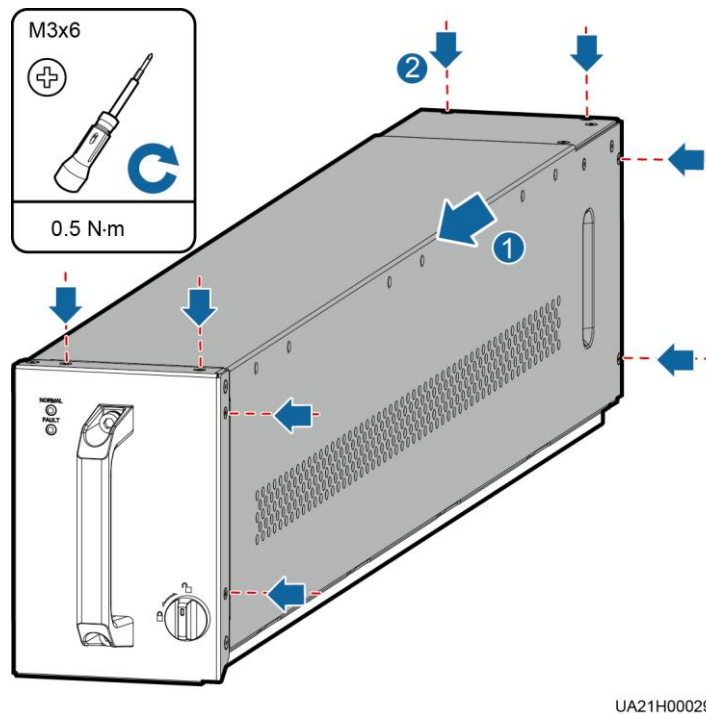
Step 6 Install the insulation protective board.

Figure 3-65 Installing the insulation protective board and connecting the battery cable



Step 7 Push the upper cover forwards as shown in the following figure to reinstall it, and screw it.

Figure 3-66 Reinstalling the upper cover



----End

3.5 Installation Verification



NOTICE

If the check results of listed items 8 and 9 in [Table 3-10](#) do not meet the acceptance criteria, the UPS may be damaged.

Table 3-10 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	Distances between cable ties are the same, and no burr exists.
06	Cable connections	The input, output, and battery cables are securely connected. For the cables secured by screws, the washers are flattened.
07	Grounding	The resistance between the UPS ground bar and the equipment room ground bar is less than 0.1 ohm.
08	AC phase sequence	For a single UPS, the mains input, bypass input, and output phase sequences are correct. For a parallel system, the phase sequences of each UPS must be consistent.
09	Battery cables	The battery strings are correctly connected to the UPS.
10	Battery module assembly (users should pay attention to this item when assembling battery modules by themselves)	If users assemble the battery module by themselves, cables are properly connected and bound inside the battery module. After assembly, the eight screws of the battery module are tightened. The voltage between the positive and negative terminals of the battery module is within the range of 96 V to 144 V.
11	Battery module installation	The battery module is fully inserted into the cabinet. The ready switch is in locked state.
12	Operating environment	Conductive dust and other sundries are cleaned inside and outside the cabinet, as shown in Figure 3-67 . <ol style="list-style-type: none"> 1. Ensure that there is no foreign matter on the switches, in the switch terminal groove, and between copper bars above the switches. 2. Ensure that there is no foreign matter at the copper bar terminals. 3. Ensure that there is no foreign matter on the bottom plate of the cabinet.

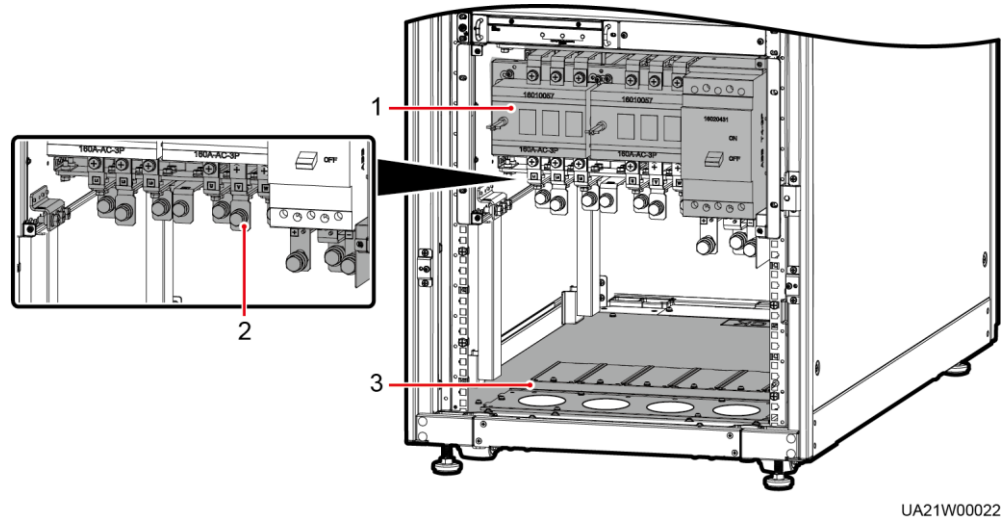
Table 3-11 Battery cabinet installation checklist

No.	Item	Acceptance Criteria
01	Battery cabinet installation	The battery cabinet is securely installed and does not tilt due to vibration.
02	Neat arrangement	The battery cabinet 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	Distances between cable ties are the same, and no burr exists.
06	Cable connections	The battery cables are securely connected. For the cables secured by screws, the washers are flattened.
07	Grounding	The resistance between the battery cabinet ground bar and the equipment room ground bar is less than 0.1 ohm.
08	Battery cables	The battery strings are correctly connected to the UPS.
09	Battery module assembly (users should pay attention to this item when assembling battery modules by themselves)	If users assemble the battery module by themselves, cables are properly connected and bound inside the battery module. After assembly, the eight screws of the battery module are tightened. The voltage between the positive and negative terminals of the battery module is within the range of 96 V to 144 V.
10	Battery module installation	The battery module is fully inserted into the cabinet. The ready switch is in locked state.
11	Operating environment	Conductive dust and other sundries are cleaned inside and outside the cabinet, as shown in Figure 3-68 . <ol style="list-style-type: none"> 1. Ensure that there is no foreign matter at the copper bar terminals. 2. Ensure that there is no foreign matter on the switches, in the switch terminal groove, and between copper bars above the switches. 3. Ensure that there is no foreign matter on the bottom plate of the cabinet.

 **NOTE**

1. In the scenarios where holes are drilled or covers are removed for routing cables, use flake sealing putty to fill in the gap between the cables and the cabinet after routing cables and checking cable connections, as shown in [Figure 3-69](#).
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, as shown in [Figure 3-70](#).

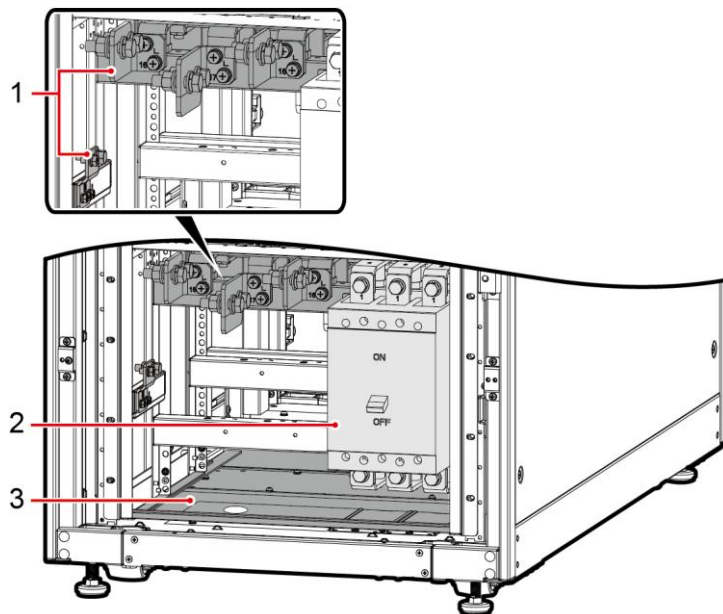
Figure 3-67 Positions to be checked for foreign matter



UA21W00022

- (1) Switches (2) Wiring terminal block (3) Cabinet bottom

Figure 3-68 Positions to be checked for foreign matter



UA21W00024

- (1) Wiring terminal block (2) Switches (3) Cabinet bottom

Figure 3-69 Fill the holes with flake sealing putty

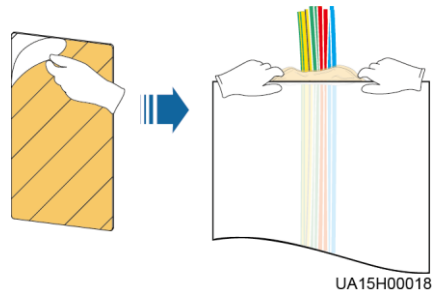
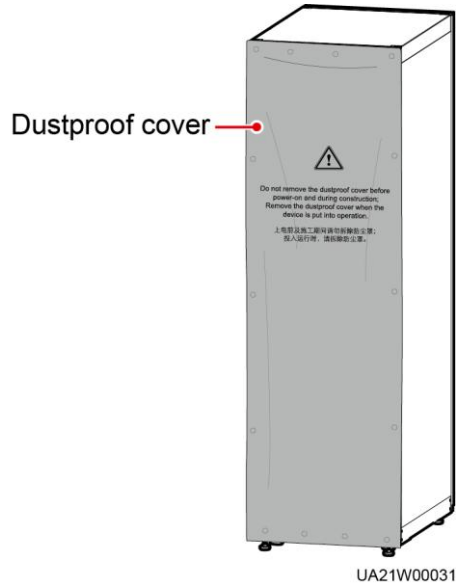


Figure 3-70 Dustproof cover



4 User Interface

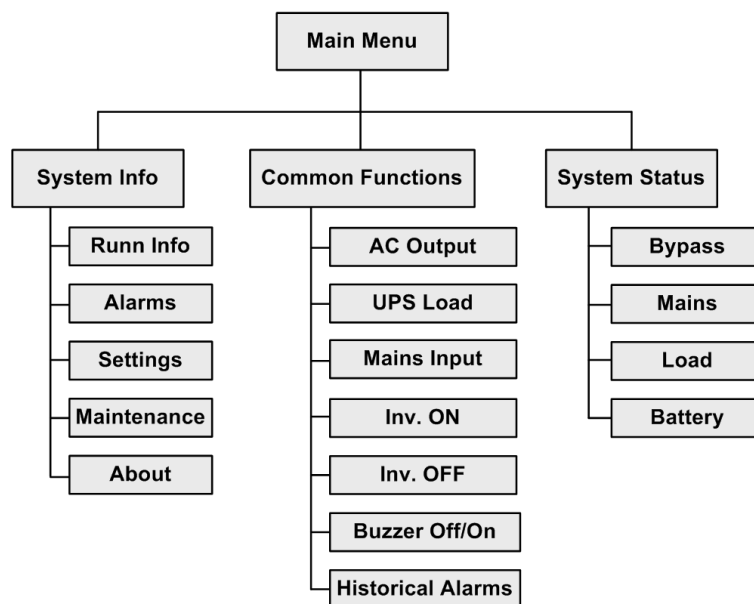
4.1 LCD Interface

4.1.1 LCD Menu

4.1.1.1 Menu Hierarchy

Figure 4-1 shows the LCD menu hierarchy.

Figure 4-1 Menu hierarchy



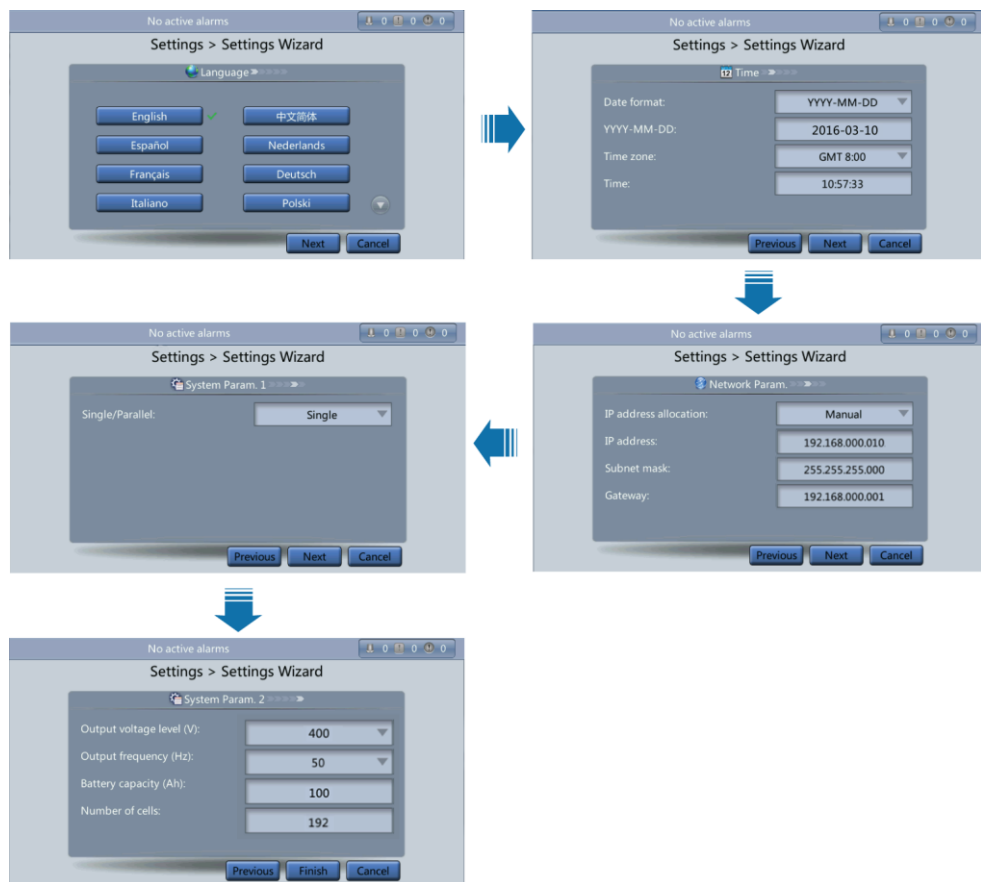
4.1.1.2 Initial Startup

NOTICE

User interfaces displayed in this document correspond to the monitor display module (MDU) version V300R001C00SPC302 and are for reference only.

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.

Figure 4-2 Settings Wizard



4.1.1.3 Main Menu screen

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.

Figure 4-3 Main Menu screen

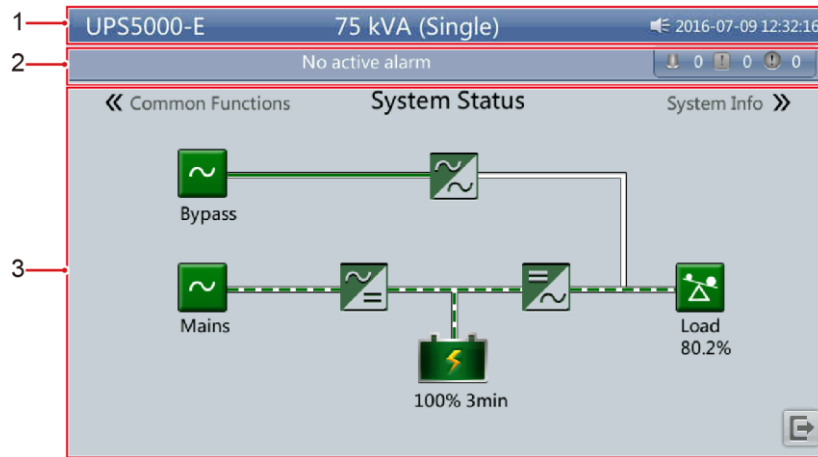


Table 4-1 Main screen description

Number	Area	Function
1	Status bar	Displays the UPS model, capacity, configuration, current date and time, Universal Serial Bus (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	Information area	Displays the power flow as well as the 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.
	Goes to the lower part of a page.
	Goes to the upper part of a page.
	Returns to the upper-level menu.
	Logs out.

4.1.2 System Info Screen

On the main screen, tap **System Info**. The **System Info** screen is displayed, as shown in [Figure 4-4](#).

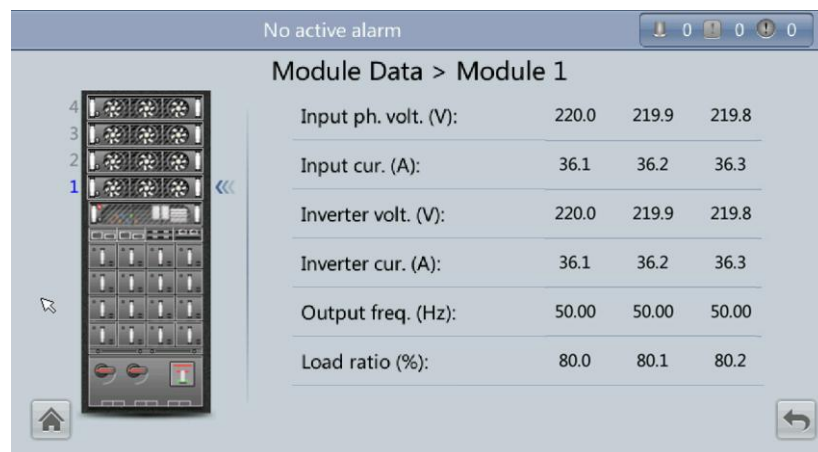
Figure 4-4 System Info Screen



4.1.2.1 Module Data Screen

On the **System Info**, tap the UPS picture. On the **Module Data** screen, select a module to view its running data. <<< points to a selected module, as shown in [Figure 4-5](#).

Figure 4-5 Module Data Screen



4.1.2.2 Runn Info Screen


On the **System Info** screen, tap  to access the **Runn Info** screen. On this screen, you can query **AC Output**, **UPS Load**, **Mains Input**, and **Bypass Input**. See [Figure 4-6](#) and [Figure 4-7](#).

Figure 4-6 Runn Info screen 1

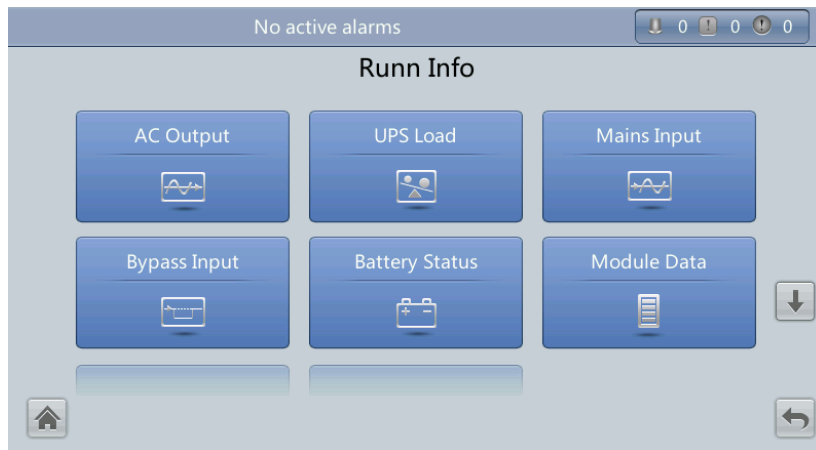


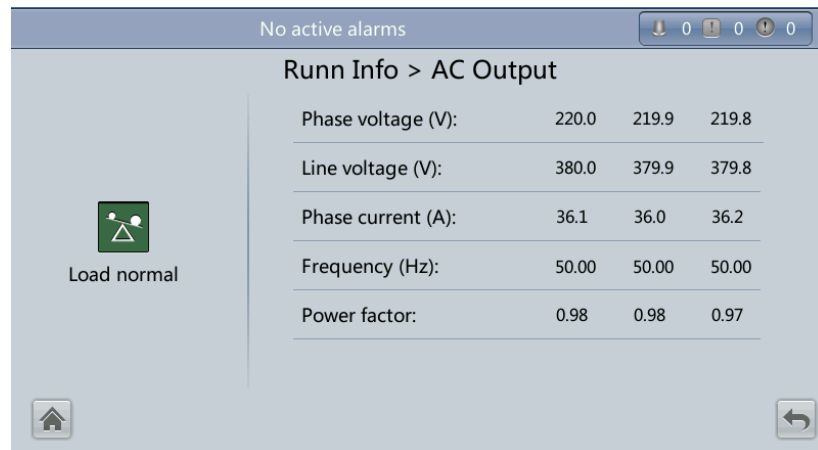
Figure 4-7 Runn Info screen 2



AC Output

Figure 4-8 shows the **AC Output** screen.

Figure 4-8 AC Output screen

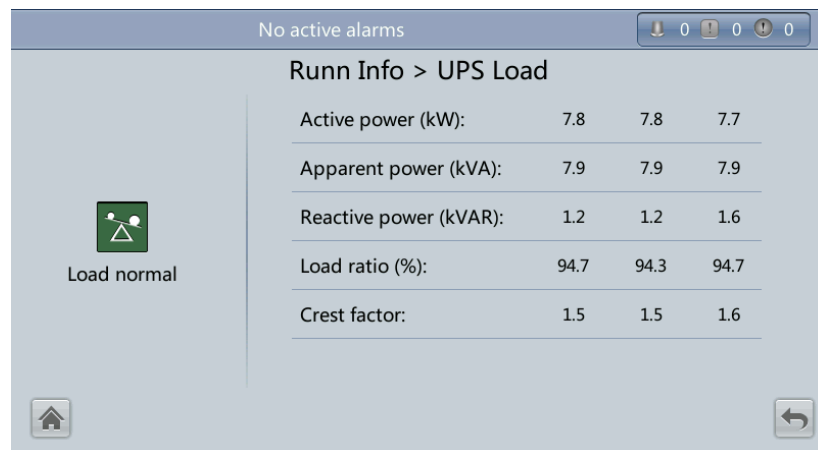


- Phase voltage (V)/Line voltage (V)/Phase current (A)/Frequency (Hz)**
 AC output phase voltage/AC output line voltage/AC output phase current/AC output frequency
- Power factor**
 Proportion of output active power to output apparent power.

UPS Load

Figure 4-9 shows the **UPS Load** screen.

Figure 4-9 UPS Load screen



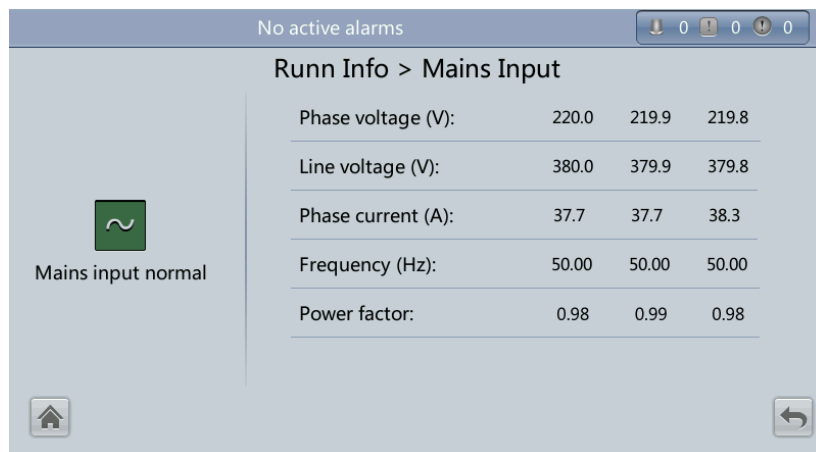
- Active power (kW)**
 Output active power of each phase on the UPS.
- Apparent power (kVA)**
 Output apparent power of each phase on the UPS.
- Reactive power (kVAR)**
 Output reactive power of each phase on the UPS.

- **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 shows the **Mains Input** screen.

Figure 4-10 Mains Input screen

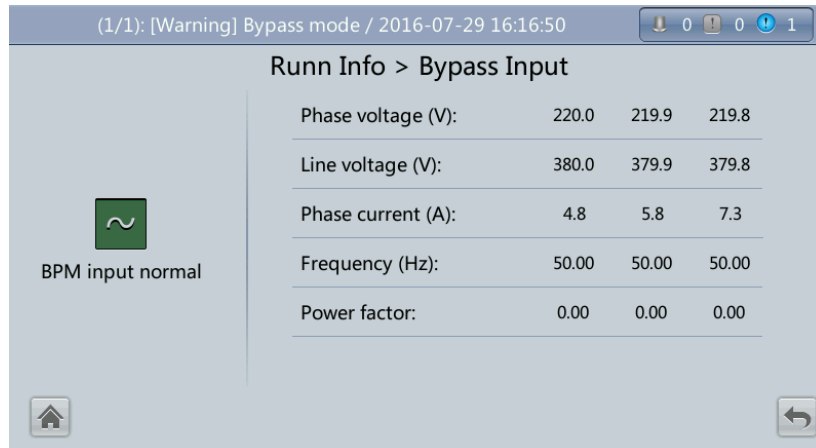


- **Phase voltage (V)/Line voltage (V)/Phase current (A)/Frequency (Hz)**
Mains input phase voltage/Mains input line voltage/Mains input phase current/Mains input frequency.
- **Power factor**
Proportion of the mains input active power to the mains input apparent power.

Bypass Input

Figure 4-11 shows the **Bypass Input** screen.

Figure 4-11 Bypass Input screen

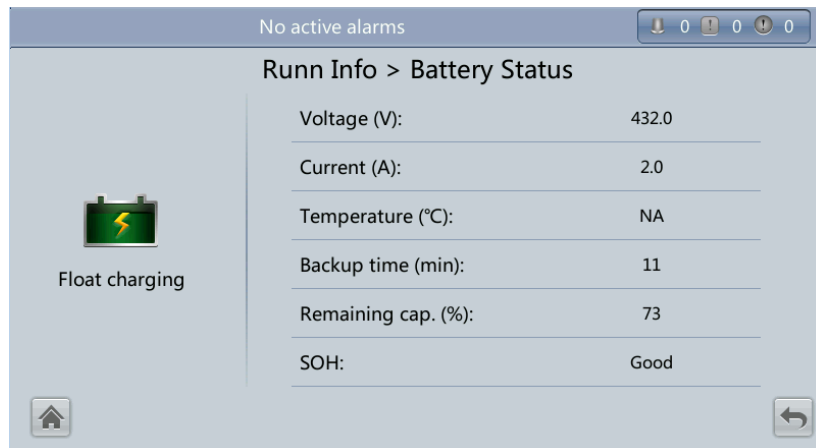


- **Phase voltage (V)/Line voltage (V)/Phase current (A)/Frequency (Hz)**
Bypass input phase voltage/Bypass input line voltage/Bypass input phase current/Bypass input frequency.
- **Power factor**
Proportion of the Bypass input active power to the Bypass input apparent power.

Battery Status

Figure 4-12 shows the **Battery Status** screen.

Figure 4-12 Battery Status screen



- **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 shows the **Total Runtime** screen.

Figure 4-13 Total Runtime screen



- **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

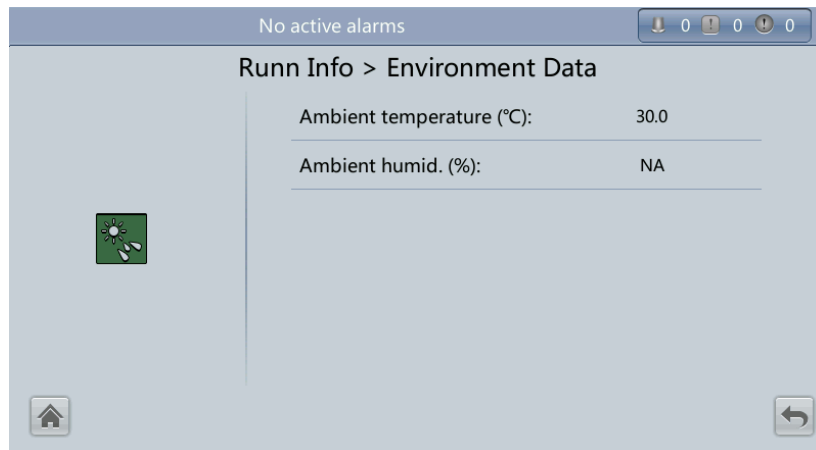
The value takes an integer. For example,

- If the value is less than 1, the value takes 0.
- If the value is not less than 1 and less than 2, the value takes 1.

Environment Data

Figure 4-14 shows the **Environment Data** screen.

Figure 4-14 Environment Data screen



- **Ambient temperature (°C)**
Temperature measured by the ambient temperature and humidity sensor. If the sensor is not installed, the temperature inside the cabinet is displayed.
- **Ambient humid. (%)**
Humidity measured by the ambient temperature and humidity sensor. If the sensor is not installed, **NA** is displayed.

4.1.2.3 Alarms Screen


Tap  on the **System Info** screen to enter the **Alarms** screen. On the **Alarms** screen, active alarms and historical alarms, clear faults, and the buzzer control can be viewed, as shown in [Figure 4-15](#).

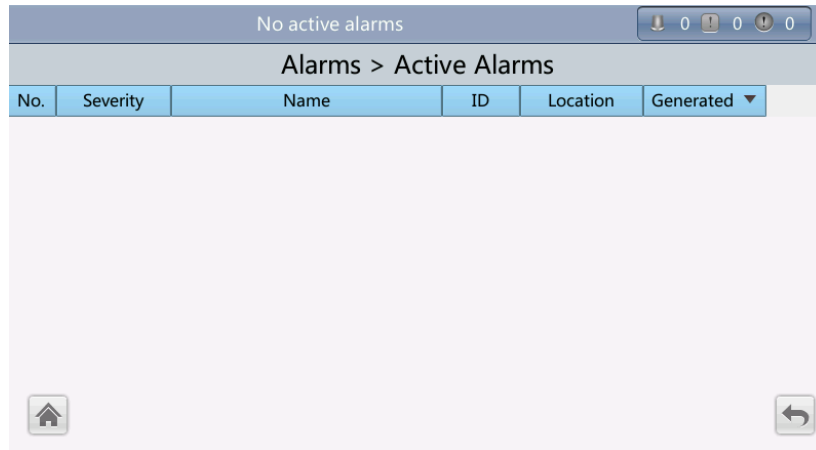
Figure 4-15 Alarms screen



Active Alarms

[Figure 4-16](#) shows the **Active Alarms** screen.

Figure 4-16 Active Alarms screen

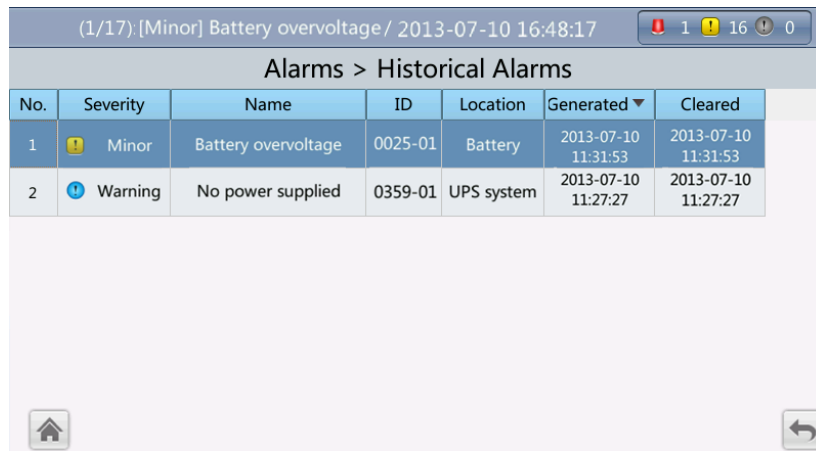


This screen displays alarm information including the severity, name, ID, location, and generation time.

Historical Alarms

Figure 4-17 shows the **Historical Alarms** screen.

Figure 4-17 Historical Alarms screen



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

Buzzer Off

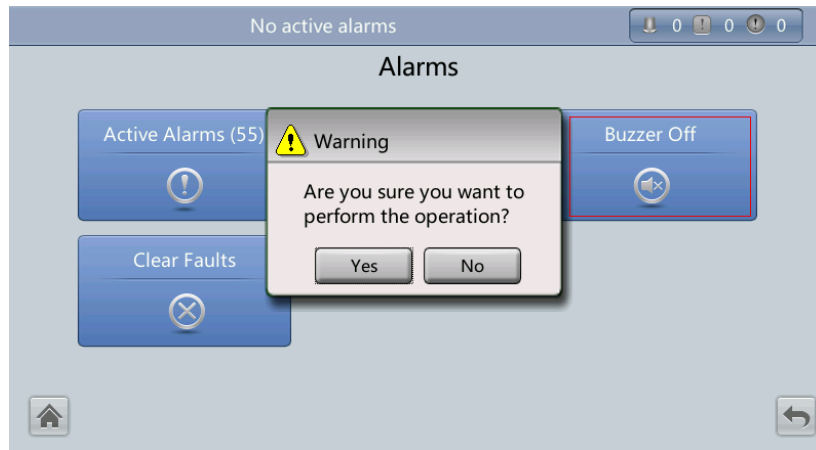
Two buzzer menus are available:

- **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 4-18](#) shows the **Buzzer Off** screen.

Figure 4-18 Buzzer Off screen



Clear Faults


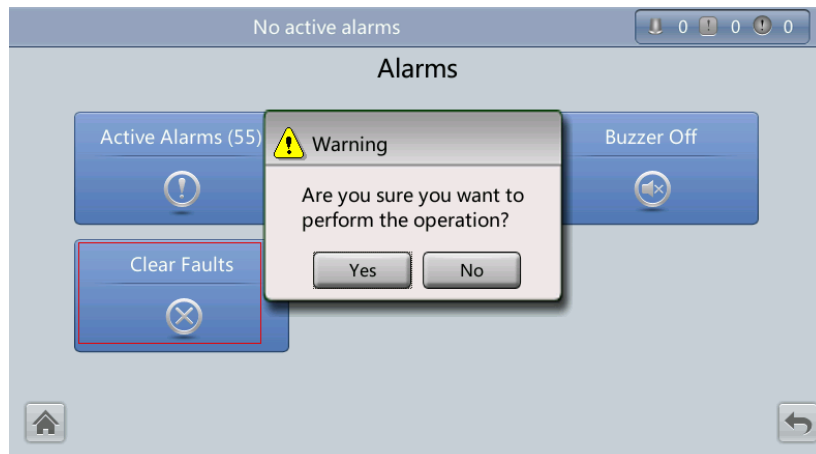
[Figure 4-19](#) shows the **Clear Faults** menu (a dialog box is displayed to confirm the action). Tap **Clear Faults**. If you have not logged in, a login screen is displayed. Enter a user name and password, and tap .

Figure 4-19 Clear Faults screen



NOTE

If an incorrect password is entered three consecutive times, the account will be locked out for 5 minutes.

4.1.2.4 Settings Screen


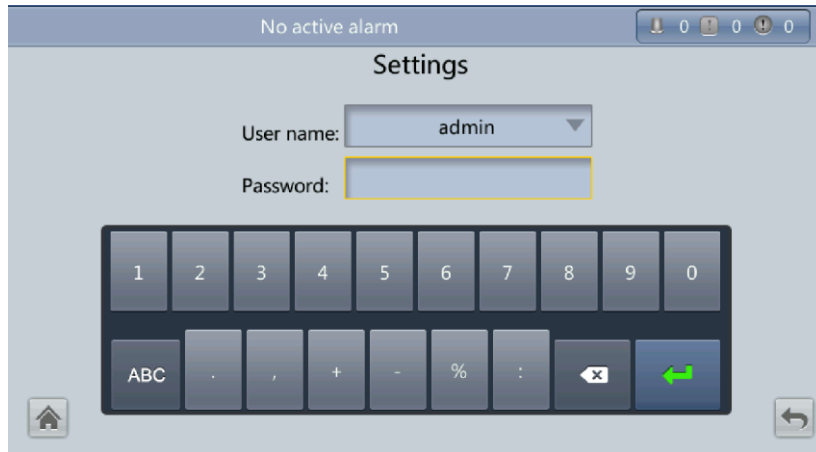

On the **System Info** screen, tap . If you have not logged in, a login screen is displayed, as shown in [Figure 4-20](#).

Figure 4-20 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 4-21](#) and [Figure 4-22](#).

 **NOTE**

- lists the default user names and preset passwords and describes the permission of the default users.
- If you enter incorrect passwords for three consecutive times, you will be locked out for 5 minutes.

Figure 4-21 Settings screen 1

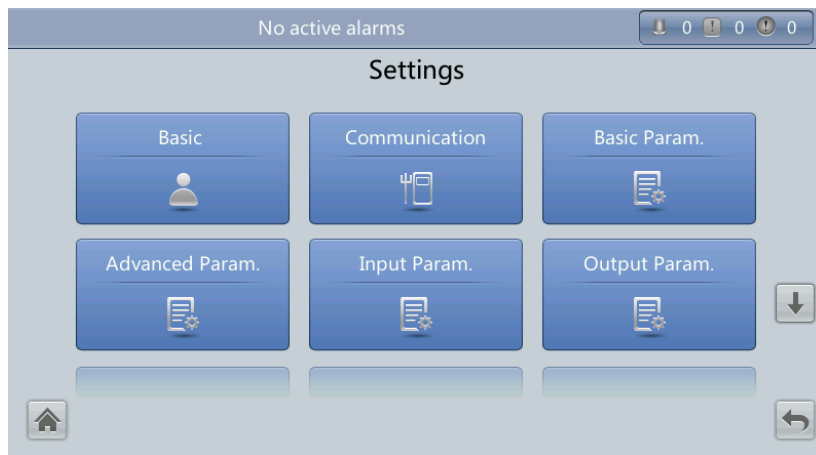


Figure 4-22 Settings screen 2



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.

Set basic parameters, as shown in [Figure 4-23](#) and [Figure 4-24](#).

Figure 4-23 Basic screen 1

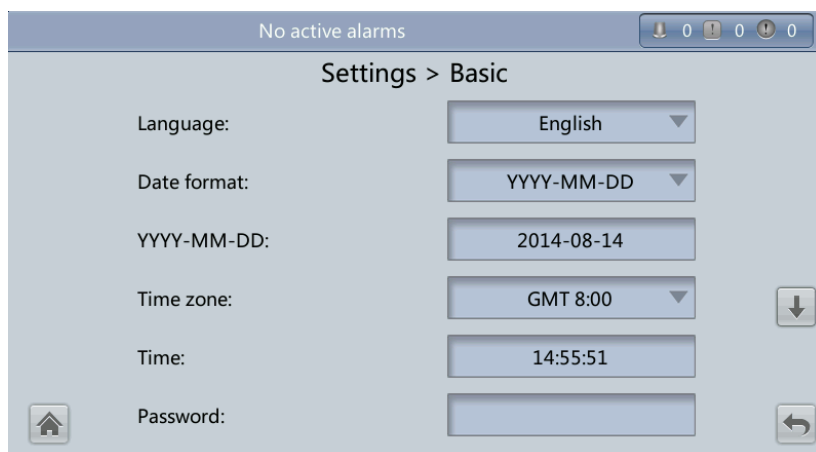
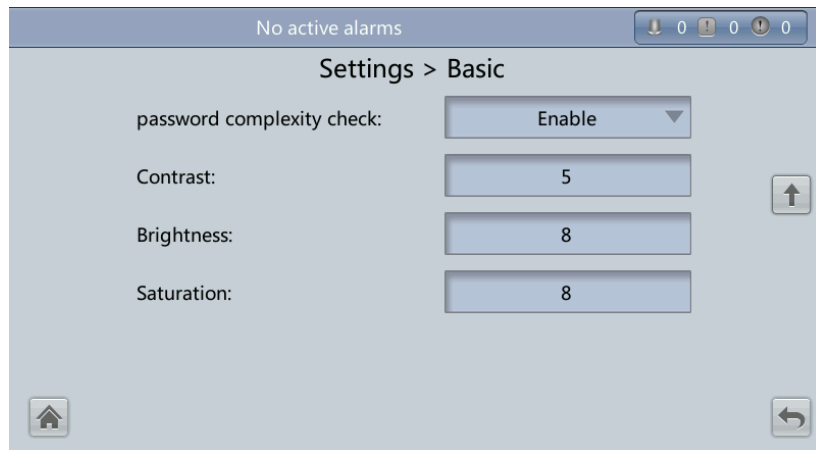


Figure 4-24 Basic screen 2



- **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. You can change the password.
- **password complexity check**
If the password complexity check is enabled, the password must be a string of 6–20 characters and contain at least two types of characters. If the password complexity check is disabled, the user password must be a string of six to eight digits.

Communications Settings

Set communications parameters, as shown in [Figure 4-25](#), [Figure 4-26](#) and [Figure 4-27](#).

Figure 4-25 Communication screen 1

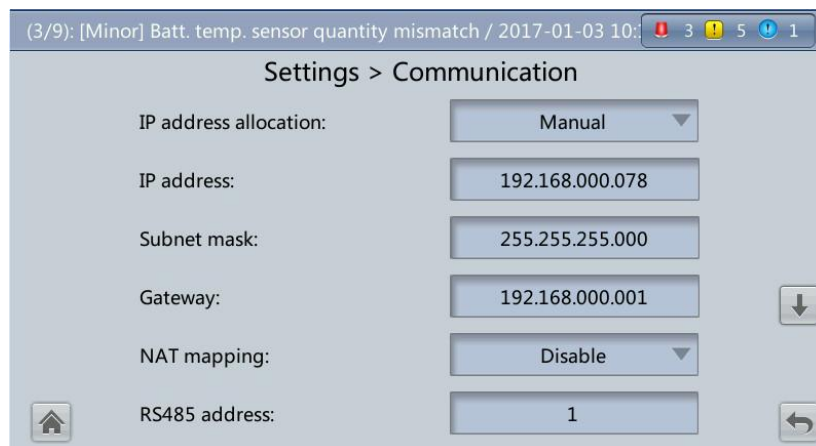


Figure 4-26 Communication screen 2

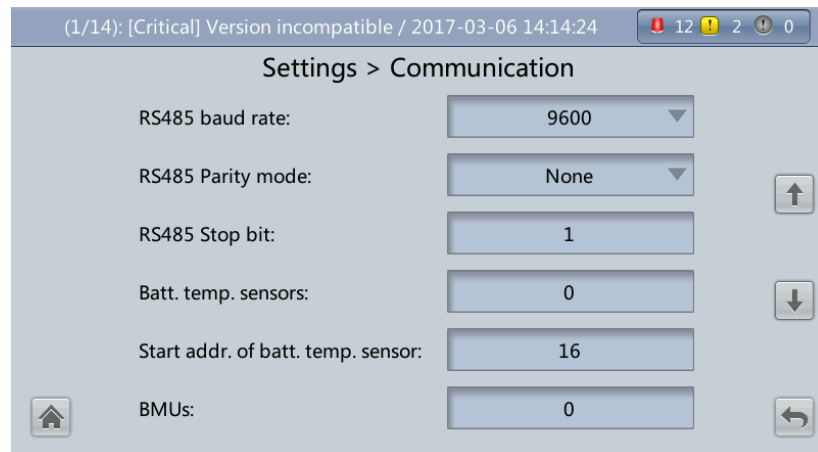
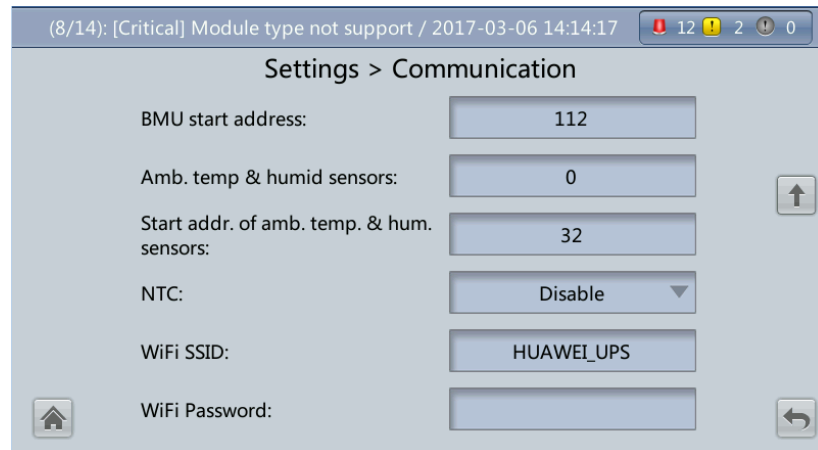


Figure 4-27 Communication screen 3



- **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 an LAN switch or router with the DHCP function, the IP address can be allocated manually or automatically.
 - **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	10110110.01100010.111000 01.01111101	10110110.01100010.111000 01.01110000
Subnet mask (255.255.255.192)	11111111.11111111.111111 11.11000000	11111111.11111111.111111 11.11000000
Bitwise AND operation result	10110110.01100010.111000 01.01000000	10110110.01100010.111000 01.01000000

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



NOTE

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

- 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**.



NOTICE

Ensure that the UPS IP address is unique on the network segment. Otherwise, the WebUI display function may be abnormal.

- 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**, an internal IP address cannot be accessed from the Internet.
- RS485 baud rate/RS485 address**
 Set an address that ranges from 1 to 254 for this port. **RS485 baud rate** depends on the network management conditions.
- 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**

When the UPS is connected over the serial port Modbus, set this parameter based on the frame format that the upstream device Modbus supports (the Modbus communication frame format uses a binary digit).

- **Batt. temp. sensors**
A maximum of four battery temperature sensors can be cascaded.
- **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 that you 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.
- **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 is the same 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. It 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 device to which the mobile phone is connected.
- **WiFi Password**
The password for accessing WiFi.

Basic Parameter Settings

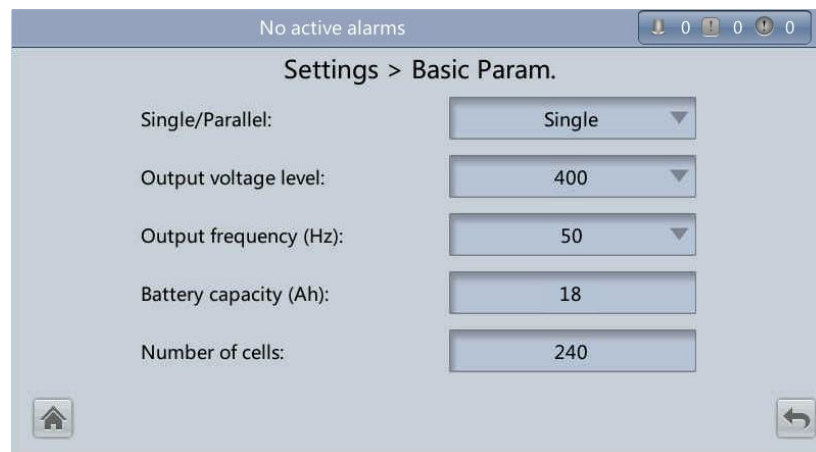


NOTICE

- **Single/Parallel, Output voltage level, and Output frequency** must be the same as the actual values. Otherwise, an alarm may be generated, or other serious faults may occur.
- **Battery capacity and Number of cells** must be the same as the actual values. Otherwise, batteries may be damaged, or other serious faults may occur.

Set basic system and battery parameters, as shown in [Figure 4-28](#).

Figure 4-28 Basic Parameter Settings



- **Single/Parallel**

Set the UPS running mode. The value can be **Single** (default) or **Parallel**.
- **Output voltage level**

The value for the system output voltage level can be set as 380 V, 400 V (default), or 415 V. After the parameter value is changed, the upper thresholds for the bypass voltage are restored to the default values. If **Output voltage level** is 380 V or 400 V, the default upper threshold is 15% and the default lower threshold is 20%. If **Output voltage level** is 415 V, the default upper threshold is 10% and the default lower threshold is 20%. The parameter is configurable after the inverter shuts down.
- **Output frequency (Hz)**

Set the system output frequency level. The value can be 50 Hz (default) or 60 Hz.
- **Battery capacity (Ah)**

Battery string capacity. The value range is 5 Ah to 9999 Ah. The default value is 18 Ah.

NOTE

- Different types of batteries cannot be mixed.
- The capacity of each battery module is 9 Ah, at least two strings of battery modules need to be installed (battery capacity: 9 Ah + 9 Ah = 18 Ah). A maximum of four battery cabinets can be connected (battery capacity: 9 Ah x 36 = 324 Ah). Therefore, the value range of the battery capacity is 18 Ah to 324 Ah.

- **Number of cells**

Number of battery cells. Each 12 V battery consists of six cells. The default value is 240 which is not configurable.

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.
- Cell float voltage, **Cell equalized volt**, **Float volt. temp. comp. coef.**, and **EOD voltage threshold** are set for cells.

Advanced Parameter Settings

 **NOTICE**

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

Advanced parameters, such as the system capacity and power module capacity, can be set as shown in [Figure 4-29](#) to [Figure 4-33](#).

Figure 4-29 Advanced Param. screen 1

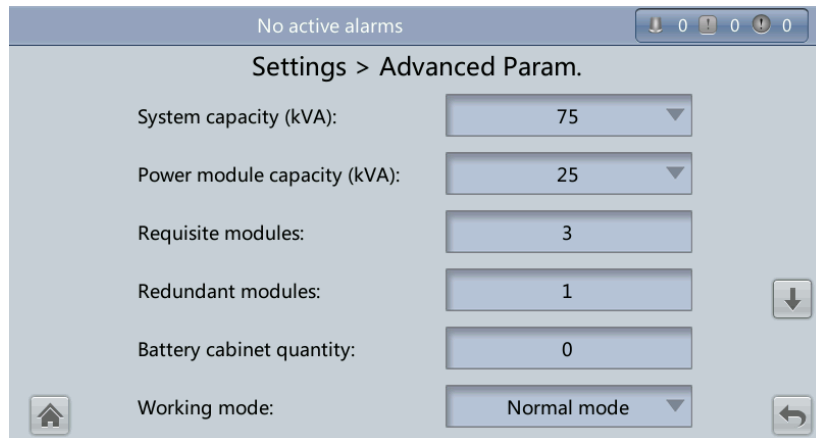


Figure 4-30 Advanced Param. screen 2

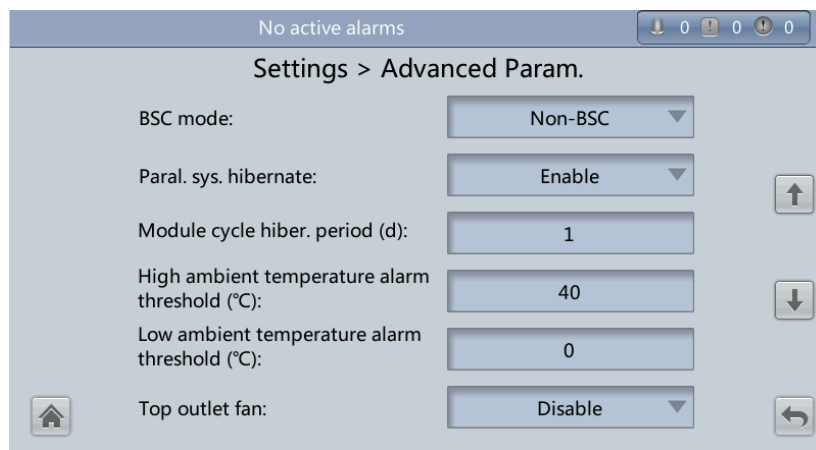


Figure 4-31 Advanced Param. screen 3

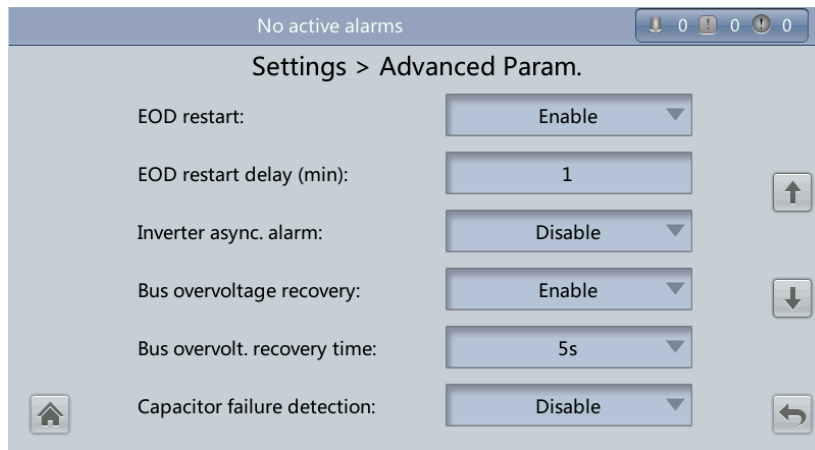


Figure 4-32 Advanced Param. screen 4

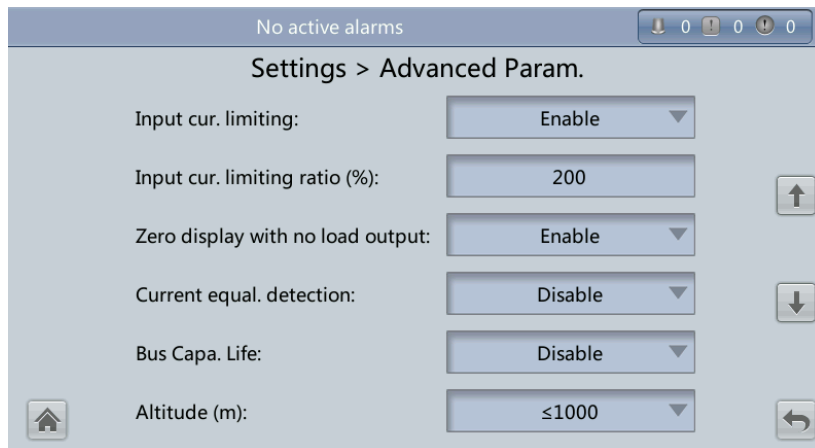
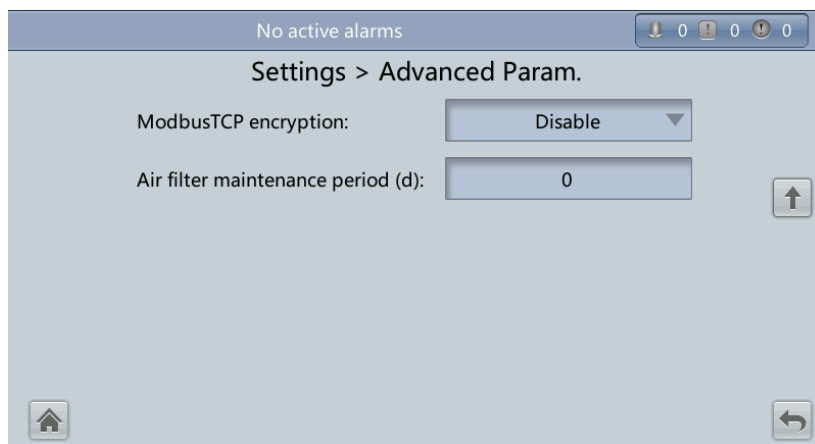


Figure 4-33 Advanced Param. screen 5



- **System capacity (kVA)**

Rated system capacity, equals to capacity of each power module multiplied by the number of requisite power modules. The **Module quantity mismatch** alarm will be generated if the setting is incorrect.

- **Power module capacity (kVA)**
Rated power module capacity.
- **Requisite modules**
Matches the system capacity.
- **Redundant modules**
Set in accordance with loading capacity and redundant requirements.
- **Battery cabinet quantity**
Number of connected battery cabinets.
- **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**. The latter is set when the system is a dual-bus system.
 - A dual-bus system consists of one master and one slave BSC system, which are specified by the customer. A BSC system cannot be the master and slave at the same time. Specify master and slave systems during deployment. To change the setting, you must follow the guidance of maintenance engineers. Set the master and slave BSC systems to master and slave BSC modes respectively.
- **Paral. sys. hibernate**
When the customer load is light, set parallel hibernation to alternate modules in hibernation, which can prolong their service life as well as improving the system efficiency.
- **Module cycle hiber. period (d)**
1 to 100 days can be set. The parameter **30 days** is set by default.
- **High ambient temperature alarm threshold (°C)**
An alarm is generated when the ambient temperature reaches or exceeds the threshold specified by this parameter.
- **Low ambient temperature alarm threshold (°C)**
A warning is generated when the ambient temperature is lower than the parameter value.
- **Top outlet fan**
If a top outlet fan is configured, check the fan running status after enabling this parameter.
- **EOD restart**
The UPS transfers to battery mode when the mains becomes abnormal. When batteries reach the EOD threshold and 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 function to restart the UPS.
- **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 the **Inverter async.** alarm is displayed when the inverter does not track the bypass input. The normal power supply is not affected no matter whether you set the parameter to **Enable** or **Disable**.

- **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**

By default, it is set to **Disable**.

- **Input cur. limiting**

Enable or disable input current limiting for the UPS to protect the D.G.

- **Input cur. limiting ratio (%)**

Limit the input current to protect the D.G. The value can be 20%–200%, 200% by default.

- **Zero display with no load output**

If this parameter is set to **Enable**, the output current and load ratio will be displayed as 0 in the case of zero load. If this parameter is set to **Disable**, the output current and load ratio will not be displayed as 0 in the case of zero load.

- **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 **Bus Capa. Life** is set to **Enable**, the UPS detects the bus capacitor lifespan.

- **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 implement encryption based on the selected encryption mode or do not implement encryption.

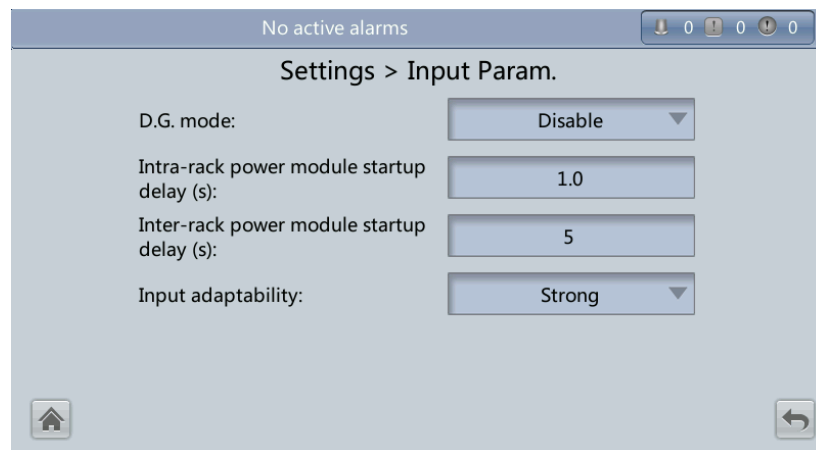
- **Air filter maintenance period (d)**

Set this parameter to the rack dustproof maintenance period. When it is set to 0, there is no reminder.

Input Parameter Settings

Set input parameters, as shown in [Figure 4-34](#).

Figure 4-34 Input Parameter Settings



NOTE

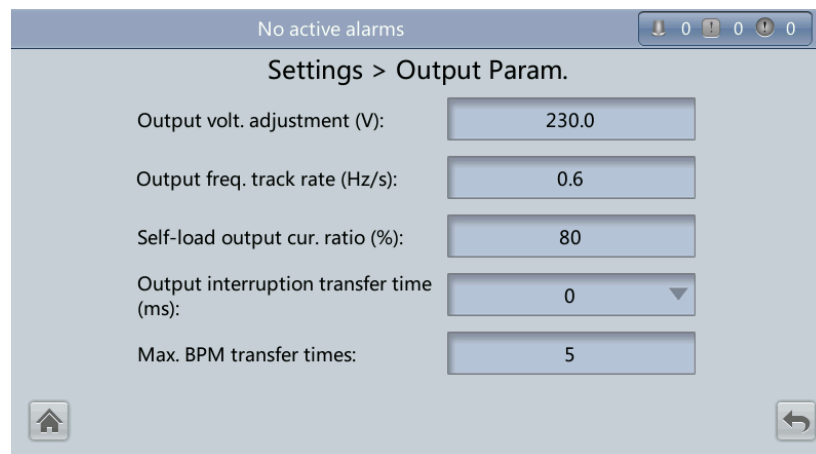
Retaining default input parameter settings is advised.

- **D.G. mode**
Enable or disable D.G. mode. Set this parameter when a D.G connects to the input PDC. Select **Enable** when a D.G. is detected over dry contacts.
- **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 100 kVA. 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 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** (default) 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.

Output Param. screen

Set output parameters, as shown in [Figure 4-35](#).

Figure 4-35 Output Param. screen



- **Output volt. adjustment (V)**

The output voltage can be slightly adjusted based on the onsite power distribution condition to ensure a minimum difference between the output voltage and the bypass voltage. This facilitates uninterruptible transfer from normal mode to bypass mode. The voltage adjustment range is $\pm 5\%$. The default value is 220.0 when the voltage is 380 V, 230.0 when 400 V, 240.0 when 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.
 - 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 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%, 80% by default.
- **Output interruption transfer time (ms)**

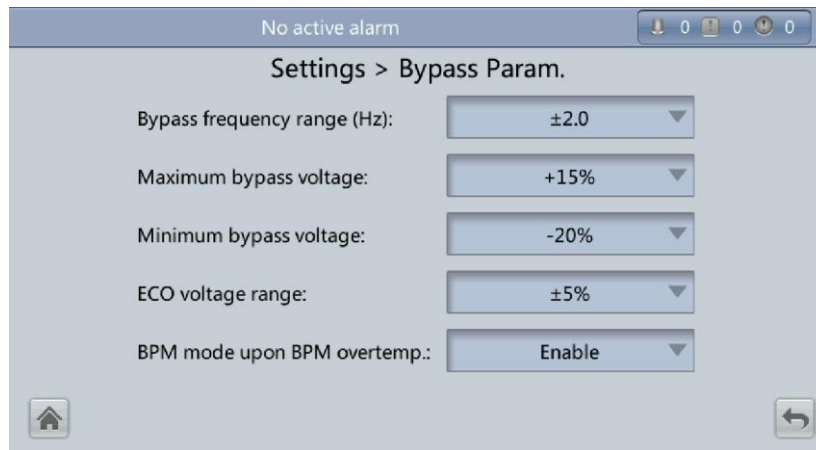
The interruption for the UPS to transfer from normal mode to bypass mode is 1–2 ms, and from bypass mode to normal mode is 0–20 ms. Set this parameter based on the output interruption time acceptable to loads. The default value is 0 ms.
- **Max. BPM transfer times**

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, 5 by default.

Bypass Parameter Settings

Set bypass parameters, such as the bypass voltage and frequency range, as shown in [Figure 4-36](#).

Figure 4-36 Bypass Param. screen



- **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 abnormal and that the bypass is unavailable.

The frequency range is the same as 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 this value, the system determines that the bypass voltage is abnormal and that the bypass is unavailable.

 **NOTE**

- When the voltage level is 380 V, the value range is 10%, 15% (default), 20%, and 25%.
- When the voltage level is 400 V, the value range is 10%, 15% (default), and 20%.
- 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 this value, the system determines that the bypass voltage is abnormal and that the bypass is unavailable. The value can be -10%, -15%, -20% (default), -30%, -40%, -50%, or -60%.

- **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 $\pm 5\%$ (default), $\pm 6\%$, $\pm 7\%$, $\pm 8\%$, $\pm 9\%$, or $\pm 10\%$.

- **BPM mode upon BPM overtemp.**

This parameter specifies whether to start bypass mode if overtemperature occurs.

Battery Parameter Settings



NOTICE

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

- **Battery string sharing** is unavailable when **Single/Parallel** is **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 tends to damage batteries. An incorrect estimated discharge time may lead to 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 alam thres.(%)** and **Single batt. dis. voltage deviation alam 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, you do not need to set these two parameters.

Set battery parameters, as shown in [Figure 4-37](#) to [Figure 4-41](#).

Figure 4-37 Battery Param. screen 1

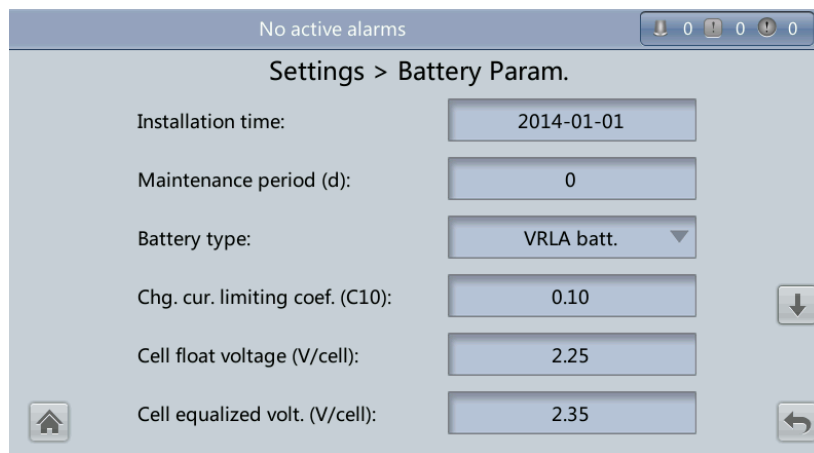


Figure 4-38 Battery Param. screen 2

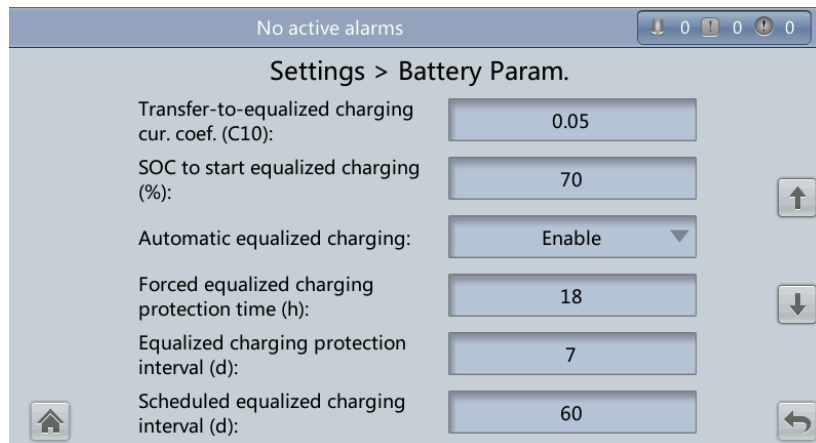


Figure 4-39 Battery Param. screen 3

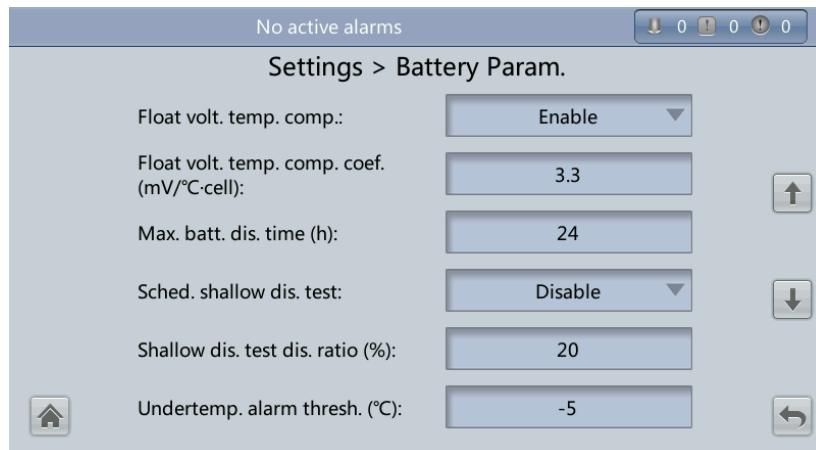


Figure 4-40 Battery Param. screen 4

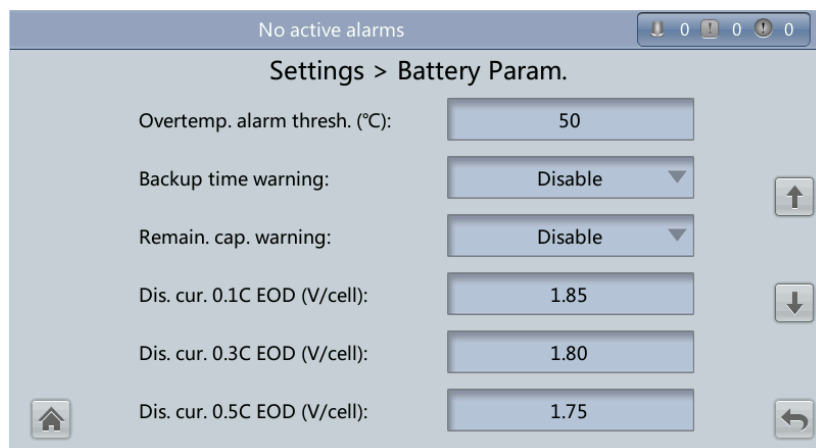
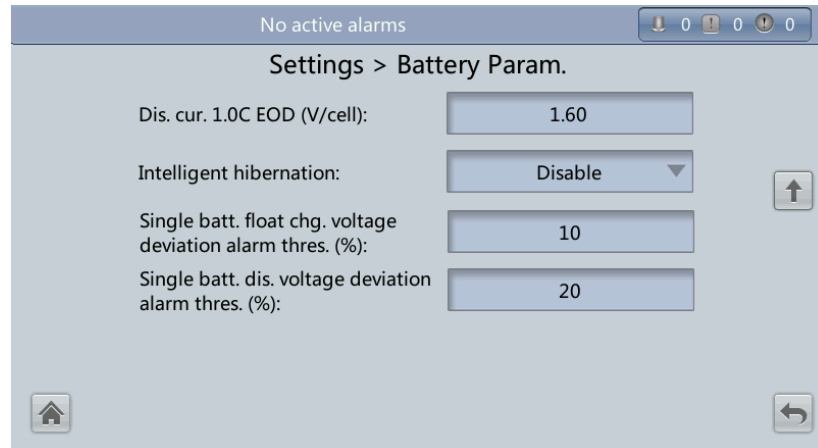


Figure 4-41 Battery Param. screen 5



- **Installation time**
A battery maintenance reminder is displayed when the maintenance time (counted from the installation time) comes.
- **Maintenance period (d)**
Time interval for reminding users of battery maintenance. The default value is 0, which means that there is no reminder.
- **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 0.05–0.15C10, and is 0.1 by default.
- **Cell float voltage (V/cell)**
The float voltage value can be 2.23–2.30 V/cell, and is 2.25 V/cell by default. The value is configurable in any mode.
- **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. The value is configurable in any mode.
- **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 the default value is 0.05.
- **SOC to start equalized charging (%)**
Batteries enter equalized charging when **Automatic equalized charging** is set to **Enable**, there is no major alarm, and the SOC value is lower than the preset value.
- **Automatic equalized charging**
When the value is **Enable**, the UPS automatically changes the battery management status to equalized charging based on the charge current and float charge time.
- **Forced equalized charging protection time(h)**
When batteries are continuously under float charging or hibernation, you can enable forced equalized charging. When the forced equalized charging time reaches the value of this parameter, float charging starts.

- **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**.
- **Float volt. temp. comp.**

Enable this feature to correct the float voltage based on the battery temperature when a battery temperature sensor is connected. The value is configurable in any mode.
- **Float volt. temp. comp. coef. (mV/ °C cell)**

Correction 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 in the range of 0–48 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.
- **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. (°C) and Overtemp. alarm thresh. (°C)**

Battery temperatures can be monitored in a timely manner. If a battery overtemperature alarm is detected, the charging current limit decreases to 0.03 CA. Battery charging stops if a battery overtemperature protection alarm (when the temperature reaches the high temperature threshold plus 3 °C) is generated. The **Undertemp. alarm thresh.** can be set from –20 °C to +5 °C and the default value is –5 °C. The **Overtemp. alarm thresh.** can be set from 35 °C to 55 °C and the default value is 50 °C.
- **Backup time warning and Remain. cap. warning**

When the first two parameters are set to **Enable**, an alarm is generated when the backup time or remaining capacity is less than the alarm threshold.
- **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 **1.75**, **0.5C EOD (V/cell)** to **1.67**, and **1.0C EOD (V/cell)** to **1.60**. These values are calculated in real time based on the discharge currents.
- **Intelligent hibernation**

The default value is **Disable**. If this parameter is set to **Enable**, the intelligent battery hibernation function is enabled.
- **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.

The calculation formula is (Charge/Discharge voltage – Average voltage)/Average voltage x 100%.

Dry Contact Settings



NOTICE

- Set the dry contacts that you need to use. Otherwise, the UPS may not run properly.
- When you disable a dry contact card, 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.
- Monitoring interface card (MUS05A): provides four routes of configurable output dry contact signals.

Set the dry contact parameters, as shown in [Figure 4-42](#) to [Figure 4-44](#).

Figure 4-42 Dry Contacts screen 1



Figure 4-43 Dry Contacts screen 2

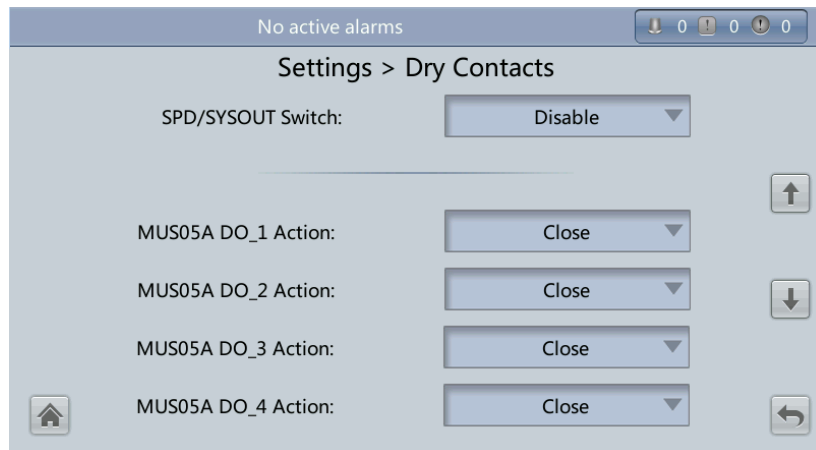
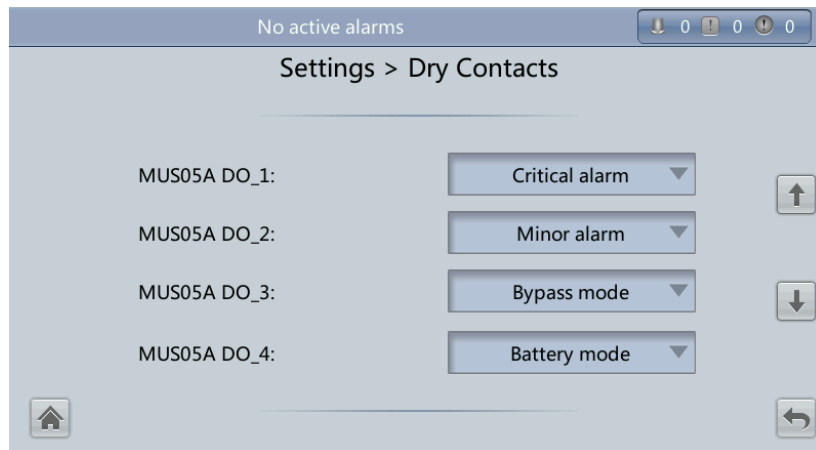


Figure 4-44 Dry Contacts screen 3



- **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.
- **PDC output breaker [OUT]**
Enable or disable PDC output circuit breaker monitoring.
- **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. How a user uses 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. A user can 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. A user can set this parameter to determine whether the port is used to detect the status of the PDU input surge protector or system output switch.

- **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.

- **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.

4.1.2.5 Maintenance Screen


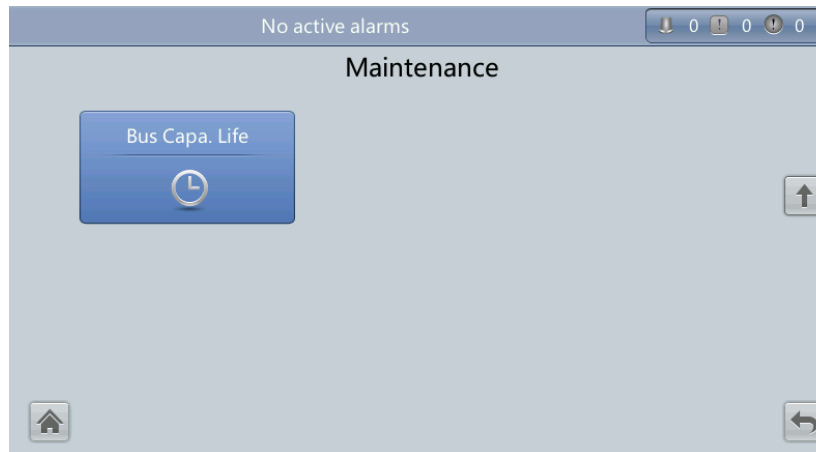
On the **System Info** screen, tap  to display the **Maintenance** screen, as shown in [Figure 4-45](#) and [Figure 4-46](#). If a user is not currently logged in, a dialog box will display for entering a user name and password. The **Maintenance** screen provides buttons such as **Battery Maint.**, **USB Operations**, **Inv. ON**, and **Inv. OFF**.

Figure 4-45 Maintenance screen 1



Figure 4-46 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.

 **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 reminds you of the upcoming time to check batteries. [Figure 4-47](#) shows the **Battery Maint.** screen.

Figure 4-47 Battery Maint. screen



- **Forced Equalized Charging**
Forcibly perform equalized charging on batteries.
- **Shallow Dis. Test**
Test the partial discharge capacities of batteries.
- **Capacity Test**
Test the full discharge capacities of batteries.

USB Operations

Figure 4-48 USB Operations screen 1

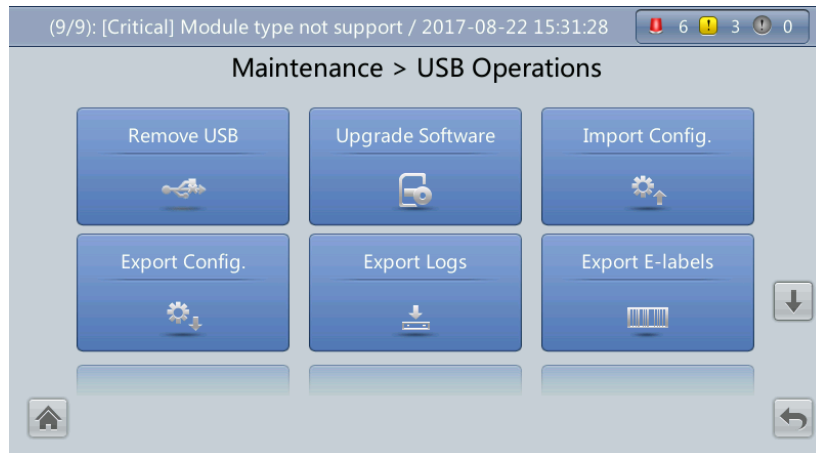


Figure 4-49 USB Operations screen 2



Inv. ON and Inv. OFF Menus

You can start and shut down the inverter using the LCD. Before the inverter starts, the system asks for confirmation to prevent misoperation. [Figure 4-50](#) shows the **Inv. ON** screen, and [Figure 4-51](#) shows the **Inv. OFF** screen.

Figure 4-50 Inv. ON screen

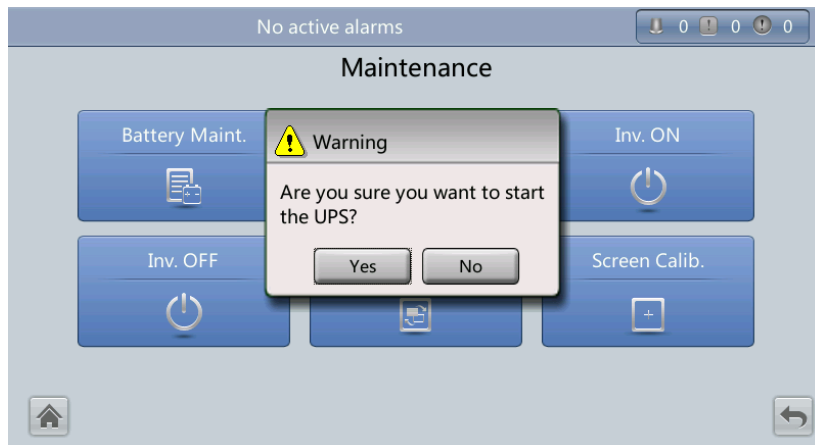
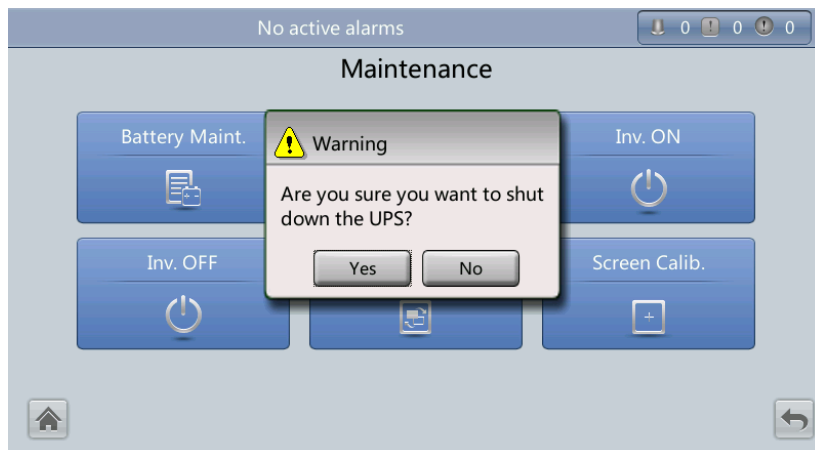


Figure 4-51 Inv. OFF screen



- **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.

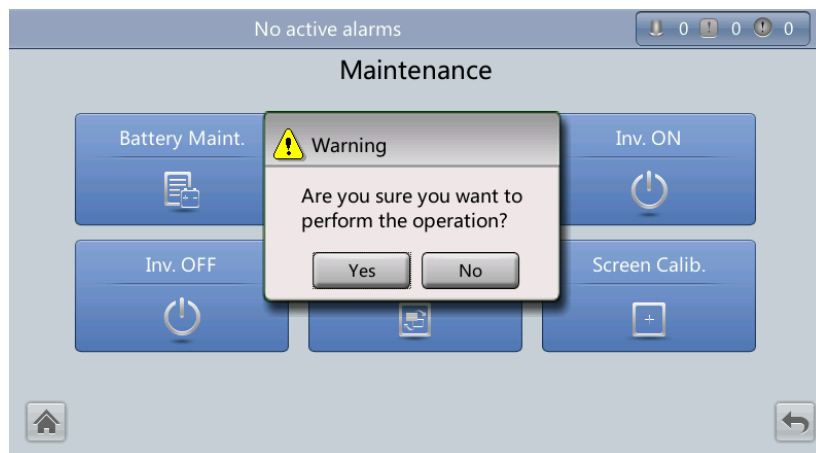
ECM Switchover

NOTICE

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

When an ECM needs to be maintained, perform active/standby switchover on the ECM, as shown in [Figure 4-52](#) (a dialog box will display asking for confirmation to prevent misoperations). After switchover, ensure that the ECM has stopped working (the yellow or red indicator is on, or the green indicator is blinking) before maintaining it.

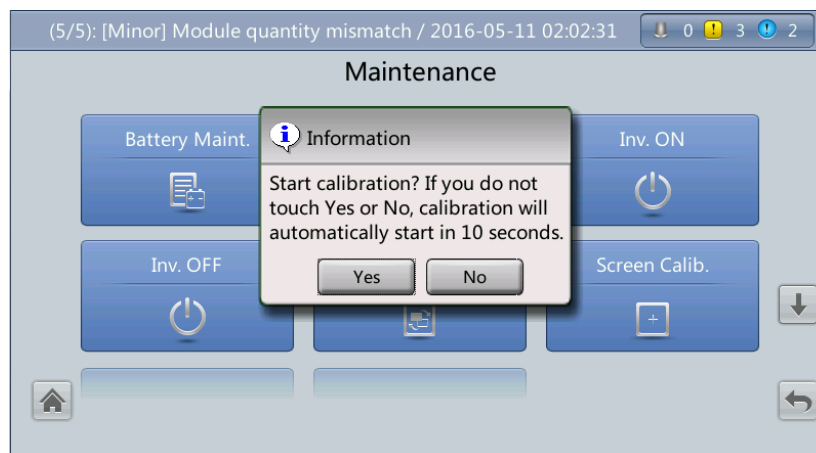
Figure 4-52 ECM switchover



Screen Calib. Menu

You can calibrate the screen, as shown in [Figure 4-53](#).

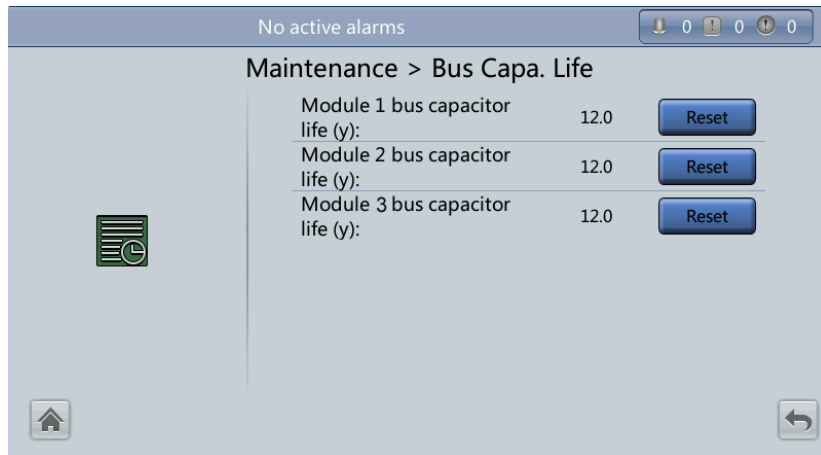
Figure 4-53 Screen Calib. screen



Bus Capa. Life

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.

Figure 4-54 Bus capacitor life forecast



4.1.2.6 About Screen

On the **System Info** screen, tap **About** to view the UPS model, manufacturer name, monitoring version and power version, as shown in [Figure 4-55](#). To view version details, tap **Version Info**.

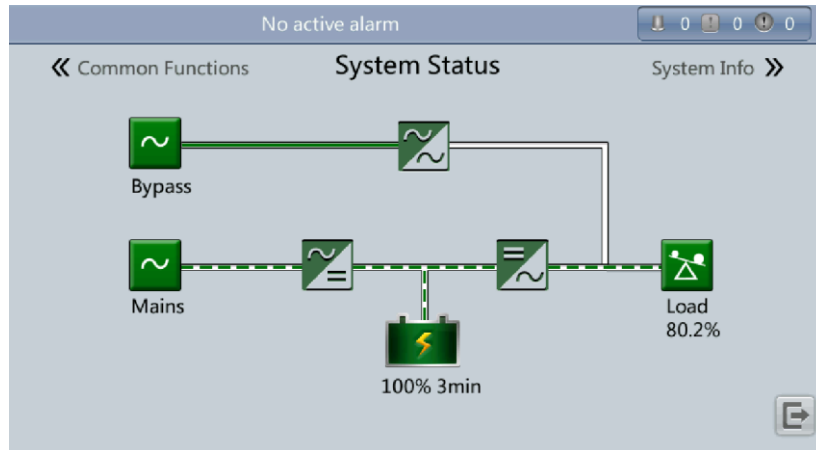
Figure 4-55 About screen



4.1.3 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 4-56](#).

Figure 4-56 System Status Screen



4.1.4 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, control the buzzer, and query the historical alarms.

Figure 4-57 Common Functions screen 1

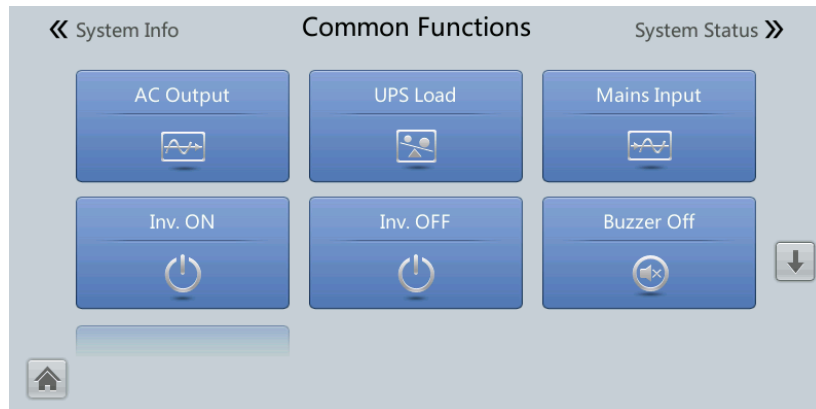
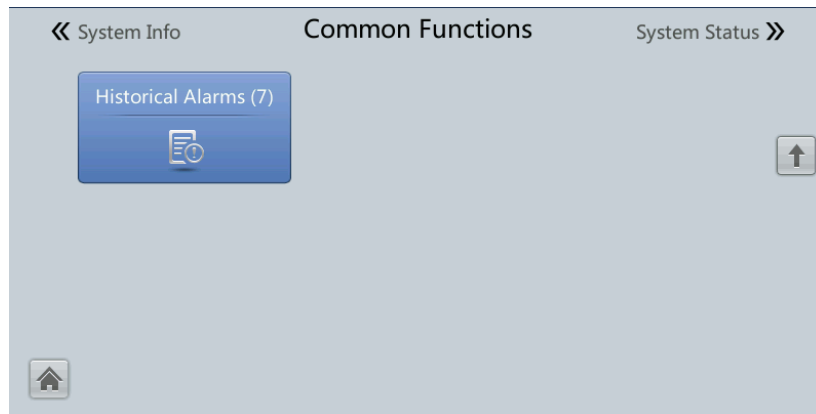


Figure 4-58 Common Functions screen 2



4.2 WebUI

4.2.1 Login

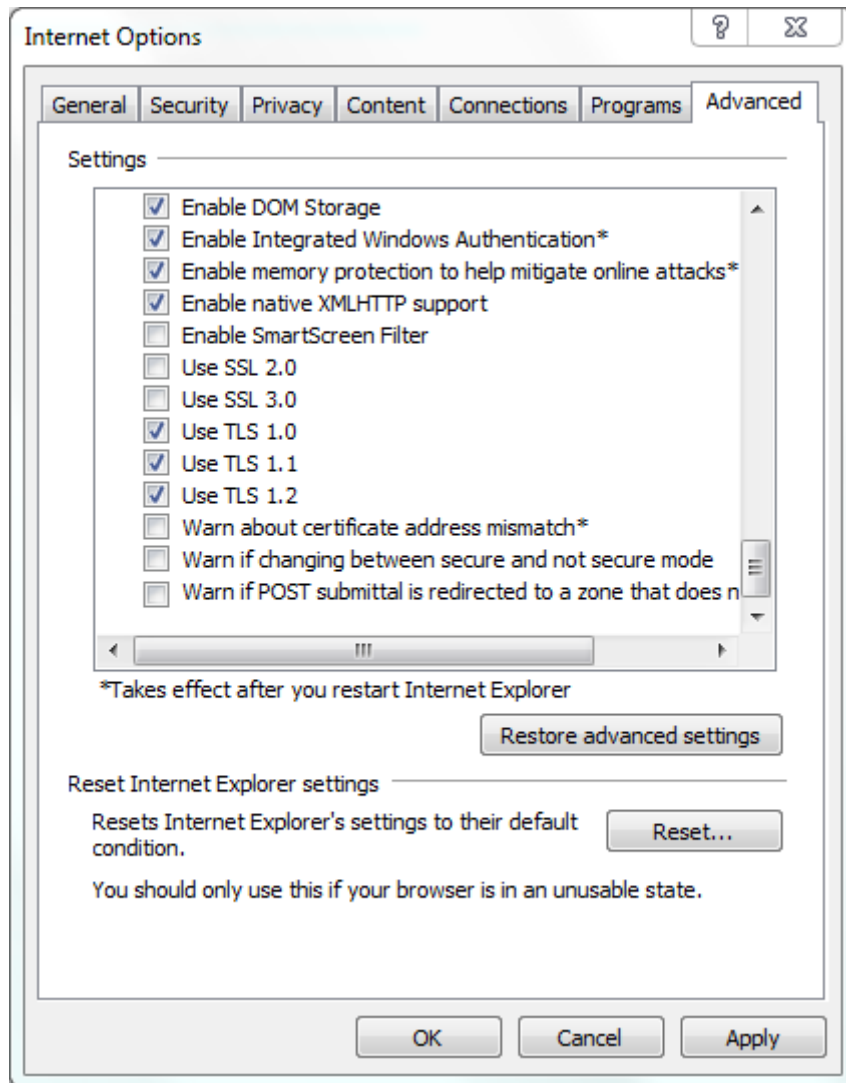
Context

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**, **Use TLS 1.1**, and **Use TLS 1.2** are selected and click **OK**.

Figure 4-59 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.

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)	LCD	000001	Performs all operations on the LCD and

Default User	Preset Password		User Rights
administrator)	WEB	Changeme	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 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

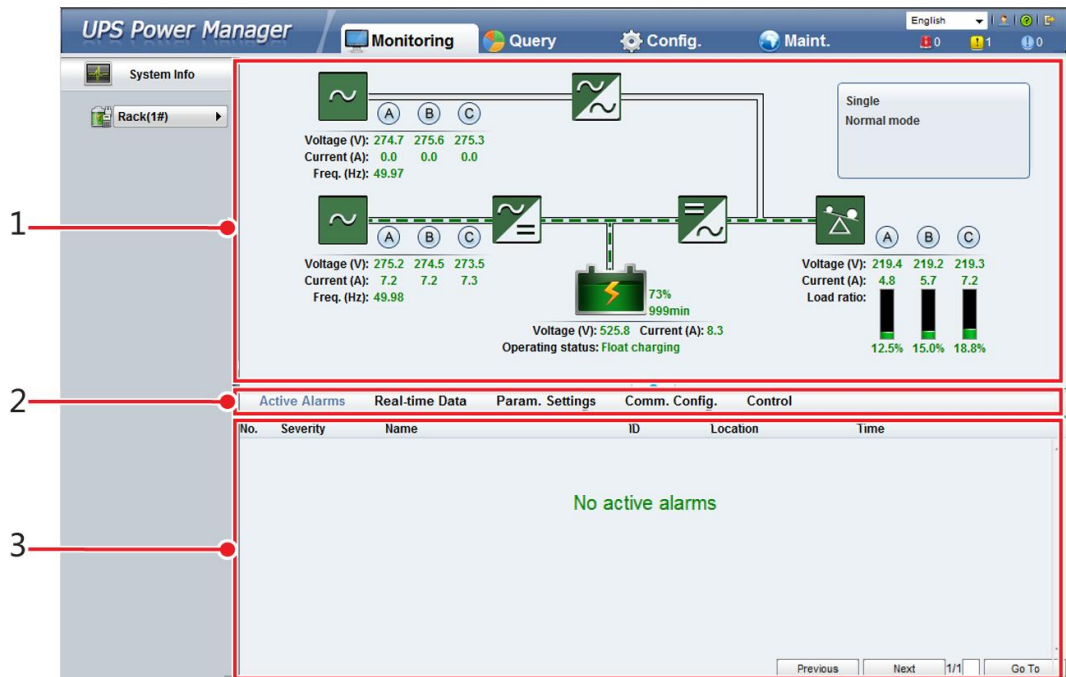
- If an incorrect password is entered three consecutive times, the account will be locked out for 5 minutes.
- After a user logs in to the WebUI, if another user logs in with the same user name, the current account will be logged out.
- It is advised to change the password after the first login using **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 4-60 Monitoring page



NOTE

- If NA is displayed for load ratio, the value is invalid or outside the range.
- If the bypass module is absent, the display of loads and battery backup time will be inaccurate.

Table 4-5 Monitoring function

Number	Area	Function
1	Running status area	Displays the power flow and UPS running information.
2	Menu bar	Displays active alarms and real-time data, sets parameters, sets communications information, and provides control commands. 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.

Figure 4-61 Active Alarms Page

Active Alarms					
No.	Severity	Name	ID	Location	Time
1	Warning	Bypass mode	0358-01	UPS system	2014-08-29 11:34:20.890

Navigation: Previous Next 1/1 Go To

4.2.2.2 Real-time Data Page

You can view the real-time system running data on the **Real-time Data** page.

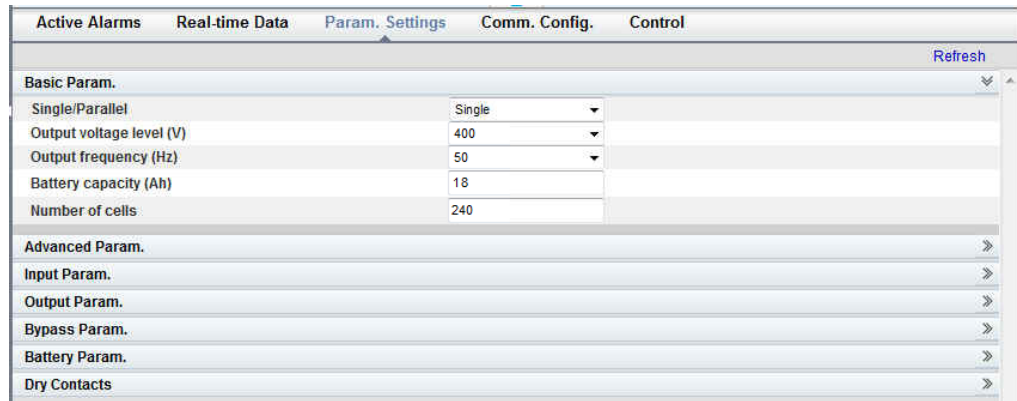
Figure 4-62 Real-time Data page

Real-time Data				
UPS				
Input	Phase voltage (V)	A: 220.7	B: 220.2	C: 219.0
	Line voltage (V)	AB: 382.0	BC: 380.2	CA: 380.8
	Current (A)	A: 1.7	B: 1.9	C: 1.0
	Power factor	A: 0.94	B: 0.95	C: 1.00
	Frequency (Hz)	49.98		
Bypass	Phase voltage (V)	A: 220.5	B: 220.8	C: 220.7
	Line voltage (V)	AB: 382.0	BC: 382.6	CA: 382.3
	Current (A)	A: 0.0	B: 0.0	C: 0.0
	Power factor	A: 0.00	B: 0.00	C: 0.00
	Frequency (Hz)	49.97		
Output	Phase voltage (V)	A: 219.5	B: 219.2	C: 219.3
	Line voltage (V)	AB: 380.2	BC: 379.7	CA: 380.0
	Current (A)	A: 4.9	B: 5.8	C: 7.3
	Power factor	A: 0.00	B: 0.00	C: 0.00
	Frequency (Hz)	49.99		
	Crest factor	A: 1.4	B: 1.1	C: 1.2
	Load ratio (%)	A: 12.7	B: 15.1	C: 19.1

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 4-63](#). The setting method is the same as that on the LCD. For details, see [4.1.2.4 Settings Screen](#).

Figure 4-63 Param. Settings page



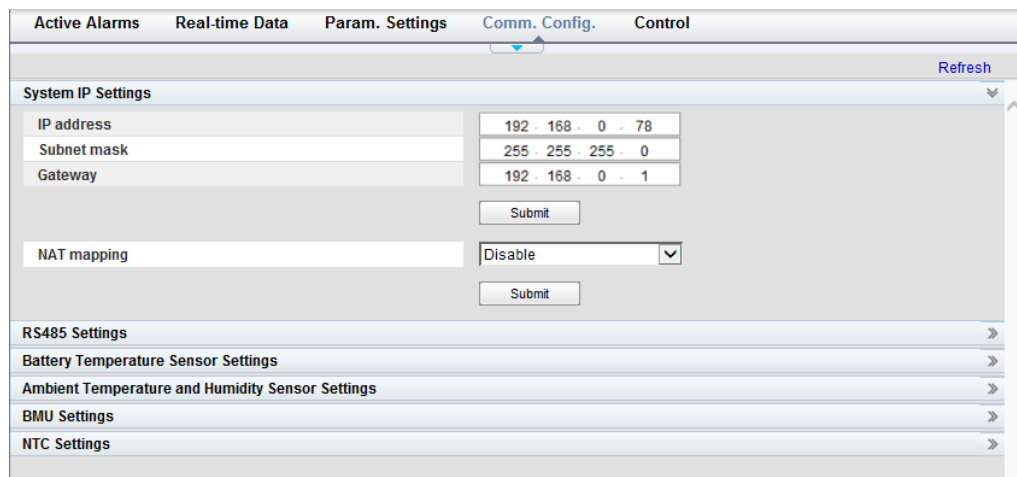
Calib. output current if no load

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

You can set communications information on the **Comm. Config.** page. The settings are the same as those on the LCD in [4.1.2.4 Settings Screen](#). See [Figure 4-64](#).

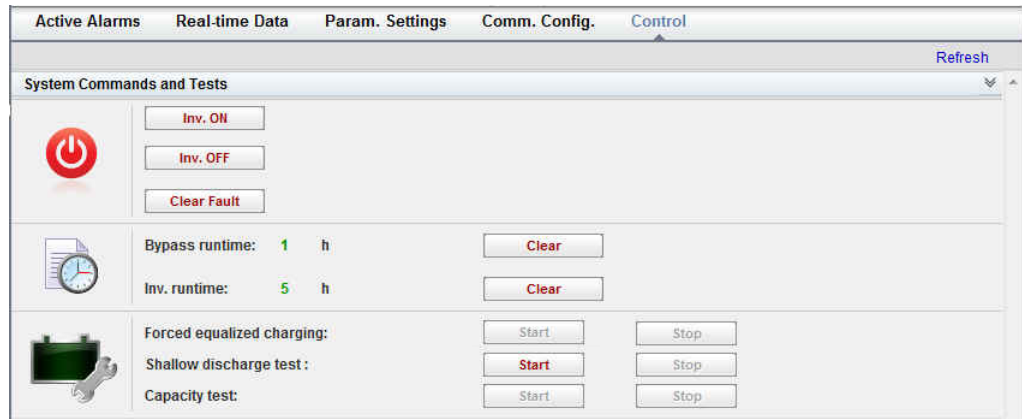
Figure 4-64 Comm. Config. page



4.2.2.5 Control Page

Open the **Control** page to control the system running.

Figure 4-65 Control page (single UPS)

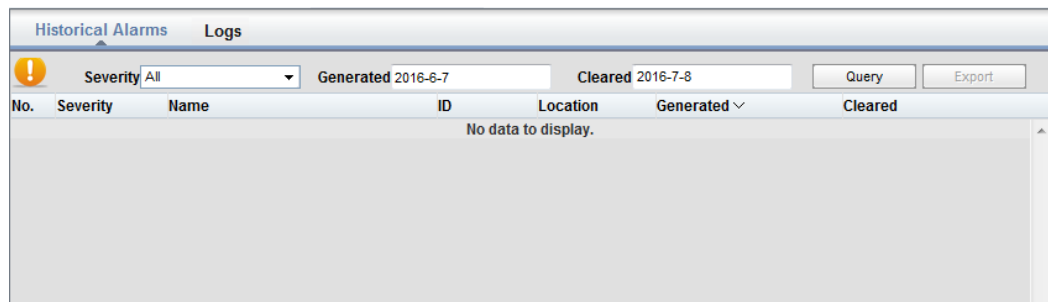


4.2.3 Query Page

4.2.3.1 Historical Alarms Page

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

Figure 4-66 Historical Alarms page



4.2.3.2 Logs Page

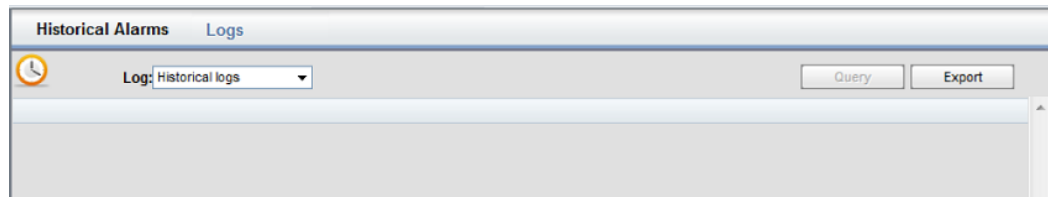
On the **Logs** page, you can set **Log** to **Historical logs**, **Cap. test logs**, or **Common test logs**, and query or export logs.



NOTE

Historical logs can be exported but not queried.

Figure 4-67 Logs Page

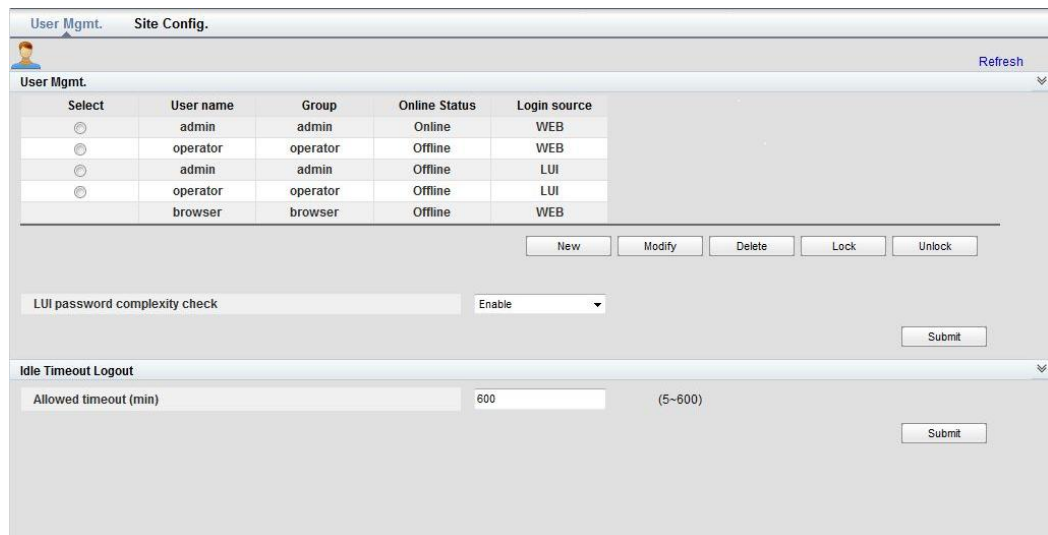


4.2.4 Config. Page

4.2.4.1 User Management

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

Figure 4-68 User Management



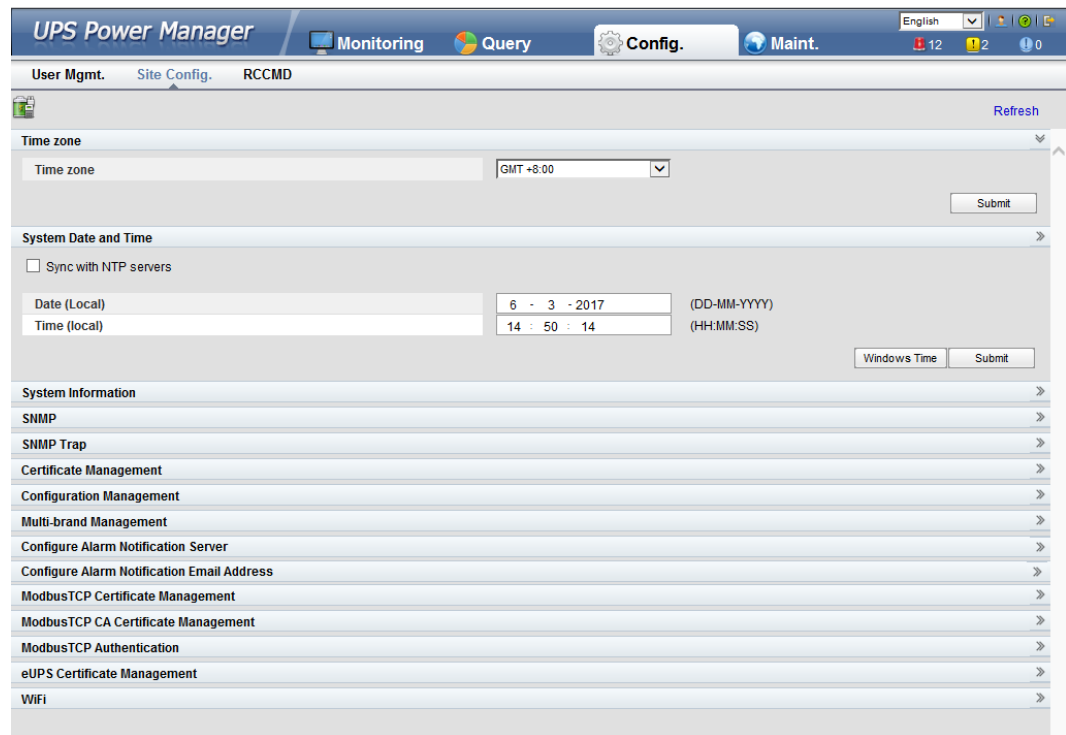
NOTE

- 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.**

Figure 4-69 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.

- **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 4-70](#). 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 4-71](#).

Figure 4-70 RCCMD function disabled

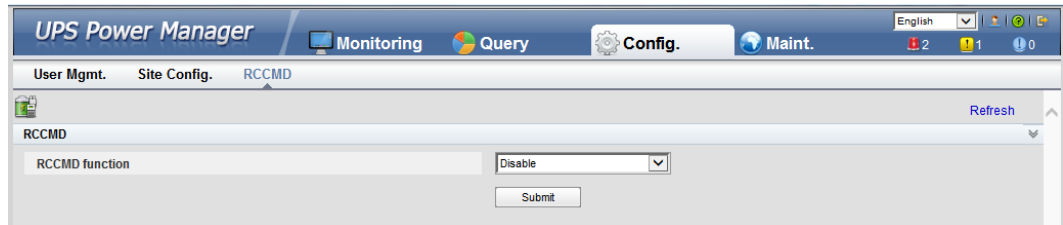
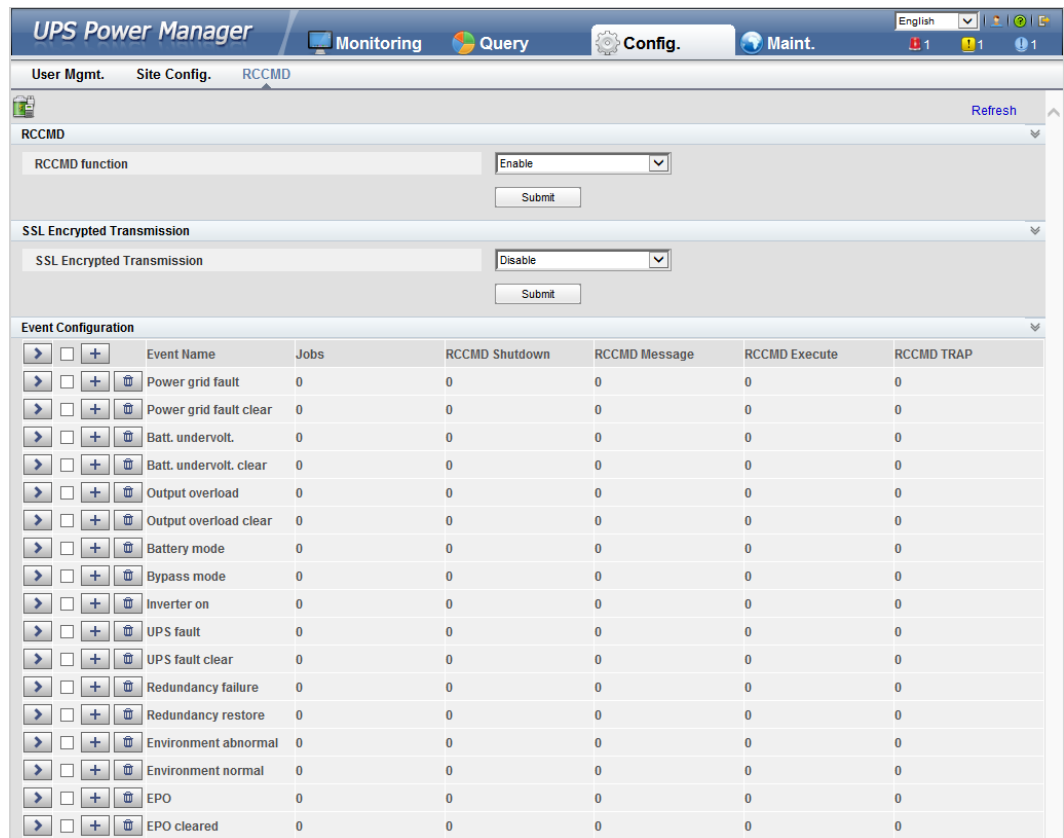


Figure 4-71 RCCMD function enabled



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 4-72](#). If it is set to **Disable**, the RCCMD certificate controls will not be displayed on the page, as shown in [Figure 4-73](#). If **SSL Encrypted Transmission** is set to **Disable**, a message indicating there is a risk will be displayed.

Figure 4-72 SSL encrypted transmission enabled by default

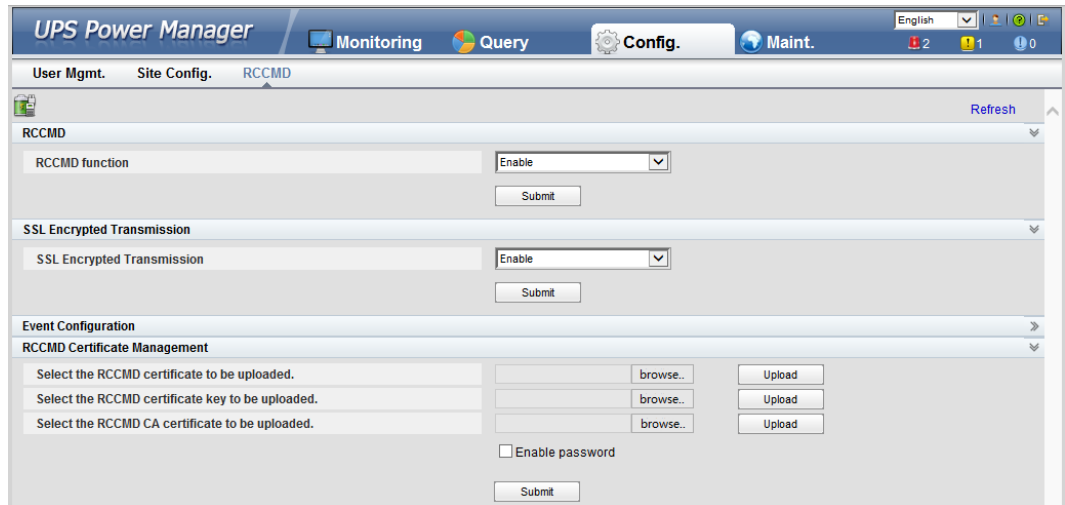
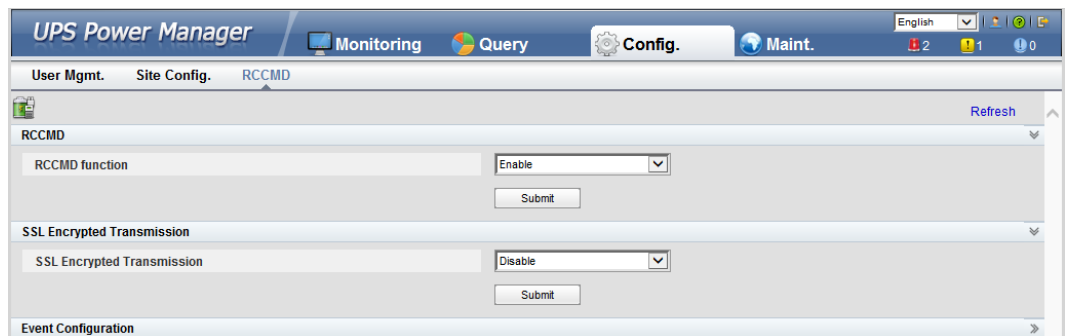


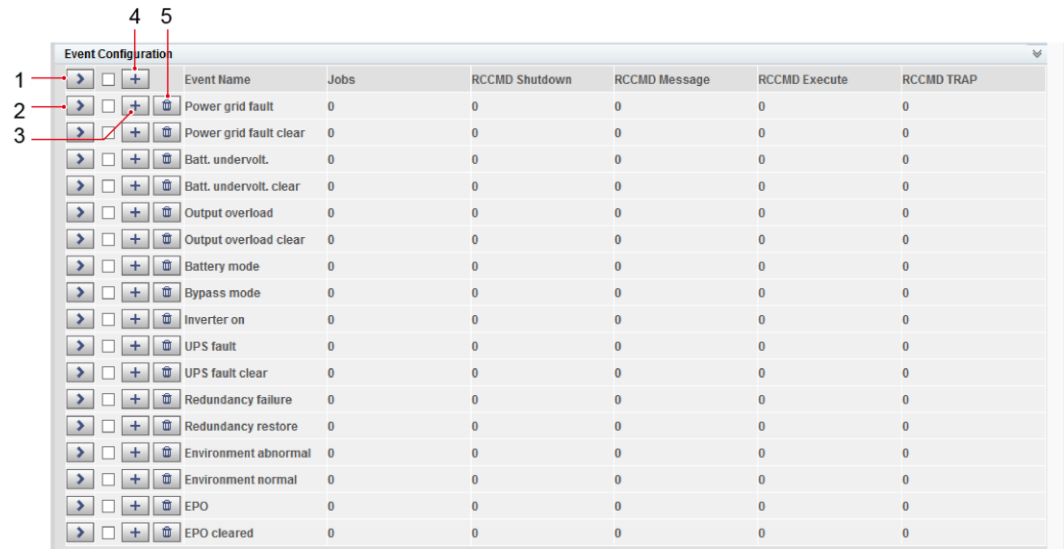
Figure 4-73 SSL encrypted transmission disabled



Event Configuration

The MDU supports 17 alarm events, and a maximum of 50 jobs can be added for each event, as shown in [Figure 4-74](#). [Figure 4-74](#) shows the buttons on the **Event Configuration** page, and [Table 4-6](#) describes these buttons.

Figure 4-74 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 4-75 shows the buttons after one event is expanded and Table 4-7 describes these buttons.

Figure 4-75 Buttons after one event is expanded

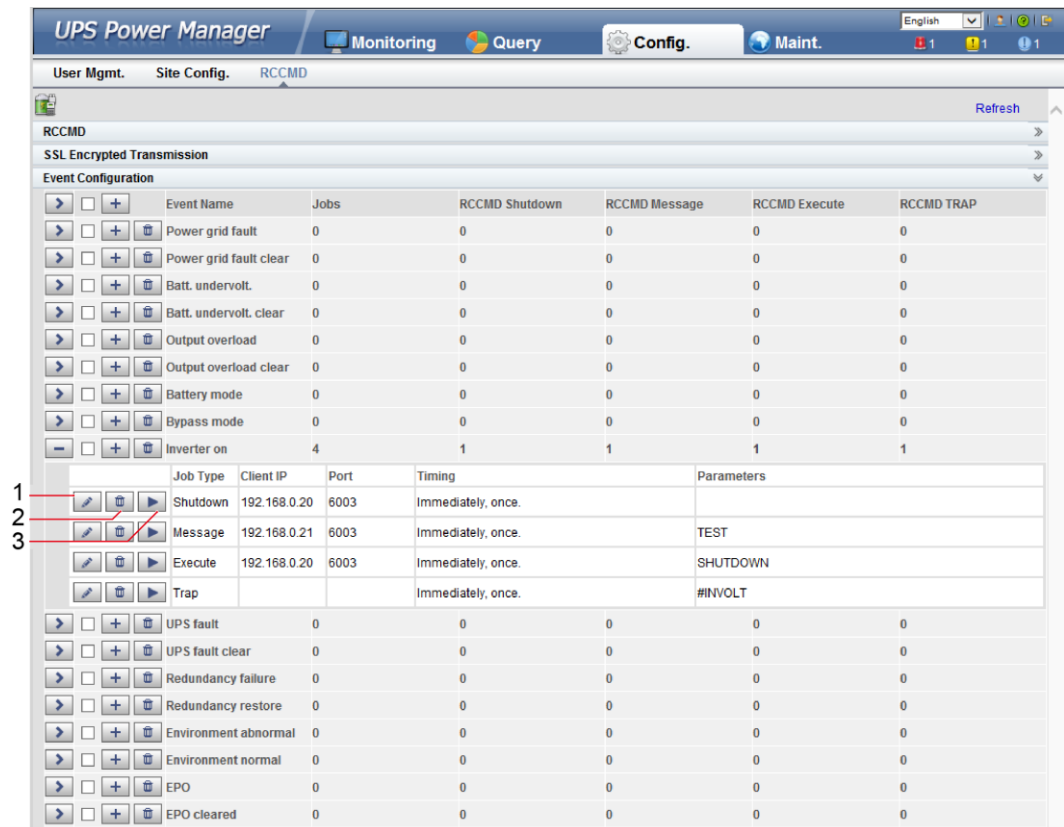


Table 4-7 Buttons after one event is expanded

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.

- **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 4-76 RCCMD shutdown

The screenshot shows a dialog box titled "Batt. undervolt. clear Job 1" with a close button in the top right corner. The "Job Type" dropdown is set to "RCCMD Shutdown". The "Client IP" field is empty. The "Port" field contains "6003" with a range "(1-65535)" to its right. Under the "Timing" section, the "Immediately, once." radio button is selected. Below this, there are three options for when actions will be executed: "After [] (0-86400) seconds, repeat all [] (5-86400) Specify the interval.", "After [] (0-86400) seconds on Battery.", and "At [] (5-86400) seconds remaining time.", all of which are unselected. At the bottom, there are "Test", "Submit", and "Cancel" buttons.

- **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 4-77 RCCMD message

The screenshot shows a dialog box titled "Batt. undervolt. clear Job 1" with a close button in the top right corner. The "Job Type" dropdown is set to "RCCMD Message". The "Client IP" field is empty. The "Port" field contains "6003" with a range "(1-65535)" to its right. The "Message" field is empty. Under the "Timing" section, the "Immediately, once." radio button is selected. Below this, there are three options for when actions will be executed: "After [] (0-86400) seconds, repeat all [] (5-86400) Specify the interval.", "After [] (0-86400) seconds on Battery.", and "At [] (5-86400) seconds remaining time.", all of which are unselected. At the bottom, there are "Test", "Submit", and "Cancel" buttons.

- **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 4-78 RCCMD execute

Batt. undervolt. clear Job 1

Job Type:

Client IP:

Port: (1-65535)

Execute:

Timing

Immediately, once.

Scheduled in (5-86400) seconds.

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

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

After (0-86400) seconds on Battery.

At (5-86400) seconds remaining time.

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

If you want to define the TRAP message by yourself, you can use the TRAP signal to display the UPS information. For example, if you enter **#INVOLT V**, the RCCMD client will receive the UPS input voltage value (for example, single-phase: 220 V; three-phase A: 220 V, B: 220 V, C: 220 V). [Table 4-8](#) lists the signal names that can be entered.

Figure 4-79 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

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

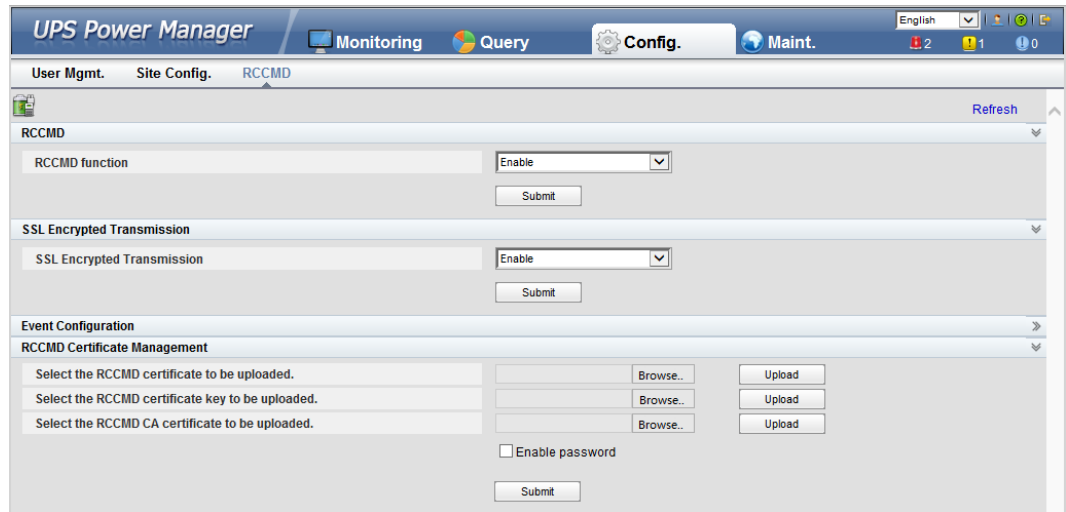


NOTICE

- 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 4-80](#). If the RCCMD certificate or RCCMD CA certificate is not uploaded, the default certificate provided by the system is used for communication. After the certificate is uploaded successfully, click **Submit**. The WebUI of the MDU will restart, and the uploaded certificate will be used for communication.

Figure 4-80 RCCMD certificate management



NOTE

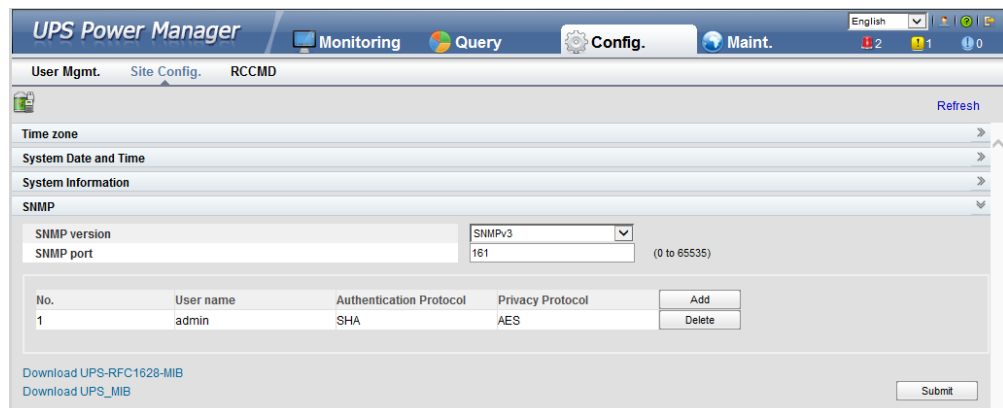
If the RCCMD certificate key has been encrypted, enable and enter the key password.

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 4-81 Download the MIB



NOTE

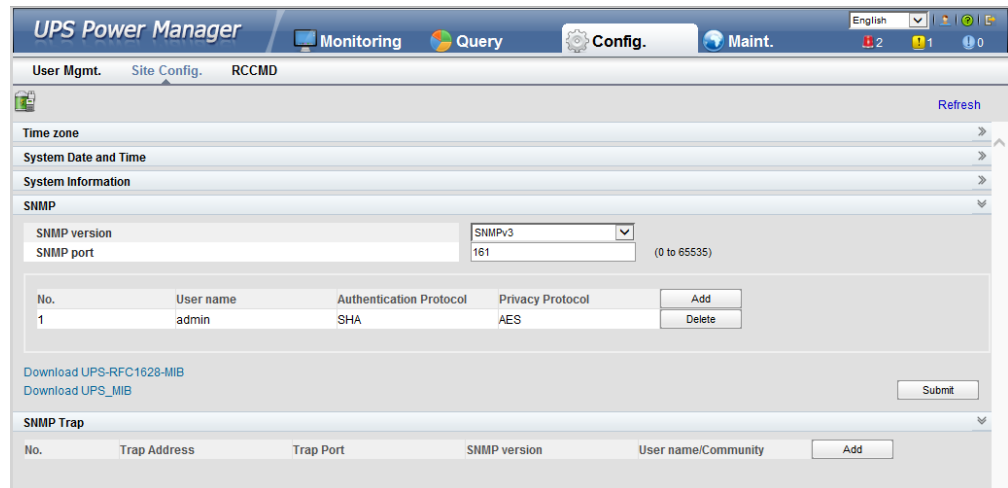
The UPS-RFC1628-MIB has more alarms than RFC1628. Download the UPS-RFC1628-MIB before using.

Managing the UPS by Using the NMS

- Applying for Access Rights

To manage the UPS by using the UNMS II of Generex over the MDU, apply to the system administrator of the MDU for access rights and add the NMS information to the NMS access list of the MDU. The NMS address and access right settings are used for adding information about the NMS accessing the MDU, including the NMS address, access right, and Trap port. For details about how to add an NMS over a web browser, see [Figure 4-82](#).

Figure 4-82 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

On the homepage, click the **Maint.** tab to access the **Calib.**, **Commissioning Var.**, **Upgrade**, and **Download** tabs for performing maintenance operations on the bypass, module, and ECM, as shown in [Figure 4-83](#) to [Figure 4-87](#).

Figure 4-83 Calib. page

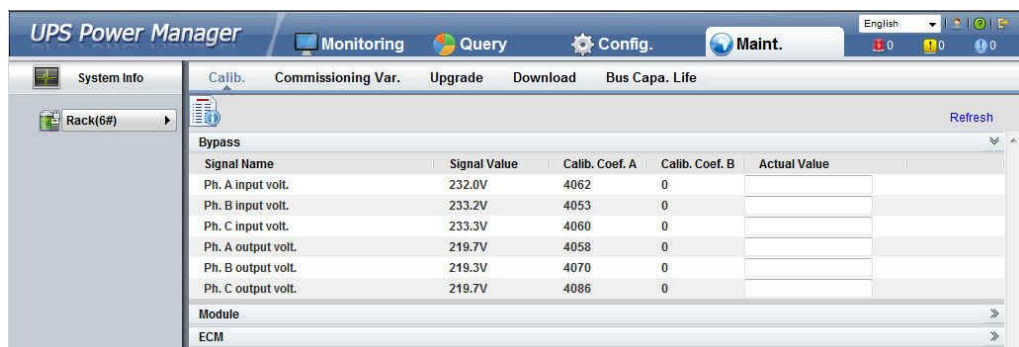


Figure 4-84 Commissioning Var. page

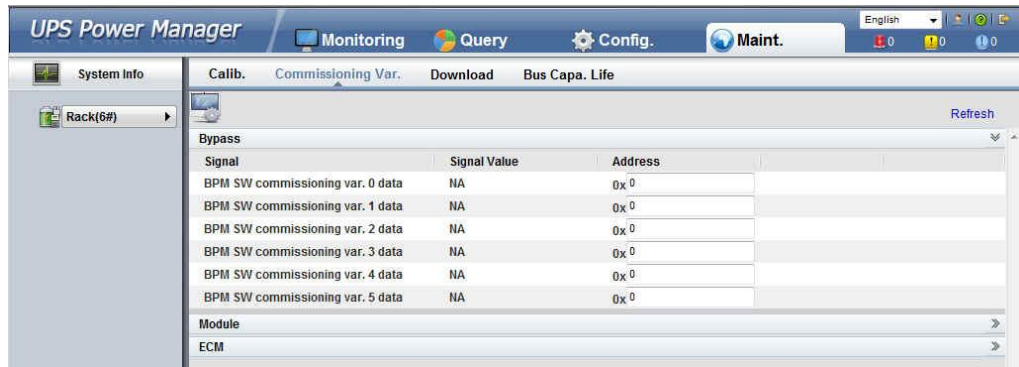


Figure 4-85 Upgrade page

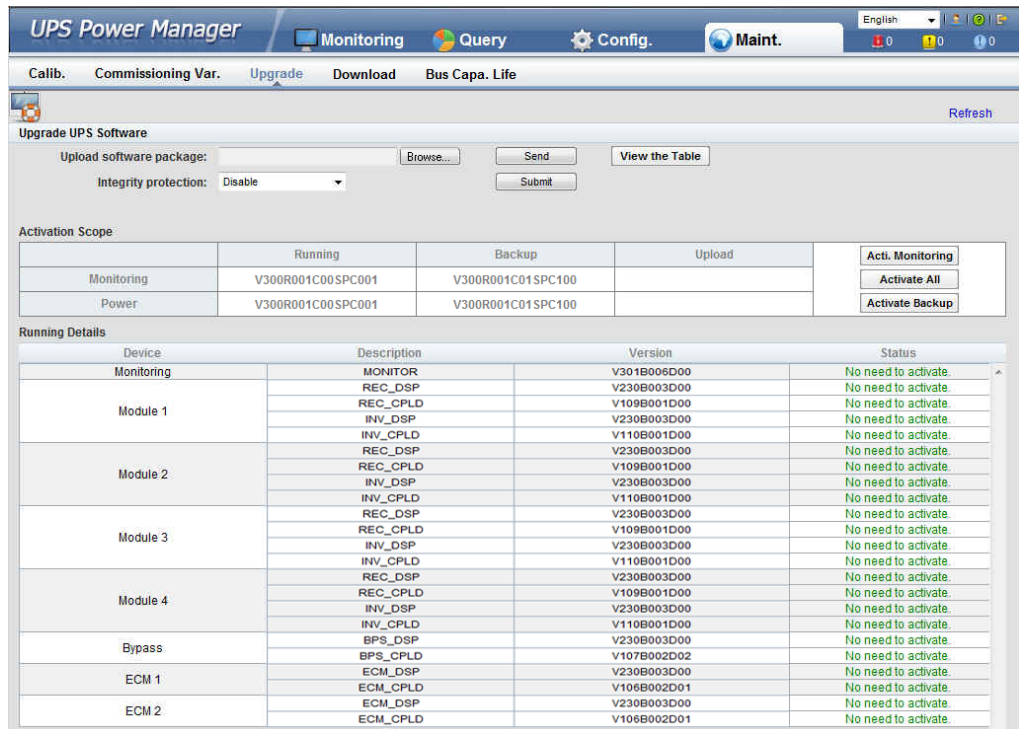


Figure 4-86 Download page

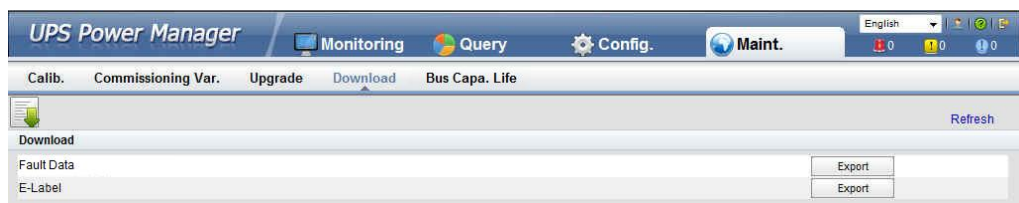
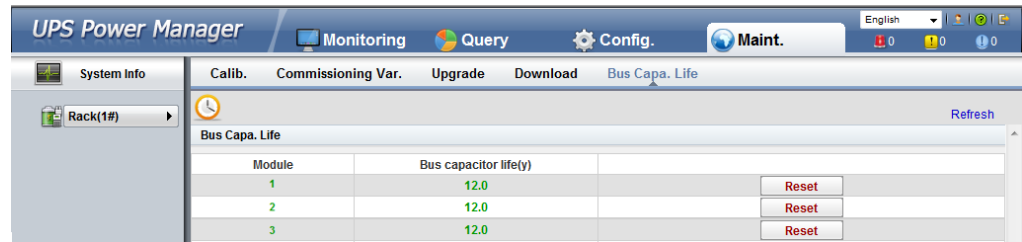


Figure 4-87 Bus Capa. Life page



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.

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 4-88 Setting the MDU IP address and SSL encrypted transmission mode on the RCCMD client

<h1>RCCMD</h1>	<h1>IP: 127.0.0.1</h1>		
<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <p>Status</p> <ul style="list-style-type: none"> • View Event Log • System Status • Logout </div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <p>Options</p> <ul style="list-style-type: none"> • Connections • Heartbeats • Redundancy • Shutdown Settings • E-mail Settings • Notification Settings • Advanced Settings • Web Configuration • User Settings </div> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Help</p> <ul style="list-style-type: none"> • Manual • Info </div>	<p>Connections</p> <p>The list below identifies all senders that are allowed to connect to this listener.</p> <p>Note: An empty list means that every sender can connect to this listener.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid #ccc; padding: 5px; width: 70%;"> <p>Sender IP Address</p> <p>192.160.0.10</p> </td> <td style="border: 1px solid #ccc; padding: 5px; width: 30%; text-align: center;"> <p>Insert</p> <hr/> <p>Remove</p> <hr/> <p>Edit</p> </td> </tr> </table> <hr/> <p>Protocol</p> <p>The setting below increases the security of connections to this RCCMD</p> <p><input checked="" type="checkbox"/> Accept only SSL connections (requires restarting RCCMD)</p> <p><input type="checkbox"/> Reject expired SSL certificates</p> <div style="text-align: right; margin-top: 10px;"> <p>Cancel Save Changes</p> </div>	<p>Sender IP Address</p> <p>192.160.0.10</p>	<p>Insert</p> <hr/> <p>Remove</p> <hr/> <p>Edit</p>
<p>Sender IP Address</p> <p>192.160.0.10</p>	<p>Insert</p> <hr/> <p>Remove</p> <hr/> <p>Edit</p>		

- 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**.
- 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

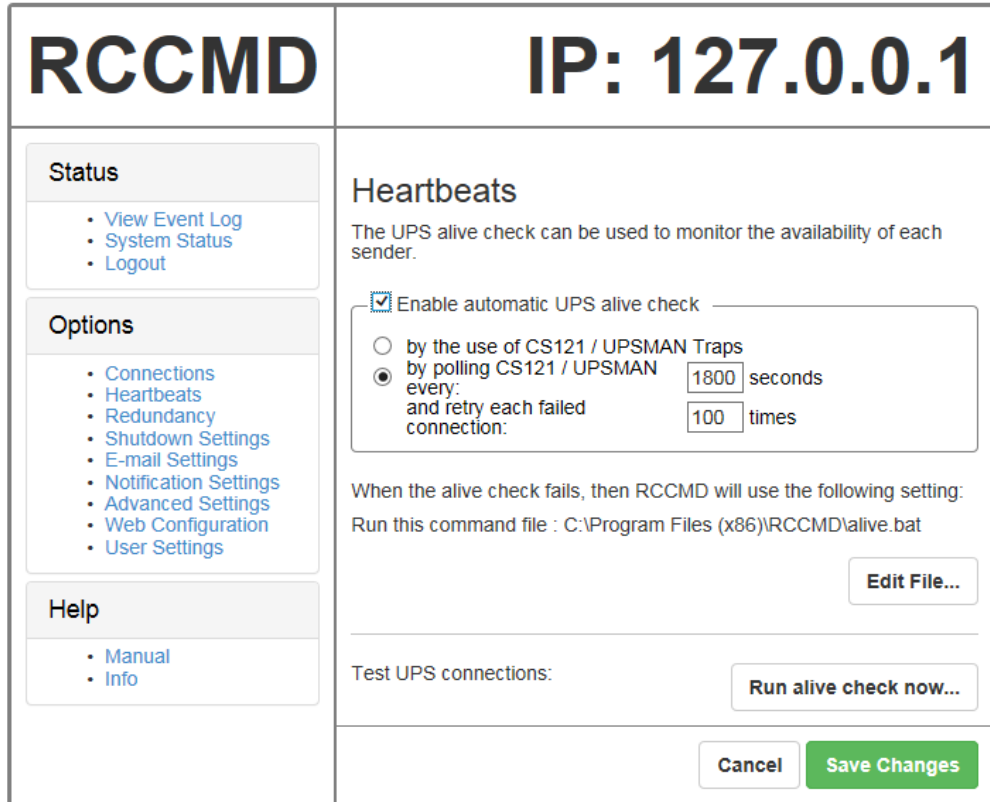
Whether the RCCMD SSL encrypted transmission is enabled on the WebUI of UPS5000 MDU and RCCMD client is irrelevant to the heartbeat detection function. Only when the SSL encryption is enabled on the RCCMD client, the logs recorded by the RCCMD client are marked with "(SSL...)".

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 4-89](#).
- 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 4-89](#).

Figure 4-89 Heartbeat detecting mode on the RCCMD client



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

Figure 4-90 Detecting heartbeat manually

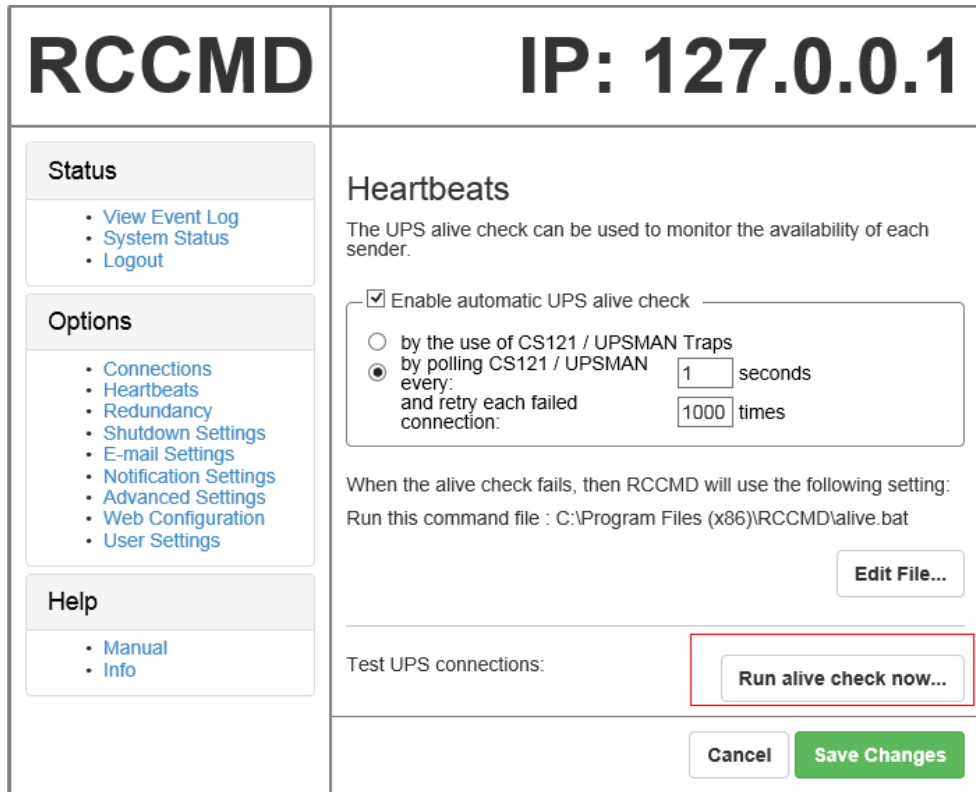
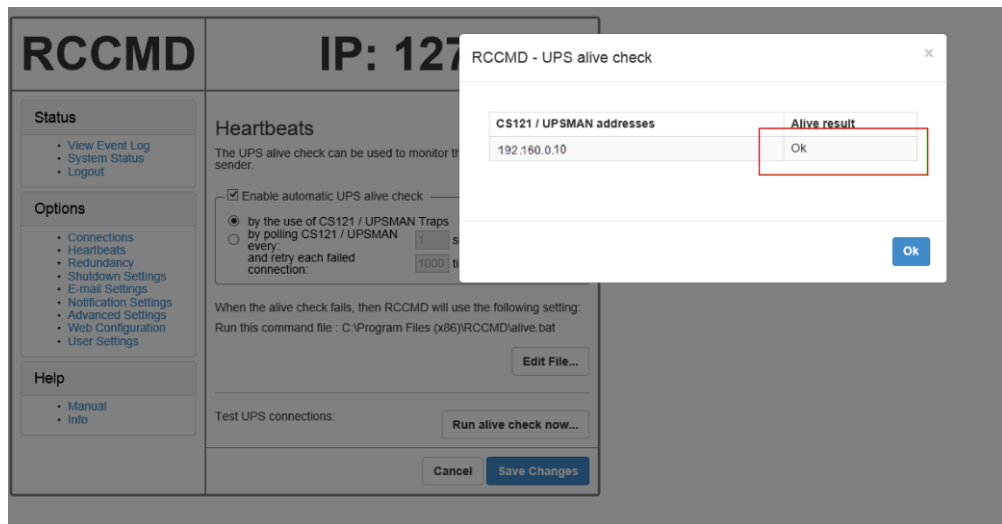


Figure 4-91 Detecting heartbeat manually and successfully



----End

5 Operations

5.1 Powering On and Starting the UPS

5.1.1 Powering On the UPS

Prerequisites

Measure the voltage and frequency of the UPS upstream input switch. 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 input switch.

Step 2 Close the UPS input 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

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

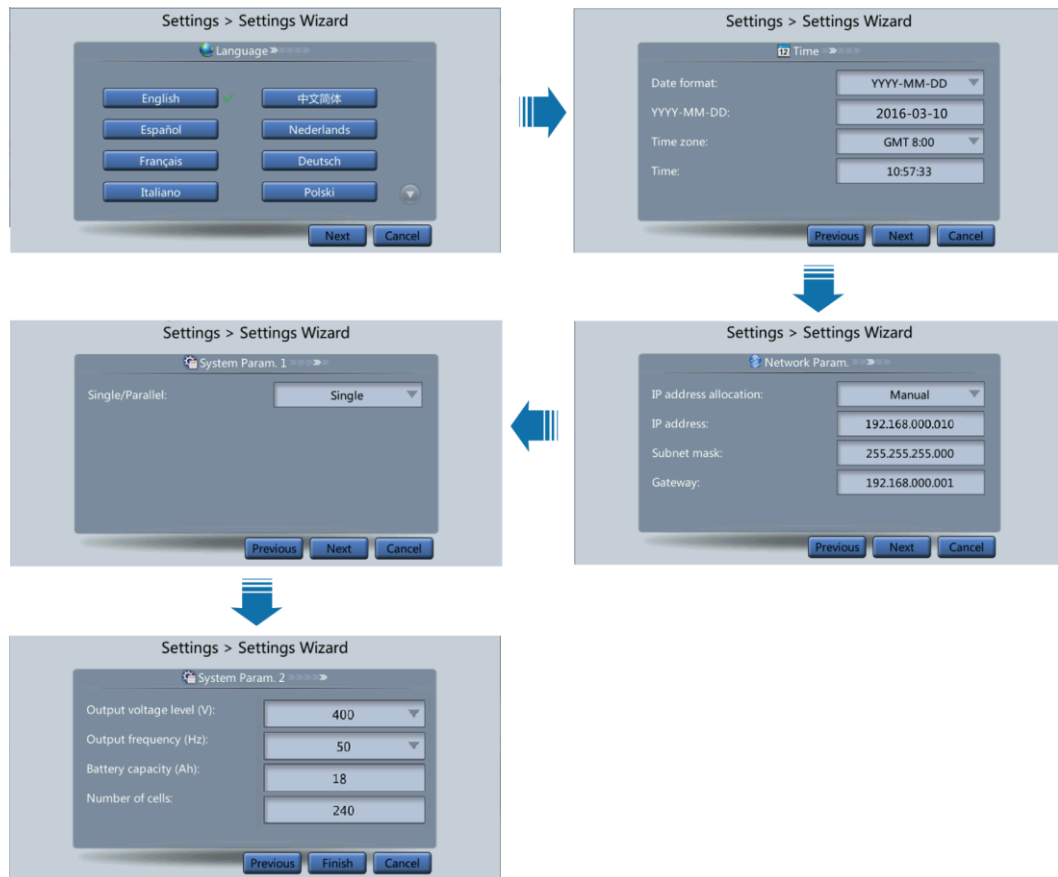
Set system parameters with caution because the settings determine normal UPS operation.

- 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:

- Set **Battery capacity** correctly after double check. Incorrect settings affect the charging power.
- High or low charging power tends to shorten the battery lifespan, or even damages batteries. To seek help about how to determine the battery capacity, contact Huawei technical support.
- 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. For example, if forty 9 Ah/12 V batteries are connected in series and two battery strings are connected in parallel to the UPS, the **Battery capacity** is 9 Ah + 9 Ah = 18 Ah.

Figure 5-1 Settings Wizard



NOTE

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

Table 5-2 Battery capacity settings

Battery Specifications	Number of Battery Strings	Battery Capacity
------------------------	---------------------------	------------------

Battery Specifications	Number of Battery Strings	Battery Capacity
9 Ah/12 V	Two battery strings connected in parallel	9 Ah + 9 Ah = 18 Ah
9 Ah/12 V	Three battery strings connected in parallel	9 Ah + 9 Ah + 9 Ah = 27 Ah
9 Ah/12 V	Four battery strings connected in parallel	9 Ah + 9 Ah + 9 Ah + 9 Ah = 36 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**


- After you set parameters on the **Settings Wizard** screen, choose **System Info > Settings > Advanced Param**. Check that **System Capacity**, **Power module capacity**, **Requisite modules**, and **Redundant modules** match the actual values.
- If dry contact signals are connected to the system, choose **System Info > Settings > Dry contacts** 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



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**.

Figure 5-2 Setting startup commissioning

The screenshot shows the 'Set Startup Offline Activation' screen. At the top, there is a green header with a back arrow and the text 'Set Startup Offline Activation'. Below the header are several input fields: 'Site' with a dropdown menu showing 'NewTest', 'Device Type' with a dropdown menu showing 'UPS5000', 'Link' with a toggle switch turned on, 'IP' with four input boxes containing '198', '168', '0', and '10', 'Port' with an input box containing '443', 'Username' with an input box containing 'admin', 'Password' with a masked input box containing '*****', and 'Identification code' with an input box containing 'kuaf' and a QR code. At the bottom, there is a green 'Login' button.

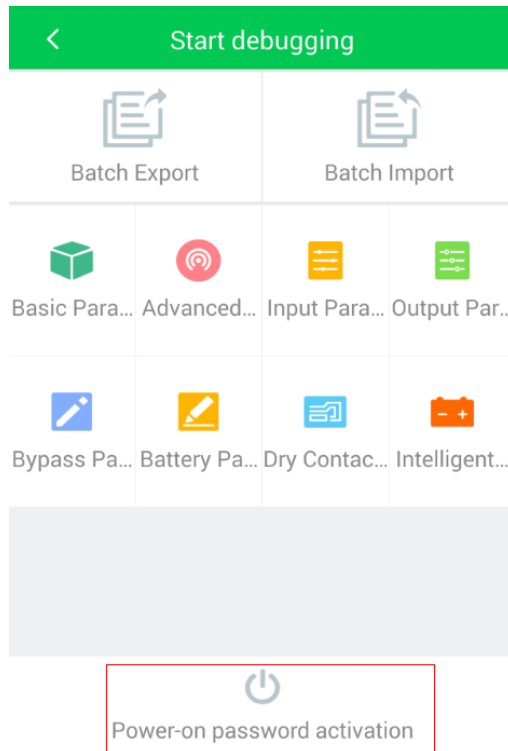
Table 5-3 Parameter description

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 .

Item	Setting Method
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.

Figure 5-3 Power-on password activation

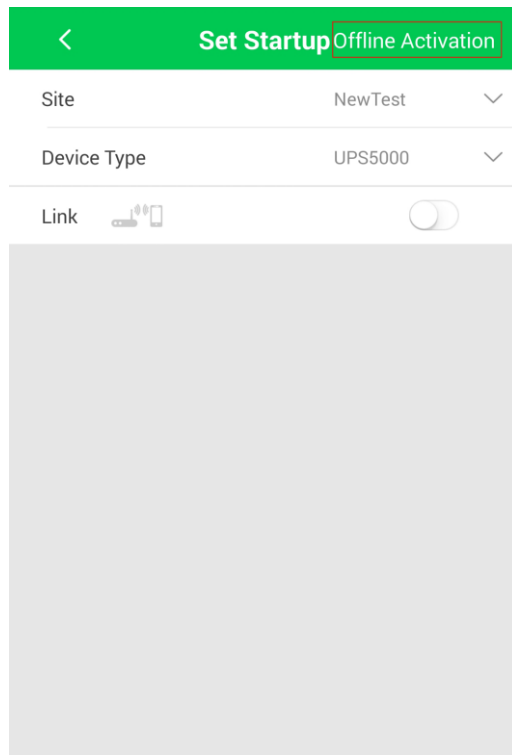


----End

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

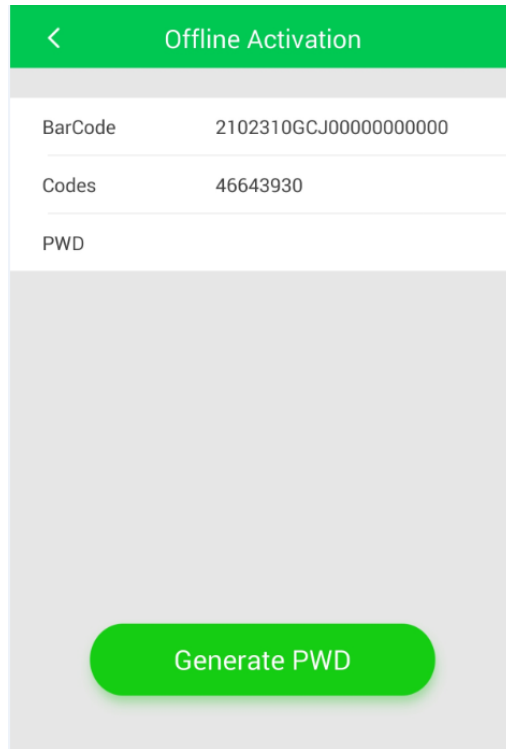


NOTE

The values of the **Bar code** and **Verification** in the figure are for reference only. The actual values prevail.

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

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**.

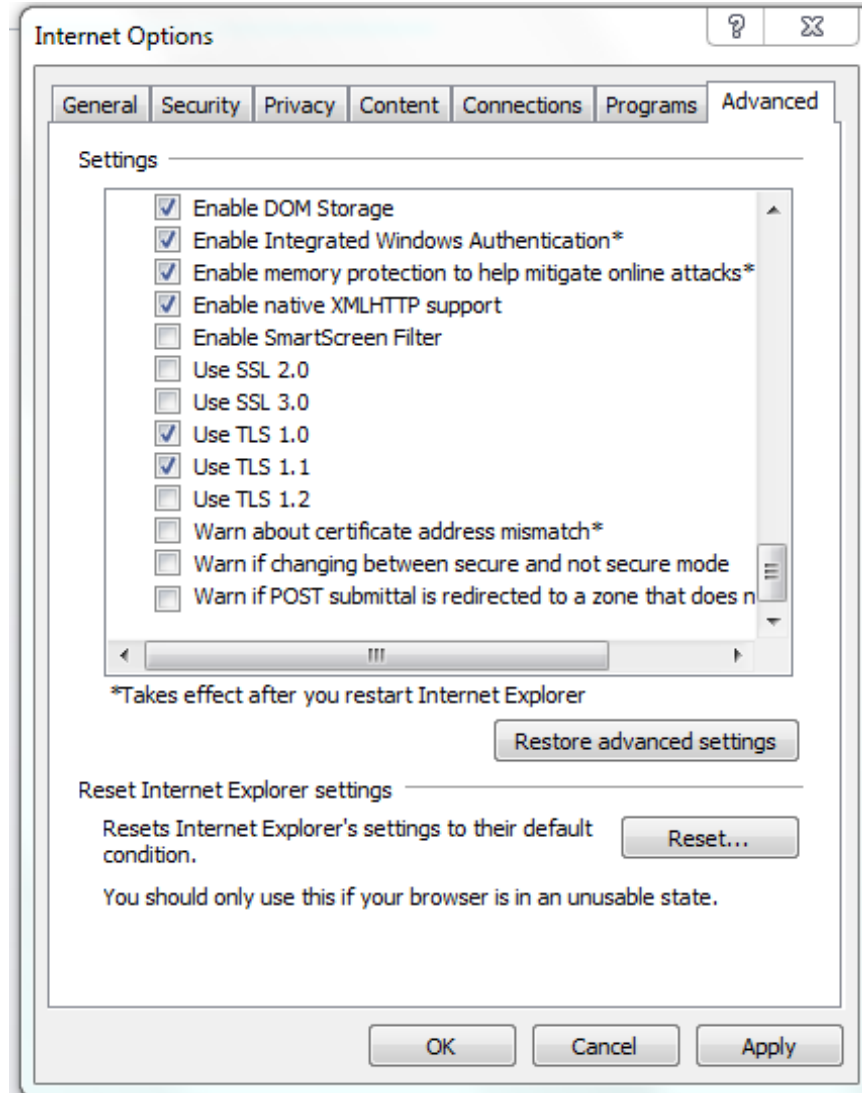
- Step 2** In the displayed login screen, enter the user name and password.
Step 3 In the displayed dialog box, tap **Yes** to start the inverter.

----End

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



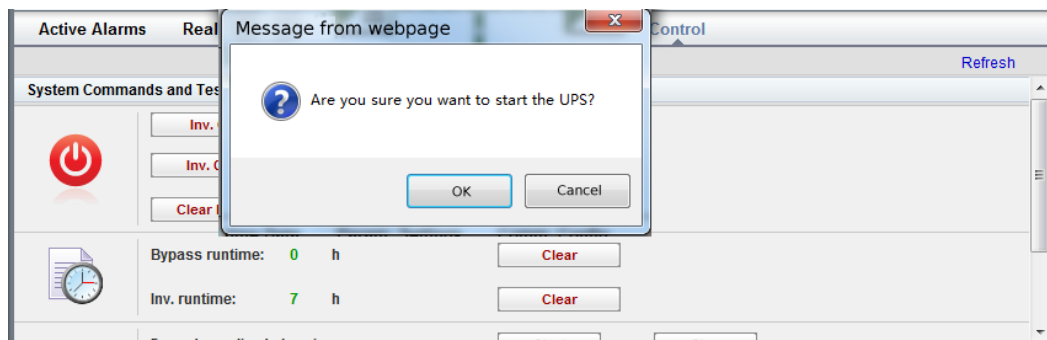
- Step 3** In the address box of the browser, enter `https://UPS IP address`.
- Step 4** Enter the correct user name and password and click **Login**.

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.

Figure 5-9 Starting the inverter



NOTE

If the power module receives a startup command when it cannot be started, the startup command will be kept for 1 minute. If the startup command is not cleared within 1 minute (for example, other faults occur on the module, or shutdown or fault rectification is performed) and the module can be started, the module 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 cabinets, close the battery switch inside the UPS

cabinet, and then close the battery switch of external battery strings. The **No battery** alarm disappears from the MDU.

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

----End

5.2 Shutting Down and Powering Off the UPS

Context




NOTICE

After you shut down the inverter, if the bypass is normal, the UPS transfers to bypass mode; if the bypass is abnormal, the UPS supplies no power. Before you shut down the UPS, ensure that all loads have shut down.

Procedure

Step 1 Shut down the inverter.

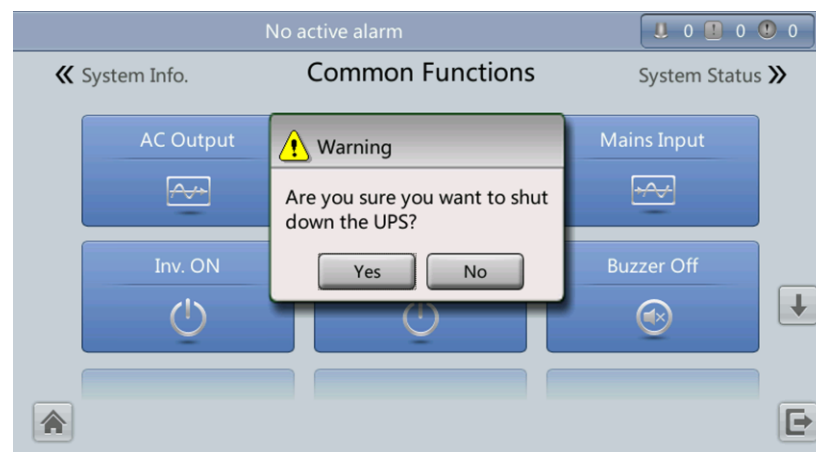
- Method for shutting down the inverter on the LCD
 - a. On the main screen, tap **Common Functions**. Tap **Inv. OFF**.
 - b. If user is not logged in, enter a user name and password, and tap  on the login screen displayed.



NOTE

- If an incorrect password is entered three consecutive times, the account will be logged out for 5 minutes.
- c. In the displayed dialog box, tap **Yes** to shut down the inverter, as shown in [Figure 5-10](#).

Figure 5-10 Inverter Off screen



 **NOTE**

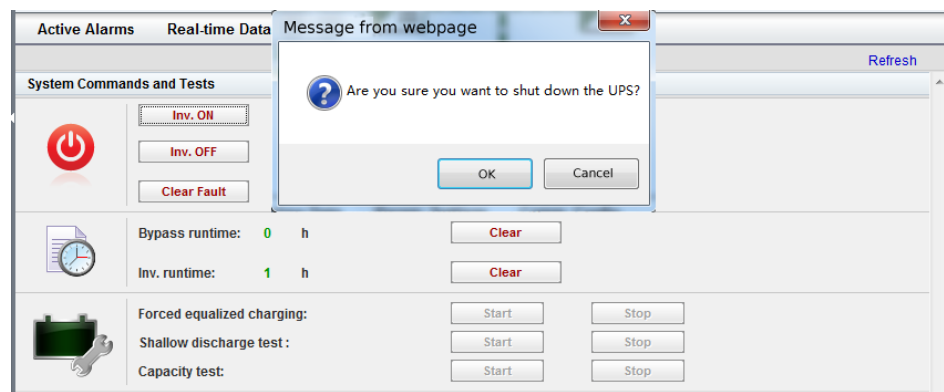
You can also tap **System Info > Maintenance** and shut down the inverter on the **Maintenance** screen.

- Method for shutting down the inverter on the WebUI
 - a. In a web browser, enter the UPS IP address.
 - b. On the login page, select a display language, enter a **user name** and **password**, and click **Login**.

 **NOTE**

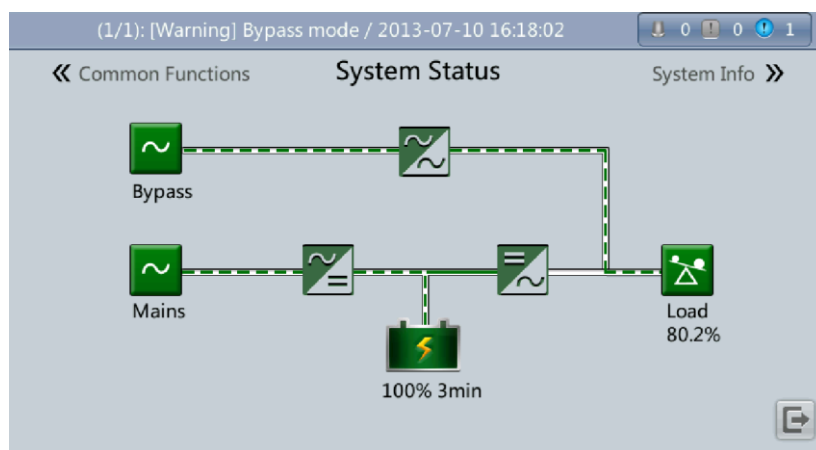
- If an incorrect password is entered three consecutive times, the account will be logged out for 5 minutes.
- c. On the homepage, choose **Monitoring > Control**, and click **Inv. OFF**. In the displayed dialog box, click **OK** to shut down the inverter, as shown in [Figure 5-11](#).

Figure 5-11 Shutting down the inverter



Step 2 After the inverter shuts down, if the bypass is normal, the UPS transfers to bypass mode, as shown in [Figure 5-12](#); if the bypass is not normal, the UPS supplies no power, and the loads shut down, as shown in [Figure 5-13](#).

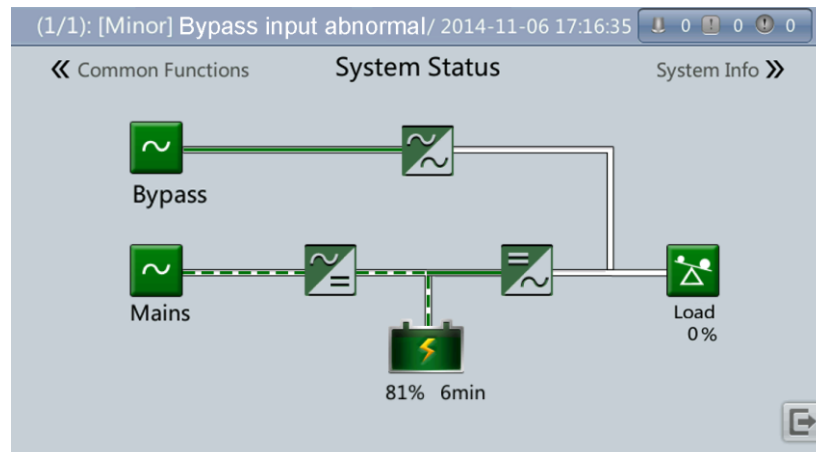
Figure 5-12 Figure 1-1 Bypass mode



 **NOTE**

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

Figure 5-13 Abnormal bypass



- Step 3** After the inverter shuts down, open the UPS output switch on the output PDC, or turn off the external output distribution switch.
- Step 4** Open the battery string input circuit breaker. If there are multiple battery cabinets, open the battery switch inside the UPS cabinet, and then open the battery switch of external battery strings.
- Step 5** Open the internal input switch.
- Step 6** Open the external input switches.

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](#).
- If you need to shut down the UPS, perform all of the preceding steps.

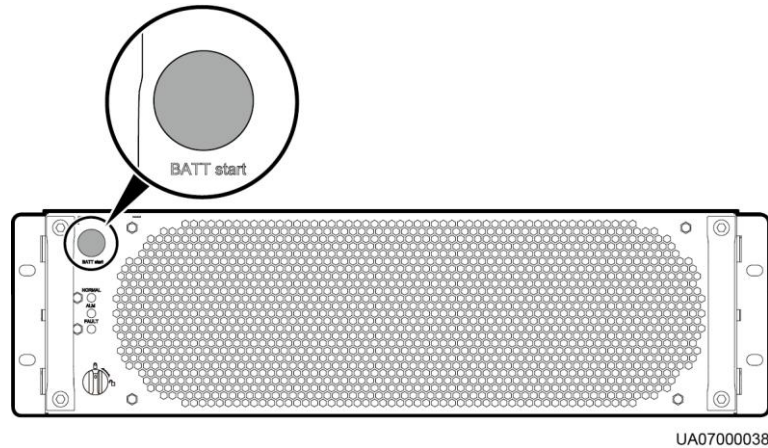
----End

5.3 Starting the UPS in Battery Mode

Procedure

- Step 1** Open the input circuit breakers. If there is no input, close the battery circuit breaker. If there are multiple battery cabinets, close the battery switch inside the UPS cabinet, and then close the battery switch of external battery strings.
- Step 2** Press and hold down the **BATT start** button on the bypass module for at least 2 seconds. [Figure 5-14](#) shows the position of the battery cold start button. The system automatically enters the battery cold start status. The LCD displays the Huawei logo and an initialization progress bar.

Figure 5-14 Battery startup button



Step 3 After LCD initialization, start the inverter.

----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 inverter over the LCD or WebUI. After the inverter is shut down, 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

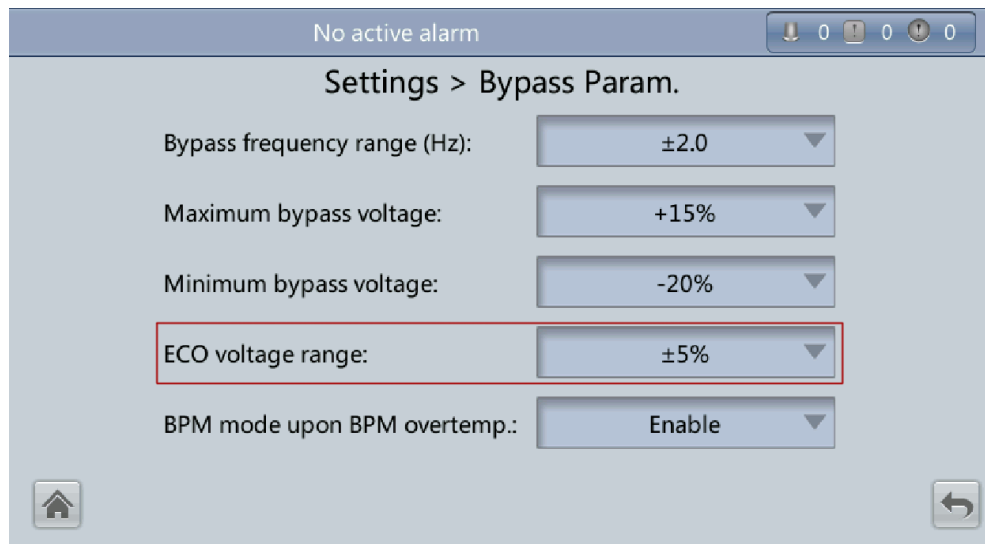
- The UPS is set to non-ECO mode by default. Set the UPS to ECO mode when energy saving is required.
- When the UPS works in ECO mode, the bypass module takes precedence over the power module in supplying power to loads. When the bypass module is disconnected, the UPS switches to the power module. The switchover time is less than 2 ms for typical working conditions and is 10 ms under harsh working conditions.
- 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

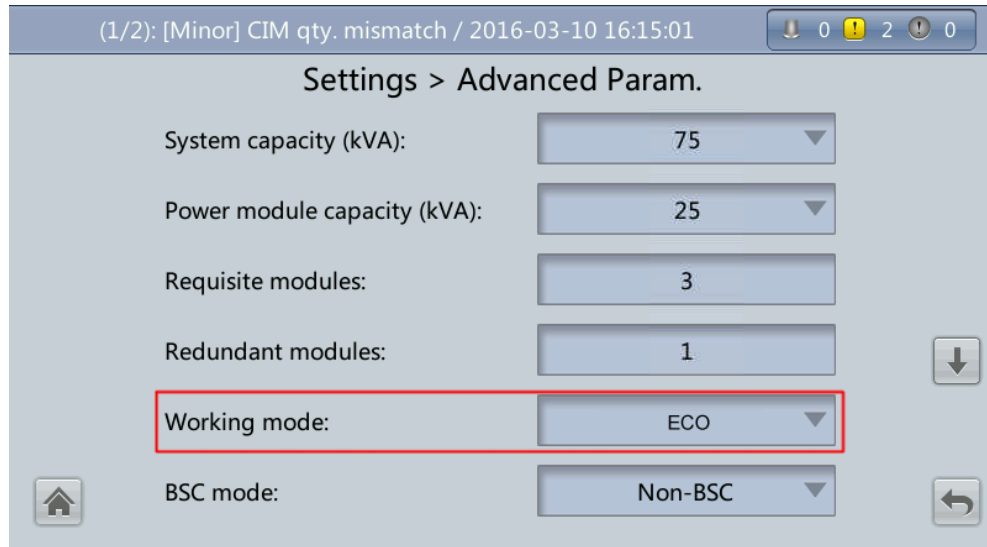
- Step 1** Manually shut down the inverter to transfer the UPS to bypass mode. For details, see [Step 1 in 5.2 Shutting Down and Powering Off the UPS](#).
- Step 2** Select a value ($\pm 5\%$, $\pm 6\%$, $\pm 7\%$, $\pm 8\%$, $\pm 9\%$, or $\pm 10\%$) from the **ECO voltage range** drop-down list box, as shown in [Figure 5-15](#).

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, as shown in [Figure 5-16](#).

Figure 5-16 Setting ECO mode



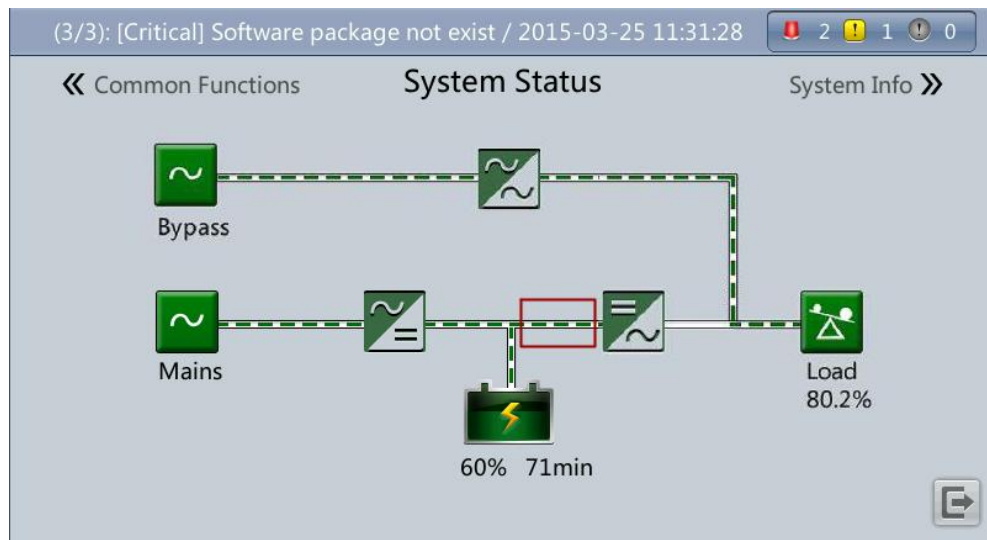
Step 4 Manually start the inverter.



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



Before a forced equalized charging test, ensure that:

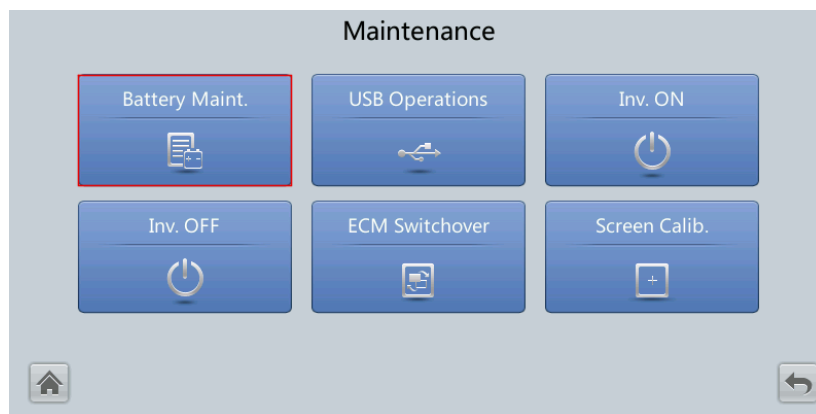
- The mains input is normal.
 - Batteries are properly connected.
 - Batteries are not in the equalized charging state.
-

Procedure

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

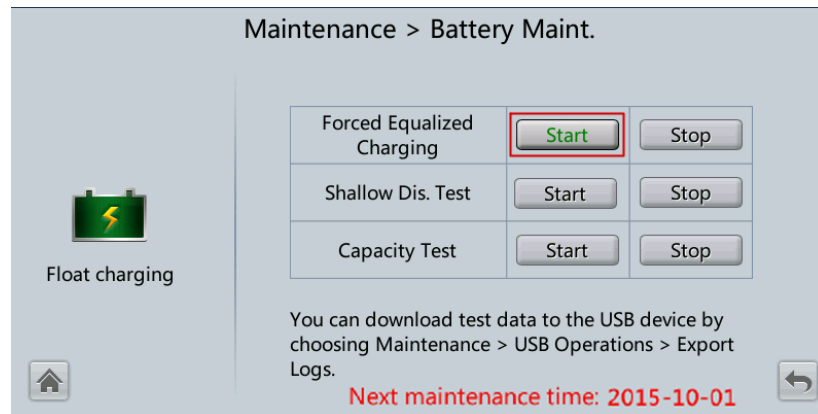
Step 2 On the **Maintenance** screen, tap **Battery Maint.**

Figure 5-18 Maintenance screen



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.

----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



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.

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.

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



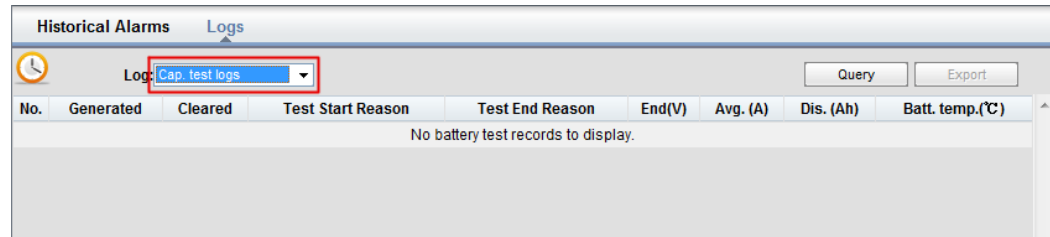
----End

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.

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

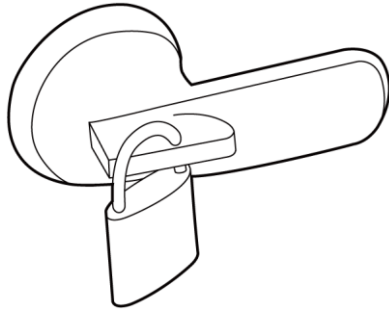
- Step 1** Transfer the UPS to bypass mode.
- Step 2** Close the maintenance bypass switch.

If the maintenance bypass switch is locked, unlock it first. [Figure 5-25](#) shows a locked maintenance bypass switch. Turn on the switch to transfer the UPS to maintenance bypass mode.

The maintenance bypass switch is OFF by default and the handle points right horizontally. Turn on the switch by turning the handle clockwise 90 degrees until it points to the ground, as shown in [Figure 5-26](#).

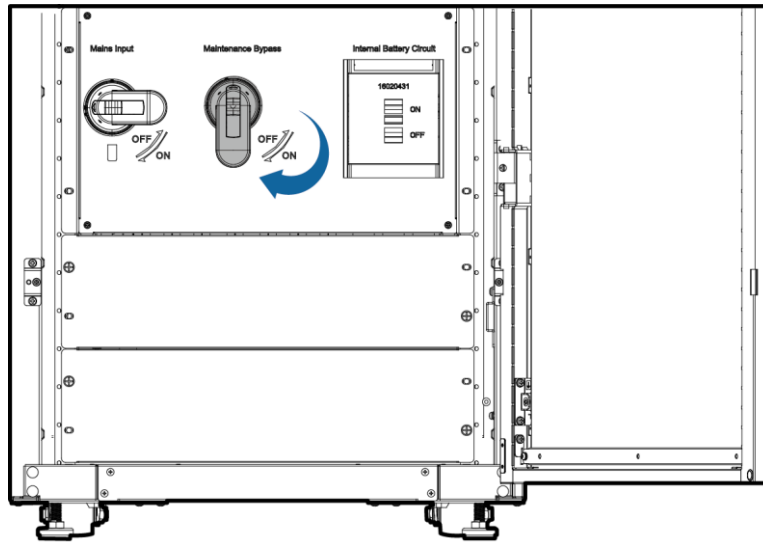
The **Maint. breaker closed** alarm is displayed in the alarm list, as shown in [Figure 5-27](#). The UPS transfers to maintenance bypass mode.

Figure 5-25 Locked maintenance bypass switch



UA1000066

Figure 5-26 Turning on the maintenance bypass switch



UA21H00025



NOTE

Exercise force when turning on or off the bypass maintenance switch.

Figure 5-27 Maint. breaker closed alarm

No.	Severity	Name	ID	Location	Time
1	Minor	Maint. breaker closed	0340-01	ECM 1	2013-07-10 16:36:21
2	Warning	Bypass mode	0358-01	UPS system	2013-07-10 16:18:02

 **NOTE**

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

----End

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.

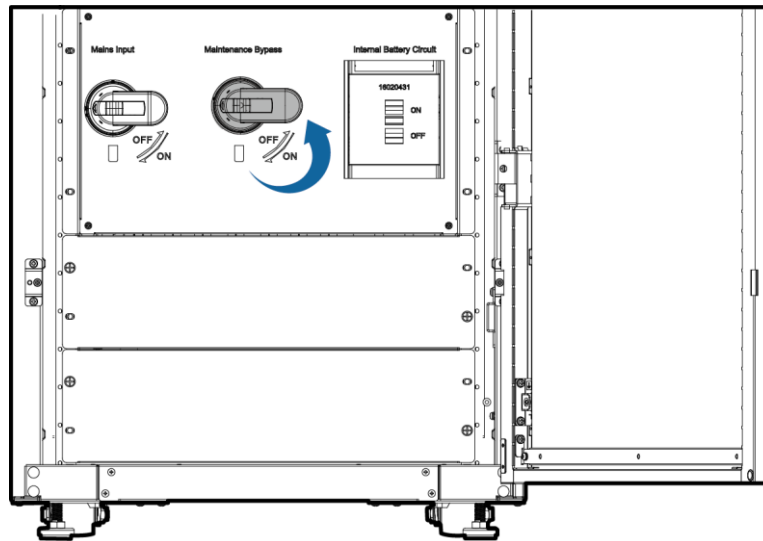
Procedure

- Step 1** Turn off the maintenance bypass switch.

The maintenance bypass switch points to the ground when it is turned on. To turn off the switch, face the cabinet and turn the handle counterclockwise 90 degrees until it points right horizontally, as shown in [Figure 5-28](#).

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 5-28 Turning off the maintenance bypass switch



UA21H00026

Step 2 Start the inverter.

----End

5.9 Performing EPO

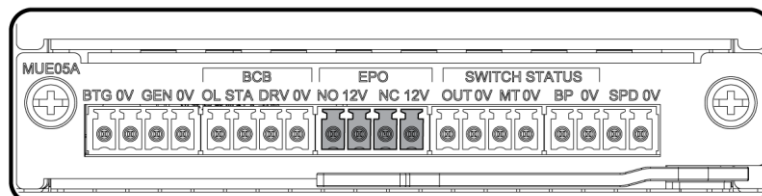


NOTICE

- 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.

Figure 5-29 EPO ports



UA10000097

Figure 5-30 EPO alarm displayed on the LCD

Active Alarms					
No.	Severity	Name	ID	Location	Time
1	Warning	No power supplied	0359-01	UPS system	2013-07-10 16:48:17
2	Critical	EPO	0085-01	ECM 1	2013-07-10 16:42:29

Figure 5-31 EPO alarm displayed on the WebUI

Active Alarms					
No.	Severity	Name	ID	Location	Time
1	Critical	EPO	0085-01	UPS system	2014-08-15 11:01:24.980
2	Warning	No power supplied	0359-01	UPS system	2014-08-15 11:01:20.300

Previous Next 1/1 Go To

NOTE

After you press the EPO button, the **EPO** and **No power supplied** alarms are displayed on the LCD.

5.10 Clearing the EPO State

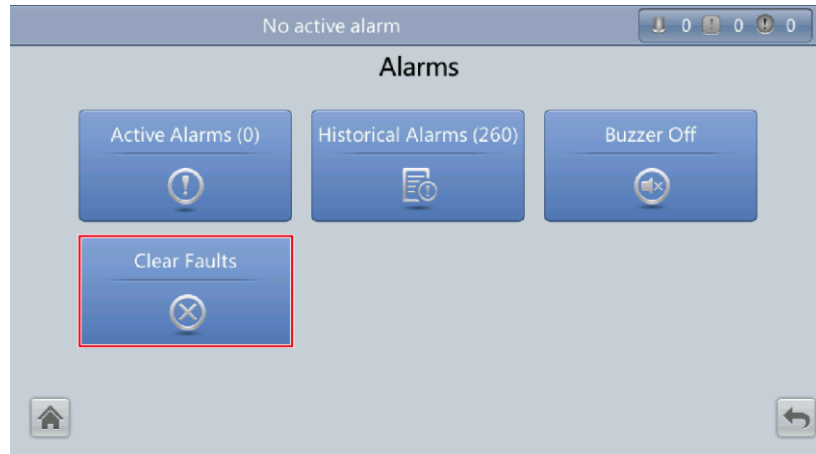
Procedure

- 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**. If you have not logged in, a login screen is displayed. Enter a user name and password, and tap

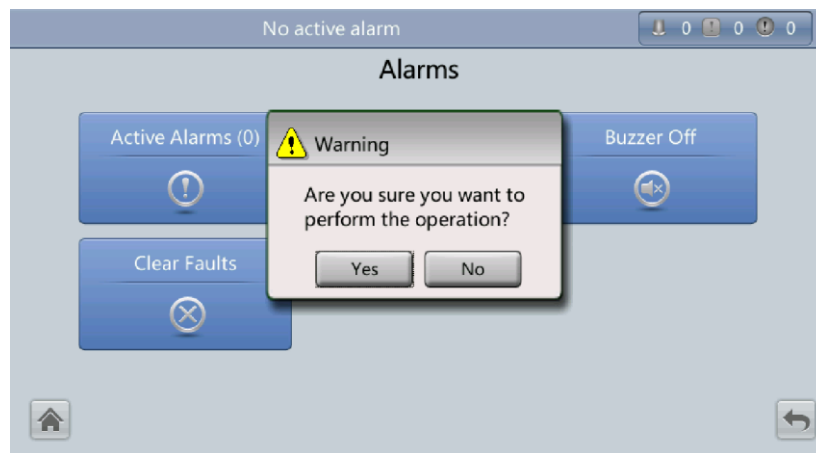


Figure 5-32 Alarms



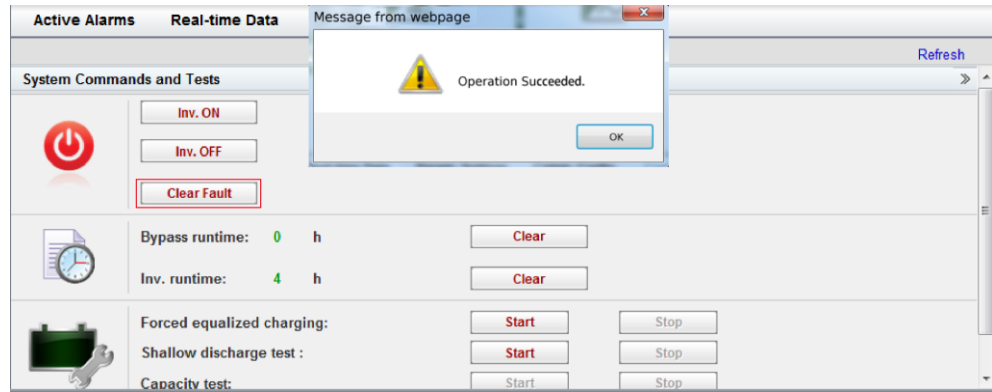
In the displayed dialog box, tap **Yes**. The EPO alarm is cleared successfully.

Figure 5-33 Clearing faults



- On the WebUI
In a web browser, enter the UPS IP address and select a display language. Enter a user name and password, and click **Login** to open the homepage. Choose **Monitoring** > **Control** > **System Commands and Tests** and click **Clear Fault**. The EPO alarm is cleared successfully.

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.

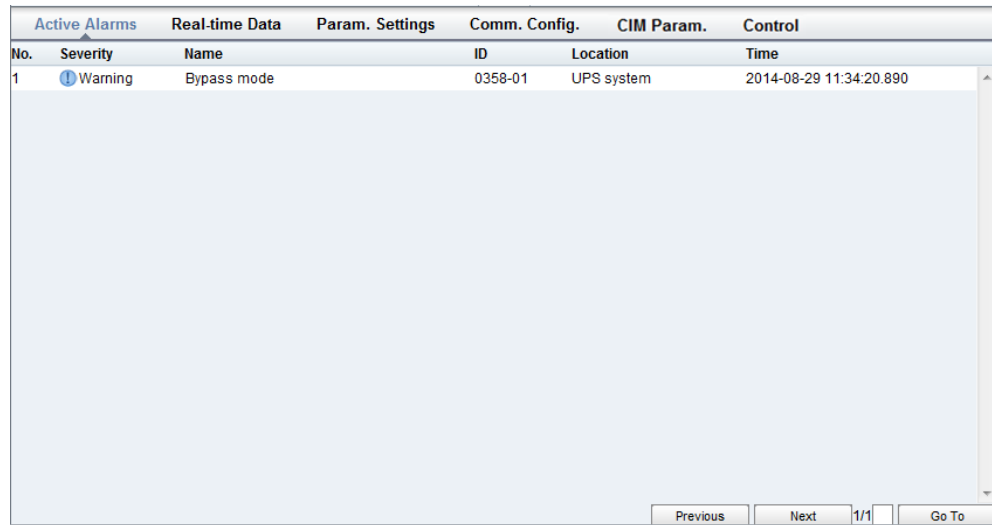
- Viewing active alarms on the LCD
Choose **System Info** > **Alarms** and tap **Active Alarms** to check that the EPO alarm is cleared.

Figure 5-35 Active alarms

No.	Severity	Name	ID	Location	Time
1	Warning	Bypass mode	0358-01	UPS system	2013-07-10 16:18:02

- Viewing active alarms on the WebUI
In a web browser, enter the UPS IP address and select a display language. Enter a user name and password, and click **Login** to open the homepage. Choose **Monitoring** > **Active Alarms** to check that the EPO alarm is cleared. If the bypass input is normal, the UPS transfers to bypass mode.

Figure 5-36 Active alarms



No.	Severity	Name	ID	Location	Time
1	Warning	Bypass mode	0358-01	UPS system	2014-08-29 11:34:20.890

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
- Fault data



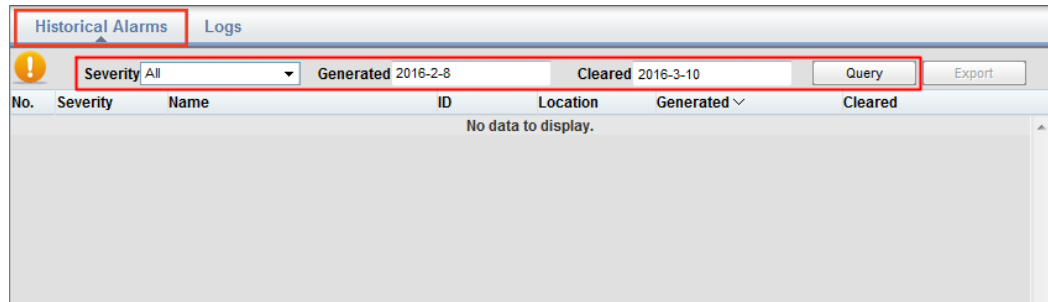
NOTE

This topic describes how to export historical alarms.

Procedure

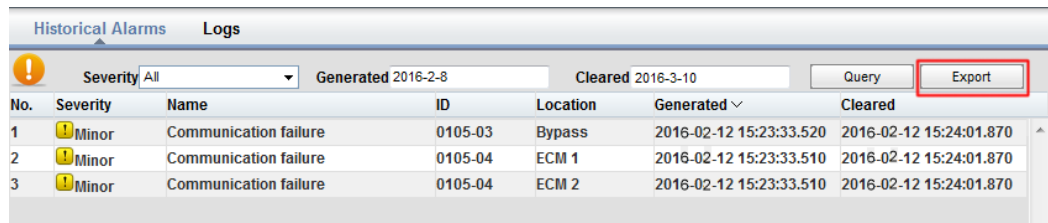
Step 1 Choose **Query > Historical Alarms**, and set **Severity**, **Generated**, and **Cleared**.

Figure 5-37 Querying historical alarms



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

Figure 5-38 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 enabling the hibernation mode:


- Ensure that the load power is stable. When 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 4.17 kVA for a 25 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

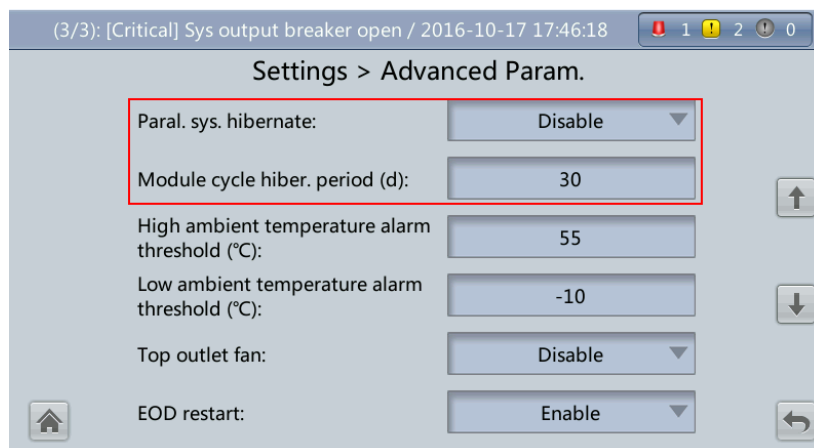
Step 1 On the main screen, tap **System Info** and . The **Settings** screen is displayed.

 **NOTE**

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

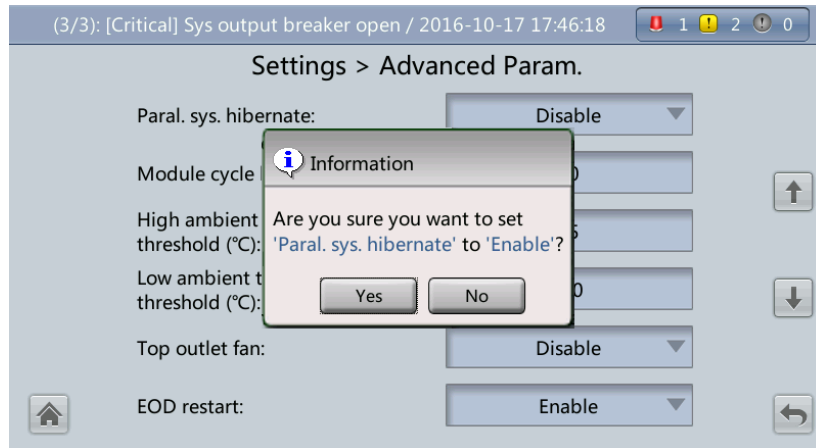
Step 2 Tap **Advanced Param.** Tap  or  to browse the parameters, as shown in [Figure 5-39](#).

Figure 5-39 Hibernation parameters on the LCD



Step 3 On the LCD, choose **Enable** from the **Paral. sys. hibernate** drop-down list box. A confirmation message is displayed, as shown in [Figure 5-40](#).

Figure 5-40 Confirmation message



- Step 4** Check that the load power is stable (that is, no transient fluctuation 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 Parameters**, as shown in [Figure 5-41](#).

Figure 5-41 Hibernation parameters on the WebUI

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Refresh				
Working mode		ECO		
BSC mode		Non-BSC		
Paral. sys. hibernate		Disable		
Module cycle hiber. period (d)		30		
Amb. temp. alarm thresh. (°C)		55		
Top outlet fan		Disable		
EOD restart		Enable		
EOD restart delay (min)		10		
Inverter async. alarm		Disable		
Bus overvoltage recovery		Enable		
Bus overvolt. recovery time		5s		
Capacitor failure detection		Enable		
Capacitor failure detection upper limit (A)		12.0		

- Step 3** On the WebUI, select **Enable** from the drop-down list box 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

6 Routine Maintenance

6.1 UPS Maintenance



NOTICE

- Only trained personnel are allowed to perform maintenance. Before performing operations on the UPS, wear electrostatic discharge (ESD) clothes, ESD gloves, and an ESD wrist strap. Remove conductive objects such as jewelry or watches during operations to avoid electric shocks or burns.
- Use insulated tools when maintaining internal devices. Only trained personnel are allowed to perform maintenance. Customers are not allowed to maintain components behind protective covers that can be removed only using tools. If the components are to be maintained, contact Huawei technical support.
- Only maintenance engineers can maintain power modules and bypass modules.
- Maintain UPSs regularly based on the following requirements. Otherwise, the UPSs may fail to operate properly and the service life may be shortened.

6.1.1 Monthly Maintenance

Table 6-1 Monthly maintenance

Check Item	Expected Result	Troubleshooting
Operating environment	<ul style="list-style-type: none">• Ambient temperature: 0–40 °C• Humidity: 0–95% RH (non-condensing)• Rodent-proof measures have been taken for the equipment room.• The equipment room is airtight.	<ul style="list-style-type: none">• If the humidity or temperature is abnormal, check the air conditioner status.• Put rodent-proof baffle plates at the door of the UPS equipment room.• Check that the equipment room is airtight and not in a direct ventilation environment.

Check Item	Expected Result	Troubleshooting
Power grid environment	<ul style="list-style-type: none"> Input voltage: 380 V AC, 400 V AC, or 415 V AC (line voltage) Output voltage: 380 V AC, 400 V AC, or 415 V AC (tolerance $\pm 1\%$, line voltage) Frequency: 40–70 Hz 	<ul style="list-style-type: none"> If the input voltage is abnormal, check the power grid status and input cable connection. 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.

Check Item	Expected Result	Troubleshooting
Power cables and terminals (between the UPS and the power distribution cabinet)	The insulation layer of cables is intact and terminals are free from black marks and noticeable sparks.	<ul style="list-style-type: none"> • Replace the cables. • Secure the output terminals.
Cables and circuit breaker through-current capacity	<p>The circuit breakers and cables meet load requirements.</p> <p>The actual cable through-current capacity is greater than the circuit breaker specifications.</p>	<ul style="list-style-type: none"> • Replace the circuit breaker. • 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:

- 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 operating temperature	<ol style="list-style-type: none"> 1. The ambient battery temperature is 25 ± 5 °C. 2. The battery operating temperature is lower than battery temperature + 20 °C. 3. Battery charge and discharge conditions meet the requirements specified in the battery specifications. 	<ol style="list-style-type: none"> 1. Identify the cause of an abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.

Item	Expected Result	Troubleshooting
Charge voltage of battery string	<ul style="list-style-type: none"> Equalized charging voltage: 2.35 V/cell \pm 1% x number of battery cells Float charging voltage: 2.25 V/cell \pm 1% x number of battery cells 	<ol style="list-style-type: none"> If the voltage drop between the battery string output terminals and the battery input terminals at the UPS side is greater than 1% of the battery string voltage, check whether the cable between the battery string and the UPS is excessively long, or the cable diameter is excessively small. Check whether the equalized charging voltage and float charging voltage are correctly set for the UPS. If the fault persists, contact Huawei technical support.

6.2.3 Quarterly Maintenance

Table 6-6 Quarterly maintenance

Item	Expected Result	Troubleshooting
Battery management parameter settings	The settings of battery management parameters meet the requirements in the user manual.	Set parameters correctly.
Battery module ready switch	The battery module ready switch is in locked state.	Rotate the battery module ready switch to the locked state.
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	<ol style="list-style-type: none"> If the batteries cannot discharge normally, locate the fault (for abnormal alarms, see the alarm list). If the fault persists, contact Huawei technical support.

6.2.4 Annual Maintenance

Table 6-7 Annual maintenance

Item	Expected Result	Troubleshooting
Capacity Test (recommended)	When the UPS is backed up, discharge a battery to the undervoltage alarm threshold, to refresh the capacity of the battery.	<ol style="list-style-type: none"> Locate the cause when an exception is identified. If the fault persists, contact Huawei technical support.

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.
- 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.

If any unmentioned faults occur, see the alarm list chapter, or contact Huawei technical support.

Table 7-1 Troubleshooting

Case	Symptom	Possible Cause	Measure
The rectifier is not normal.	The rectifier is not working, and the bus voltage is not boosted.	The mains voltage exceeds the upper threshold 280 V or is less than the lower threshold 80 V.	Check whether the mains voltage exceeds the threshold. If yes, contact the electric power company.

Case	Symptom	Possible Cause	Measure
		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.

Case	Symptom	Possible Cause	Measure
A battery module is abnormal.	The buzzer is activated, and the Fault indicator is on.	The battery module is not properly installed.	Check whether the positioning lock on the faulty battery module is in locked state. If the positioning lock is in unlocked state, remove the battery module and check whether the pins of the output DL terminal of the battery module are damaged. If the terminal is abnormal, replace the battery module.
		A fuse inside a battery module is blown.	Check whether the output voltage of the faulty battery module is normal. If the voltage is abnormal, replace the battery module.



NOTE

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

8 Technical Specifications

8.1 Physical Specifications

Item	UPS5000-E-75K-BF
Cabling mode	<ul style="list-style-type: none"> Power cables are routed in and out from the bottom. Signal cables are routed from the top or bottom.
Protection level	IP20 (IP21 requires the configuration of IP21 components.)
Communication	Supports dry contact, RS485 serial port, and FE port. Supports the Simple Network Management Protocol (SNMP).
Product weight (net weight)	<ul style="list-style-type: none"> 25 kVA (full configuration): 890 kg 50 kVA (full configuration): 910 kg 75 kVA (full configuration): 930 kg Battery cabinet (full configuration): 1400 kg

8.2 Environmental Specifications

Item	UPS5000-E-75K-BF
Operating temperature	0 °C to 40 °C
Storage temperature	<ul style="list-style-type: none"> UPS and optional components except battery module: -40 °C to +70 °C Battery module (including batteries): -20 °C to +40 °C
Humidity	0-95% RH (non-condensing)
Altitude	0-1000 m When the altitude is greater than 1000 m and less than 5000 m, the rated power should be derated. For details, see the IEC62040-3.

Item	UPS5000-E-75K-BF
Noise	At 25 °C and under constant pressure: < 65 dB

8.3 Safety Regulations and EMC

Item	UPS5000-E-75K-BF
Safety regulations	EN62040-1: 2013 IEC62040-1: 2013 YD/T2165-2010
EMC	EN62040-2 IEC62040-2 IEC61000-2-2 IEC61000-4-2 IEC61000-4-6 IEC61000-4-3 IEC61000-4-11 IEC61000-4-4 IEC61000-4-5

8.4 Mains Input Electrical Specifications

Item	UPS5000-E-75K-BF
Input system	Three-phase, four-wire, and PE wire
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)
Input voltage range	80–280 V AC (phase voltage) At 0–40 °C: The UPS works at full load when the voltage is 176–280 V AC and is linear derated to 40% load when the voltage is 176–80 V AC.
Input frequency range	40–70 Hz
Input PF	> 0.99 (full load), > 0.98 (50% load)
THDi	< 3% (full linear load); < 5% (full non-linear load)

8.5 Bypass Input Electrical Specifications

Item	UPS5000-E-(25 kVA-75 kVA)
Input voltage range	<ul style="list-style-type: none"> • Upper threshold: +10%, +15% (default), +20%, +25% (when the voltage system is 380 V AC) • Upper threshold: +10%, +15% (default), +20% (when the voltage system is 400 V AC) • Upper threshold: +10% (default), +15% (when the voltage system is 415 V AC) • Lower threshold: -10%, -15%, -20% (default), -30%, -40%, -50%, or -60%
Input system	Three-phase, four-wire, and PE wire
Rated frequency	50 Hz or 60 Hz
Input frequency range	± 6 Hz (adjustable, 0.5–6 Hz, ± 2 Hz by default)
Input mode	Single mains

8.6 Battery Specifications

Item	UPS5000-E-(25 kVA-75 kVA)
Battery voltage	480 V DC
Number of batteries	Forty 12 V batteries
Battery leakage current	$\leq 500 \mu\text{A}$ for a single power module. If there are N modules, the leakage current is $N \times 500 \mu\text{A}$.
Battery deep discharge protection	<ul style="list-style-type: none"> • The discharge time is longer than 24 hours. (The maximum battery discharge time can be set on the LCD. The value in the range of 0–48 hours. The default value is 24 hours. If the time is set to 0 hours, battery discharge protection is not implemented.) • In normal mode, the battery voltage is less than 10.8 V.
Battery management	Intelligent battery management is supported.
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.

Item	UPS5000-E-(25 kVA-75 kVA)
Charge voltage	<ul style="list-style-type: none"> Equalized voltage: 2.3–2.4 V/Cell, default: 2.35 V/Cell Float voltage: 2.23–2.3 V/Cell, default: 2.25 V/Cell

8.7 Output Electrical Specifications

Item	UPS5000-E-75K-BF
Rated capacity	25 kVA–75 kVA: 25 kVA/50 kVA/75 kVA
Output system	Three-phase, four-wire, and PE
Rated output voltage	380 V AC/400 V AC/415 V AC (line voltage)
Output voltage precision	±1%
Frequency	In normal mode, the mains frequency is synchronized with the bypass input frequency. In battery mode, the frequency is 50 Hz or 60 Hz (tolerance ±0.05%).
Total harmonic distortion (THD)	<ul style="list-style-type: none"> ≤ 1% (full linear load) ≤ 4% (full non-linear load)
Output PF	1
Transfer time	<ul style="list-style-type: none"> 0 ms (uninterruptible transfer) ≤ 20 ms (interruptible transfer)
Output voltage unbalance	Voltage unbalance: ±3%, phase unbalance: 120±2°
Overload capability	<p>Inverter overload capability:</p> <ul style="list-style-type: none"> 100% < load ≤ 110%: after 60 minutes, transfer to bypass mode if the bypass is normal or disconnect output if the bypass is abnormal 110% < load ≤ 125%: after 10 minutes, transfer to bypass mode if the bypass is normal or disconnect output if the bypass is abnormal 125% < load ≤ 150%: after 1 minute, transfer to bypass mode if the bypass is normal or disconnect output if the bypass is abnormal Load > 150% or in case of short circuit, the inverter can work for 200 ms.

8.8 System Electrical Specifications

Item	UPS5000-E-75K-BF
Redundancy design	The auxiliary power supplies, centralized controllers, and parallel signals use redundancy design.

8.9 Internal Switch Parameters

Switch	UPS5000-E-75K-BF	ESS-480-72BCN1
Input switch	750 V AC 160 A/3P	N/A
Maintenance bypass switch	750 V AC 160 A/3P	N/A
Battery switch	750 V DC 250 A/3P	750 V DC 400 A/3P

A Menu Hierarchy

A.1 Menus on the LCD

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

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	
		Dry Contacts	N/A	
		Settings Wizard	N/A	
	Maintenance	Battery Maint.	N/A	
		USB Operations	Remove USB	
			Upgrade Software	
			Load Config.	
			Export Config.	
			Export Logs	
			Export E-labels	
			Export Alarms	
			Multi-brand	
			Serviceable data	
			Inv. ON	N/A
		Inv. OFF	N/A	
		ECM Switchover	N/A	
	Screen Calib.	N/A		
	Bus Capa. Life	N/A		
	About	Model	N/A	
		Manufacturer	N/A	
		Monitoring Version	N/A	
		Power Version	N/A	
		Version Info	N/A	
	Common Functions	AC Output	Phase voltage	N/A
Line voltage			N/A	
Phase current			N/A	
Frequency			N/A	
Power factor			N/A	
UPS Load		Active power	N/A	
		Apparent power	N/A	
		Reactive power	N/A	

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu
		Load ratio	N/A
		Crest factor	N/A
	Mains Input	Phase voltage	N/A
		Line voltage	N/A
		Phase current	N/A
		Frequency	N/A
		Power factor	N/A
		Inv. ON	N/A
	Inv. OFF	N/A	N/A
	Buzzer Off	N/A	N/A
	Historical Alarms	N/A	N/A
System Status	Bypass	N/A	N/A
	Mains	N/A	N/A
	Load	N/A	N/A
	Battery	N/A	N/A

A.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	
			Bypass	Phase voltage
				Line voltage
				Current

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
				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
			Environment Data	Ambient temperature
				Ambient humidity
		Module	Rectifier	Phase voltage
				Line voltage
				Current
				Power factor

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
				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
	Param. Settings	Basic Parameters	Single/Parallel	N/A
			Voltage level	N/A
			Output frequency	N/A
			Battery capacity	N/A
			Number of cells	N/A
		Advanced Parameters	System capacity	N/A
			Power module capacity	N/A
			Requisite modules	N/A
			Redundant modules	N/A
			Num of batt racks	N/A
			Working mode	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			BSC mode	N/A
			Paral. sys. hibernate	N/A
			Module cycle hiber. period	N/A
			Amb. temp. alarm thresh	N/A
			Environ Temp Warn Point	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
			Input cur. limiting	N/A
			Input cur. limiting ratio	N/A
			No-load output shows zero	N/A
			Current equal. detection	N/A
			Bus Capa. Life	N/A
			Altitude (m)	N/A
			ModbusTCP encryption	N/A
			Air filter maintenance period	N/A
		Input Parameters	D.G. mode	N/A
			D.G. power limiting	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			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 Parameters	Output volt. adjustment	N/A
			Outp. transf. interrupt time	N/A
			Self-load output cur. ratio	N/A
			Output interruption transfer time	N/A
			Max. BPM transfer times	N/A
		Bypass Parameters	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 Parameters	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

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			Transfer-to-equalized charging SOC value	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
			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

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			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
			Single batt. float chg. voltage deviation alam thres.	N/A
			Single batt. dis. voltage deviation alam thres.	N/A
		Dry Contacts	MUE05A connection	N/A
			Battery ground fault	N/A
			D.G. connection	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
			MUS05A DO_1 Action	N/A
			MUS05A DO_2 Action	N/A
			MUS05A DO_3 Action	N/A
			MUS05A DO_4 Action	N/A
		MUS05A DO_1	N/A	
		MUS05A DO_2	N/A	
		MUS05A DO_3	N/A	

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu	
	Comm. Config.	System IP Settings	MUS05A DO_4	N/A	
			IP Address	N/A	
			Subnet Mask	N/A	
			Default 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 humidity sensors	N/A	
		NTC Settings	NTC	N/A	
		Control	System Commands and Tests	Inv. ON	N/A
				Inv. OFF	N/A
				Clear Fault	N/A
				Bypass runtime	N/A
	Inv. runtime			N/A	
	Forced equalized charging			N/A	
	Shallow discharge test			N/A	
Capacity Test	N/A				
Query	Alarm History	Query	N/A	N/A	
		Export	N/A	N/A	
	Logs	Historical log	N/A	N/A	

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu	
		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	Time zone	N/A
			System Date and Time	Sync with NTP servers	N/A
				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	
			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		

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
		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
			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	Upload	N/A
			Password	N/A
			Confirm password	N/A
		eUPS Certificate Management	Upload	N/A
			Password	N/A
			Confirm password	N/A
Maint.	Calib	Bypass	Ph. A input volt.	N/A
			Ph. B input volt	N/A
			Ph. C input volt	N/A
			Ph. A output volt.	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			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
			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	

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			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
			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

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
		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. 3 data	N/A
			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
		ECM SW commissioning var. 1 data		N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			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. 5 data	N/A
	Upgrade	Upgrade UPS Software	N/A	N/A
	Download	Download	Fault Data	N/A
			E-Label	N/A
	Bus Capa. Life	Bus Capa. Life	Module	N/A
			Bus capacitor life	N/A

B (Optional) TN-C System Application

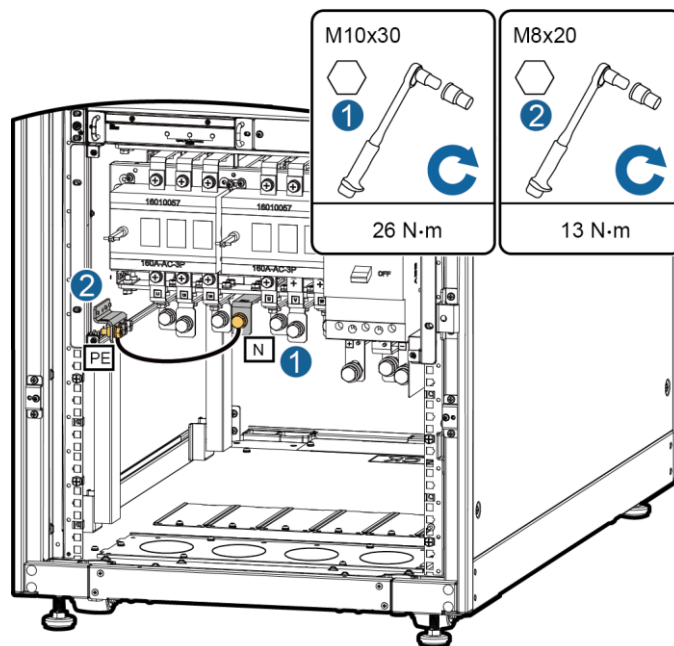
If the TN-C system is adopted, short-circuit the input N and PE. The recommended cross-sectional area for the cable is 25 mm².



NOTE

The following cable connections are for reference only.

Figure B-1 Short-circuiting the input N and PE



UA21110046

C Alarm List

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0001-1	Mains voltage abnormal	Minor	<ul style="list-style-type: none"> • Cable connections are incorrect. • The mains is not normal. • The power module is faulty. 	<ol style="list-style-type: none"> 1. Check whether cables to mains are disconnected, loose, or incorrectly connected. 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			<ul style="list-style-type: none"> • Cable connections are incorrect. • The mains is not normal. • The mains input fuse for the power module is blown. 	<ol style="list-style-type: none"> 1. Check whether cables to mains are disconnected, loose, or incorrectly connected. 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.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0005-1	Mains neutral absent	Minor	Cable connections are incorrect.	<ol style="list-style-type: none"> 1. Secure or connect the neutral wire to the cabinet if it is loose or disconnected. 2. Check that the neutral wire to the power distribution system is normal.
0006-1	Mains undervoltage	Minor	<ul style="list-style-type: none"> • The mains is not normal. • 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	<ul style="list-style-type: none"> • The bypass voltage range is not correctly set. • The bypass input voltage is not normal. 	<ol style="list-style-type: none"> 1. Check the bypass input voltage or cable connections with a multimeter. 2. Check the voltage system and bypass voltage thresholds configured on the LCD.
0010-2			<ul style="list-style-type: none"> • The bypass frequency range is not correctly set. • The bypass input frequency is not normal. 	<ol style="list-style-type: none"> 1. Check the bypass input voltage or cable connections with a multimeter. 2. Check the bypass input frequency. Check the rated frequency and frequency range configured on the LCD.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0011-1	Bypass phase reversed	Minor	The phase sequence of the three-phase bypass input is reversed.	Check whether the cable phase sequence is correct using a multimeter. If no multimeter is available, exchange the positions of any two cables.
0012-1	Bypass neutral absent	Minor	The neutral wire of bypass input is not installed properly.	<ol style="list-style-type: none"> 1. Secure or connect the neutral wire to the cabinet if it is loose or disconnected. 2. Check that the neutral wire to the power distribution system is normal.
0020-1	Battery connected reversely	Critical	Batteries are not properly installed.	<ol style="list-style-type: none"> 1. Check whether battery polarities are correctly installed by using a multimeter. If no, correct the installation. 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	<ul style="list-style-type: none"> • There is no battery string. • The battery string is not properly installed. • The power module battery fuse is blown. 	<ol style="list-style-type: none"> 1. Check that battery cables are correctly connected. 2. Check that the battery terminal voltage is normal. 3. Check that the battery fuse in the power module is intact.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0025-1	Battery overvoltage	Minor	<ul style="list-style-type: none"> The configured number of batteries is less than the actual number. The battery neutral wire is not installed properly. 	<ol style="list-style-type: none"> Check whether battery parameters are correctly set. If they are correctly set, certain batteries may be faulty. Check whether the battery neutral wire is correctly connected.
0026-1	Low battery voltage	Minor	<ul style="list-style-type: none"> Battery discharge results in low battery voltage. The battery neutral wire is not installed properly. The charger is faulty. 	<ol style="list-style-type: none"> If the low battery voltage alarm is generated in battery mode, check whether the mains voltage recovers. If yes, charge batteries immediately. Check whether the battery neutral wire is correctly connected. 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.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0530-1	Battery ground fault	Critical	<ul style="list-style-type: none"> The battery string is not properly grounded. The battery ground monitoring cable is faulty. The dry contact board is faulty. 	<ol style="list-style-type: none"> Check whether the positive and negative terminals of the battery string are grounded or have sufficient resistance to the ground. Check whether the battery grounding failure detector is faulty by replacing it with a new one. 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 protection	Critical	<ul style="list-style-type: none"> The battery voltage is greater than the upper threshold. The configured number of batteries is less than the actual number. The actual number of batteries does not meet requirements. 	<ol style="list-style-type: none"> Check the battery voltage. Check that the configured number of batteries matches the actual number. Check that the actual number of batteries meets requirements.
0036-2	Battery maintenance reminder	Warning	The time for maintenance arrives.	Maintain the batteries.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0037-1	Battery undervoltage	Critical	<ul style="list-style-type: none"> The UPS has worked in battery mode for an extended amount of time. The charger is faulty. 	<ol style="list-style-type: none"> Check whether the battery voltage is normal. Check whether the output is overloaded. Check whether any battery is damaged. If yes, replace the battery. Check whether any battery charger generates an alarm. If yes, replace the faulty module.
0040-7	Rectifier abnormal	Critical	<ul style="list-style-type: none"> The fan for the power module is not functioning properly. The air channel for the power module is obstructed. 	<ol style="list-style-type: none"> Check that the air channel for the module is free from blockage. Check whether the fans are functioning properly. Replace the power module if the fans are faulty.
0043-1	Fan abnormal	Critical	<ul style="list-style-type: none"> The fan for the power module is abnormal. 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			<ul style="list-style-type: none"> The fan is 	<ol style="list-style-type: none"> Replace the fan.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0043-4			faulty. <ul style="list-style-type: none"> The fan monitoring cable is faulty. 	2. Check the fan monitoring cable.
0047-1	Not ready	Critical	The ready switch is OFF.	Close the ready switch.
0060-4	Inverter abnormal	Critical	<ul style="list-style-type: none"> A load short-circuit occurs. A short circuit occurs inside the module. (This fault seldom occurs.) 	1. Check load cable distributions. 2. If load cable distributions are normal, replace the power module.
0061-2	Inverter alarm	Minor	<ul style="list-style-type: none"> The I2C bus is not normal. The E2PROM is faulty. 	1. Rectify the fault and check whether the alarm is cleared. 2. If the alarm is generated again, replace the power module.
0061-7	Inverter alarm	Minor	The bypass waveform is not normal.	<ul style="list-style-type: none"> If not all modules generate the alarm, start the UPS, transfer it to normal mode, and replace the faulty module. 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.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0564-1	Overload timeout	Critical	<ul style="list-style-type: none"> The load is excessive. Derating reduces the rated system power. The module is damaged. 	<ol style="list-style-type: none"> Check that there is no overload. Check that the module power is not derated due to a fan fault. If the alarm persists, replace the power module.
0565-1	Load impact transfer-to-bypass	Minor	<ul style="list-style-type: none"> A large-power RCD load is instantly connected, or the output load short-circuits. The inverter bridge short-circuits. 	<ol style="list-style-type: none"> Check the load. If the load is normal, replace the power module.
0566-1	Output overload	Minor	<ul style="list-style-type: none"> The load is excessive. Derating reduces the rated system power. The module is damaged. 	<ol style="list-style-type: none"> Check that there is no overload. Check that the module power is not derated due to a fan fault. If the alarm persists, replace the power module.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0570-4	BPM module abnormal	Critical	<ul style="list-style-type: none"> The bypass fan is not functioning properly, or the air channel is blocked. The ambient temperature exceeds the upper threshold. The load is excessive. 	<ol style="list-style-type: none"> Check the bypass fan and air channel. If the fan is faulty, replace it. Check that the ambient temperature has not exceeded 40 °C. Check that there is no overload.
0583-1	Inter-rack par. cable abnormal	Critical	<ul style="list-style-type: none"> The inter-rack parallel system CAN bus is disconnected or short-circuited. Only one rack works in a parallel system. An ECM is faulty. 	<ol style="list-style-type: none"> Check the inter-rack parallel system CAN bus. Rectify the disconnection or short-circuit fault. Replace the ECM.
0583-4			The inter-rack industrial frequency synchronization cable is broken.	Replace the inter-rack parallel cable.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0583-5			The inter-rack carrier synchronization cable is broken.	
0583-6			<ul style="list-style-type: none"> The intra-rack INVBYP cable is broken. 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-bypass	Warning	The neighboring UPS is not normal, and transfers to bypass mode.	Check the reason why the neighboring UPS transfers to bypass mode.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0088-1	Rack address conflict	Critical	The configured rack address conflicts with another one.	Check the rack address setting.
0089-1	Rack output overload	Minor	<ul style="list-style-type: none"> The load is excessive. The rack capacity setting is not appropriate. 	<ul style="list-style-type: none"> Check the load and remove some loads or expand the UPS power capacity if the UPS is overloaded. 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.
0334	BSC master system	Warning	BSC master system.	The running status is displayed. No further measures are required.
0334	BSC slave system		BSC slave system.	The running status is displayed. No further measures are required.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0337	PDC bypass input breaker open	Critical	The bypass input circuit breaker on the PDC is OFF.	The running status is displayed. No further measures are required.
0338	PDC output breaker open	Critical	The output circuit breaker on the PDC is OFF.	<ol style="list-style-type: none"> 1. Check that all UPS output circuit breakers are ON. 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	<ul style="list-style-type: none"> • The load is excessive. • The configured number of redundant racks is incorrect. 	<ol style="list-style-type: none"> 1. Reduce the load. 2. Decrease the configured number of redundant racks.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0095-1	Insuffi. redundancy	Minor	<ul style="list-style-type: none"> The load is excessive. The configured number of redundant modules is incorrect. 	<ol style="list-style-type: none"> Reduce the load. Decrease the configured number of redundant modules.
0096-1	ECO volt. Abnormal	Minor	<ul style="list-style-type: none"> The ECO bypass voltage or frequency is out of the preset range. The ECO bypass voltage or frequency range is incorrectly set. The bypass input sequence is reverse or the neutral wire is disconnected. 	<ol style="list-style-type: none"> Check the bypass input voltage and frequency. Check that the rated voltage, rated frequency, ECO bypass voltage range, and frequency range are correctly set. Check that the bypass cables and circuit breakers are correctly connected.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0098-1	Bypass current not shared	Minor	<ul style="list-style-type: none"> The output and input circuit breakers are OFF. The length of the bypass input or output cables is incorrect. The bypass SCR open-circuits. 	<ol style="list-style-type: none"> Check that the output and bypass input circuit breakers on each rack are ON. Check that bypass input and output power cables on each rack meet the length requirements. Rectify any bypass SCR open-circuit.
0150-1	Inverter asynchronous	Minor	<ul style="list-style-type: none"> The bypass frequency changes fast. The output frequency track rate is incorrectly set. 	<ol style="list-style-type: none"> Check that the bypass output frequency does not change fast. Check that the Output freq. track rate is properly set.
0101-1	BSC signal abnormal	Minor	<ul style="list-style-type: none"> The dual bus connector is loose. Parameters are set incorrectly. 	<ol style="list-style-type: none"> Check the dual bus connector. Check the parameter settings.
0102-1	Maint. breaker misoperation	Critical	The user operation is incorrect.	<ol style="list-style-type: none"> Shut down the inverter and then close the maintenance circuit breaker. After maintenance, open the maintenance circuit breaker and then start the inverter.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0380	In self-check	Warning	The inverter is in self-check.	Wait until the inverter self-check is complete.

D Acronyms and Abbreviations

A

ASIC	application-specific integrated circuit
ATS	AC transfer switch
AWG	American wire gauge

B

BSC	bus synchronization controller
BCB	battery circuit breaker box
BBB	battery bus bar box
BMU	battery monitoring unit

C

CAN	control area network
CM	control module

D

D.G	diesel generator
DSP	digital signal processing

E

ECO	economic control operation
EPO	emergency power-off
ECM	energy control module
EOD	end of discharge

ESD	electrostatic discharge
F	
FE	fast Ethernet
I	
I²C	Inter-Integrated Circuit
IEC	International Electrotechnical Commission
L	
LCD	liquid crystal display
LSI	large-scale integrated
M	
MCCB	molded case circuit breaker
MDU	monitor display unit
N	
NC	normally closed
NO	normally open
NTC	negative temperature coefficient
O	
O&M	operation and maintenance
P	
PCB	Printed circuit board
PDC	power distribution cabinet
PE	protective earthing
PF	power factor
PVC	Polyvinyl chloride
R	

RS485	Recommend Standard 485
S	
SELV	safety extra-low voltage
STS	static transfer switch
SNMP	Simple Network Management Protocol
SOC	state of charge
SPD	surge protective device
SSL	Secure Sockets Layer
T	
THDi	total distortion of the input current waveform
THDv	total harmonic distortion of output voltage
TNV	telecommunication network voltage
U	
UPS	uninterruptible power system
USB	Universal Serial Bus
V	
VRLA	valve-regulated lead acid battery
W	
WebUI	web user interface