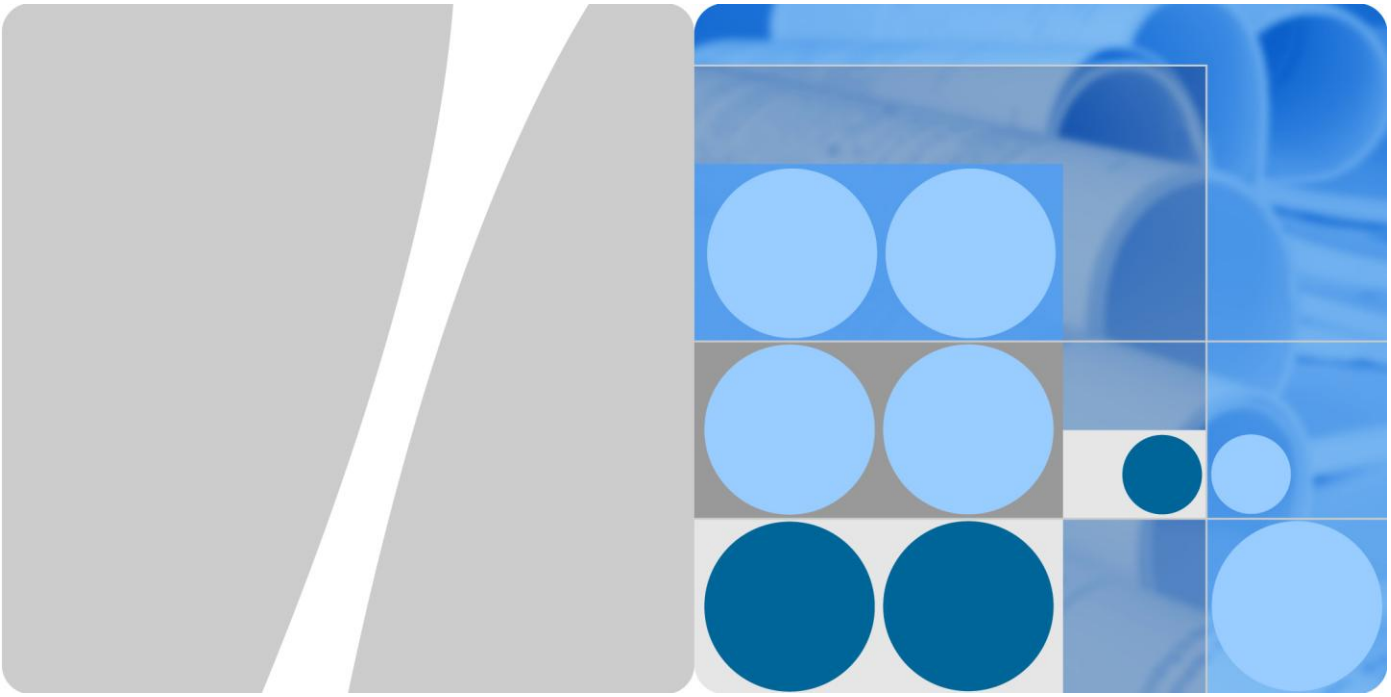
Part number: 31010LMQ



UPS5000-E-(40 kVA-320 kVA)

User Manual

Issue 10

Date 2015-09-15

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About This Document

Purpose

This document describes the UPS5000-E-(40 kVA-320 kVA) in terms of its features, performance, working principles, appearance as well as instructions for installation, and operation and maintenance (O&M).

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.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.

Symbol	Description
	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 10 (2015-09-15)

Upgraded the software version and added the description of the UPS5000-E-320K-F320T.

Issue 09 (2015-08-20)

Deleted V100R001 from the version information.

Issue 08 (2015-04-02)

Updated the Monitoring screen image.

Issue 07 (2014-10-31)

Modified some pictures based on Issue 06.

Issue 06 (2014-09-02)

- Optimized the document architecture.
- Updated the Monitoring screen image.

Issue 05 (2013-12-12)

Four UPS5000-E-320 kVAs can be paralleled.

Issue 04 (2013-11-12)

Updated figures.

Issue 03 (2013-09-10)

Added the description of the UPS5000-E-(240 kVA-320 kVA) based on Issue 02.

Issue 02 (2013-07-30)

Modified some pictures based on Issue 01.

Issue 01 (2013-06-15)

This is the first release.

Contents

1 Safety Precautions

1.1 General Safety Precautions

This section describes the safety precautions that you must take 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 installation or maintenance. The "NOTICE", "CAUTION", "WARNING", and "DANGER" statements in this document do not represent all the safety instructions. They are only supplements to the safety instructions. Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment, and they must understand basic safety precautions to avoid hazards.

To ensure safety of humans and the equipment, pay attention to the safety symbols on the equipment and all the safety instructions in this document. Huawei will not be liable for any consequence caused by the violation of the safety operation regulations and design, production, and usage standards.

Declaration

Huawei does not take responsibilities for the following situations:

- Operation under severe environments which are not specified in this document.
- Usage under installation and operating environments which are not specified in related international specifications.
- Unauthorized product changes and software code modification.
- Operation ignoring safety precautions and operation guidance specified in this document.
- Damage caused by abnormal 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 (IEC60364-3).

Local Safety Regulations

When operating the equipment, you must follow local laws and regulations. The safety instructions in this document are only supplements to the local laws and regulations.

Personal Requirements

DANGER

Only engineers certified by the manufacturer or its agents are allowed to perform UPS commissioning and maintenance. Otherwise, human injury or equipment damage may occur, and the resulting UPS faults are beyond warranty scope.

Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment, and they must understand basic safety precautions to avoid hazards.

- Only trained and qualified personnel are allowed to install, operate, and maintain the UPS.
- Only trained and qualified personnel are allowed to remove safety facilities and inspect the equipment.
- Only personnel certified or authorized by Huawei are allowed to replace or change the devices or components (including software).
- Installation personnel must report faults or errors that might cause serious safety issues to related owners.
- This product should be installed and used by following the specification requirements (see the chapters related to installation and technical specifications) specified in this manual. Otherwise, the product may be damaged, and the resulting product exceptions or component damage are beyond the warranty scope.

Grounding Requirements

Equipment to be grounded (excluding the energy storage system) must meet the following requirements:

- Ground the device before you install it and disconnect the ground cable after you remove the device.
- Do not damage the ground conductor.
- Do not perform operations on the device if the ground conductor is not installed.
- The device must be grounded permanently. Before performing operations on the device, check the electrical connection of the device to ensure that it is securely grounded.

Personal Security

- Do not perform operations on devices or cables during lightning strikes.

- To avoid electric shocks, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- Before performing operations on a device, wear electrostatic discharge (ESD) clothes, ESD gloves, and an ESD wrist strap. Do not wear jewelry or watches during 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.
- Keep all switches OFF during device installation.
- Power on the UPS only after authorized engineers arrive at the site.
- If you use a C2 UPS in residential areas, take installation restriction or additional measures to prevent radio frequency interferences.
- If you use the UPS for life-supporting medical apparatus and facilities such as lifts where adequate care has to be taken to ensure personal security, discuss with the manufacturer in advance about the applicability, settings, management, and maintenance of the UPS, which require special considerations during design.

Device Security

- Before operation, ensure that the device is firmly anchored to the floor or other solid objects, such as a wall or an installation rack.
- Do not block ventilation vents while the system is operating.
- Before powering on the device, ensure that it is securely screwed and will not fall over during operation.
- After the installation, remove packing materials from the equipment area.
- Replace warning labels that have worn out.
- 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 inductive loads, and half-wave rectification loads. It does not apply to the regeneration load.
- Without prior consent from the manufacturer, do not alter the UPS internal structure or installation procedure.
- Never use water to clean electrical components in the interior and exterior of the UPS.

1.2 Electrical Safety

High Voltage

DANGER

- The high voltage power supply provides power for the device operation. Direct or indirect contact (through damp objects) with high voltage and AC mains supply may result in serious injury.
- Non-standard and 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, follow local safety regulations and rules.
- During the installation of the AC power supply facility, follow the local safety regulations.
- Before cable connections, ensure that the mains switch, bypass switch, and mains distribution switch are OFF.
- Dedicated tools must be used during high voltage and AC operations. Avoid using ordinary tools.
- When 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 Electrical Leakage

DANGER

- Ground the device before powering it on. Otherwise, personal injury or device damage may be caused by high leakage current.
- If a "high electrical leakage" tag is attached to the power terminal of the device, you must ground the protective ground terminal to the device enclosure before powering the device on, thereby preventing electric shocks.
- The UPS is a large leakage current device. Do not configure a circuit breaker that has the leakage current protection function.

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 hurt human eyes.

- Before moving or reconnecting the UPS, disconnect the mains and batteries and wait about five minutes after the UPS completely powers off. Otherwise, electric shocks may occur.

- Before installing or removing the power cable, turn off the power switch.
- Before connecting a power cable, check that the label on the power cable is correct.

Fuse

NOTICE

To ensure that the system runs safely, if a fuse is to be replaced, the new fuse must be of the same type and specifications.

Backfeed Protection

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

Electrostatic Discharge

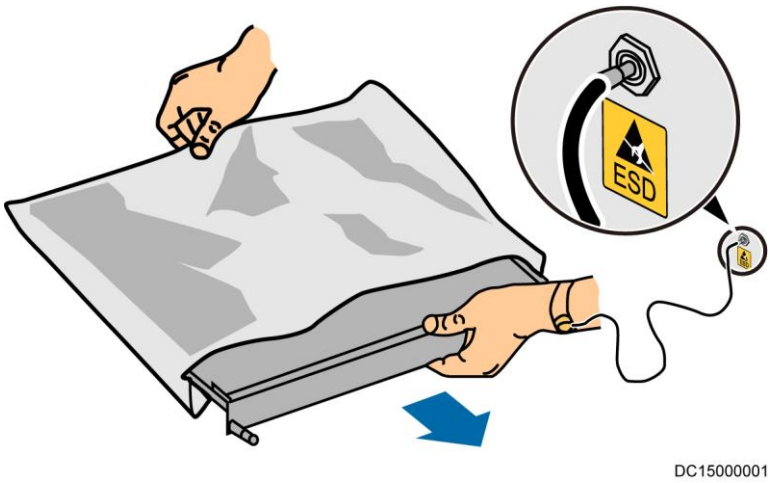
NOTICE

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

- Human body movement, friction between human bodies and clothes, friction between shoes and floors, or handling of plastic articles causes static electromagnetic fields on human bodies. These static electromagnetic fields cannot be eliminated until the static is discharged.
- To prevent electrostatic-sensitive components from being damaged by the static on human bodies, you must wear a well-grounded ESD wrist strap when touching the device or handling boards or application-specific integrated circuits (ASICs).

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

Figure 1-1 Wearing an ESD wrist strap



1.3 Operating Environment

DANGER

Do not place the device in an environment that has inflammable and explosive air or gas. Do not perform any operation in this kind of environment.

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

Keep the UPS away from the following environments:

- Places where the temperature and humidity are beyond the range of 0–40 ℃ and 0%–95% RH respectively.
- Places in direct sunlight or near heat sources.
- Places subject to vibrations or shocks.
- Dusty places, or places exposed to corrosive substances, salts, or flammable gases.
- Sea environments or outdoor land environments (with simple shielding measures) near pollution sources. If a site is near a pollution source, it is at most:
  - 3.7 km away from saline water areas such as the ocean and salinas.
  - 3 km away from serious pollution sources, such as metallurgic plants, coal mines, and heat and power plants.
  - 2 km away from secondary pollution sources, such as chemical factories, rubber plants, and electroplating factories.
  - 1 km away from light pollution sources, such as food factories, tanneries, and heating boilers.

1.4 Battery

This section describes precautions for operating batteries.

DANGER

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

NOTICE

- To ensure battery security 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.
- Handle lead-acid batteries according to local regulations.

- Incorrect handling of batteries causes hazards. When operating batteries, avoid battery short circuits and electrolyte overflow or leakage.
- Electrolyte overflow may damage the device. It will corrode metal parts and circuit boards, and ultimately damage the device and cause short circuits of 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 circuits, acid leaks, and even human injuries may result.

Technical Specifications

Table 1-1 Battery specifications

Battery Type	Minimum/Maximum Number of Batteries	Cell Float Voltage	Cell Equalized Voltage	Cell Minimum Voltage
Sealing lead-acid battery	Thirty to forty-six 12 V batteries	2.23–2.27 V/cell	2.3–2.4 V/cell	1.6–1.9 V/cell
Open lead-acid battery	Thirty to forty-six 12 V batteries	2.23–2.27 V/cell	2.3–2.4 V/cell	1.6–1.9 V/cell

NOTE
A cell indicates a 2 V cell, each 12 V battery consists of six cells.

Preventative Measures

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

- Use special insulation tools.
- Take care to protect your eyes when operating batteries.
- Wear rubber gloves and a protective coat in case of electrolyte overflow.
- When moving a battery, ensure that its electrodes are upward. Leaning or reversing the battery is prohibited.
- Switch off the power supply during installation and maintenance.

Short Circuit

DANGER

Battery short circuits may cause human injuries. Although the voltage of ordinary batteries is low, the instantaneous high current caused by the short circuit releases a great deal of energy.

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

Harmful Gas

DANGER

Do not use unsealed lead-acid batteries. Place and secure lead-acid batteries horizontally to avoid inflammation or device corrosion due to flammable gases emitted from batteries.

The lead-acid batteries in use may emit flammable gases. Therefore, store the batteries in a place with good ventilation, and take precautions against fire.

Battery Temperature

DANGER

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

- Install or store batteries far away from fire and heating sources, such as transformers. Never burn batteries.

- When the temperature of the battery is higher than 60 ℃, check the battery for electrolyte overflow. If the electrolyte overflows, absorb and counteract the electrolyte immediately.

Acid leakage

DANGER

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

When moving or handling a battery whose electrolyte leaks, note that the leaking electrolyte may hurt human bodies. When you find 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 supplier.

If your body meets the acid, wash the part that has met the acid with clean water immediately, or immediately call a doctor if the situation is serious.

1.5 Mechanical Safety

Moving Sharp Objects

CAUTION

Wear protective gloves when moving sharp objects.

Moving Heavy Objects

DANGER

- Perform operations by strictly following the symbols of instructions on the device.
- Exercise caution to prevent injury when moving heavy objects.

When moving or lifting a device, hold the handle or bottom of the device.

Handling Fans

Do not insert your fingers or boards into the operating fans until the fans are switched off and stop 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, violent strike or vibration may damage the cable sheathing. To ensure safety, comply with the following requirements:

- Cables can be laid or installed only when the temperature is higher than 0 ℃ (32 ℉).
- Before laying out cables that have been stored in a temperature lower than 0 ℃ (32 ℉), move the cables to an environment of the ambient temperature and store them at the ambient temperature for at least 24 hours.
- Handle cables with caution, especially at a low temperature. Do not drop the cables directly from the vehicle.
- As the insulation layer of a cable may age or be damaged at high temperatures, ensure a sufficient distance between cables and the DC busbars, shunts, and fuses. Cables prepared by the customer should be flame resistant. No cable should be allowed to pass through the rear of the air outlet of the cabinet. The air outlet should not be blocked by any foreign matter.

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

2 Overview

2.1 Model Description

Figure 2-1 shows a UPS model number.

Figure 2-1 UPS model number

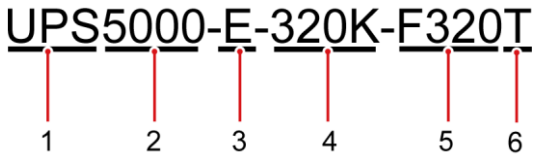


Table 2-1 Model number details

No.	Item	Description
1	Product category	UPS
2	UPS family	5000
3	UPS subcategory	E
4	Output capacity	• 120K: 120 kVA • 200K: 200 kVA • 320K: 320 kVA
5	Rack type	• F120: 120 kVA rack • F200: 200 kVA rack • F320: 320 kVA rack
6	Cable routing	Routed from the top (only the UPS5000-E-320K-F320T model contains "T")

This document describes the following UPS models:

- UPS5000-E-120K-F120

Output capacity: 40 kVA, 80 kVA, or 120 kVA

- UPS5000-E-200K-F200

  Output capacity: 40 kVA, 80 kVA, 120 kVA, 160 kVA, or 200 kVA

- UPS5000-E-320K-F320

  Output capacity: 40 kVA, 80 kVA, 120 kVA, 160 kVA, 200 kVA, 240 kVA, 280 kVA, or 320 kVA

- UPS5000-E-320K-F320T

  Output capacity: 40 kVA, 80 kVA, 120 kVA, 160 kVA, 200 kVA, 240 kVA, 280 kVA, or 320 kVA

NOTE

- The UPS5000-E-120K-F120 can expand to a maximum of 120 kVA and is at least 40 kVA. Cables are routed from the top or bottom.
- The UPS5000-E-200K-F200 can expand to a maximum of 200 kVA and is at least 40 kVA. When mentioning the UPS5000-E-200K-F200, this document emphasizes its output capacity of 160 kVA or 200 kVA. Cables are routed from the top or bottom.
- The UPS5000-E-320K-F320 can expand to a maximum of 320 kVA and is at least 40 kVA. When mentioning the UPS5000-E-320K-F320, this document emphasizes its output capacity of 240 kVA, 280 kVA, or 320 kVA. Cables are routed from the bottom (a top entry cabinet can be installed.)
- The UPS5000-E-320K-F320T can expand to a maximum of 320 kVA and is at least 40 kVA. When mentioning the UPS5000-E-320K-F320, this document emphasizes its output capacity of 240 kVA, 280 kVA, or 320 kVA. Cables are routed from the top.

2.2 Benefits

High Stability and Reliability

- The UPS is suitable for poor power grids because it supports a wide range of input frequencies which is 40–70 Hz. The UPS works at full load when the line voltage is 305–485 V AC and is linearly derated when the line voltage is 138–305 V AC (excluding 305 V AC).
- The UPS5000-E has 5 kA lightning protection, higher than the industry level 2 kA.
- The control module (CM) uses a redundant design. Fans have high fault tolerance capability: When a single fan is faulty, the UPS5000-E works at 50% load; when two fans are faulty, the UPS5000-E works at 30% load.
- The UPS5000-E has a high inverter overload capability.
  - 105% < load ≤ 110%: transfer to bypass mode after 60 min
  - 110% < load ≤ 125%: transfer to bypass mode after 10 min
  - 125% < load ≤ 150%: transfer to bypass mode after 1 min
- The UPS5000-E has a high bypass overload capability.
  - Load ≤ 135%: run continuously in bypass mode at 30°C or less
  - 1000% load: run in bypass mode for 100 ms

High Flexibility and Intelligent Management

- The built-in parallel card supports parallel connection of UPS5000-Es. Built-in bus synchronization controllers (BSCs) support dual-bus configuration.

- Intelligent power supply mode allows you to intelligently control the diesel generator (D.G.) and ensures uninterruptible power supply. The D.G. connection has two scenarios: use with an AC transfer switch (ATS) and reuse.
- The UPS5000-E intelligently manages batteries. The number of batteries is adjustable. Batteries have a high fault tolerance capability and are easy to maintain. All these features help increase the battery lifespan by 50%.
- The UPS5000-E provides a variety of optional components to address various customer requirements.

Ease of Use

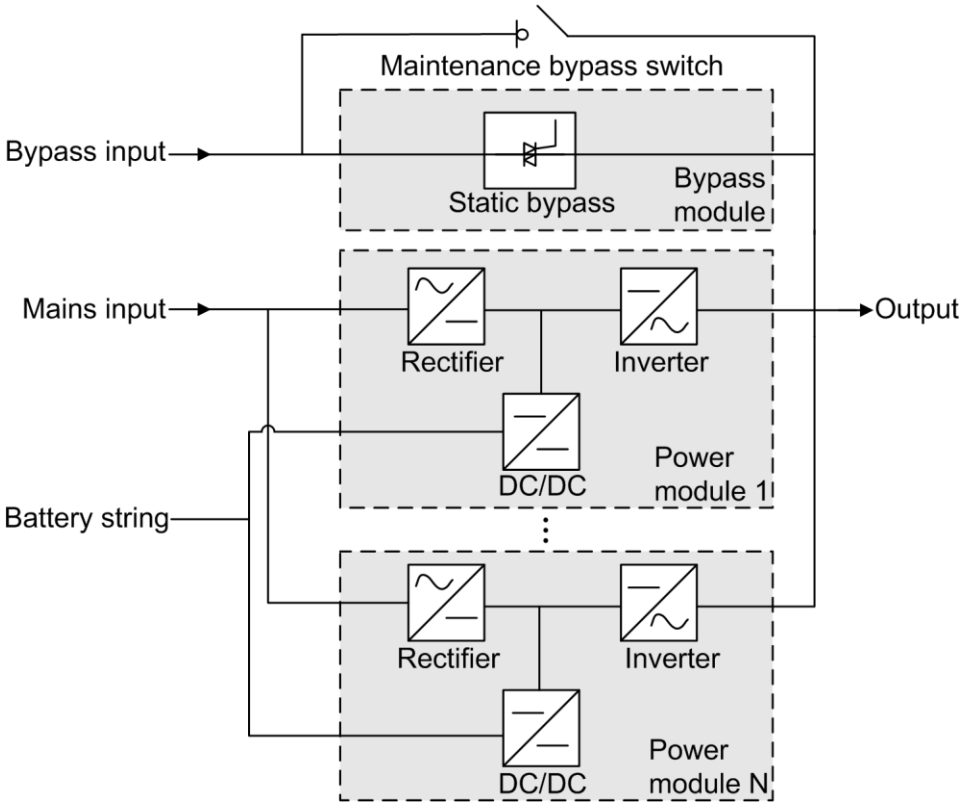
- The UPS5000-E is maintained from the front. UPS5000-E-120K-F120 and UPS5000-E-200K-F200 can be installed back to back or in a row against the wall to save space.
- UPS5000-E-120K-F120 and UPS5000-E-200K-F200 allows you to route cables from the top and bottom. The UPS5000-E-320K-F320 allows you to route cables from the bottom; if you install a top entry cabinet, you can also route cables from the top. The UPS5000-E-320K-F320T supports cable routing from the top.
- A user-friendly 7-inch liquid crystal display (LCD) provides the UPS5000-E status and operating data.
- If a surface protection box is configured, the UPS5000-E can provide the 5 kA surge protection capability. If a surge protection box (20 kA) is configured, the UPS5000-E can provide level C surge protection.

2.3 Working Principle

2.3.1 Conceptual Diagram

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

Figure 2-2 UPS conceptual diagram

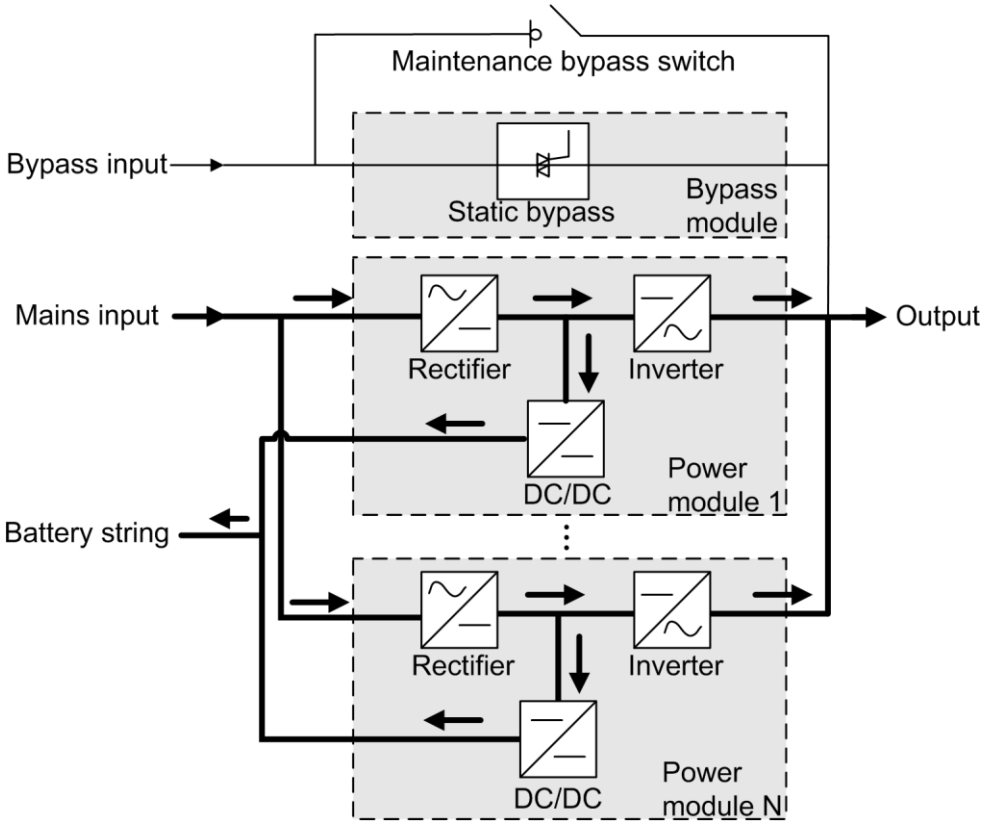


2.3.2 Working Modes

2.3.2.1 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 the conceptual diagram of the UPS working in normal mode.

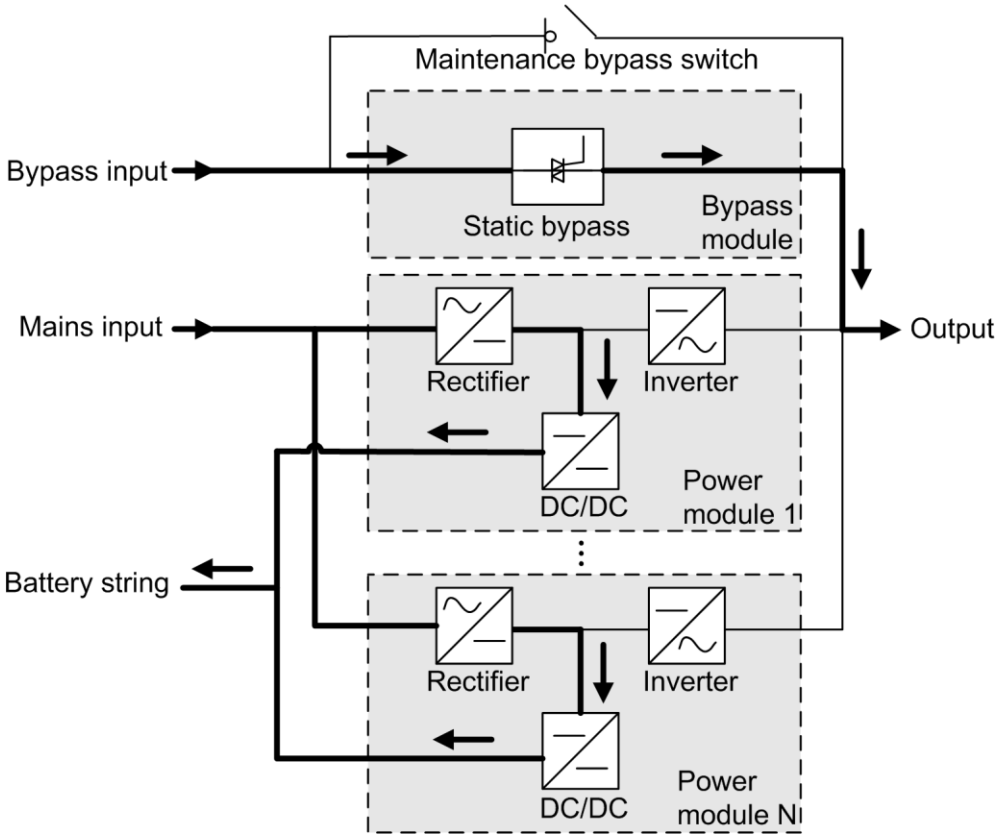
Figure 2-3 UPS conceptual diagram in normal mode



2.3.2.2 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 and therefore tends to be affected by mains outages, and abnormal AC voltage and frequency. Figure 2-4 shows the conceptual diagram of the UPS working in bypass mode.

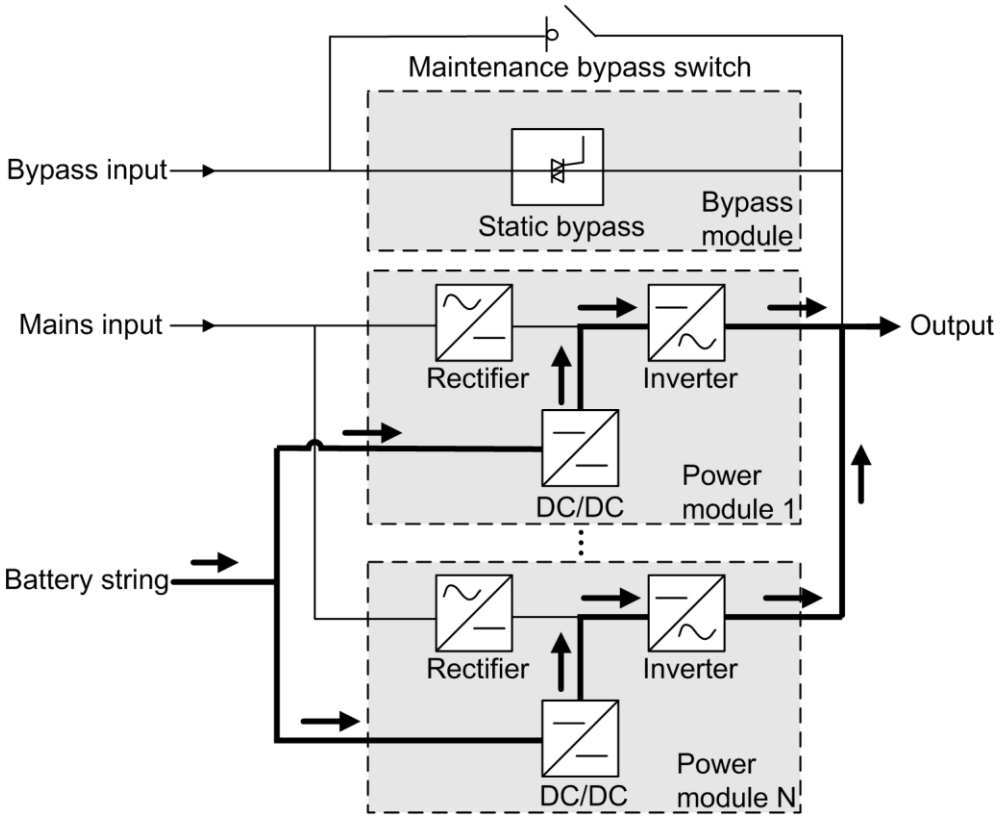
Figure 2-4 UPS conceptual diagram in bypass mode



2.3.2.3 Battery Mode

If the rectifier input voltage is abnormal, the UPS transfers to battery mode. The power module obtains DC power from batteries, which is converted into AC outputs by the inverter. Figure 2-5 shows the conceptual diagram of the UPS working in battery mode.

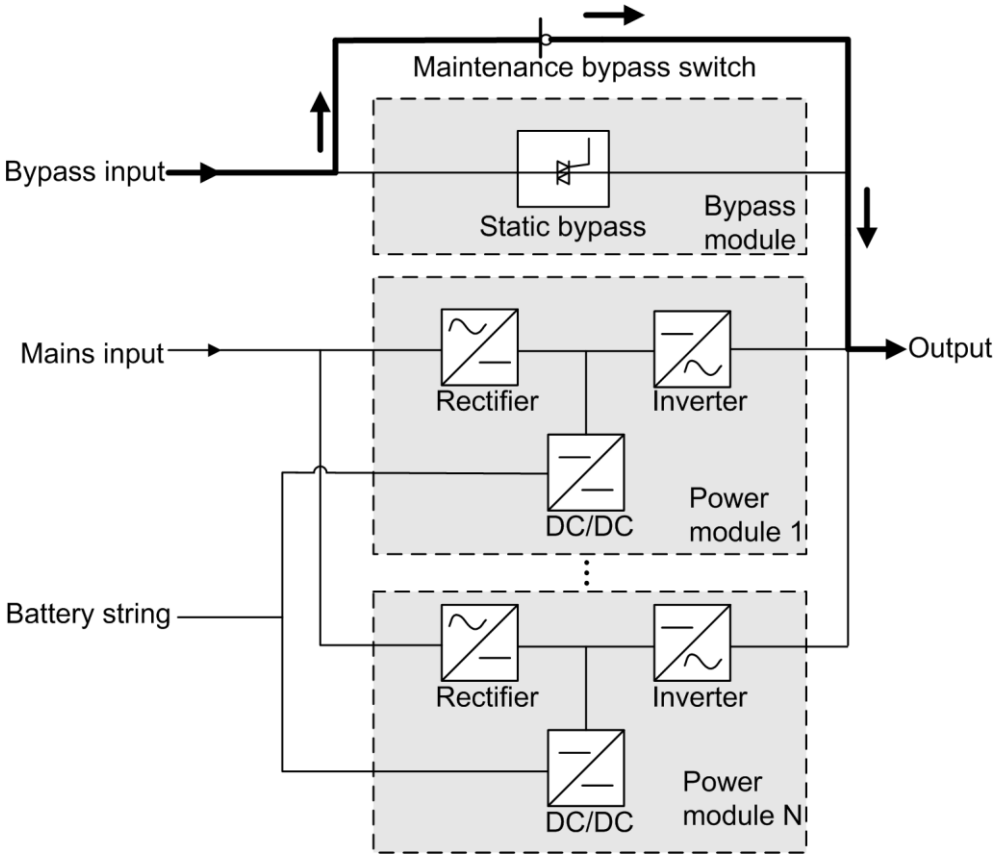
Figure 2-5 UPS conceptual diagram in battery mode



2.3.2.4 Maintenance Bypass Mode

In maintenance bypass mode, the current flows through maintenance bypass circuits, instead of the power module or bypass module. You can perform maintenance on the UPS in this mode. Figure 2-6 shows the conceptual diagram of the UPS working in maintenance bypass mode.

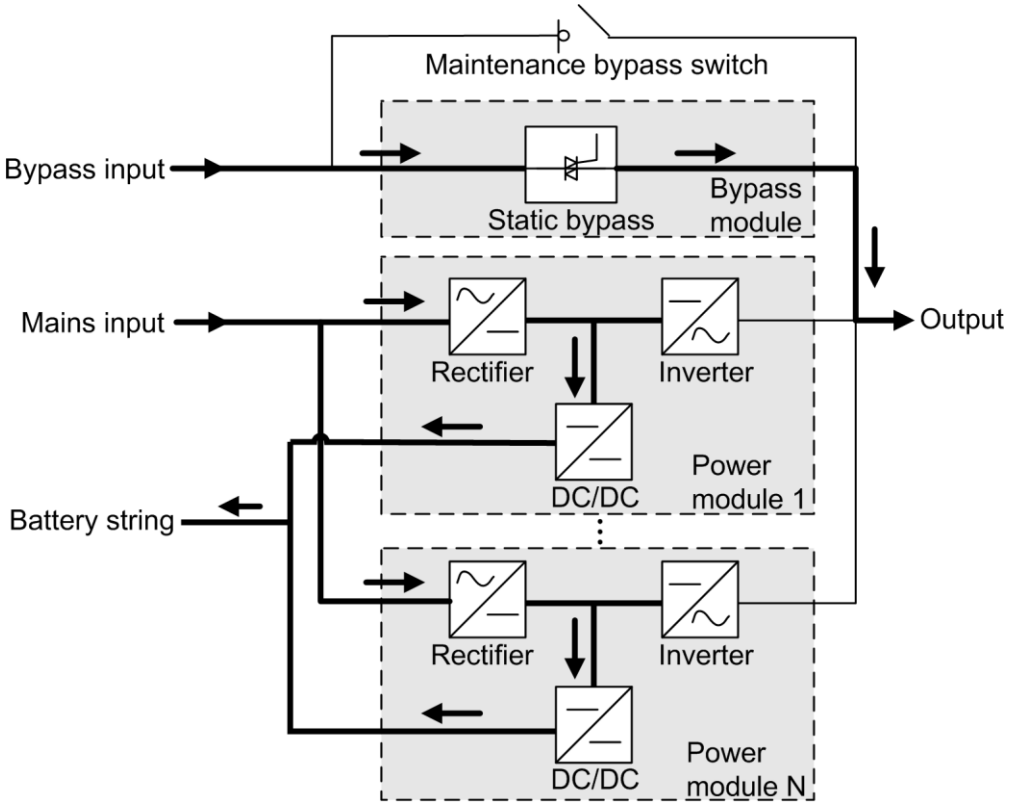
Figure 2-6 UPS conceptual diagram in maintenance bypass mode



2.3.2.5 ECO Mode

The energy control operation (ECO) mode is an energy-saving mode that can be configured on the product's liquid crystal display (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 (manual startup is required to ensure that the inverter is in standby state and the power flow has reached the inverter). When the bypass input voltage is out of 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. The ECO mode delivers a higher efficiency. Figure 2-7 shows the conceptual diagram of the UPS working in ECO mode.

Figure 2-7 UPS conceptual diagram in ECO mode

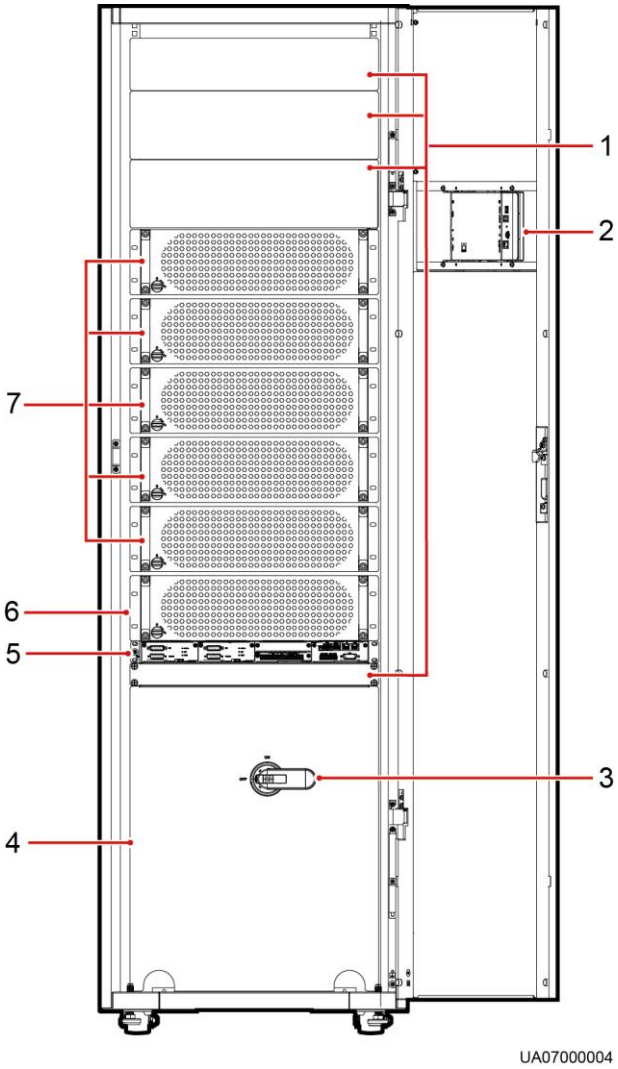


2.4 Overview

2.4.1 Structure

Figure 2-8 shows the front view of the UPS5000-E-200K-F200 cabinet, and Figure 2-9 shows the front view of the UPS5000-E-320K-F320T cabinet.

Figure 2-8 UPS5000-E-200K-F200 front view (with the door open)

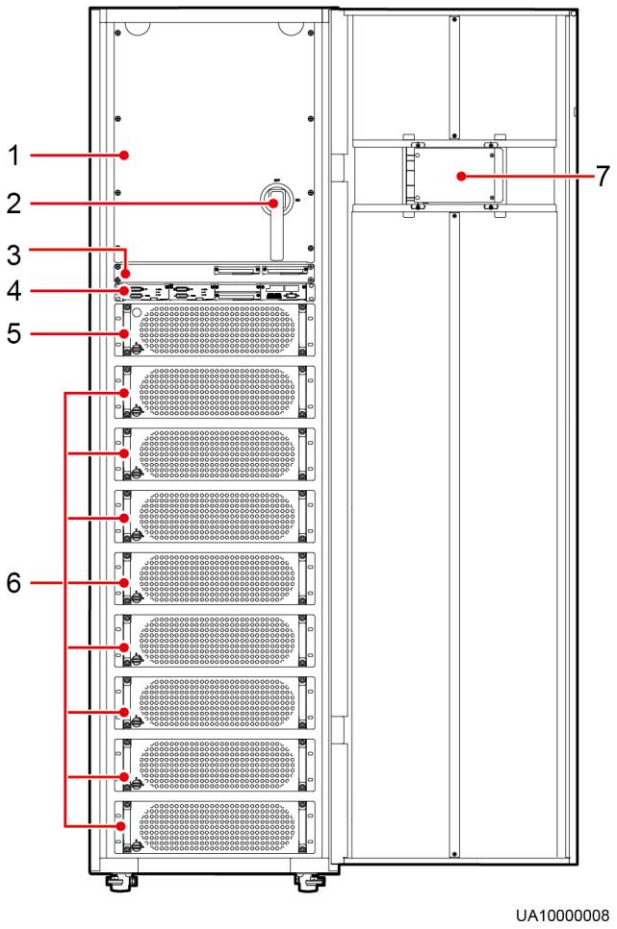


(1) Filler panels	(2) Monitor display unit (MDU)	(3) Maintenance bypass switch	(4) Power distribution subrack cover
(5) Control Module (CM)	(6) Bypass module	(7) Power modules	

NOTE

The UPS5000-E-200K-F200 is used as an example to introduce the UPS5000-E-120K-F120, UPS5000-E-200K-F200, and UPS5000-E-320K-F320.

Figure 2-9 UPS5000-E-320K-F320T front view (with the door open)



(1) Power distribution subrack cover	(2) Maintenance bypass switch	(3) Filler panels	(4) CM
(5) Bypass module	(6) Power modules	(7) MDU	

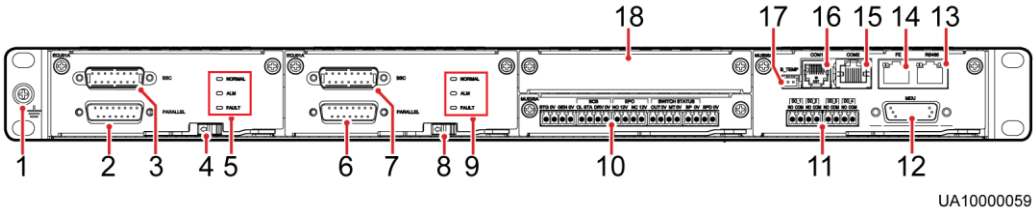
2.4.2 Control Module

2.4.2.1 Overview

In a standard configuration, the CM provides two ECMs, one dry contact card, and one monitoring interface card (from left to right). The cards are hot swappable. One subrack is reserved above the dry contact card. You can insert a backfeed protection card or dry contact extended card into this subrack.

Figure 2-10 shows the CM.

Figure 2-10 CM

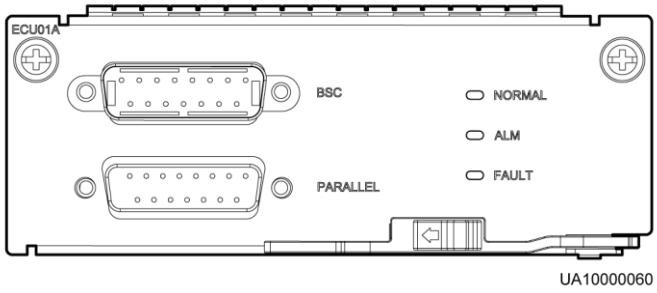


(1) Ground terminal	(2) Parallel port 1	(3) BSC port 1	(4) ECM 1 ready switch
(5) Indicator for ECM 1	(6) Parallel port 2	(7) BSC port 2	(8) ECM 2 ready switch
(9) Indicator for ECM 2	(10) Dry contact card	(11) Dry contacts	(12) MDU port
(13) RS485 port	(14) Fast Ethernet (FE) port	(15) COM2 port	(16)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

2.4.2.2 ECM

The CM provides two active/standby energy control modules (ECMs). Each ECM provides one BSC port and one parallel port, as shown in Figure 2-11.

Figure 2-11 ECM



To connect UPSs in parallel, use a parallel cable to connect the parallel ports on the ECMs on the two UPSs. A hot swappable BSC is used in a dual-bus system to process the communication information of two UPS systems. Table 2-2 describes the functions of the ECMs.

Table 2-2 Ports on the ECMs

Silk Screen	Description
PARALLEL	This port transmits parallel signals. To connect UPSs in parallel, use a parallel cable to connect the parallel ports on the ECMs on the UPSs. *N*

Silk Screen	Description
	UPSs require *N* parallel cables so that at least two parallel cables are connected to each UPS, which improves connection reliability.
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.

2.4.2.3 Dry contact card

The dry contact card allows the UPS to control and monitor the battery circuit breaker (BCB) box and implement remote emergency power-off (EPO). The maximum voltage/current is 12 V/200 mA or 5 V/100 mA.

Figure 2-12 shows the signal ports on the dry contact card.

Figure 2-12 Dry contact card

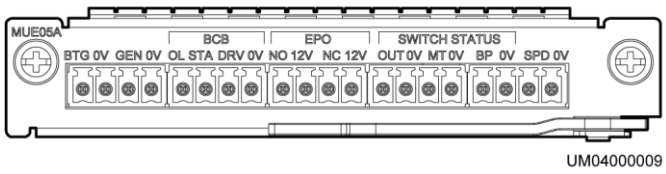


Table 2-3 describes the ports on the dry contact card.

Table 2-3 Ports on the dry contact card

Port	Silk Screen	Description	Status
-	BTG	Detects battery ground failures	Status: • Connected: battery grounding failure • Disconnected: no battery grounding failure The initial status is Disconnected.
	0 V	Secondary side ground	
	GEN	Detects D.G. mode	Status: • Connected: D.G. mode • Disconnected: non-D.G. mode The initial status is Disconnected.
	0 V	Secondary side ground	
BCB	OL	Detects the BCB box	Status: • Grounded: BCB box connected • Floated: BCB box not connected The initial status is Grounded.

Port	Silk Screen	Description	Status
	STA	Monitors the battery switch	Status: • Connected: battery switch ON • Disconnected: battery switch OFF The initial status is Disconnected.
	DRV	Controls the trip of the battery switch in the BCB box	Voltage: • 0 V: battery switch not tripped • 12 V: battery switch tripped The initial port voltage is 0 V.
	0 V	Secondary side ground	
EPO	NO	EPO port	The initial status is Disconnected. If the normally open (NO) port is connected to the EPO_12V port, EPO is triggered.
	12 V	+12 V	
	NC	EPO port	The initial status is Connected. If the normally closed (NC) port is disconnected from the EPO_12V port, EPO is triggered.
	12 V	+12 V	
SWITCH STATUS	OUT	Monitors the UPS output circuit breaker on the output power distribution cabinet (PDC)	Status: • Disconnected: circuit breaker OFF • Connected: circuit breaker ON The initial status is Connected.
	0 V	Secondary side ground	
	MT	Monitors the maintenance circuit breaker on the output PDC	Status: • Disconnected: circuit breaker ON • Connected: circuit breaker OFF The initial status is Disconnected.
	0 V	Secondary side ground	
SWITCH STATUS	BP	Monitors the bypass input circuit breaker on the input PDC	Status: • Disconnected: circuit breaker OFF • Connected: circuit breaker ON The initial status is Connected.
	0 V	Secondary side ground	
-	SPD	Monitors the input AC SPD	Status: • Disconnected: SPD disabled • Connected: SPD enabled The initial status is Connected.
	0 V	Secondary side ground	

NOTE

NO is short for normally open, and NC is short for normally closed.

2.4.2.4 (Optional) Backfeed Protection Card

Energy backfeed may be dangerous for the UPS, loads, and maintenance personnel. When backfeed occurs, the backfeed protection card triggers alarm signals or quickly disconnects the backfeed loop. The backfeed protection card uses relay contact signals. The signal ports support any power signals with a voltage of no more than 240 V AC and a current of less than 4 A. For details, see the *UPS Backfeed Protection Card User Manual*.

2.4.2.5 (Optional) Dry Contact Extended Card

The dry contact extended card provides five signal output ports and five signal input ports. For details, see the *UPS Dry Contact Extended Card User Manual*.

2.4.2.6 Monitoring Interface Card

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. Interworking with the monitoring interface card, the MDU monitors the UPS, configures parameters, delivers commands, reports information, and displays the UPS key information and parameters on the LCD.

Figure 2-13 shows the monitoring interface card.

Figure 2-13 Monitoring interface card

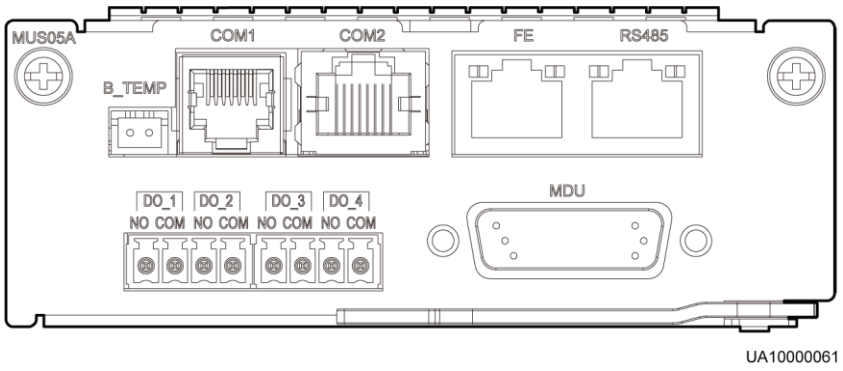


Table 2-4 describes the ports on the monitoring interface card.

Table 2-4 Ports on the monitoring interface card

Port	Silk Screen	Description
DO_1	NO	DO indicates critical alarms, minor alarms, bypass mode, battery mode, low battery voltage, or D.G. control. DO_1 indicates any of the six meanings (except for D.G. control); by default, it indicates critical alarms. The maximum voltage is 30 V DC, and the maximum current is 1 A.
	COM	
DO_2	NO	DO indicates critical alarms, minor alarms, bypass mode, battery mode, low battery voltage, or D.G. control. DO_2 indicates any of the six meanings (except for D.G. control); by
	COM	

Port	Silk Screen	Description
		default, it indicates minor alarms. The maximum voltage is 30 V DC, and the maximum current is 1 A.
DO_3	NO	DO indicates critical alarms, minor alarms, bypass mode, battery mode, low battery voltage, or D.G. control. DO_3 indicates any of the six meanings (except for D.G. control); by default, it indicates bypass mode. The maximum voltage is 30 V DC, and the maximum current is 1 A.
	COM	
DO_4	NO	DO indicates critical alarms, minor alarms, bypass mode, battery mode, low battery voltage, or D.G. control. DO_4 indicates any of the six meanings (except for D.G. control); by default, it indicates battery mode. The maximum voltage is 30 V DC, and the maximum current is 1 A. When the UPS works in intelligent mode, DO_4 indicates D.G. control, which cannot be changed.
	COM	
DB26	MDU	Provides FE, RS485, Inter-Integrated Circuit (I2C), and control area network (CAN) signals.
Battery temperature sensor port	B_TEMP	Connects to an indoor battery temperature sensor. This port can connect to a short-distance battery temperature sensor.
Southbound port 2	COM2	Connects to a southbound device, such as a BMU.
Southbound port 1	COM1	Connects to an ambient temperature and humidity sensor over two wires.
Network port	FE	N/A
Northbound communications port	RS485	Connects to a northbound network management device or third-party network management device over two wires.

NOTE

- Dry contact signals take effect only after you set them on the LCD. Set unused dry contact signals to **Disable**.
- Set the EPO port to NO or NC as required.
- In a parallel system, ensure correct connections between dry contacts and each UPS.
- Signal cables must be double-insulated twisted cables. If the cable length is 25–50 m, the cross-sectional area must be 0.5–1.5 mm^2.

2.5 Typical Configurations

Table 2-5 describes typical UPS configurations.

Table 2-5 Typical configurations

Function	Application Scenario
Single UPS	A single UPS5000-E is applicable to scenarios with light loads. Its power will be redundant when loads are light as it adopts modular design.
N+X parallel system, where N is the number of requisite UPSs connected in parallel, and X is the number of redundant UPSs	An N+X parallel system supplies power to important loads in small- and medium-sized equipment rooms. It features high reliability and powerful transient overload capacity. $1 \leq N+X \leq 4$ ($1 \leq N \leq 4$, $0 \leq X \leq 3$) For example, in a 3+1 parallel system, three UPSs are requisite UPSs and one UPS is redundant.
Dual-bus system	The dual-bus system is suitable for scenarios where highly reliable power supply is required. The dual-bus system supplies power to important loads in large- and medium-sized equipment rooms and data centers. The dual-bus system is highly reliable, but its configuration 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 and WebUI.

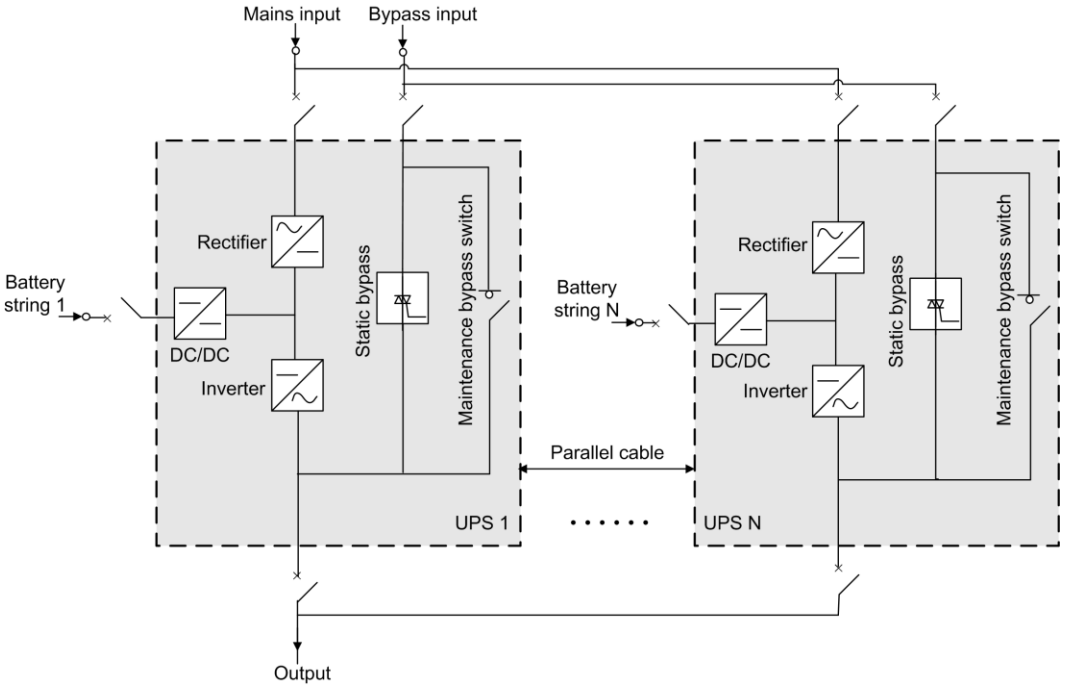
2.5.1 Single UPS

The UPS5000-E has a modular structure. Its power modules are connected in parallel to deliver a high loading capability. If a single power module develops a fault, the other power modules continue working. So long as the load is not too large, this redundant capacity can continue to provide power and therefore helps ensure reliability. Figure 2-2 shows the conceptual diagram of a single UPS.

2.5.2 N+X Parallel System

In an N+X parallel system, multiple UPS5000-Es are connected together. Specifically, mains input, bypass input, and output terminals are connected in parallel, and ECMs are connected over parallel cables. The parallel connections synchronize the UPS outputs to supply power to loads. If a single UPS fails, the other UPSs continue supplying power to loads. Figure 2-14 shows the conceptual diagram of an N+X parallel system.

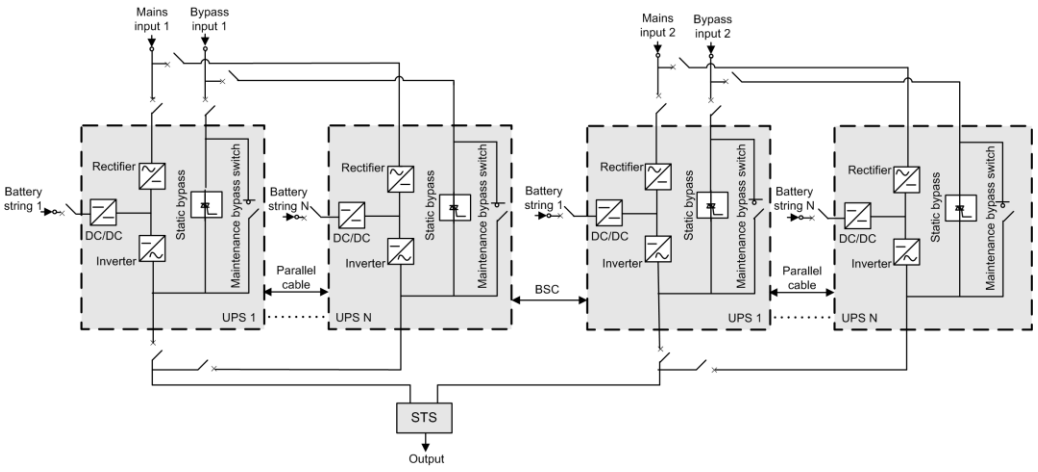
Figure 2-14 Conceptual diagram of an N+X parallel system



2.5.3 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. The dual-bus system is highly reliable and is suitable for loads with multiple input terminals. You can install a static transfer switch (STS) to start the bus synchronization controller (BSC), while the STS is optional, and the BSC is a standard configuration. Of the two UPS systems, one is a master system, and the other is a slave system. The UPS systems work in normal mode or bypass mode. Figure 2-15 shows the conceptual diagram of a dual-bus system.

Figure 2-15 Conceptual diagram of a dual-bus system



2.6 Optional Components

Component	Model	Function
Input PDC	PDC-0630ACV4INA	• Provides one 4-pole 630 A input ATS, two 3-pole 400 A mains output molded case circuit breakers (MCCBs), and two 3-pole 400 A bypass output MCCBs. • Measures and displays electrical parameters, such as the three-phase input voltage, current, and power factor (PF). • Provides signal ports to report the status of circuit breakers, and provides three-phase power indicators to display the power status.
Output PDC	PDC-0630ACV4OUA	• Provides two 4-pole 400 A input MCCBs and one 3-pole 630 A maintenance bypass circuit breaker. • Measures and displays electrical parameters, such as the three-phase input voltage, current, and PF. • Provides signal ports to report the status of circuit breakers, and provides three-phase power indicators to display the power status.
BCB box	• PDC-0250DC0384BXA • PDC-0400DC0384BXA • PDC-0630DC0384BXA • PDU8000-0125DCV8-BXA001 • PDU8000-0250DCV8-BXA001 • PDU8000-0400DCV8-BXA001 • PDU8000-0630DCV8-BXA001 • PDU8000-0800DCV8-BXA001	• Controls the connection between battery strings and the UPS. • Provides overload protection, short-circuit protection, and remote trip control.
Battery bus bar (BBB) box	• PDU8000-0630DCV8-BGA001 • PDU8000-1250DCV8-BGA001 • PDU8000-2000DCV8-BGA001	Converges the energy from multiple battery strings.
Surge	N/A	Improves the UPS surge protection

Component	Model	Function
protection box		capability. For details, see the *UPS Surge Protection Box Quick Installation Guide*.
Surge protection box subrack	N/A	Configured only when the surge protection box is used. The position for installing the surge protection box subrack and ECM expansion subrack is the same, and therefore the two types of subracks cannot be used simultaneously.
ECM extended subrack	N/A	Install this subrack when the UPS is equipped with a backfeed protection card and dry contact extended card. The position for installing the surge protection box subrack and ECM expansion subrack is the same, and therefore the two types of subracks cannot be used simultaneously.
Antiseismic kit	N/A	Reinforces the cabinet so that the cabinet meets the requirements of 9 degree seismic fortification intensity.
IP21 component	N/A	Prevents water from dropping into the cabinet, protecting the cabinet to IP21.
Top outlet kit	N/A	If you need to install the cabinet against a wall, install a top outlet kit to meet heat dissipation requirements.
Top entry cabinet	N/A	Install a top entry cabinet to route cables from the top of the UPS5000-E-320K-F320 cabinet.
Dry contact extended card	N/A	Provides extended monitoring ports: five relay output ports and five input ports.
Backfeed protection card	N/A	Detects mains and bypass backfeed and provides protection.
BMU	N/A	• Monitors battery voltages and temperatures as well as battery string charge and discharge currents. • Communicates with the UPS over Modbus.
Battery grounding failure detector	N/A	• Detects current leakage and generates alarms. When equipped with a remote trip switch, the detector protects devices and prevents the outbreak of a fire. • Detects battery grounding failures and generates alarms when the ground leakage current exceeds the specified value.

Component	Model	Function
Ambient temperature and humidity sensor	N/A	Monitors the ambient temperature and humidity, and can be applied to batteries.
Battery temperature sensor	N/A	Used as an external battery temperature sensor.
Parallel cable	5 m, 10 m, or 15 m	Connects UPSs in parallel.
BSC cable	5 m, 10 m, 15 m or 60 m	Transmits bus synchronization signals in a dual-bus system.

NOTE

- The ECM extended subrack does not support onsite installation. If you require this optional component, inform Huawei when you purchase the UPS. Huawei installs it before delivery.
- The top entry cabinet applies only to the UPS5000-E-320K-F320. The input PDC, output PDC, and top outlet kit component apply only to the UPS5000-E-120K-F120 and UPS5000-E-200K-F200. The IP21 component can be configured for the UPS5000-E-320K-F320 if cables are routed from the bottom. The IP21 component cannot be configured for the UPS5000-E-320K-F320T. The other components apply to all UPS5000-E models in this document.

3 Installation

3.1 Installation Preparations

3.1.1 Site

3.1.1.1 Weight and Dimensions

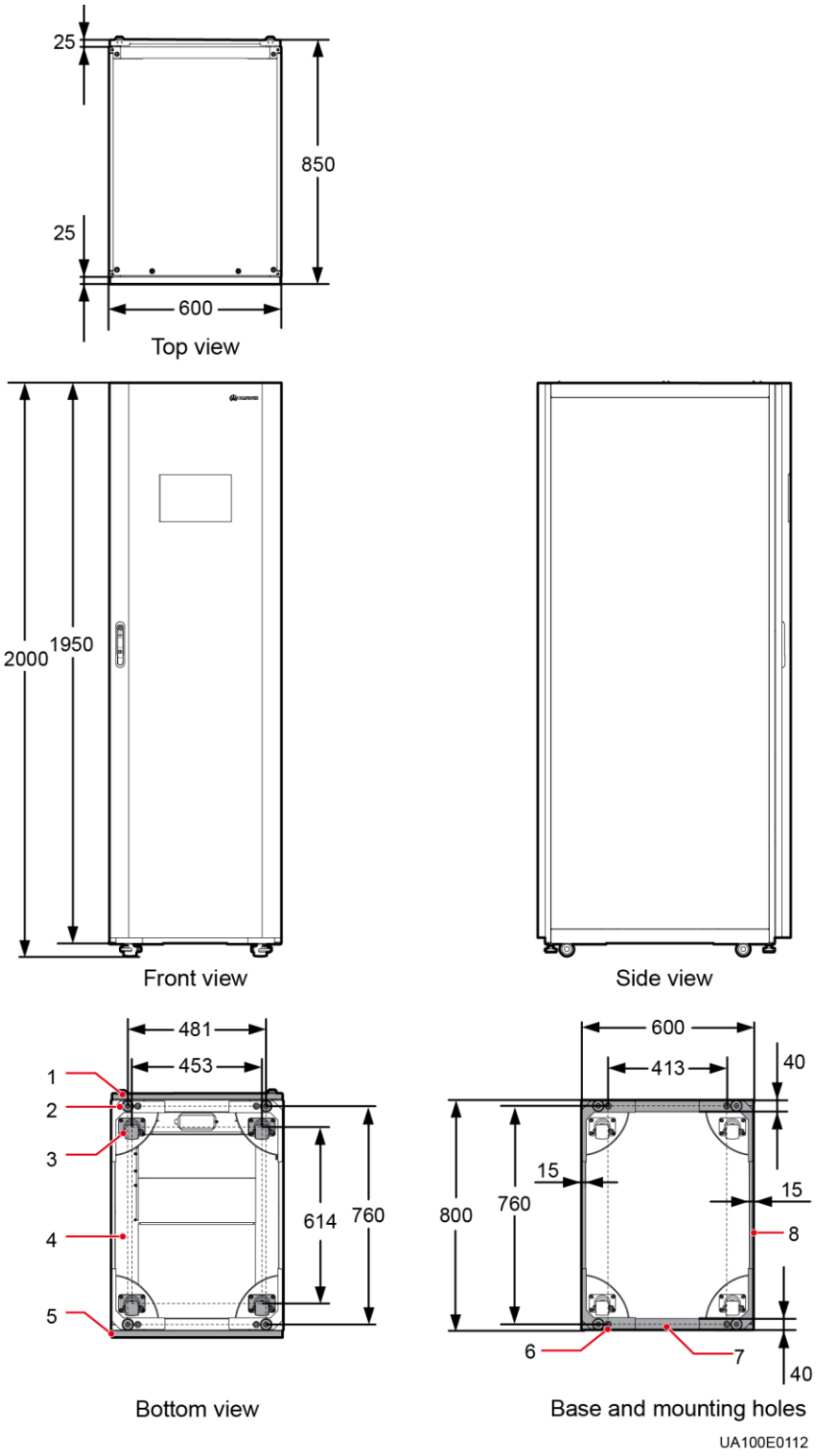
Ensure that the floor or installation support can bear the weight of the UPS5000-E, batteries, and battery racks. The weight of batteries and battery racks depends on the UPS configuration for the site. Table 3-1 lists the UPS5000-E weight.

Table 3-1 UPS weight

Model	Capacity	Weight
UPS5000-E-120K-F120	40 kVA	256.5 kg
	80 kVA	289.0 kg
	120 kVA	321.5 kg
UPS5000-E-200K-F200	160 kVA	354.0 kg
	200 kVA	386.5 kg
UPS5000-E-320K-F320/UPS5000-E-320K-F320T	40 kVA	256.5 kg
	80 kVA	289.0 kg
	120 kVA	321.5 kg
	160 kVA	354.0 kg
	200 kVA	386.5 kg
	240 kVA	419.0 kg
	280 kVA	451.5 kg
	320 kVA	484.0 kg

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

3.1.1.2 Installation Environment

- Do not install the UPS in high temperature, low temperature, or damp areas. For details about environmental specifications, see chapter 8 Technical Specifications.
- Install the UPS far away from water sources, heat sources, and flammable or explosive materials. Keep the UPS away from direct sunlight, dust, volatile gases, corrosive materials, and salty air.
- Do not install the UPS in environments with conductive metal scraps in the air.
- The optimal operating temperatures for valve regulated lead acid (VRLA) batteries are 20–30 ℃. Operating temperatures higher than 30 ℃ shorten the battery lifespan, and operating temperatures lower than 20 ℃ reduce the battery backup time.

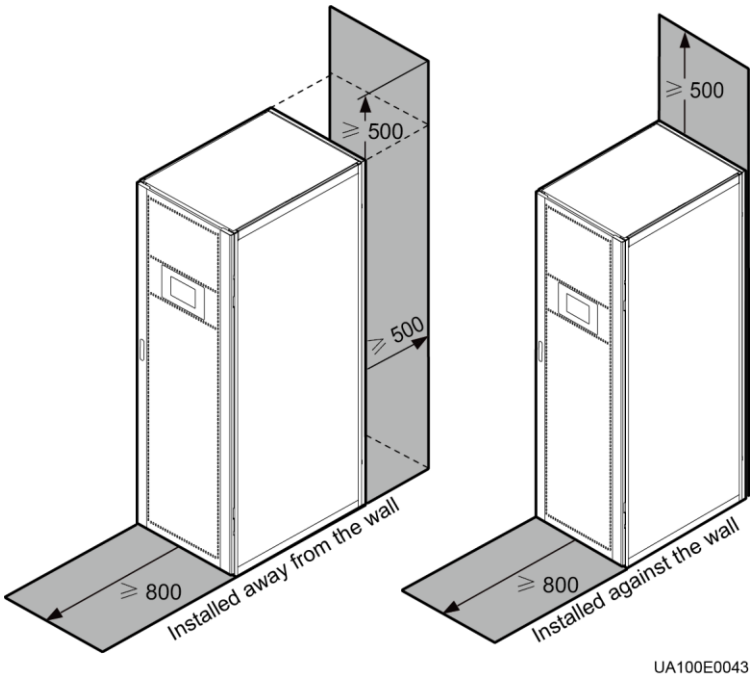
3.1.1.3 Installation Clearances

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

- Reserve a clearance of at least 800 mm from the front of the cabinet.
- Reserve a clearance of at least 500 mm from the top of the cabinet.
- 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 500 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 800 mm.

See Figure 3-2.

Figure 3-2 Reserved clearances (unit: mm)



NOTE

The UPS5000-E-120K-F120 and UPS5000-E-200K-F200 can be installed against the wall only when cables are routed from the bottom.

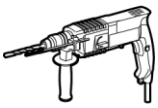
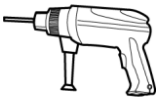
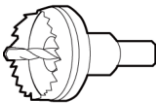
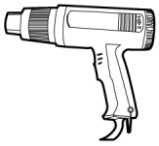
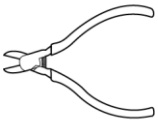
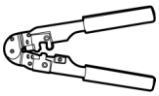
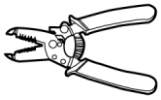
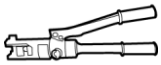
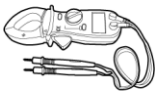
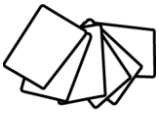
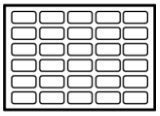
3.1.2 Tools

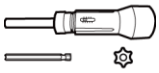
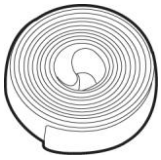
NOTICE

Insulate installation tools to prevent electric shocks.

You need to prepare the tools and meters required for installation.

Table 3-2 Tools and meters

Tools and Meters			
Pallet truck 	Manual pallet truck 	Ladder 	Rubber mallet 
Hammer drill and drill bit Φ16 	Hand-held electric drill 	Alloy hole saw 	Heat gun 
Diagonal pliers 	Crimping tools 	Wire stripper 	Hydraulic pliers 
Clamp meter 	Multimeter 	Cable tie	Level
Polyvinyl chloride (PVC) insulation tape	Cotton cloth 	Label 	Electrician's knife 

Tools and Meters			
			
Electrostatic discharge (ESD) gloves 	Protective gloves 	Insulated gloves 	Insulation protective shoes 
Torque screwdriver 	Insulated adjustable wrench 	Inner hexagon spanner 	Brush 
Flat-head screwdriver (2–5 mm) 	Phillips screwdriver (M3/M4/M5/M6/M8) 	Insulated torque wrench (M6/M8/M12/M16) 	Heat shrink tubing 

NOTE

Table 3-2 lists the common tools for installing and connecting cables, the special tools by referring to the corresponding parts manual. Add or delete tools as required onsite.

3.1.3 Power Cables

NOTICE

- The UPS can generate large leakage currents. A circuit breaker that provides leakage current protection is not recommended.
- If multiple UPSs are to be connected in parallel, input and output power cables for each UPS should have the same length and specifications.
- In Table 3-3, the mains input power cable diameter of the UPS5000-E-240 kVA is less than that of the UPS5000-E-200 kVA. The following describes the reason: Cables for the UPS5000-E-(40 kVA-200 kVA) can be multi-core or single-core while those for the UPS5000-E-(240 kVA-320 kVA) can only be single-core (single-core cables endure currents better than multi-core cables).

Table 3-3 lists the recommended cross-sectional areas for power cables.

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

Item			UPS5000-E-120K-F120			UPS5000-E-200K-F200		UPS5000-E-320K-F320/UPS5000-E-320K-F320T		
			40 kVA	80 kVA	120 kVA	160 kVA	200 kVA	240 kVA	280 kVA	320 kVA
Mains input	Mains input current (A)		71	142	213	284	355	426	498	569
	Recommended cross-sectional area (mm^2)	L1	4 x 16	4 x 50	4 x 95	2 x (4 x 70)	2 x (4 x 95)	2 x (4 x 70) (Cable types are different.)	2 x (4 x 95)	2 x (4 x 120)
		L2								
		L3								
		N								
Bypass input	Bypass input current (A)		61	122	182	243	304	365	425	486
	Recommended cross-sectional area (mm^2)	L1	4 x 16	4 x 35	4 x 70	2 x (4 x 50)	2 x (4 x 70)	2 x (4 x 70)	2 x (4 x 70)	2 x (4 x 95)
		L2								
		L3								
		N								
Output	Output current (A)		61	122	182	243	304	365	425	486
	Recommended cross-sectional area (mm^2)	U	4 x 16	4 x 35	4 x 70	2 x (4 x 50)	2 x (4 x 70)	2 x (4 x 70)	2 x (4 x 70)	2 x (4 x 95)
		V								
		W								
		N (If the voltage is								

Item			UPS5000-E-120K-F120			UPS5000-E-200K-F200		UPS5000-E-320K-F320/UPS5000-E-320K-F320T		
			40 kVA	80 kVA	120 kVA	160 kVA	200 kVA	240 kVA	280 kVA	320 kVA
		non-linear, increase the cross-sectional area of the neutral wire.)								
Battery input	Nominal discharge current (384 V current; thirty-two 12 V batteries) (A)		110	219	329	439	548	658	768	877
	Maximum discharge current (end of discharge current of thirty-two 12 V batteries, namely, 1.67 V/cell discharge current for 192 2 V cells) (A)		132	263	394	525	657	787	918	1049
	Recommended cross-sectional area (mm^2)	+	3 x 35	3 x 95	3 x 150	2 x (3 x 120)	2 x (3 x 150)	2 x (3 x 120)	2 x (3 x 120)	2 x (3 x 150)
		N								
		–								
Ground cable	Recommended cross-sectional area (mm^2)	PE	16	25	50	70	95	70	70	95

NOTE

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

If external conditions such as cable layout or ambient temperatures change, perform verification in accordance with the IEC-60364-5-52 or local regulations.

The currents listed in Table 3-3 are measured at a rated voltage of 380 V. If the rated voltage is 400 V, multiply the currents by 0.95. If the rated voltage is 415 V, multiply the currents by 0.92.

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

When the mains input and bypass input share a power source, configure both types of input power cables as mains input power cables. The cables listed in Table 3-3 are used only when the following requirements are met:

- Cable routing mode: For the UPS5000-E-(40 kVA-200 kVA), route cables along the wall or floor in accordance with mode C in the IEC-60364-5-52. For the UPS5000-E-(240 kVA-320 kVA), route one layer of cables along ladders or brackets in accordance with mode F in the IEC60364-5-52.
- The ambient temperature is 30 ℃.
- The AC voltage loss is less than 3%, and the DC voltage loss is less than 1%.
- 40–200 kVA: single- or multi-core 90 ℃ soft power cable with a copper conductor; 240–320 kVA: single-core 90 ℃ soft power cable with a copper conductor.
- The AC power cable for the UPS5000-E-(80 kVA-200 kVA) is no longer than 30 m, and the DC power cable is no longer than 40 m. Neither the AC nor DC power cables for the UPS5000-E-40 kVA are longer than 20 m. The AC power cable for the UPS5000-E-(240 kVA-320 kVA) is no longer than 30 m, and the DC power cable is no longer than 50 m.

Table 3-4 lists the power cable connector requirements for the UPS5000-E-120K-F120 and UPS5000-E-200K-F200. Table 3-5 lists the power cable connector requirements for the UPS5000-E-320K-F320 and UPS5000-E-320K-F320T.

Table 3-4 Power cable connector requirements for the UPS5000-E-120K-F120 and UPS5000-E-200K-F200

Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Torque
Mains input connector	Crimped OT terminals	M10	10.5 mm	26 N•m
Bypass input connector	Crimped OT terminals	M10	10.5 mm	26 N•m
Battery input connector	Crimped OT terminals	M12	13 mm	46 N•m
Output connector	Crimped OT terminals	M10	10.5 mm	26 N•m
Grounding connector	Crimped OT terminals	M10	10.5 mm	26 N•m

Table 3-5 Power cable connector requirements for the UPS5000-E-320K-F320 and UPS5000-E-320K-F320T

Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Torque
Mains input	Crimped OT	M12	13.5 mm	46 N•m

Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Torque
connector	terminals			
Bypass input connector	Crimped OT terminals	M12	13.5 mm	46 N•m
Battery input connector	Crimped OT terminals	M12	13.5 mm	46 N•m
Output connector	Crimped OT terminals	M12	13.5 mm	46 N•m
Grounding connector	Crimped OT terminals	M12	13.5 mm	46 N•m

Table 3-6 lists the recommended upstream input circuit breaker configurations for the UPS5000-E.

Table 3-6 Upstream input circuit breaker configurations

Upstream Input Circuit Breaker	UPS5000-E-120K-F120			UPS5000-E-200K-F200		UPS5000-E-320K-F320/ UPS5000-E-320K-F320T		
	40 kVA	80 kVA	120 kVA	160 kVA	200 kVA	240 kVA	280 kVA	320 kVA
Upstream mains input switch	Three-pole, 100 A	Three-pole, 160 A	Three-pole, 250 A	Three-pole, 400 A	Three-pole, 400 A	Three-pole, 500 A	Three-pole, 500 A	Three-pole, 630 A
Upstream bypass input switch	Three-pole, 100 A	Three-pole, 160 A	Three-pole, 250 A	Three-pole, 400 A	Three-pole, 400 A	Three-pole, 500 A	Three-pole, 500 A	Three-pole, 630 A

Table 3-7 Upstream input circuit breakers

Model	UPS Capacity	Component	Specifications	Manufacturer
UPS5000-E-120K-F120	40 kVA	Mains input circuit breaker	T1N160 TMD R100 FFC 3P	ABB (recommended when the short-circuit current where the switch is located is less than 36 kVA.)
		Bypass input circuit breaker	T1N160 TMD R100 FFC 3P	
	80 kVA	Mains input circuit breaker	T1N160 TMD R160 FFC 3P	
		Bypass input circuit breaker	T1N160 TMD R160 FFC 3P	

Model	UPS Capacity	Component	Specifications	Manufacturer
	120 kVA	Mains input circuit breaker	T3N250 TMD R250 FF 3P	
		Bypass input circuit breaker	T3N250 TMD R250 FF 3P	
UPS5000-E-200K-F200	160 kVA	Mains input circuit breaker	T5N400 TMA R320 FF 3P	
		Bypass input circuit breaker	T5N400 TMA R320 FF 3P	
	200 kVA	Mains input circuit breaker	T5N400 TMA R400 FF 3P	
		Bypass input circuit breaker	T5N400 TMA R400 FF 3P	
UPS5000-E-320K-F320/UPS5000-E-320K-F320T	240 kVA	Mains input circuit breaker	T5N630 TMA R500 FF 3P	
		Bypass input circuit breaker	T5N630 TMA R500 FF 3P	
	280 kVA	Mains input circuit breaker	T5N630 TMA R500 FF 3P	
		Bypass input circuit breaker	T5N630 TMA R500 FF 3P	
	320 kVA	Mains input circuit breaker	T6N630 PR221DS-LS/I R630 FF 3P	
		Bypass input circuit breaker	T6N630 PR221DS-LS/I R630 FF 3P	

NOTE

- The input upstream circuit breakers recommended in Table 3-7 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.
- 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.
- 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.

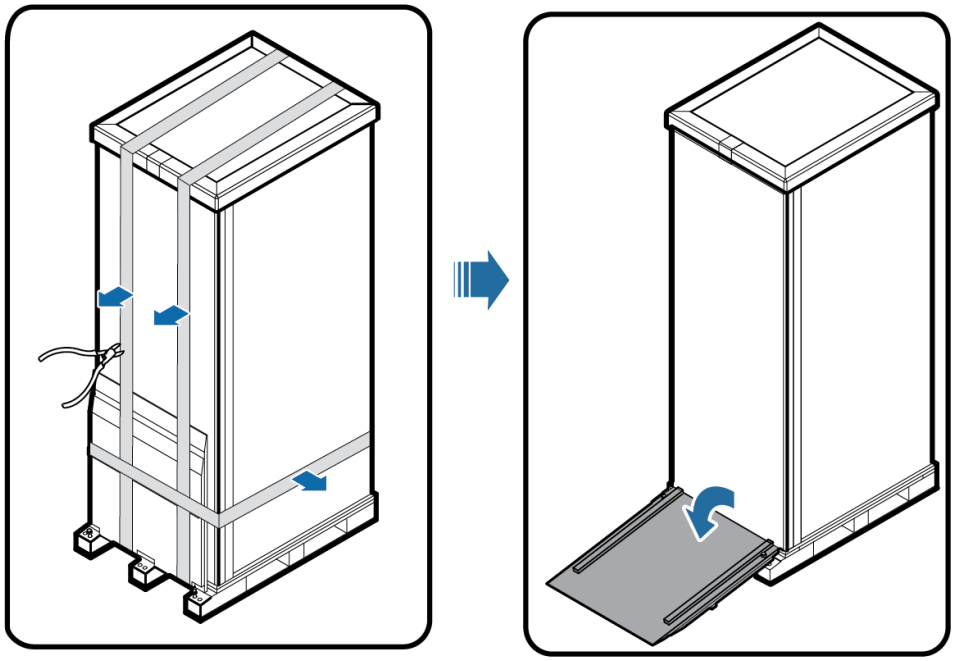
Procedure

Step 1 Use a pallet truck to transport the UPS to the installation position.

Step 2 Check the UPS packing.

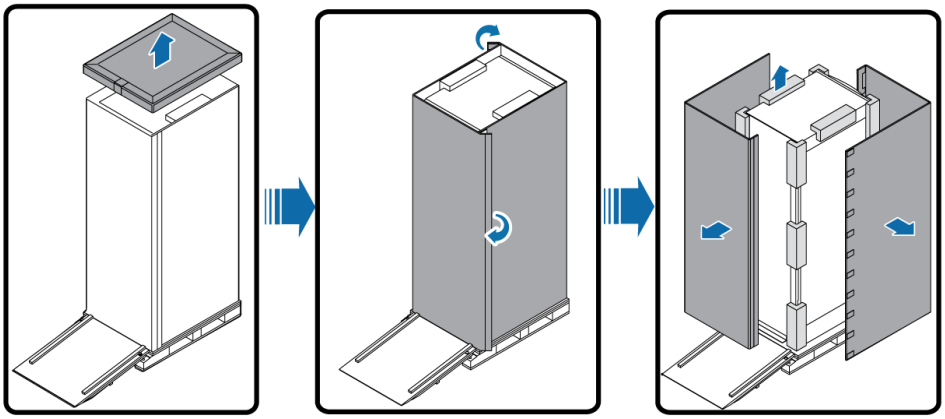
Step 3 Hold the sliding plate steady. Cut and remove the binding tapes. Put down the sliding plate gently. See Figure 3-3.

Figure 3-3 Removing binding tapes



Step 4 Remove packing materials, as shown in Figure 3-4.

Figure 3-4 Removing packing materials



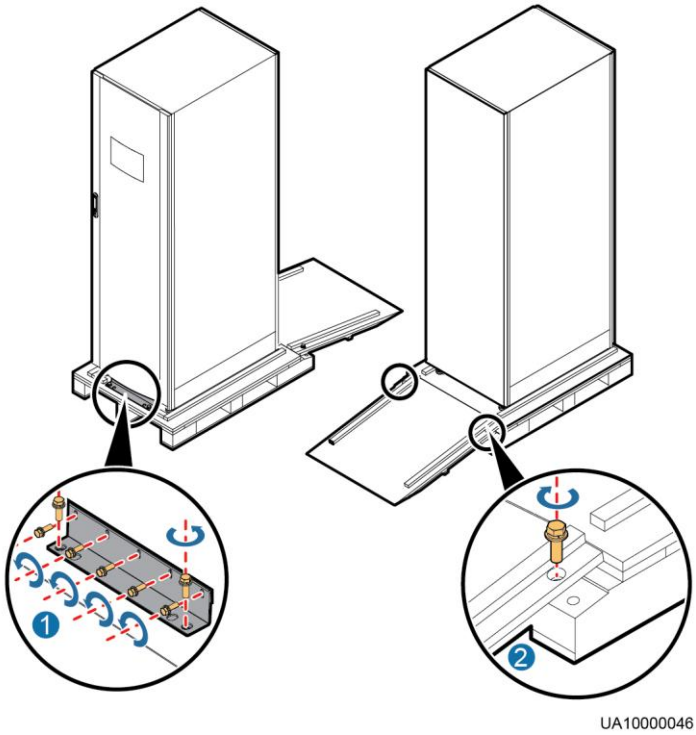
Step 5 Remove the plastic bag and take out the fittings box.

Step 6 Check that the UPS is intact.

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

Step 7 Remove the L-shaped bracket that secures the cabinet and the pallet, and secure the sliding plate to the pallet by using the two M12 screws that you have removed, as shown in Figure 3-5.

Figure 3-5 Removing the L-shaped bracket

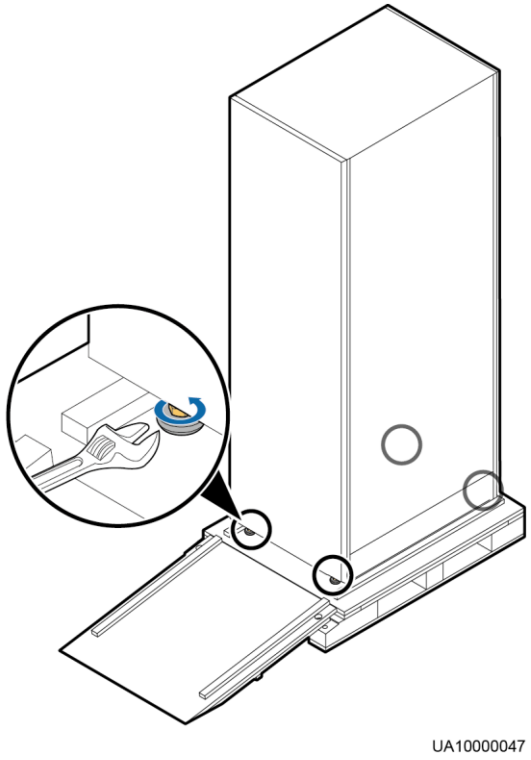


NOTE

Tighten the two screws in step 2 in Figure 3-5. Otherwise, the slide plate may move when you remove the UPS.

Step 8 Raise the four leveling feet using an adjustable wrench, as shown in Figure 3-6.

Figure 3-6 Raising the leveling feet



Step 9 Push the cabinet along the sliding plate to the floor.

----End

3.2 Installing a Single UPS

NOTICE

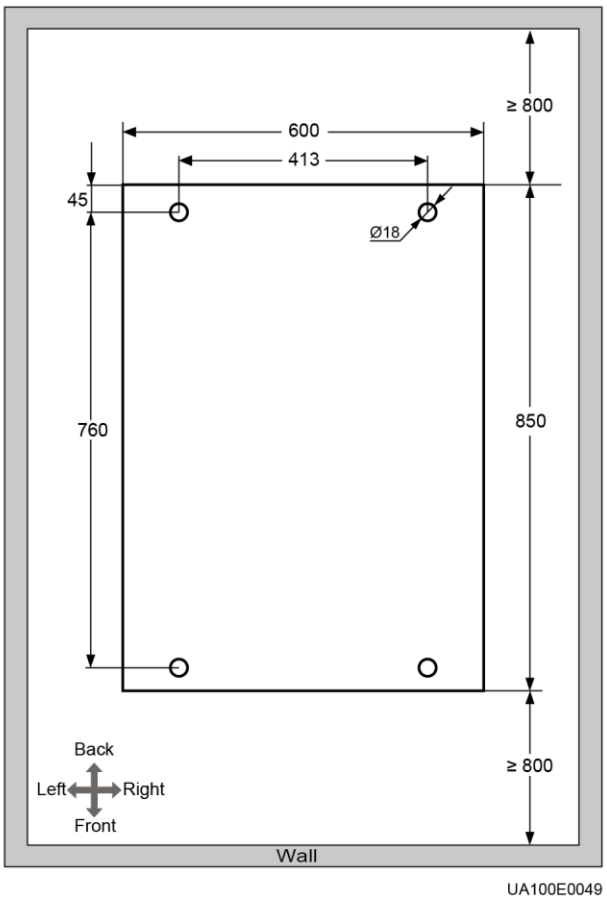
- The top entry cabinet applies only to the UPS5000-E-320K-F320.
- The input PDC, output PDC, top outlet kit, and IP21 component apply only to the UPS5000-E-120K-F120 and UPS5000-E-200K-F200.
- The other components are optional for the four models of UPS5000-Es.

3.2.1 Installing the Cabinet

Secured Installation

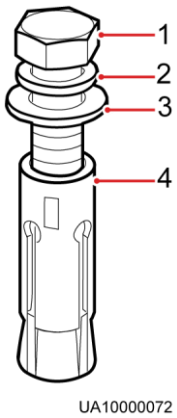
Step 1 Determine the position for installing the cabinet. Mark mounting holes based on the drawings, as shown in Figure 3-7.

Figure 3-7 Mounting holes (unit: mm)



Step 2 Use a hammer drill to drill six holes for installing expansion bolts and then install six expansion bolts in the holes. Figure 3-8 shows expansion bolt composition. Figure 3-9 shows how to install an expansion bolt.

Figure 3-8 Expansion bolt composition

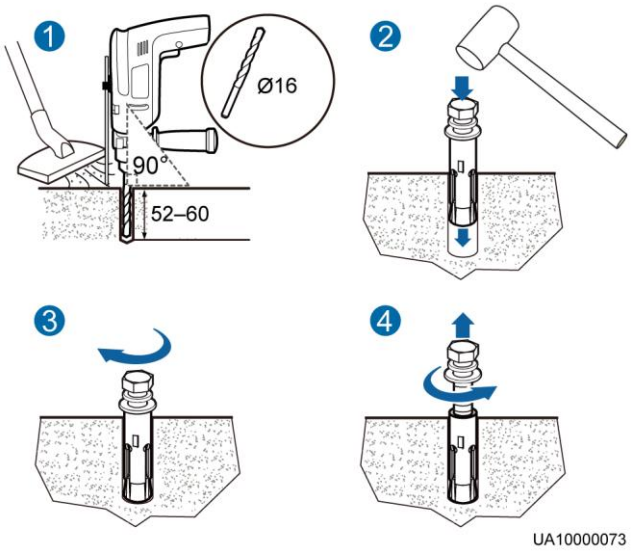


(1) M12 bolt (2) Spring washer (3) Flat washer (4) Expansion sleeve

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 3-9 Installing expansion bolts (unit: mm)



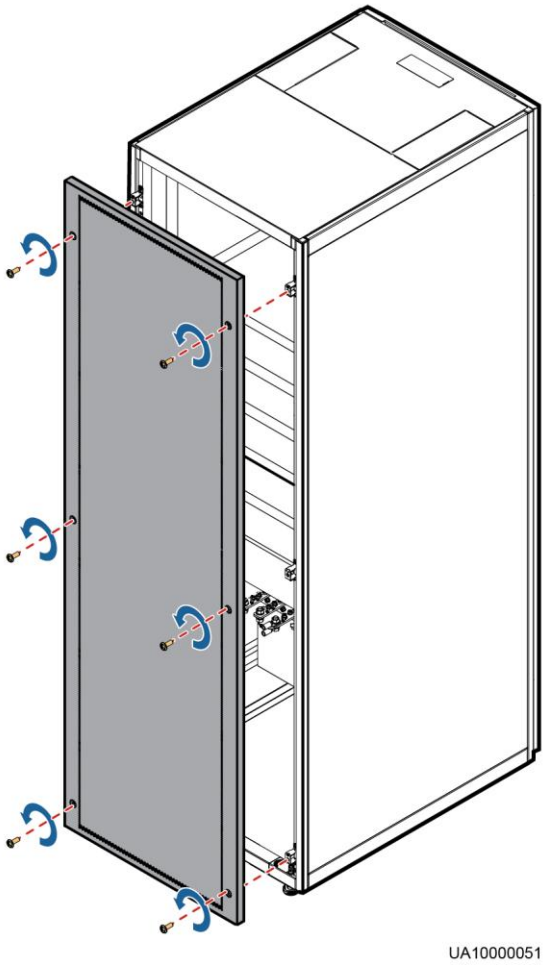
1. Drill holes in the ground by using a hammer drill. The hole depth is 52 mm to 60 mm.
2. Partially tighten the expansion bolt and vertically insert it into the hole. Knock the expansion bolt using a rubber mallet until the expansion sleeve is fully inserted into the hole.
3. Partially tighten the expansion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

Step 3 Slide the cabinet on its castors to the installation position.

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

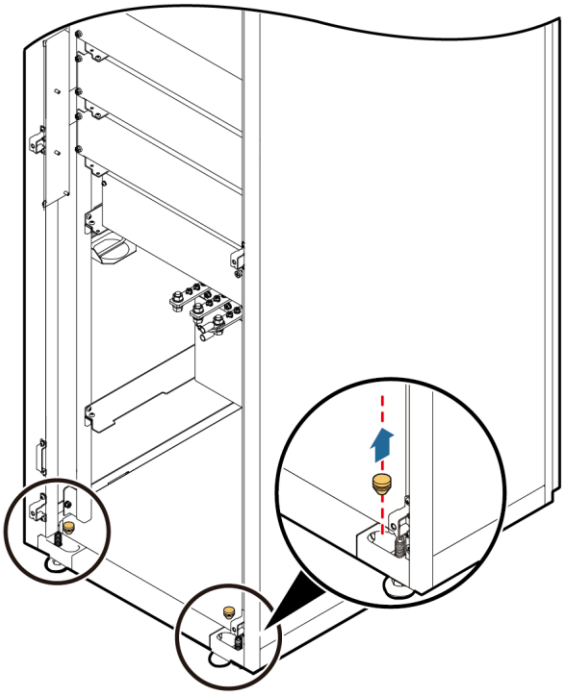
Step 5 Remove the rear panel of the cabinet, as shown in Figure 3-10, and then open the front door.

Figure 3-10 Removing the rear panel



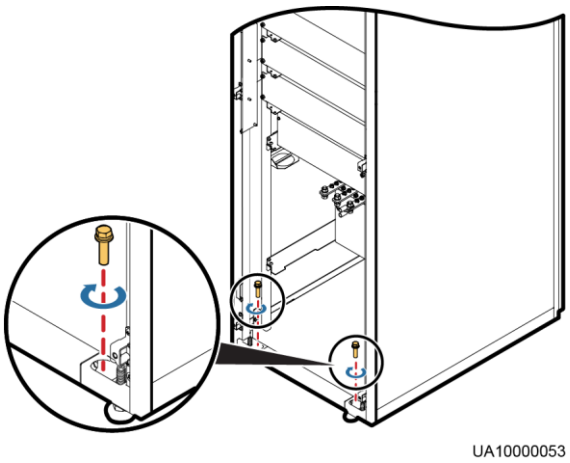
Step 6 Remove the four rubber plugs from the bottom of the cabinet (two on the front and two at the back), as shown in Figure 3-11.

Figure 3-11 Removing rubber plugs



Step 7 Insert four M12x115 expansion bolts into the expansion bolt holes in the floor, and tighten the expansion bolts, as shown in Figure 3-12.

Figure 3-12 Tightening expansion bolts

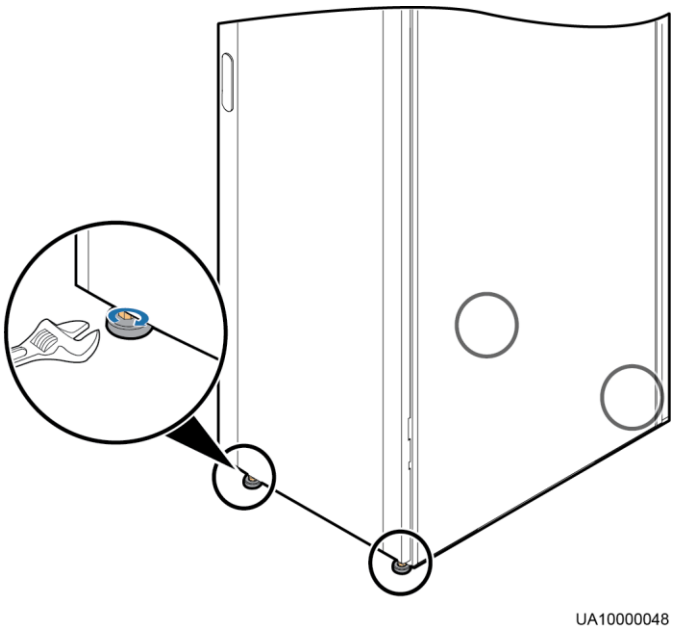


----End

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 3-13.

Figure 3-13 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.

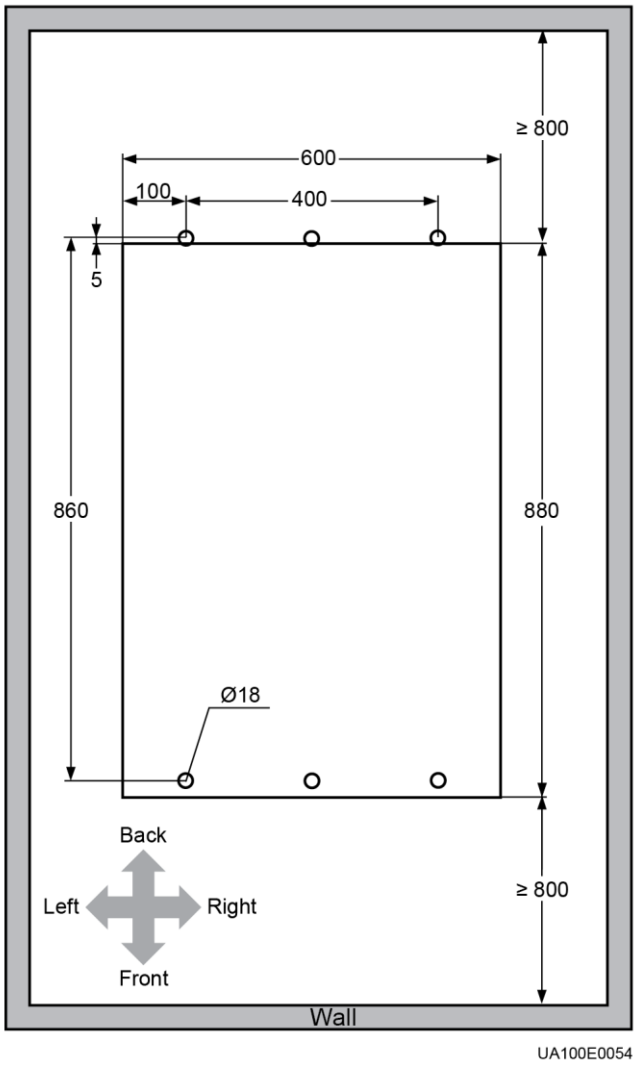
----End

3.2.2 (Optional) Installing Antiseismic Kits

Procedure

Step 1 Determine the positions for installing the antiseismic kits. Mark mounting holes based on the drawings, as shown in Figure 3-14.

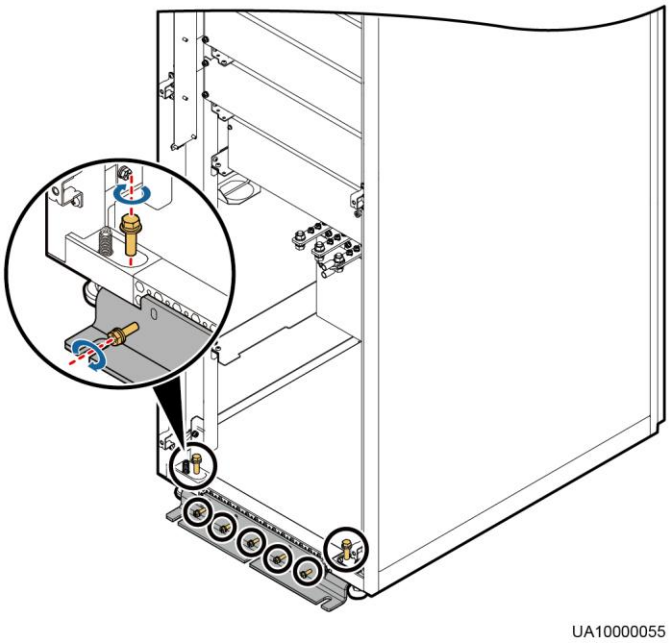
Figure 3-14 Installation dimensions (unit: mm)



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 by using ten M6 screws and four M12 screws, as shown in Figure 3-15.

Figure 3-15 Securing the antiseismic kits to the cabinet

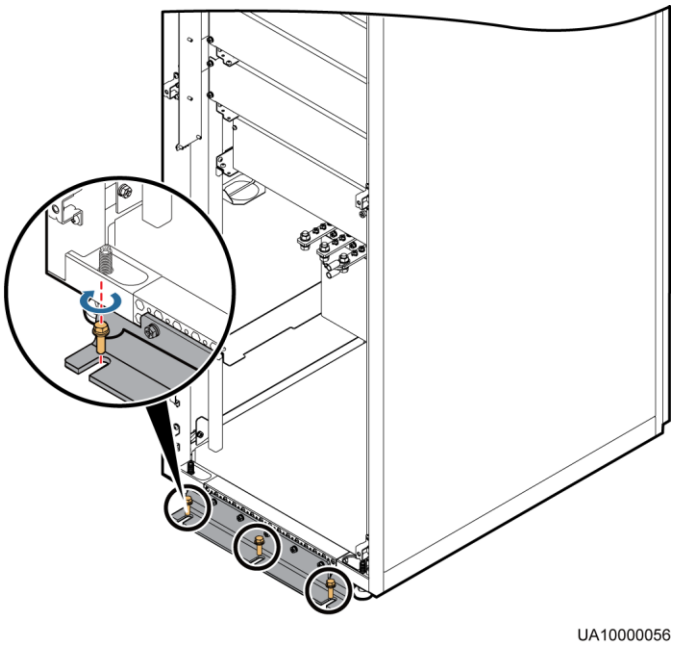


Step 4 Reinstall the rear panel.

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

Step 6 Secure the two antiseismic kits to the floor at the front and rear of the cabinet by using six M12 expansion bolts, as shown in Figure 3-16.

Figure 3-16 Securing the antiseismic kits to the floor



----End

3.2.3 (Optional) Installing an IP21 Component

Context

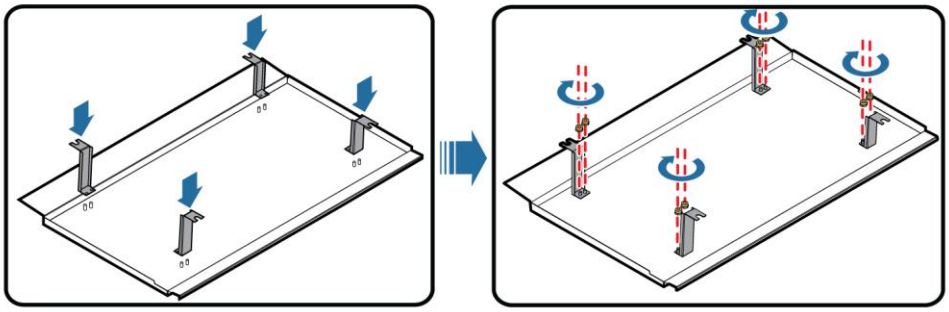
NOTICE

If an IP21 component is installed for the UPS5000-E-120K-F120 and UPS5000-E-200K-F200, top cable routing is not supported.

Procedure

Step 1 Install leveling feet at the bottom of the IP21 component, with two long feet on the front and two short feet at the rear, as shown in Figure 3-17.

Figure 3-17 Installing leveling feet

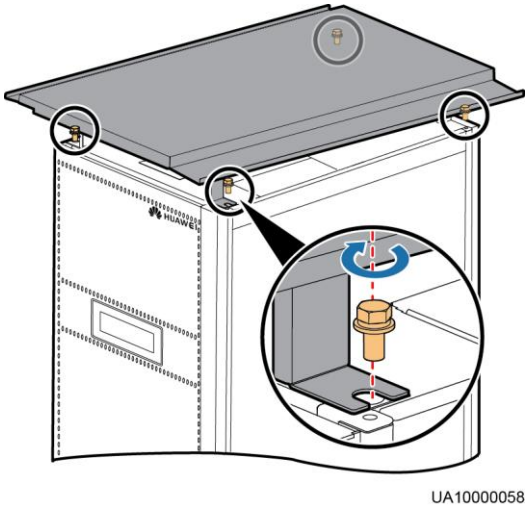


NOTE

Refer to the "front" and "back" silk screens on the surface of the IP21 component.

Step 2 Install the IP21 component at the top of the UPS cabinet using four M12 screws, as shown in Figure 3-18.

Figure 3-18 Installing the IP21 component



----End

3.2.4 (Optional) Installing a Top Outlet Kit

See the *UPS Top Outlet Kit User Manual*.

3.2.5 (Optional) Installing an Input PDC

See the *PDC-0630ACV4INA Power Distribution Unit User Manual.*

3.2.6 (Optional) Installing an Output PDC

See the*PDC-0630ACV4OUA Power Distribution Unit User Manual.*

3.2.7 Installing Batteries

Context

DANGER

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

Procedure

Step 1 Install a battery rack and batteries.

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

Step 2 (Optional) Install a BCB box.

For details, see the *PDC-(0250, 0400, 0630) DC0384BXA BCB Box User Manual* or *PDU8000-(0125, 0250, 0400, 0630, 0800) DCV8-BXA001 BCB Box User Manual* delivered with the BCB box.

Step 3 (Optional) Install a BBB box.

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

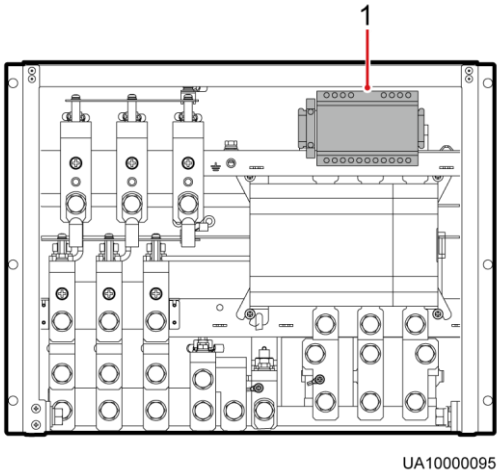
Step 4 (Optional) Install a BMU.

For details, see the *UPS Battery Monitor Unit User Manual*.

Step 5 (Optional) Install a battery grounding failure detector.

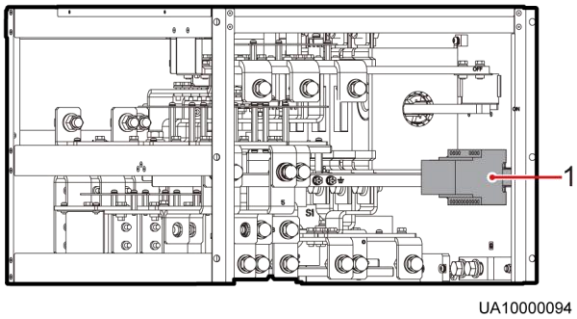
Install a battery grounding failure detector, as shown in Figure 3-19 (for the UPS5000-E-120K-F120/UPS5000-E-200K-F200), Figure 3-20 (for the UPS5000-E-320K-F320), and Figure 3-21 (for the UPS5000-E-320K-F320T).

Figure 3-19 Position for installing a battery grounding failure detector (UPS5000-E-200K-F200/UPS5000-E-120K-F120)



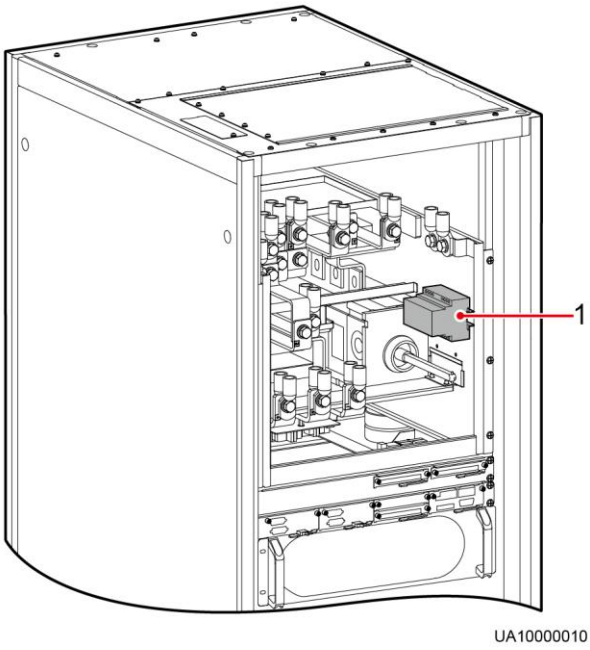
(1) Battery grounding failure detector

Figure 3-20 Position for installing a battery grounding failure detector (UPS5000-E-320K-F320)



(1) Battery grounding failure detector

Figure 3-21 Position for installing a battery grounding failure detector (UPS5000-E-320K-F320T)



(1) Battery grounding failure detector

NOTE

For details about how to install a battery grounding failure detector, see the *UPS Battery Grounding Failure Detector User Manual*.

----End

3.2.8 Routing Cables

3.2.8.1 Top Cable Routing

UPS5000-E-120K-F120 and UPS5000-E-200K-F200

NOTICE

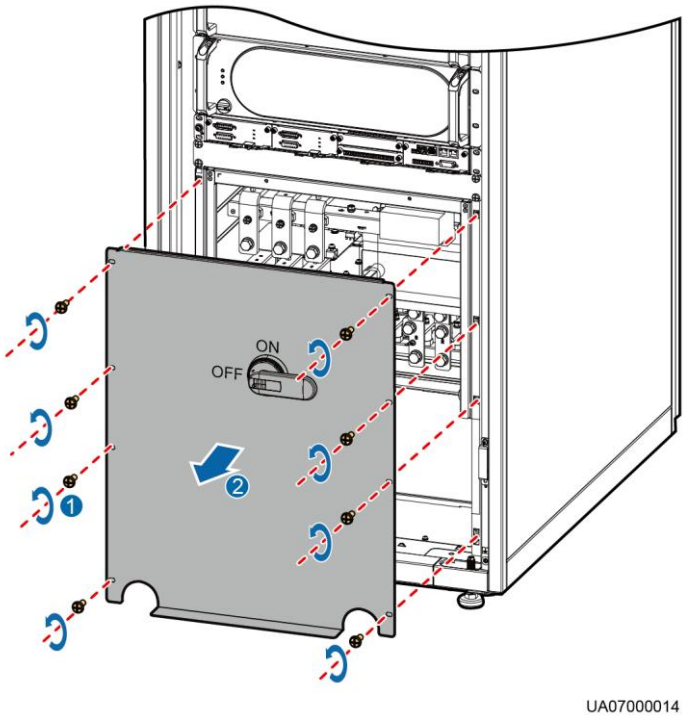
- Perform the following steps to route cables from the top.
- The basic rule is to route cables from inside out and from the bottom up.
- After routing cables, use fireproof mud to fill in the gap between the cables and the cabinet.

The UPS5000-E-120K-F120 and UPS5000-E-200K-F200 use the same top cable routing mode. To route cables from the top of the UPS5000-E-320K-F320, configure a top entry cabinet.

To route cables from the top of the UPS5000-E-120K-F120 or UPS5000-E-200K-F200, perform the following steps:

Step 1 Open the front door, and remove the cover from the power distribution subrack, as shown in Figure 3-22.

Figure 3-22 Removing the cover



NOTE

The cover can be removed only when the maintenance bypass switch is OFF.

Step 2 Route power cables.

NOTICE

You can remove the small cable tray covers or drill holes on the big cable tray cover to route cables.

- Removing the cable tray covers from the top of the cabinet and then routing cables

  Remove the covers of the cabinet top, as shown in Figure 3-23.

  Figure 3-23 Removing the cable tray covers

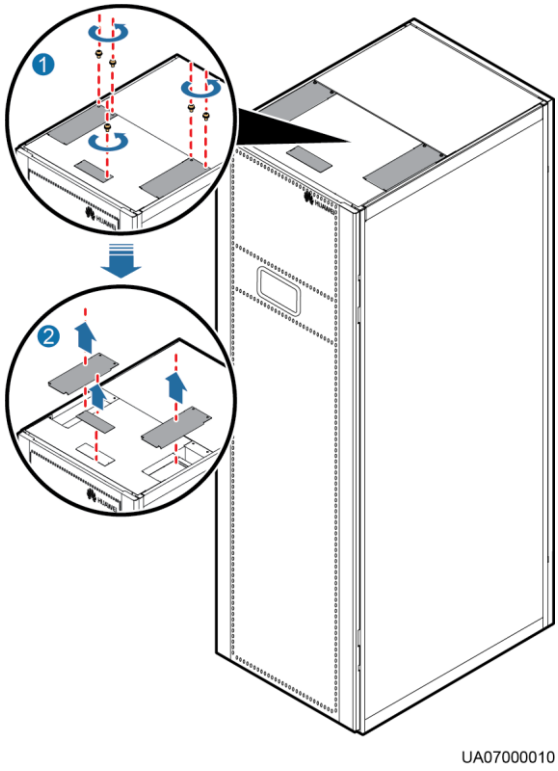
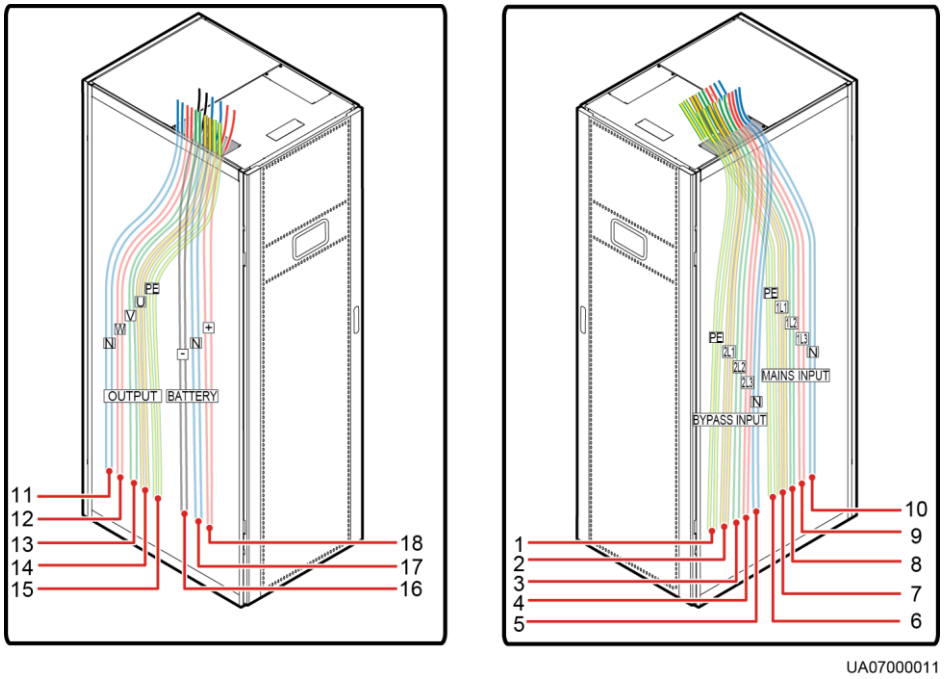
  

  Figure 3-24 shows how to route power cables that are recommended in Table 3-3 for the UPS5000-E-200K-F200.

Figure 3-24 Routing power cables through the cable tray covers at the top of the cabinet



(1) Bypass input PE	(2) Bypass input L1	(3) Bypass input L2	(4) Bypass input L3
(5) Bypass input N	(6) Mains input PE	(7) Mains input L1	(8) Mains input L2
(9) Mains input L3	(10) Mains input N	(11) Output N	(12) Output W
(13) Output V	(14) Output U	(15) Output PE	(16) Battery input negative terminal
(17) Battery input N	(18) Battery input positive terminal		

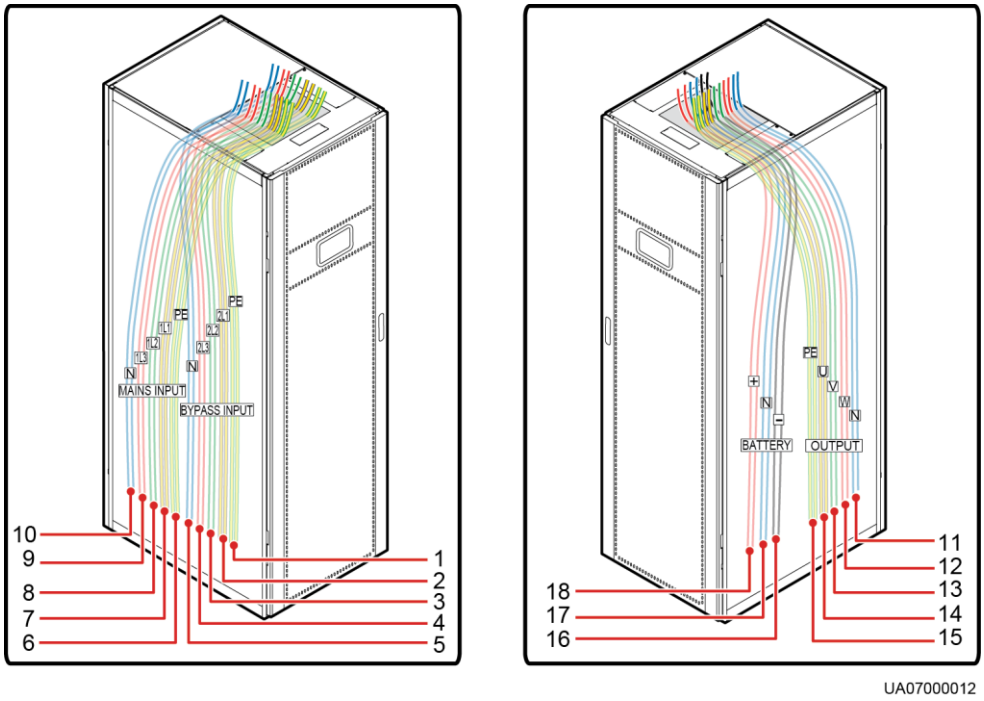
- Drilling holes and routing cables

  Based on site requirements such as the number of cables and cable size, you can drill holes in the large cover in the middle of the cabinet top to accommodate the cables. Table 3-3 shows how to route power cables that are recommended in Figure 3-25 for the UPS5000-E-200K-F200.

NOTE

Remove the cover before drilling holes. If you choose to route cables by drilling holes, paste grommet strip to the hole edge to protect cables.

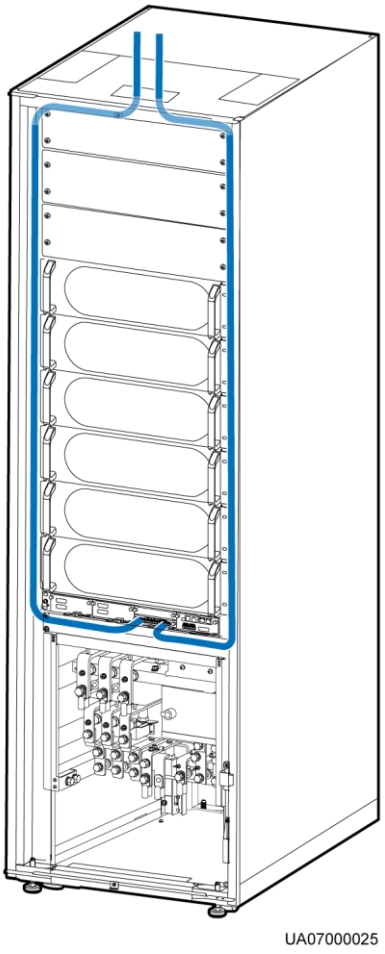
Figure 3-25 Routing power cables through the holes at the top of the cabinet



(1) Bypass input PE	(2) Bypass input L1	(3) Bypass input L2	(4) Bypass input L3
(5) Bypass input N	(6) Mains input PE	(7) Mains input L1	(8) Mains input L2
(9) Mains input L3	(10) Mains input N	(11) Output N	(12) Output W
(13) Output V	(14) Output U	(15) Output PE	(16) Battery input negative terminal
(17) Battery input N	(18) Battery input positive terminal		

Step 3 Route the cables on the left of subracks along the left side of the cabinet and the cables on the right side of subracks along the right side of the cabinet, and then bind the cables to the cabinet, as shown in Figure 3-26.

Figure 3-26 Routing signal cables from the top of the cabinet



NOTE

The number and colors of signal cables shown in Figure 3-26 are for reference only.

----End

UPS5000-E-320K-F320

To route cables from the top of the UPS5000-E-320K-F320, perform the following steps:

NOTICE

- Before using a top entry cabinet for cable routing, determine whether to place the top entry cabinet on the left or right of the UPS5000-E cabinet. The scenario in which the top entry cabinet is placed on the right of the UPS cabinet is used an example (the procedure is the same if the top entry cabinet is placed on the left).
- After routing cables, use fireproof mud to fill in the gap between the cables and the cabinet.

Step 1 Place the top entry cabinet on the left or right of the UPS based on actual requirements.

Step 2 Remove the right panel from the UPS and the front panel from the top entry cabinet, and put the panel and screws away.

Step 3 Level the feet of the top entry cabinet to make it in the same plane with the UPS.

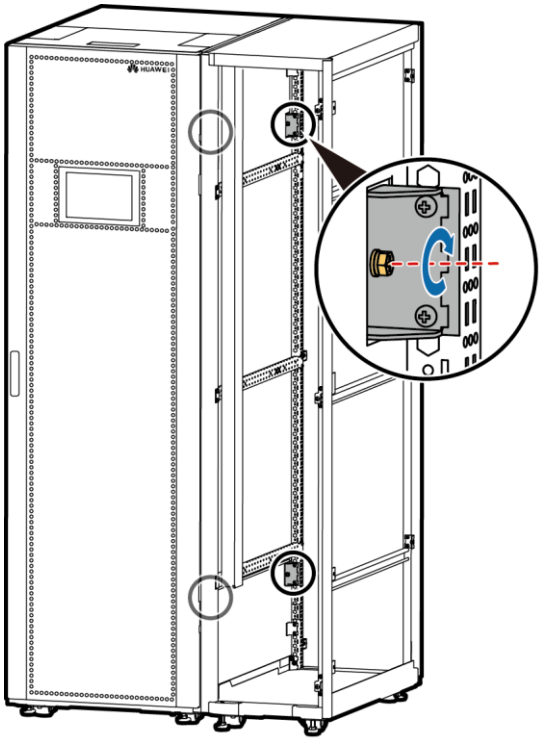
Step 4 Remove the top entry panel for the top entry cabinet and the cover for control cables, and reinstall the top cover on the top entry cabinet.

NOTE

If you choose to route cables by drilling holes, paste grommet strip to the hole edge to protect cables.

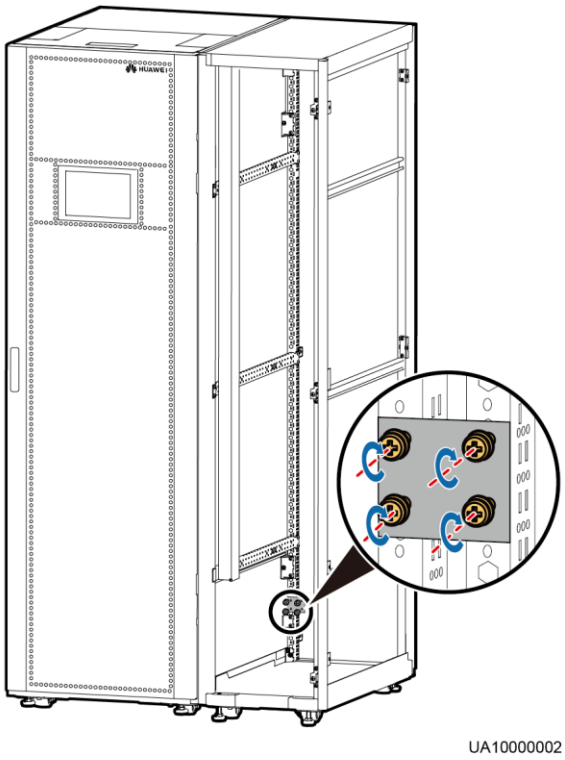
Step 5 Install the connecting kit on the UPS. Combine the UPS and the top entry cabinet by using a connecting kit, as shown in Figure 3-27.

Figure 3-27 Combining the UPS and the top entry cabinet



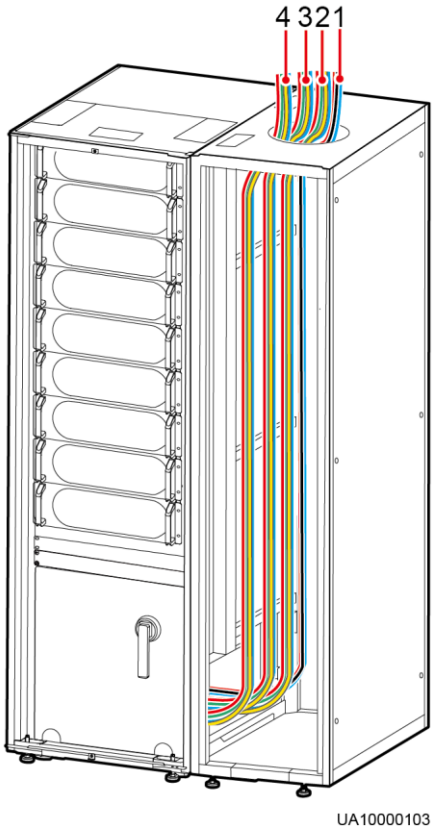
Step 6 Connect the UPS to the top entry cabinet with short-circuit busbars, as shown in Figure 3-28.

Figure 3-28 Installing parallel busbar



Step 7 Connect power cables to the UPS through the top entry cabinet, as shown in Figure 3-29.

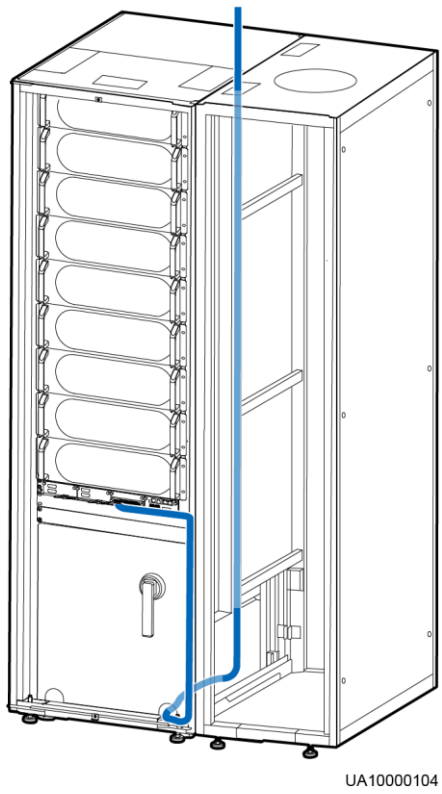
Figure 3-29 Routing power cables from the top of the cabinet



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

Step 8 Connect signal cables to the UPS5000-E through the cable trough in the top entry cabinet, as shown in Figure 3-30.

Figure 3-30 Routing signal cables from the top of the cabinet



NOTE

Install a cable trough near the front of the UPS5000-E cabinet. If the cable trough is near the rear of the UPS5000-E cabinet, move it to a place near the front of the cabinet.

Step 9 Install the side panel removed from the right of the UPS5000-E cabinet on the outer side of the top entry cabinet.

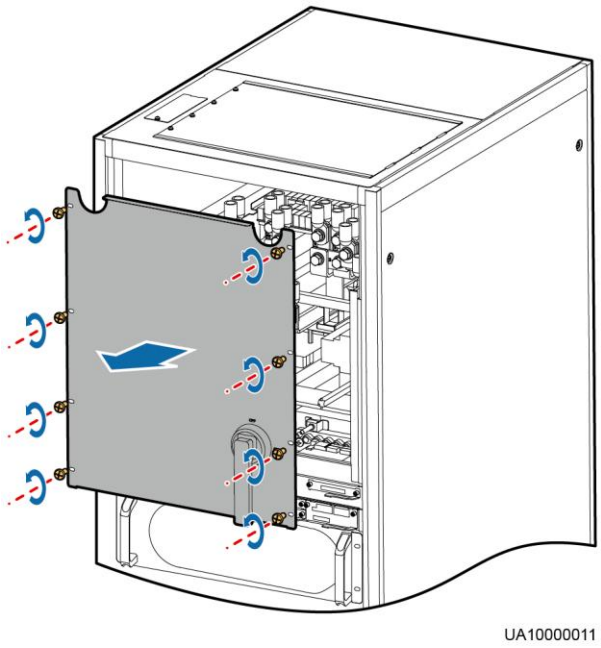
----End

UPS5000-E-320K-F320T

To route cables from the top of the UPS5000-E-320K-F320T, perform the following steps:

Step 1 Open the front door, and remove the cover from the power distribution subrack, as shown in Figure 3-31.

Figure 3-31 Removing the cover



NOTE

The cover can be removed only when the maintenance bypass switch is OFF.

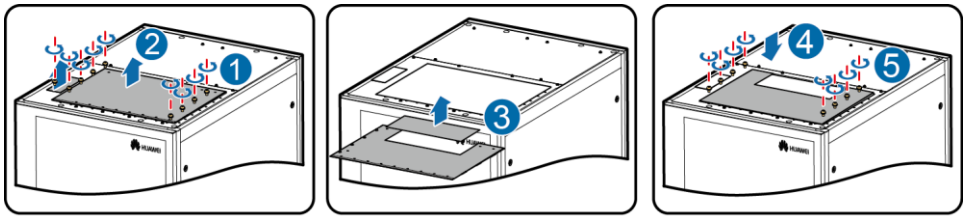
Step 2 Route power cables.

1. Take the cable tray covers for the power cables and control cables out of the cabinet, drill holes on the cable tray cover for the power cables using a hole saw, attach grommet strips on the hole edges for protecting cables, and reinstall the cable tray cover for the power cables, as shown in Figure 3-32.

NOTE

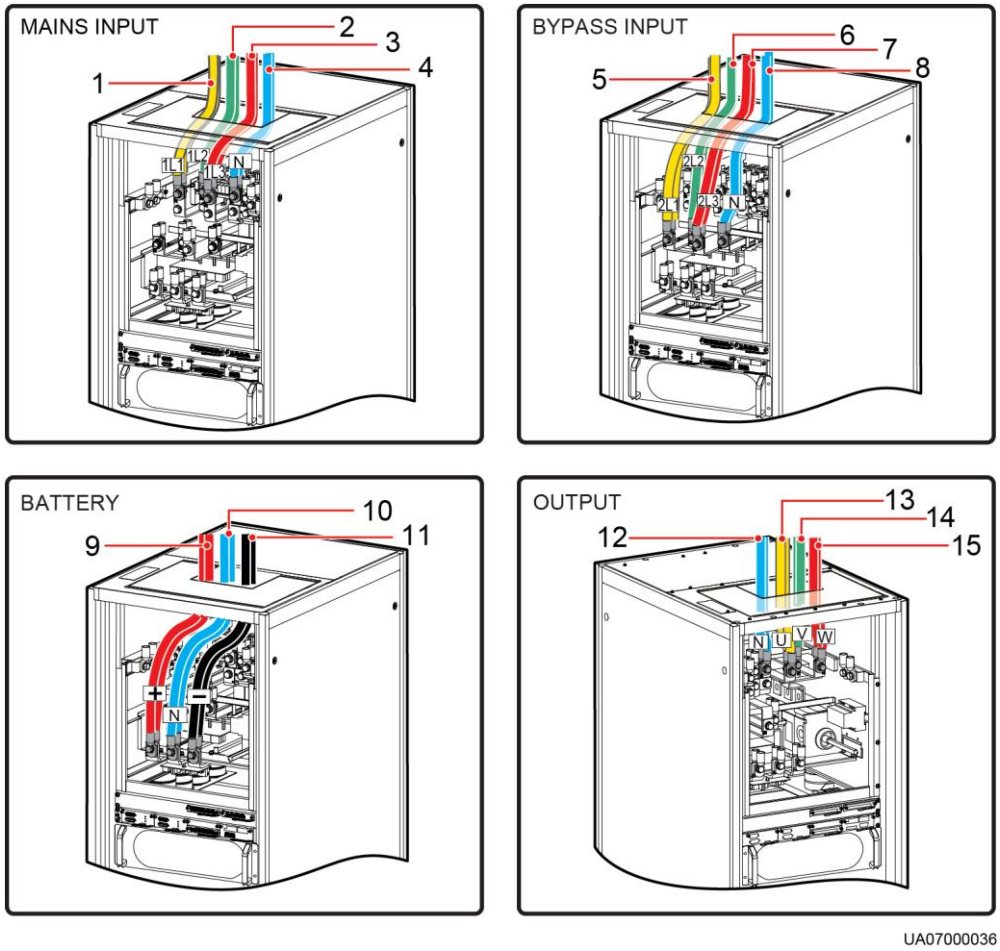
The hole size and quantity are for reference only.

Figure 3-32 Removing the cable tray cover from the top of the cabinet



2. Figure 3-33 shows the power cables routed from the top of the cabinet.

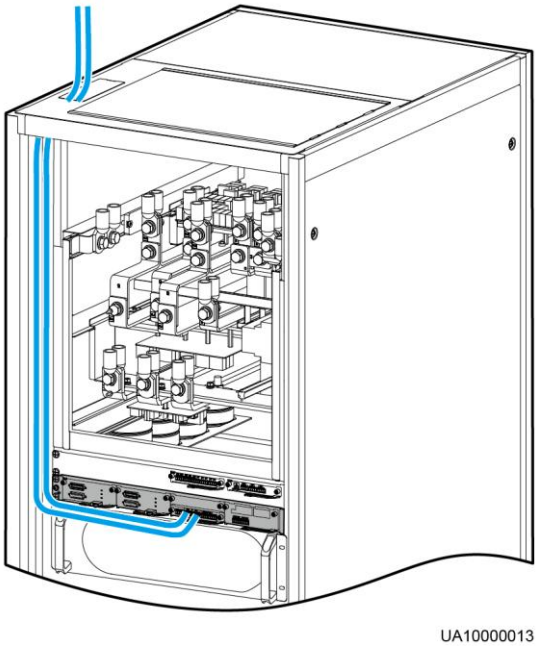
Figure 3-33 Routing power cables from the top of the cabinet



(1) Mains input L1	(2) Mains input L2	(3) Mains input L3	(4) Mains input N
(5) Bypass input L1	(6) Bypass input L2	(7) Bypass input L3	(8) Bypass input N
(9) Battery input positive terminal	(10) Battery input N	(11) Battery input negative terminal	(12) Output N
(13) Output U	(14) Output V	(15) Output W	

Step 3 Route control cables. Bind cables to the cabinet. Figure 3-34 shows the control cables routed from the top of the cabinet.

Figure 3-34 Routing signal cables from the top of the cabinet



----End

3.2.8.2 Bottom Cable Routing

Context

NOTICE

- If you route cables through the bottom of the cabinet, ensure sufficient space.
- After routing cables, use fireproof mud to fill in the gap between the cables and the cabinet.

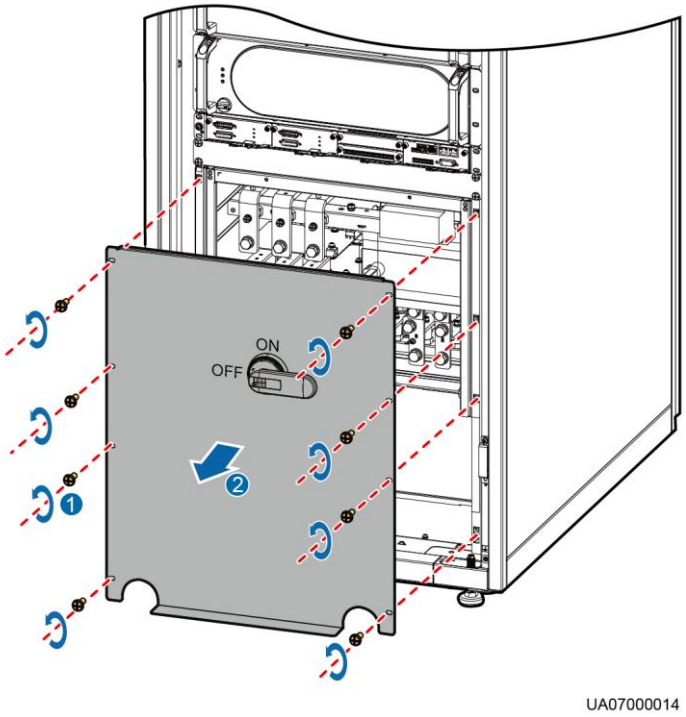
The UPS5000-E-320K-F320T does not support cable routing from the bottom.

The UPS5000-E-120K-F120, UPS5000-E-200K-F200, and UPS5000-E-320K-F320 use the same bottom cable routing mode. Bottom cable routing for the UPS5000-E-200K-F200 is used as an example. To route cables from the bottom of the UPS5000-E-200K-F200, perform the following steps:

Procedure

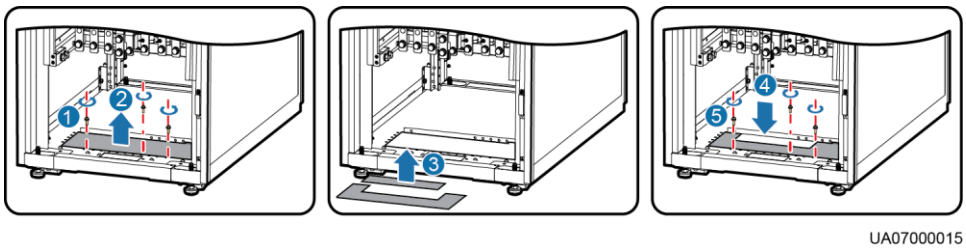
Step 1 Open the front door, and remove the cover from the power distribution subrack, as shown in Figure 3-35.

Figure 3-35 Removing the cover



Step 2 Take the cable tray covers for the power cables and control cables out of the cabinet, drill holes on the cable tray cover for the power cables using a hole saw, attach grommet strips on the hole edges for protecting cables, and reinstall the cable tray cover for the power cables, as shown in Figure 3-36.

Figure 3-36 Removing the bottom cover and drilling holes

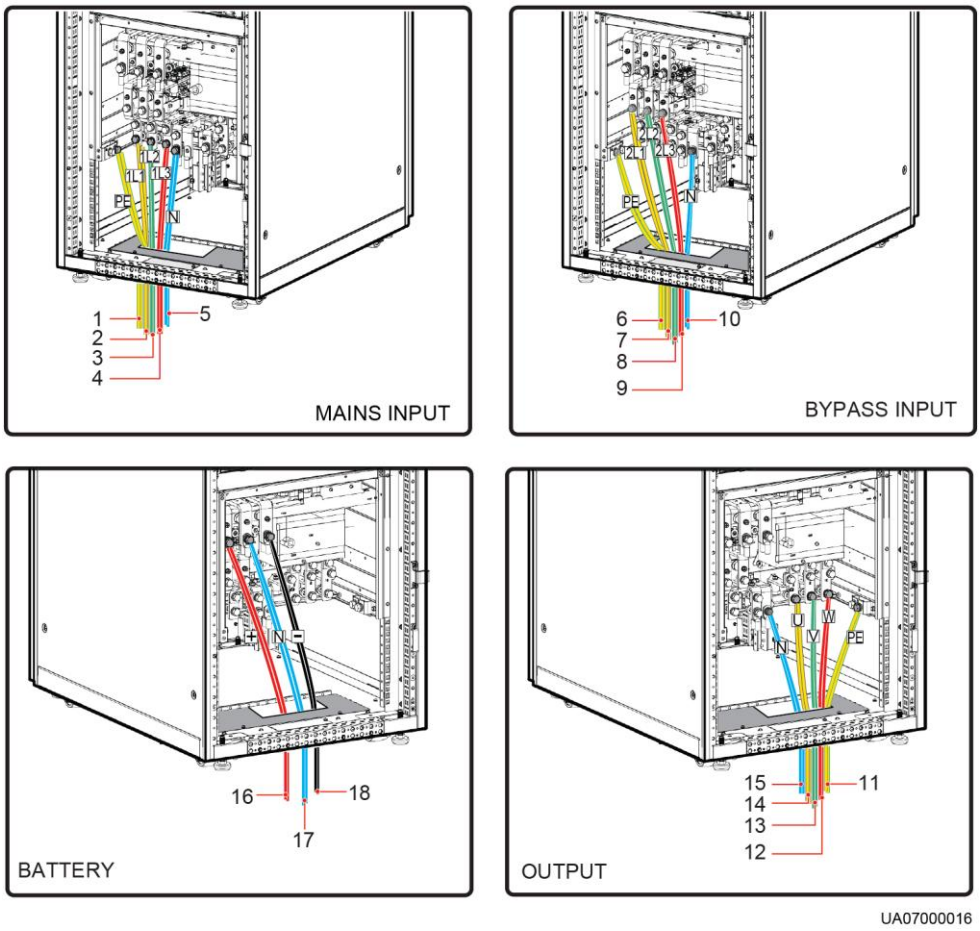


NOTE
The hole size and quantity are for reference only.

Step 3 Route power cables.

Figure 3-37 shows how to route power cables that are recommended in Table 3-3 for the UPS5000-E-200K-F200.

Figure 3-37 Routing power cables from the bottom of the cabinet



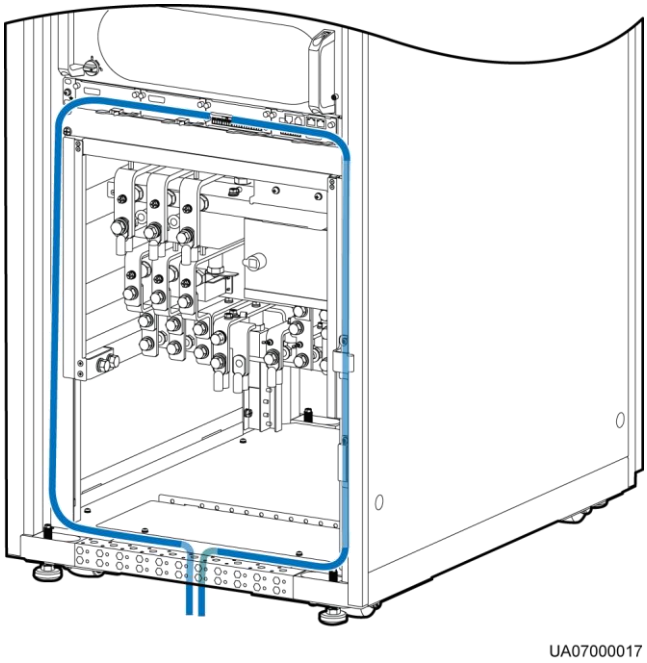
(1) Mains input PE	(2) Mains input L1	(3) Mains input L2	(4) Mains input L3
(5) Mains input N	(6) Bypass input PE	(7) Bypass input L1	(8) Bypass input L2
(9) Bypass input L3	(10) Bypass input N	(11) Output PE	(12) Output W
(13) Output V	(14) Output U	(15) Output N	(16) Battery input positive terminal
(17) Battery input N	(18) Battery input negative terminal		

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. Then route cables through the holes, use fireproof putty to fill in the gap between cables and the cabinet.

Step 4 Route the cables on the left of subracks along the left side of the cabinet and the cables on the right side of subracks along the right side of the cabinet, and then bind the cables to the cabinet, as shown in Figure 3-38.

Figure 3-38 Routing signal cables from the bottom of the cabinet



NOTE

The number and colors of signal cables shown in Figure 3-38 are for reference only.

----End

3.2.9 Connecting Ground Cables

Context

NOTICE

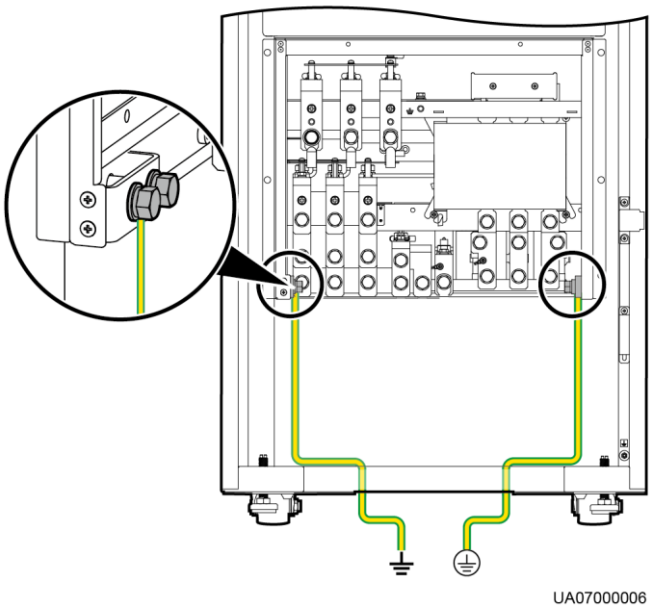
- Before connecting cables, ensure that the upstream input switches for all the UPSs are OFF.
- Determine the actual number of ground cables based on Table 3-3 and the site requirements. The following figure is for reference only.
- Prepare OT terminals onsite. Strip the cable to expose the copper wire, which should be as long as the part where the OT terminal is secured with the cable.

Procedure

Step 1 Connect a ground cable to the UPS5000-E.

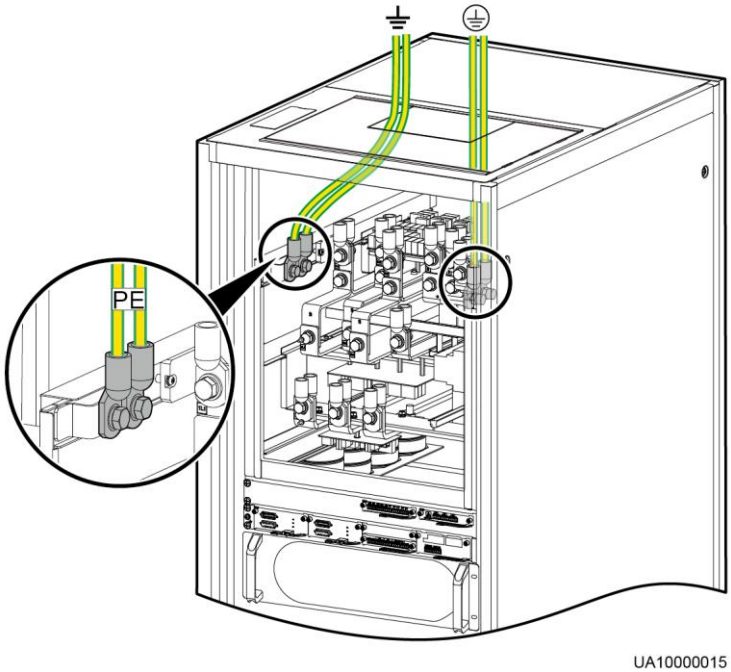
- The ground cable connection method is the same for the UPS5000-E-120K-F120, UPS5000-E-200K-F200, and UPS5000-E-320K-F320. Grounding for the UPS5000-E-200K-F200 is used as example, which is shown in Figure 3-39.

Figure 3-39 Grounding (UPS5000-E-200K-F200)



- Figure 3-40 shows grounding for the UPS5000-E-320K-F320T.

Figure 3-40 Grounding (UPS5000-E-320K-F320T)



NOTE

In the preceding figure, circled wiring terminals are primary ones and must connect to the ground cable. Determine whether to connect the wiring terminals that are not circled to the ground cable based on site requirements. The preceding figure uses two ground cables as an example.

----End

3.2.10 Connecting AC Input Power Cables

3.2.10.1 Single Mains

Context

NOTICE

Prepare OT terminals onsite. Strip the cable to expose the copper wire, which should be as long as the part where the OT terminal is secured with the cable.

Procedure

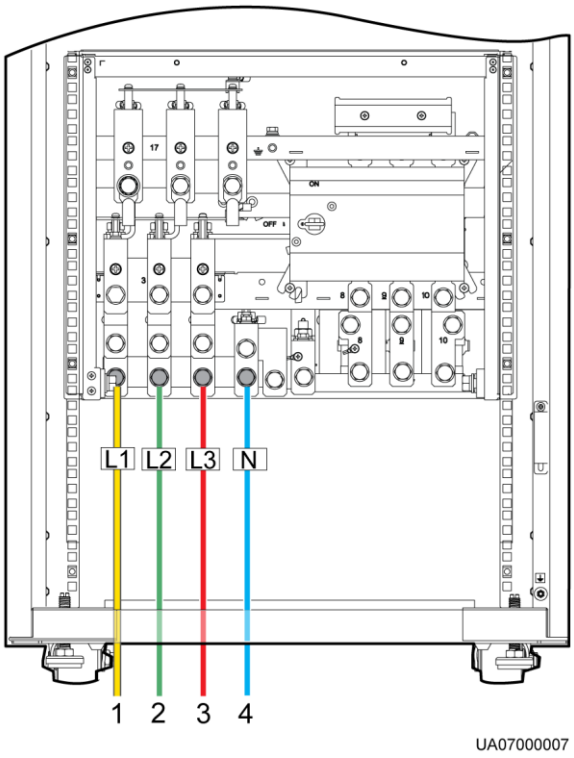
Step 1 (Optional) Connect cables to the input PDC.

NOTE

For the connection method, see the *PDC-0630ACV4INA Power Distribution Unit User Manual*. If the mains input and bypass input share a power source, mains and bypass input terminals are connected by copper bars.

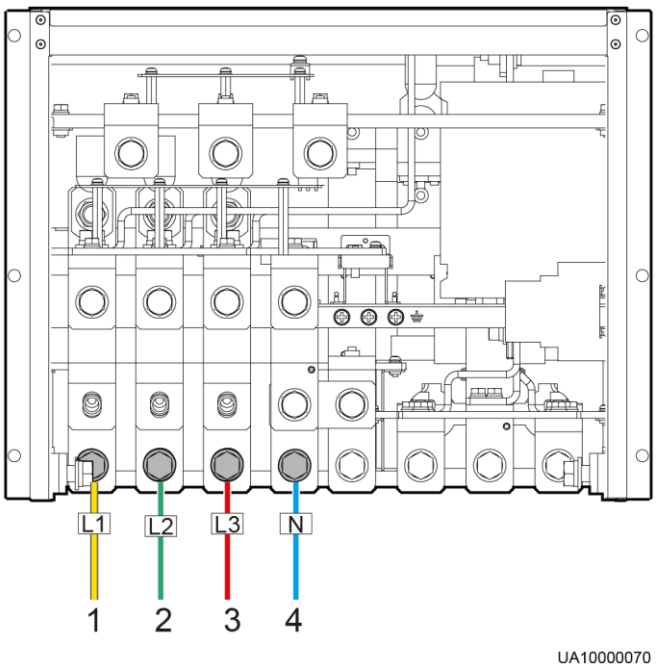
Step 2 Connect the wires of the AC input power cable to terminals L1, L2, L3, and N on the UPS cabinet, as shown in Figure 3-41 (for the UPS5000-E-120K-F120/UPS5000-E-200K-F200), Figure 3-42 (for the UPS5000-E-320K-F320), and Figure 3-43 (for the UPS5000-E-320K-F320T).

Figure 3-41 Input terminals (UPS5000-E-200K-F200/UPS5000-E-120K-F120)



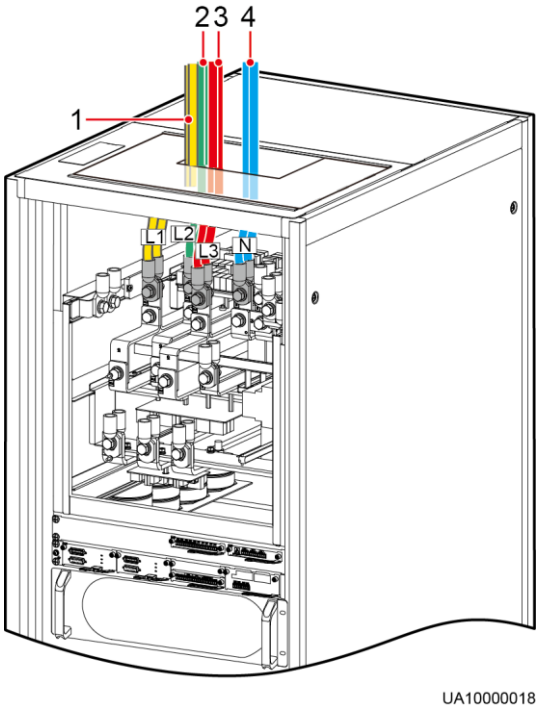
(1) Input L1 (2) Input L2 (3) Input L3 (4) Input N

Figure 3-42 Input terminals (UPS5000-E-320K-F320)



(1) Input L1 (2) Input L2 (3) Input L3 (4) Input N

Figure 3-43 Input terminals (UPS5000-E-320K-F320T)



(1) Input L1 (2) Input L2 (3) Input L3 (4) Input N

----End

3.2.10.2 Dual Mains

Procedure

Step 1 Remove the copper bars between mains input terminals and bypass input terminals. The removal method is the same for the UPS5000-E-120K-F120, UPS5000-E-200K-F200, and UPS5000-E-320K-F320. Removing copper bars for the UPS5000-E-200K-F200 is used as example, which is shown in Figure 3-44. Figure 3-45 shows how to remove the copper bars for the UPS5000-E-320K-F320T.

Figure 3-44 Removing the copper bars (UPS5000-E-200K-F200)

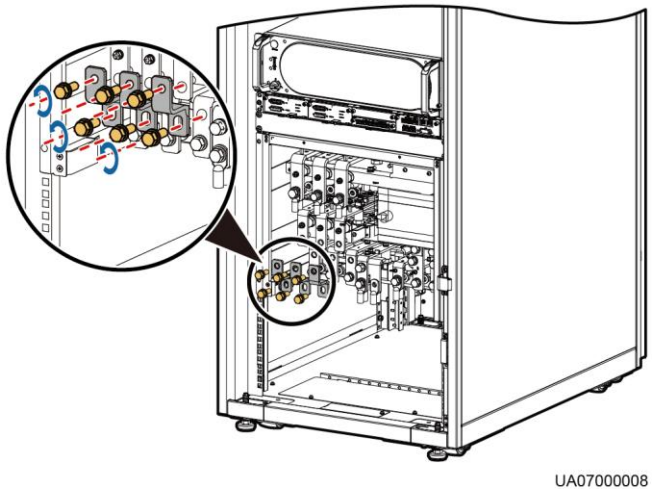
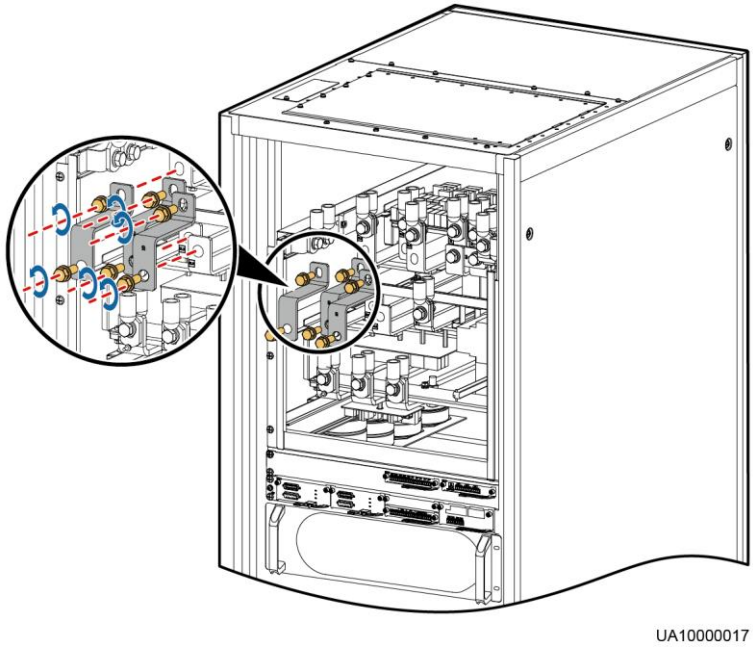


Figure 3-45 Removing the copper bars (UPS5000-E-320K-F320T)



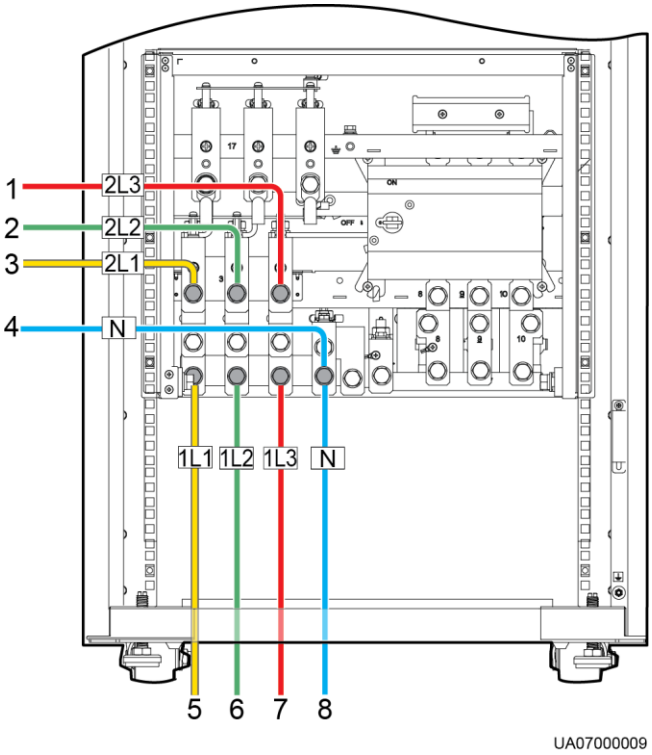
NOTE
Store the removed copper bars.

Step 2 (Optional) Connect cables to the input PDC.

NOTE
For details, see the *PDC-0630ACV4INA Power Distribution Unit User Manual*.

Step 3 Connect the mains and bypass input power cables to the mains and bypass input terminals L1, L2, L3, and N respectively, as shown in Figure 3-46 (for the UPS5000-E-120K-F120/UPS5000-E-200K-F200), Figure 3-47 (for the UPS5000-E-320K-F320), and Figure 3-48 (for the UPS5000-E-320K-F320T).

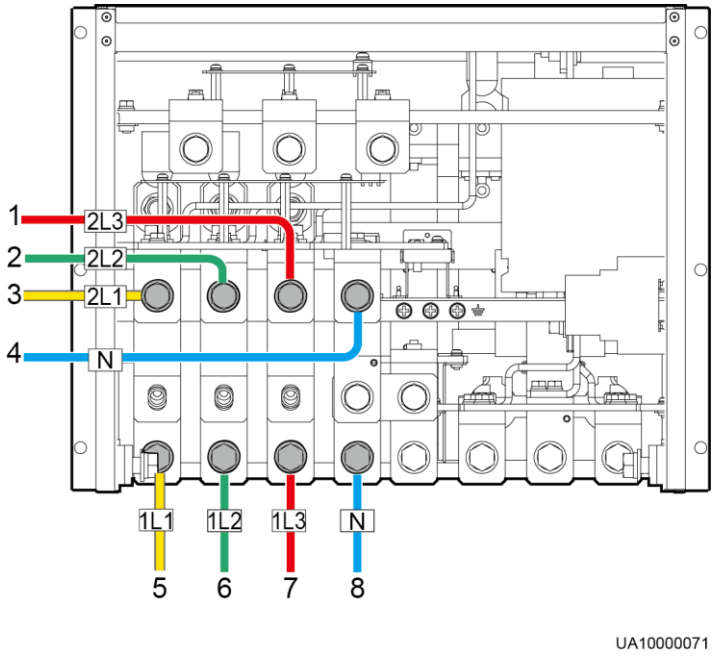
Figure 3-46 Input terminals (UPS5000-E-200K-F200/UPS5000-E-120K-F120)



(1) Bypass input 2L3 (2) Bypass input 2L2 (3) Bypass input 2L1 (4) Bypass input N

(5) Mains input 1L1 (6) Mains input 1L2 (7) Mains input 1L3 (8) Mains input N

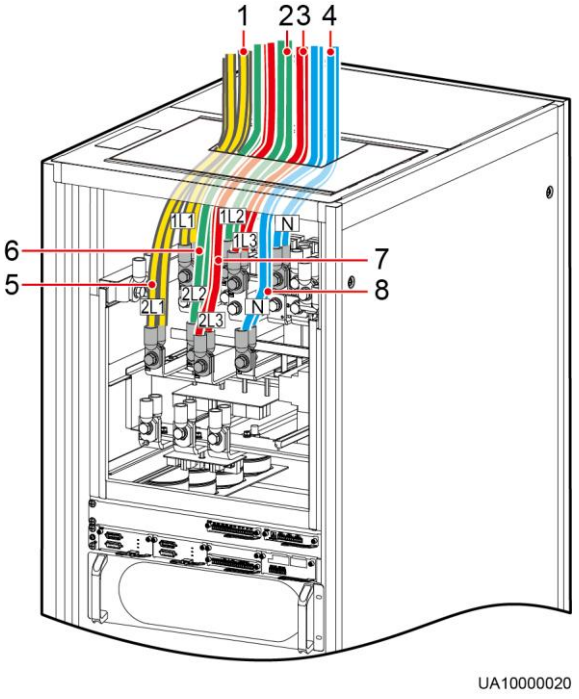
Figure 3-47 Input terminals (UPS5000-E-320K-F320)



(1) Bypass input 2L3 (2) Bypass input 2L2 (3) Bypass input 2L1 (4) Bypass input N

(5) Mains input 1L1 (6) Mains input 1L2 (7) Mains input 1L3 (8) Mains input N

Figure 3-48 Input terminals (UPS5000-E-320K-F320T)



(1) Mains input 1L1 (2) Mains input 1L2 (3) Mains input 1L3 (4) Mains input N

(5) Bypass input 2L1 (6) Bypass input 2L2 (7) Bypass input 2L3 (8) Bypass input N

----End

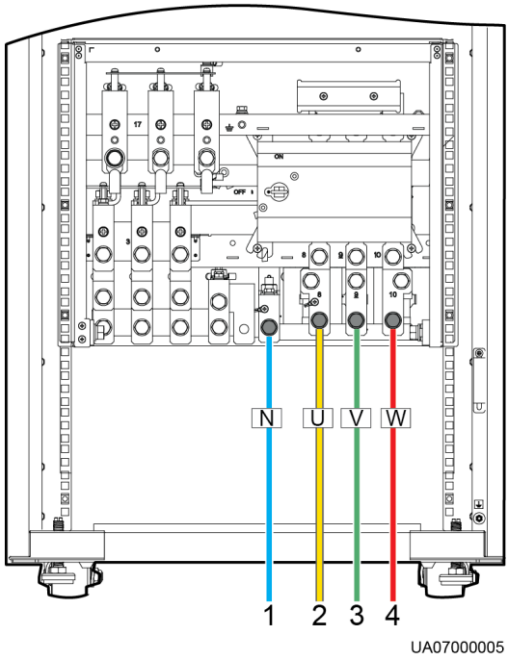
3.2.11 Connecting AC Output Power Cables

NOTICE

Prepare OT terminals onsite. Strip the cable to expose the copper wire, which should be as long as the part where the OT terminal is secured with the cable.

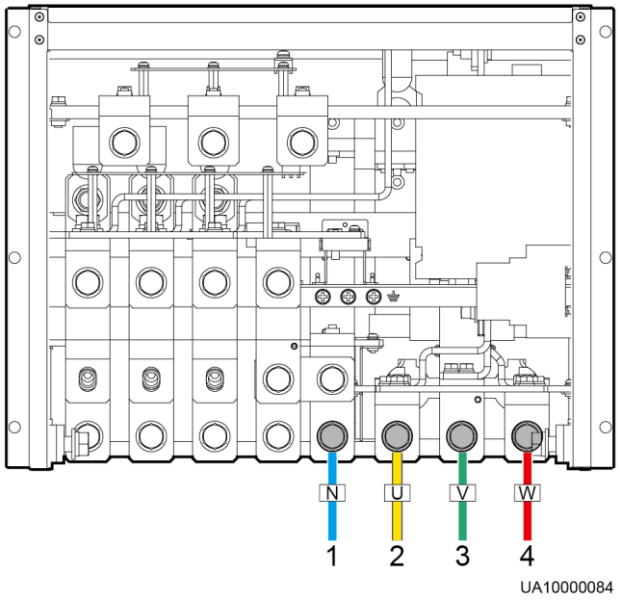
Connect AC output power cables to the output terminals N, U, V, and W on the UPS cabinet, as shown in Figure 3-49 (for the UPS5000-E-120K-F120/UPS5000-E-200K-F200), Figure 3-50 (for the UPS5000-E-320K-F320), and Figure 3-51 (for the UPS5000-E-320K-F320T).

Figure 3-49 Output terminals (UPS5000-E-200K-F200/UPS5000-E-120K-F120)



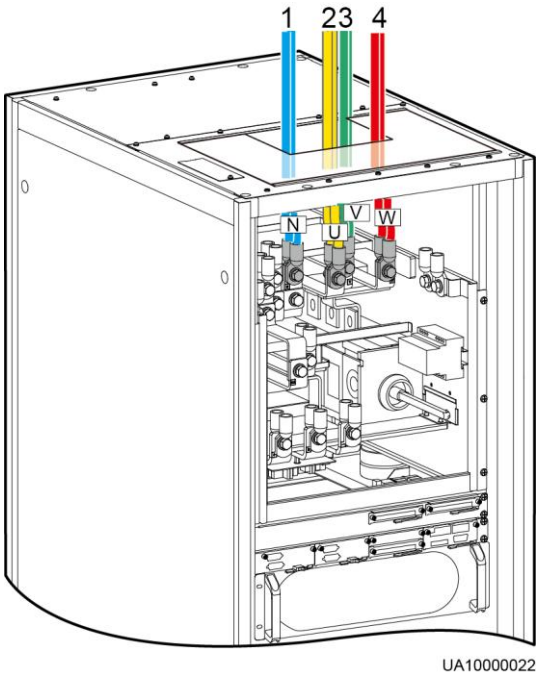
(1) Output N (2) Output U (3) Output V (4) Output W

Figure 3-50 Output terminals (UPS5000-E-320K-F320)



(1) Output N (2) Output U (3) Output V (4) Output W

Figure 3-51 Output terminals (UPS5000-E-320K-F320T)



(1) Output N (2) Output U (3) Output V (4) Output W

NOTE

If an output PDC is used, see the *PDC-0630ACV4OUA Power Distribution Unit User Manual* to connect cables between the output PDC and the UPS.

3.2.12 Connecting Battery Cables

Context

CAUTION

- The battery string voltage may cause serious injury. Observe safety precautions when connecting cables.
- Ensure that cables are correctly connected between battery strings and the battery switch, and between the battery switch and the UPS.

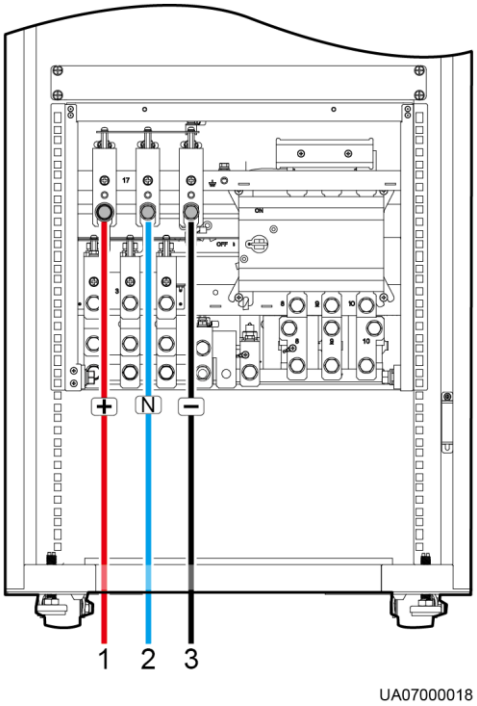
Procedure

Step 1 (Optional) Connect the cable between the BCB box and intelligent battery detector.

For the connection methods, see the manuals for these components.

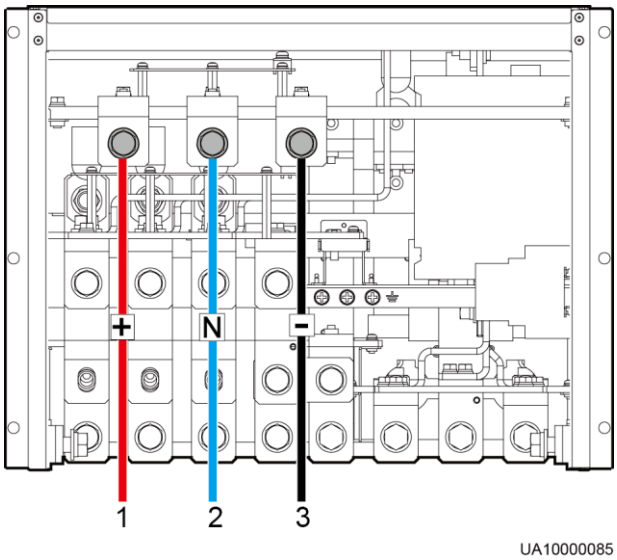
Step 2 Connect the wires of the battery cable to positive and negative battery terminals and terminal N on the UPS cabinet, as shown in Figure 3-52 (for the UPS5000-E-120K-F120 and UPS5000-E-200K-F200), Figure 3-53 (for the UPS5000-E-320K-F320), and Figure 3-54 (for the UPS5000-E-320K-F320T).

Figure 3-52 Battery terminals (UPS5000-E-200K-F200/UPS5000-E-120K-F120)



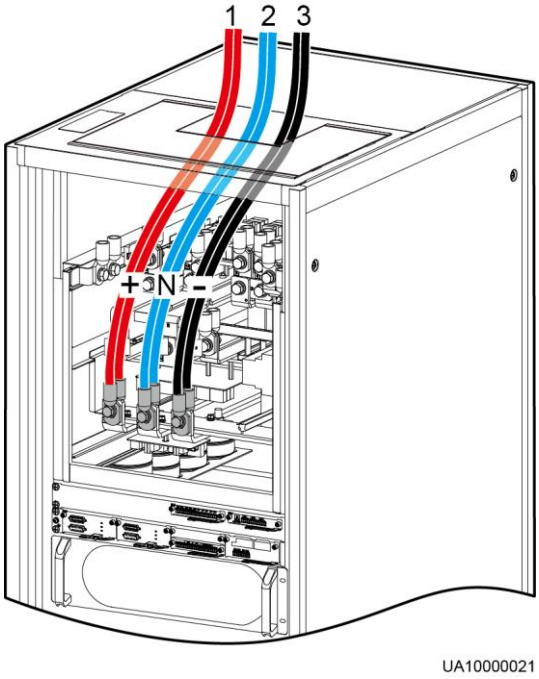
(1) Battery input +　　(2) Battery input N　　(3) Battery input -

Figure 3-53 Battery terminals (UPS5000-E-320K-F320)



(1) Battery input +　　(2) Battery input N　　(3) Battery input -

Figure 3-54 Battery terminals (UPS5000-E-320K-F320T)

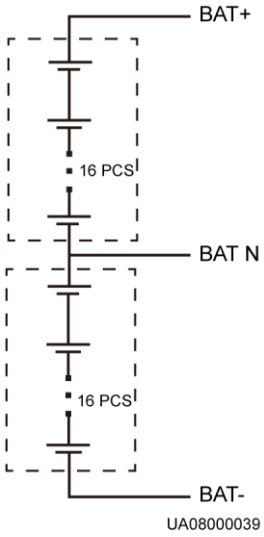


(1) Battery input +　　(2) Battery input N　　(3) Battery input -

Step 3 Route the battery neutral cable from the middle connection point of the positive and negative battery strings.

Figure 3-55 shows a neutral cable routed from the middle of the two battery strings consisting of 32 batteries, half positive and half negative.

Figure 3-55 Neutral wire



----End

3.2.13 Connecting Signal Cables

3.2.13.1 (Optional) Connecting a Battery Grounding Failure Detector

Connect the alarm relay output terminals on the battery grounding failure detector to the dry contact card on the CM. For details, see the *UPS Battery Grounding Failure Detector User Manual*.

3.2.13.2 Connecting a Remote EPO Switch

NOTICE

- Huawei does not provide an EPO switch and cable. Prepare them before installation. The 22 AWG cable is recommended. AWG is short for American wire gauge.
- To prevent problems, equip the EPO switch with a protective cover, and enclose the cable with a protective tube.

Connect the EPO switch to the dry contact card on the UPS. Figure 3-56 shows the NC state, and Figure 3-57 shows the NO state.

NOTE

When the EPO switch is in the NC state, remove the jumper between EPO_NC and EPO_12V before connection. When you turn off the EPO switch, 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 you turn on the EPO switch, EPO is triggered.

Figure 3-56 EPO NC connection

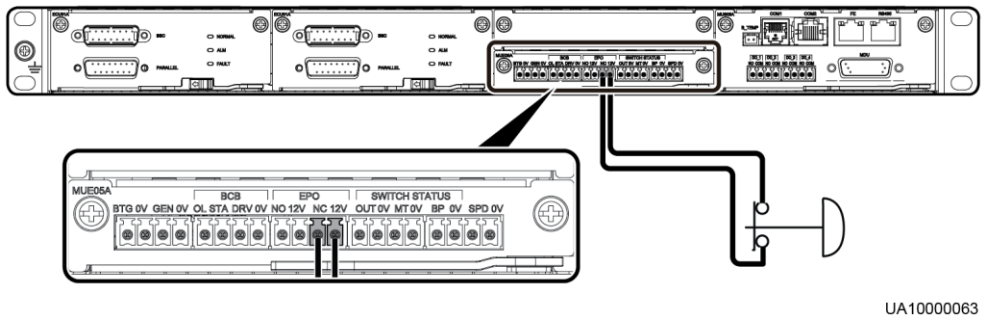
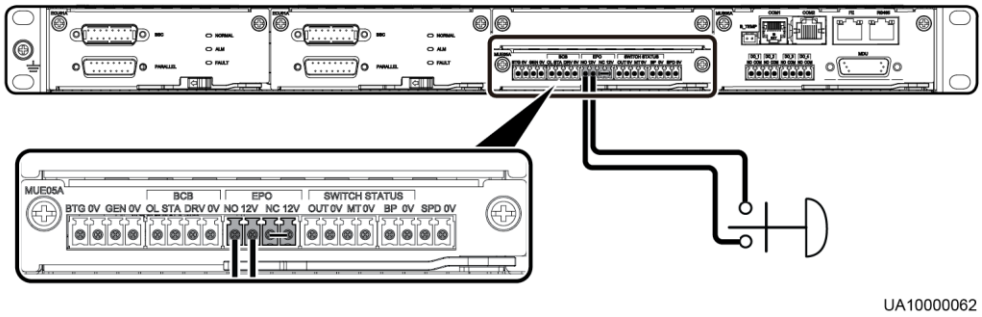


Figure 3-57 EPO NO connection



3.2.13.3 (Optional) Connecting the BCB Box

Open the cover on the BCB box, and connect the BCB ports on the dry contact card to the control signal ports on the BCB box. For details, see the *PDC-(0250, 0400, 0630) DC0384BXA BCB Box User Manual* or *PDU8000-(0125, 0250, 0400, 0630, 0800) DCV8-BXA001 BCB-BOX User Manual*.

3.2.13.4 (Optional) Connecting the Output PDC

Connect the SWITCH STATUS ports on the dry contact card to the dry contact ports on the output PDC. For details, see the *PDC-0630ACV4OUA Power Distribution Unit User Manual*.

3.2.13.5 (Optional) Connecting the Input PDC

Connect the ports on the dry contact card to the dry contact ports on the input PDC. For details, see the *PDC-0630ACV4INA Power Distribution Unit User Manual*.

3.2.13.6 (Optional) Connecting the Backfeed Protection Card

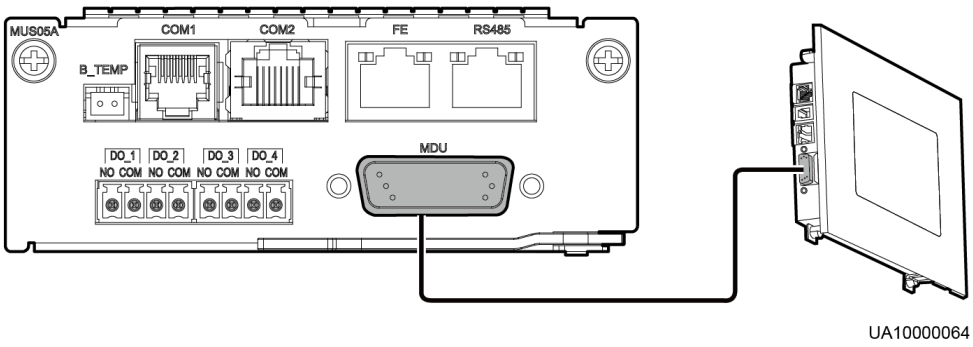
For details, see the *UPS Backfeed Protection Card User Manual*.

3.2.13.7 Connecting Communications Cables

Procedure

Step 1 Connect the MUS05A port on the MDU to the MDU port on the monitoring interface card, as shown in Figure 3-58.

Figure 3-58 Connecting the MDU port



Step 2 Connect the monitoring units such as an alarm indicator to the dry contacts on the monitoring interface card.

Step 3 Connect the external network management device to the RS485 port.

Figure 3-59 and Table 3-8 describe the RS485 pin definitions.

Figure 3-59 RS485 pins

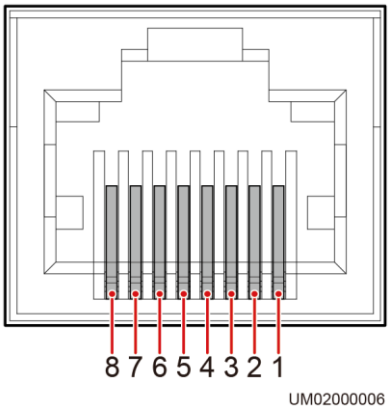


Table 3-8 Pin definition

Pin	Description
1	RS485_T+
2	RS485_T–
3	-
4	RS485_R+
5	RS485_R–
6	GND
7	-

Pin	Description
8	-

NOTE

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

- Connect pin 1 and pin 2. Pin 1 connects to 485+ and pin 2 connects to 485–.
- Connect pin 4 and pin 5. Pin 4 connects to 485+ and pin 5 connects to 485–.
- Connect pins 1, 2, 4, and 5. Twist cables to pin 1 and pin 4 into one cable and then connect it to 485+. Twist cables to pin 2 and pin 5 into one and then connect it to 485–.

Step 4 Connect the network port on a PC to the FE port on the monitoring interface card.

Step 5 (Optional) Connect the RJ11 port on the temperature and humidity sensor to the COM1 port. For details, see the *UPS Ambient Temperature and Humidity Sensor User Manual*.

Step 6 (Optional) Connect the BMU to the COM2 port. For details, see the *UPS Battery Monitor Unit User Manual*.

Step 7 (Optional) Connect the short-distance battery temperature sensor to the B_TEMP port on the monitoring interface card.

----End

3.3 Installing a Parallel System

3.3.1 Installing the UPSs

NOTICE

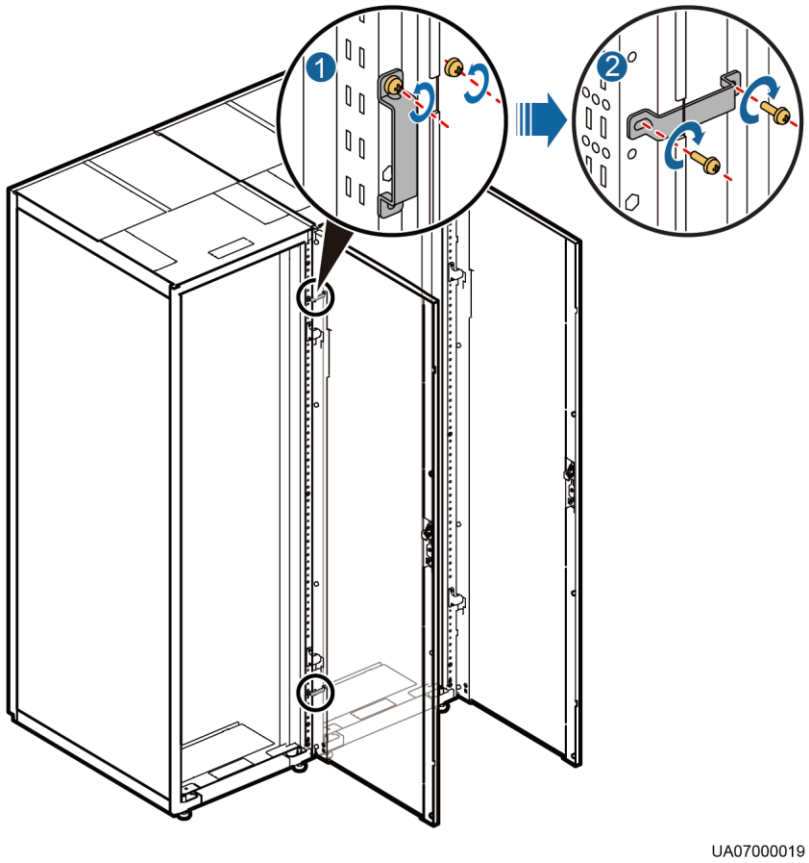
Connect parallel plates to reinforce the cabinet combination.

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 parallel plate and put it through the reserved holes to connect the two UPSs and then tighten the screws on the plate, as shown in Figure 3-60.

Figure 3-60 Connecting parallel plates



NOTE

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

----End

3.3.2 Connecting Power Cables

Context

Parallel power cable connection for the UPS5000-E-120K-F120, UPS5000-E-320K-F320, and UPS5000-E-320K-F320T is the same as that for the UPS5000-E-200K-F200. To connect parallel power cables for the UPS5000-E-200K-F200 (used as an example), perform the following steps:

Procedure

Step 1 Ground each UPS in the parallel system by following the steps in section 3.2.9 Connecting Ground Cables.

Step 2 Connect power cables to each UPS in the parallel system by following the steps in 3.2.10 Connecting AC Input Power Cables and 3.2.11 Connecting AC Output Power Cables.

Step 3 Connect battery cables to each UPS by following the steps in section 3.2.12 Connecting Battery Cables.

Step 4 (Optional) Connect cables to the input PDC.

NOTE
For details, see the *PDC-0630ACV4INA Power Distribution Unit User Manual*.

Step 5 Select a parallel connection method to connect cables to the parallel system based on the site configurations.

Figure 3-61 and Figure 3-62 show the typical conceptual diagram and cable connections for a 1+1 parallel system.

Figure 3-61 Conceptual diagram of a 1+1 parallel system

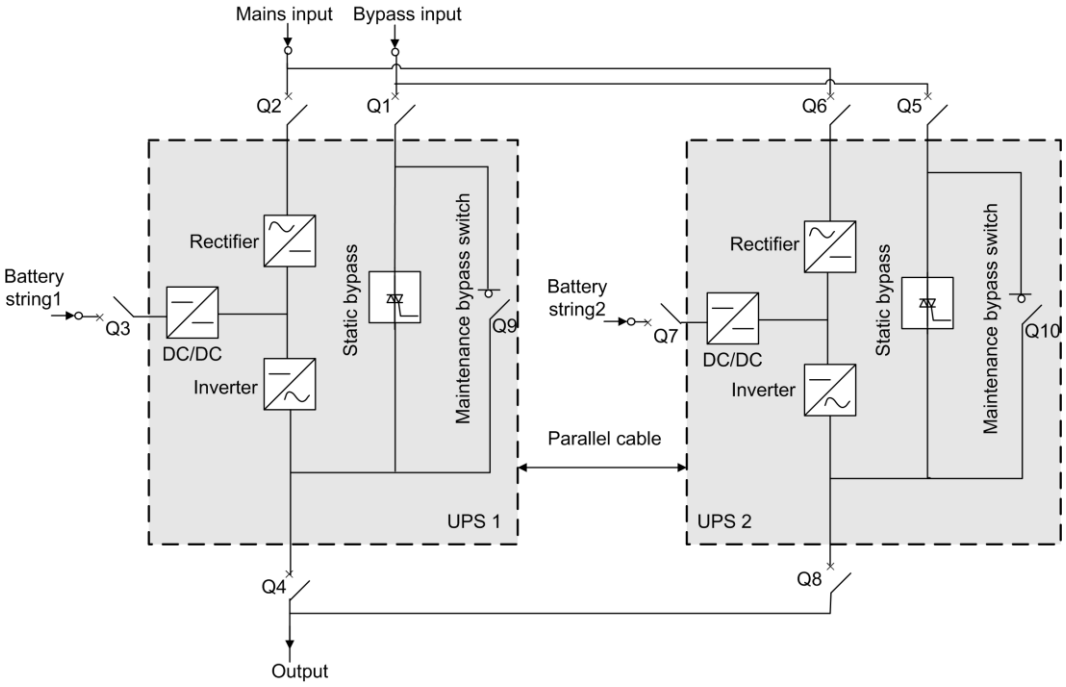
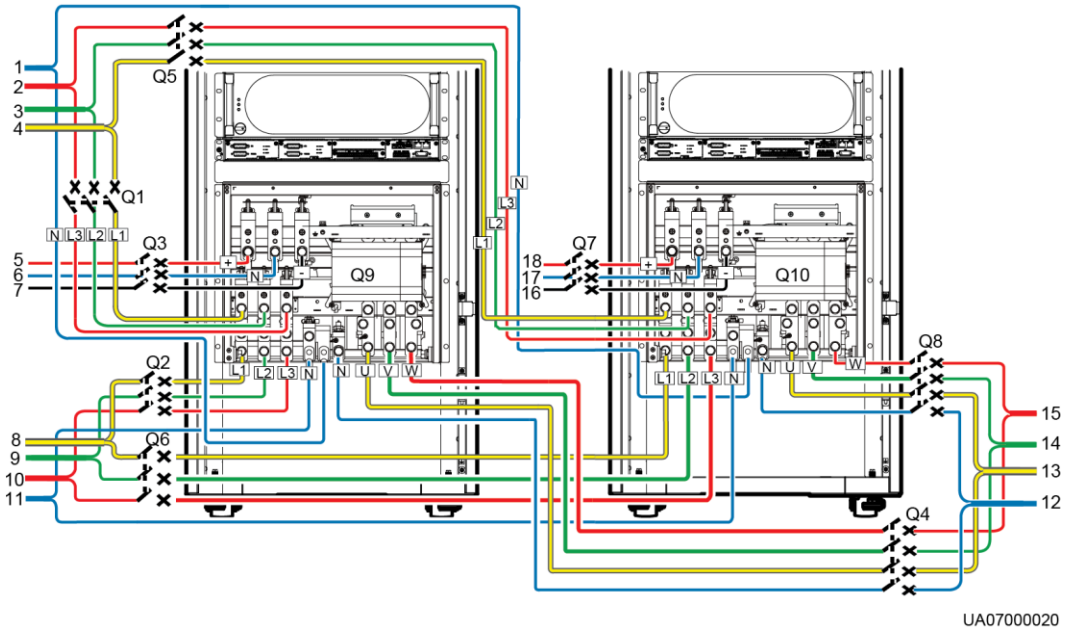


Figure 3-62 Cable connections for a 1+1 parallel system



(1) Bypass input N	(2) Bypass input L3	(3) Bypass input L2	(4) Bypass input L1
(5) Battery string 1 input positive terminal	(6) Battery string 1 input N	(7) Battery string 1 input negative terminal	(8) Mains input L1
(9) Mains input L2	(10) Mains input L3	(11) Mains input N	(12) Output N
(13) Output U	(14) Output V	(15) Output W	(16) Battery string 2 input negative terminal
(17) Battery string 2 input N	(18) Battery string 2 input positive terminal		

Figure 3-63 and Figure 3-64 show the conceptual diagram and cable connections for a dual-bus system consisting of two UPS systems.

Figure 3-63 Conceptual diagram of a dual-bus system

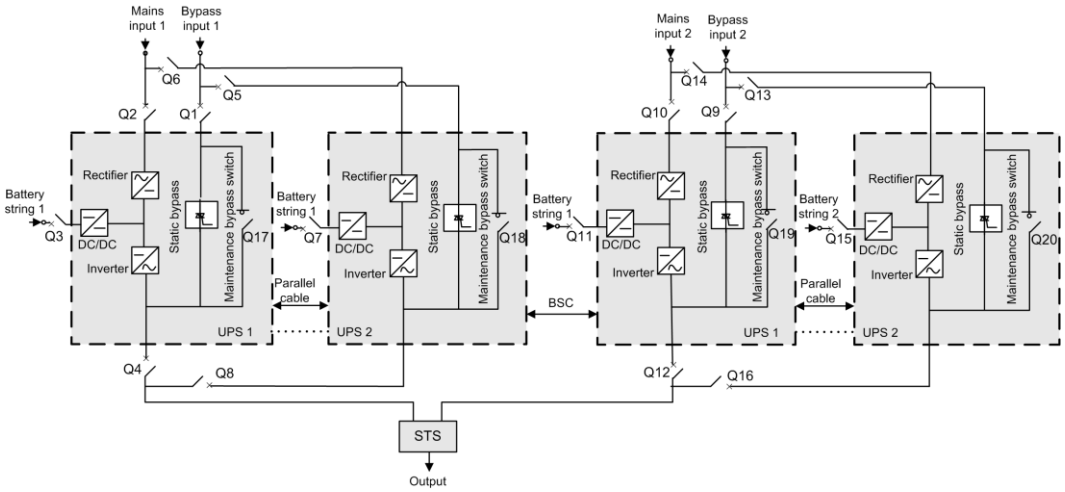
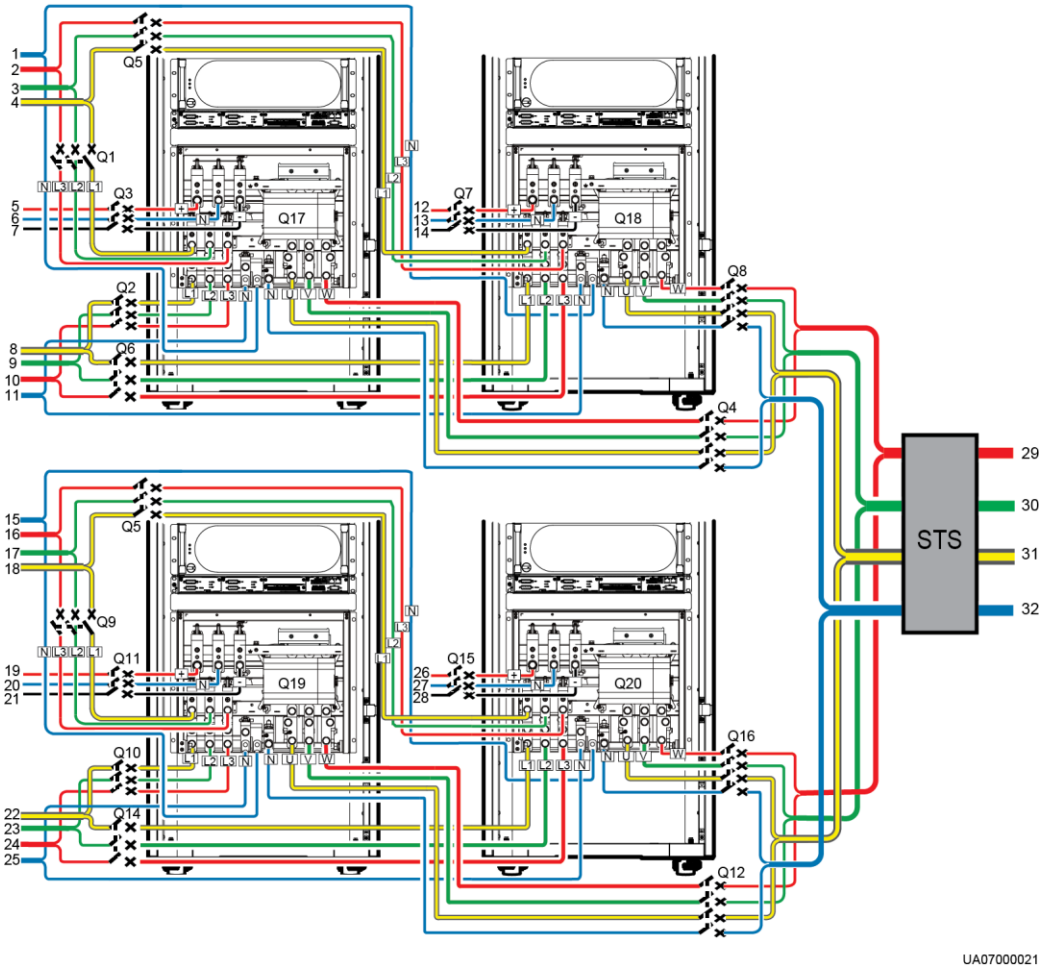


Figure 3-64 Cable connections for a dual-bus system



(1) Bypass input 1 N (2) Bypass input 1L3 (3) Bypass input 1L2 (4) Bypass input 1L1

(5) Battery string 1 input positive terminal	(6) Battery string 1 input N	(7) Battery string 1 input negative terminal	(8) Mains input 1L1
(9) Mains input 1L2	(10) Mains input 1L3	(11) Mains input 1 N	(12) Battery string 2 input positive terminal
(13) Battery string 2 input N	(14) Battery string 2 input negative terminal	(15) Bypass input 2 N	(16) Bypass input 2L3
(17) Bypass input 2L2	(18) Bypass input 2L1	(19) Battery string 3 input positive terminal	(20) Battery string 3 input N
(21) Battery string 3 input negative terminal	(22) Mains input 2L1	(23) Mains input 2L2	(24) Mains input 2L3
(25) Mains input 2 N	(26) Battery string 4 input positive terminal	(27) Battery string 4 input N	(28) Battery string 4 input negative terminal
(29) Output W	(30) Output V	(31) Output U	(32) Output N

Step 6 (Optional) Connect cables to the output PDC.

NOTE
For the connection method, see the *PDC-0630ACV4OUA Power Distribution Unit User Manual*.

----End

3.3.3 Connecting Signal Cables

Context

NOTICE
Choose the following methods to connect signal cables for parallel UPSs.

A maximum of four UPS5000-E-120K-F120s, UPS5000-E-200K-F200s, UPS5000-E-320K-F320s, or UPS5000-E-320K-F320Ts can be connected in parallel. Cable connection principles for two UPSs connected in parallel are the same as those for four UPSs connected in parallel. The following describes how to connect cables for four UPSs connected in parallel.

Procedure

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

- Figure 3-65 and Figure 3-66 show the topology diagram and cable connections for the N+X parallel system.

Figure 3-65 Topology diagram of an N+X parallel system

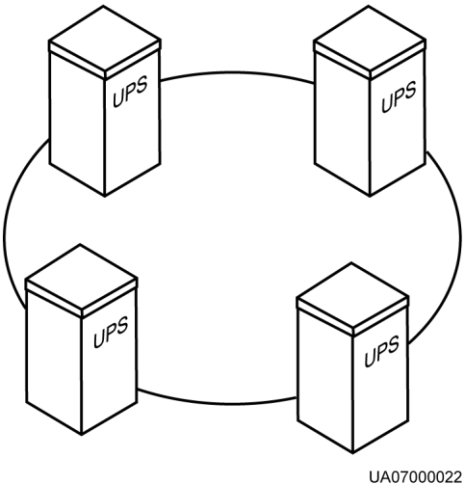
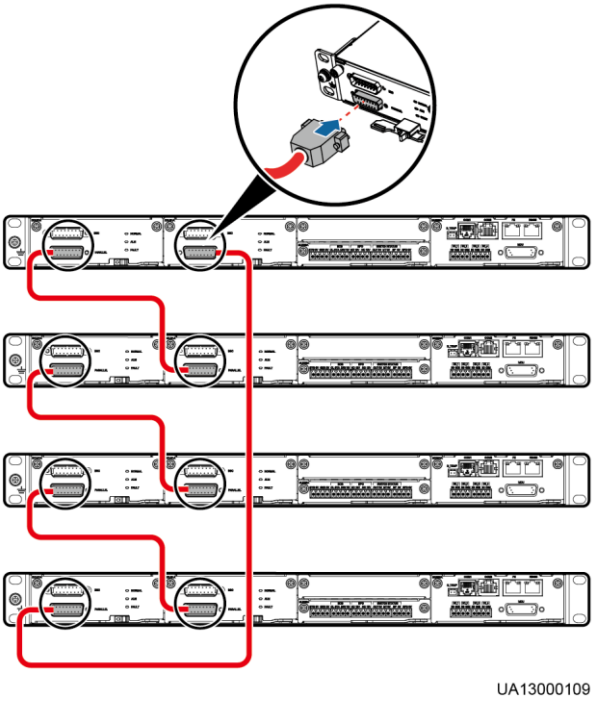
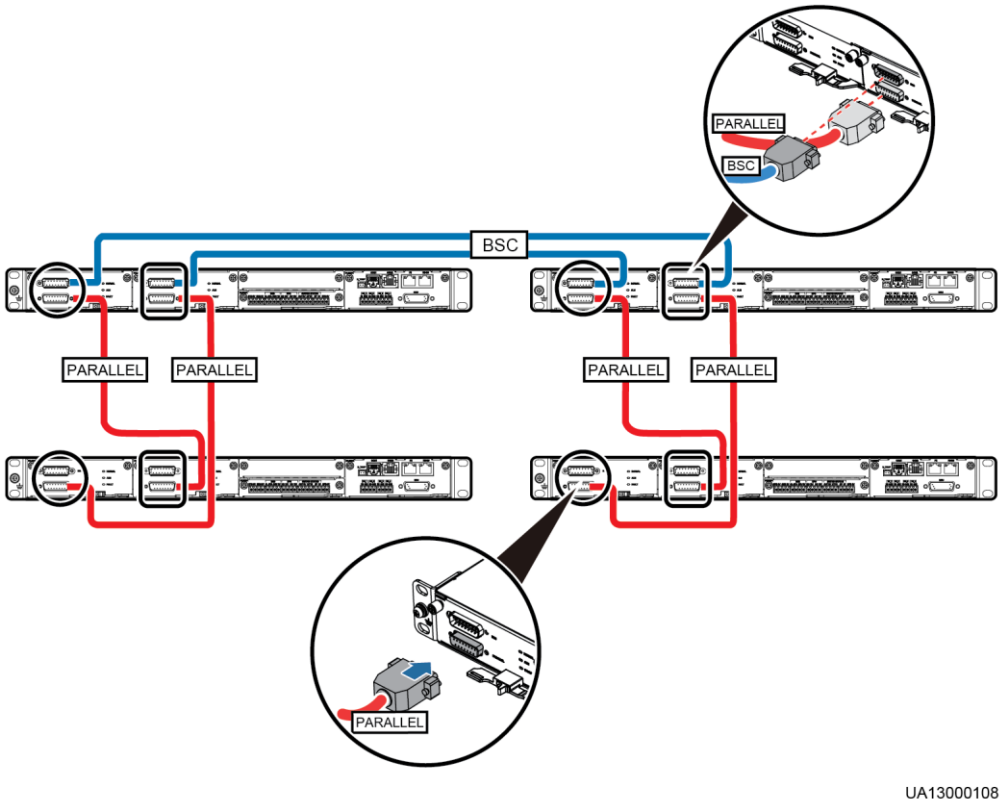


Figure 3-66 Connecting signal cables in a parallel system consisting of four UPSs



- Connect cables to BSC ports in the UPS systems. Figure 3-67 shows how to connect signal cables in a dual-bus system.

Figure 3-67 Connecting signal cables in a dual-bus system



Step 2 Connecting the signal cables to each single UPS in a parallel system. For details, see section 3.2.13 Connecting Signal Cables.

----End

3.4 Verifying the Installation

CAUTION

Check items 09 and 10 carefully. Otherwise, the UPS may fail.

No.	Item	Expected Result
01	Consistency between system configurations and delivery configurations	System configurations, including models and number of modules, comply with the contract.
02	Cable layout	Cables are routed properly and meet engineering requirements.
03	Cable connections	Input and output power cables and battery cables are securely connected and spring

No.	Item	Expected Result
		washers are flattened, prevent falling off and safety accidents. Ensure that there is no disconnection or potential risk.
04	Serial port connection (security protection mechanism supported)	Signal cables are connected properly and securely.
05	Cable labels	Both ends of each cable are labeled. Labels are easy to understand.
06	Ground cable connections	The ground cable is securely connected to the equipment room ground bar. Measure the resistance between the UPS ground cable and the equipment room ground bar, which must be less than 1 ohm.
07	Distances between cable ties	Distances between cable ties are the same, and no burr exists.
08	Cable connections	Cables are properly connected according to wiring diagrams.
09	Live wire and neutral wire connections	Input and output live wires and neutral wires are correctly connected. Mains input terminals 1L1, 1L2, 1L3, and N, bypass input terminals 2L1, 2L2, 2L3, and N, and output terminals U, V, W, and N are properly connected.
10	Input and output live wire phase sequences	In single UPS mode, mains and bypass input and output live wires are connected in a correct sequence; in a parallel system, mains and bypass input and output live wires are connected in the same sequence for each UPS.
11	Battery cable connection	Check that the voltages on the positive and negative battery terminals and battery N are correct using a multimeter.
12	Operating environment	Clean the conductive air and other sundries.
13	Copper busbar short circuit	Check that copper busbars are open-circuited using a multimeter.

NOTE

After routing cables and checking cable connections, use fireproof mud to fill in the gap between the cables and the cabinet, and reinstall the front panels on the power distribution subrack and top entry cabinet.

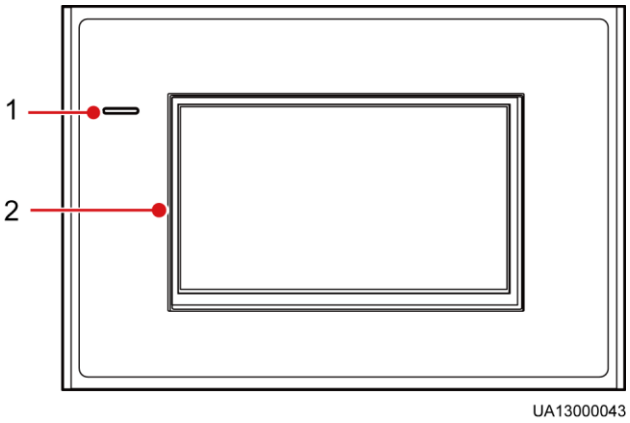
4 User Interface

4.1 LCD Interface

4.1.1 LCD

The MDU is located on the front door of the cabinet. The MDU allows you to control the UPS operation, set parameters, and view running status and alarms. The MDU provides a Status indicator and an LCD touchscreen, as shown in Figure 4-1.

Figure 4-1 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, as shown in Figure 4-2.

Figure 4-2 Touching the LCD

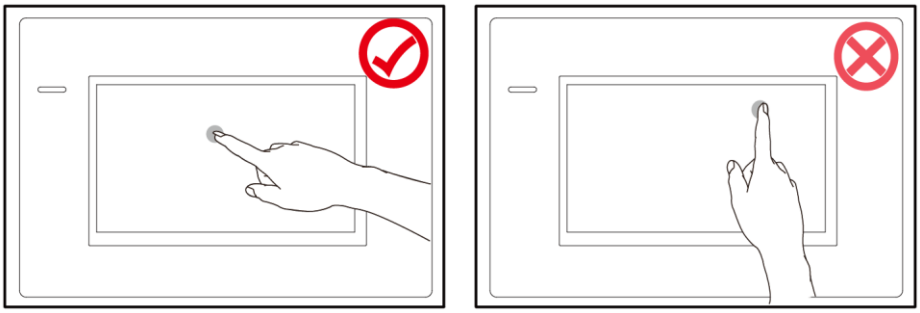


Table 4-1 describes the status indicator.

Table 4-1 Status indicator

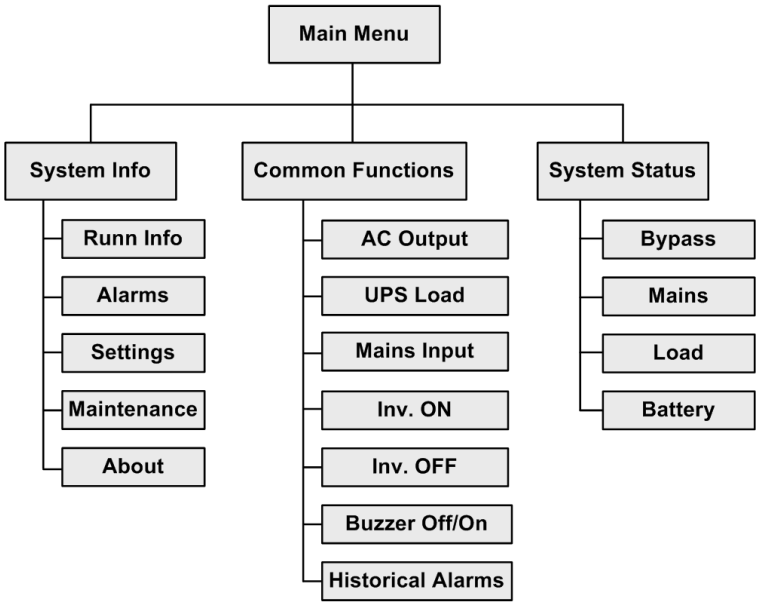
Status	Color	Meaning
On	Red	A critical alarm has been generated, and the buzzer sounds continuously.
	Yellow	A minor alarm has been generated and the buzzer sounds intermittently at 2 Hz. For example, the yellow indicator is steady on when the inverter does not supply power in normal mode.
	Green	The UPS is running properly.
Off	N/A	The MDU is powered off.

4.1.2 LCD Menu

4.1.2.1 Menu Hierarchy

Figure 4-3 shows the LCD menu hierarchy.

Figure 4-3 Menu hierarchy



4.1.2.2 Initial Startup

NOTICE

User interfaces displayed in this document correspond to the Monitoring Version V100R001C10SPC009 and are for reference only.

The **Settings Wizard** screen is displayed when you start the UPS for the first time or when you restart the UPS after restoring factory settings, as shown in Figure 4-4. You can set **Language**, **Time**, **Network Param.**, and **System Param.** on the **Settings Wizard** screen.

Figure 4-4 Settings Wizard

4.1.2.3 Main Menu

The LCD screen is divided into three parts: status bar, alarm bar and information area. Figure 4-5 shows the default main screen. Table 4-2 describes functions of all domains on the screen.

Figure 4-5 Main Menu screen

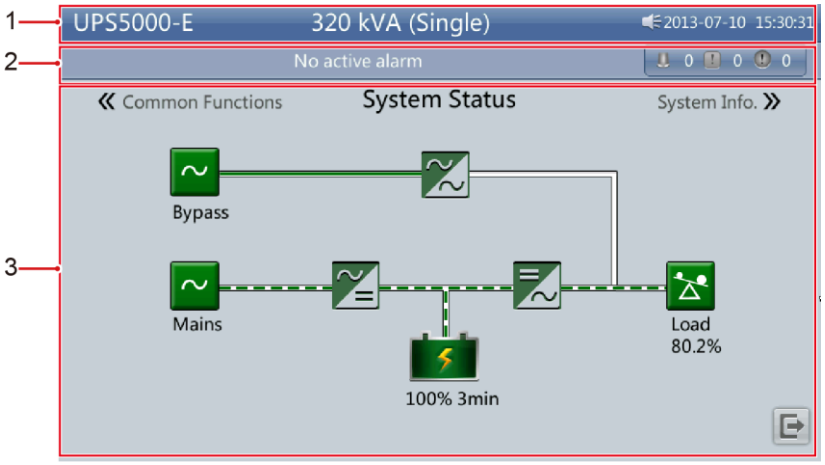


Table 4-2 Main screen description

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 4-3 describes the functions of common buttons.

Table 4-3 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.

Button	Function
	Logs out.

4.1.3 System Info. Screen

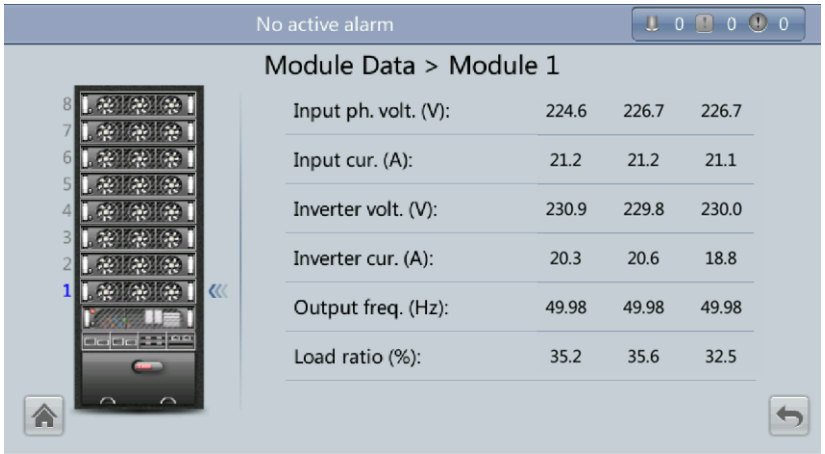
On the main screen, tap **System Info.**. The **System Info.** screen is displayed, as shown in Figure 4-6.

Figure 4-6 System Info. screen

4.1.3.1 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 4-7.

Figure 4-7 Module Data screen



4.1.3.2 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 4-8 and Figure 4-9.

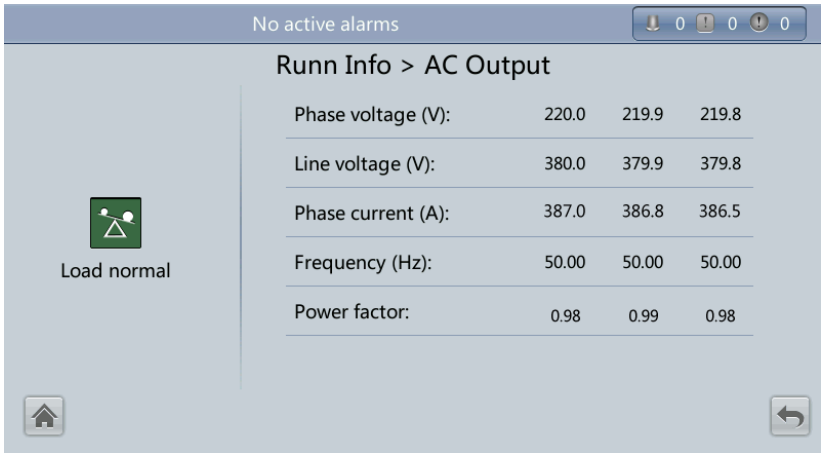
Figure 4-8 Runn Info screen 1

Figure 4-9 Runn Info screen 2

AC Output

Figure 4-10 shows the **AC Output** screen.

Figure 4-10 AC Output screen



- **Phase voltage (V)/Line voltage (V)/Phase current (A)/Frequency (Hz)**

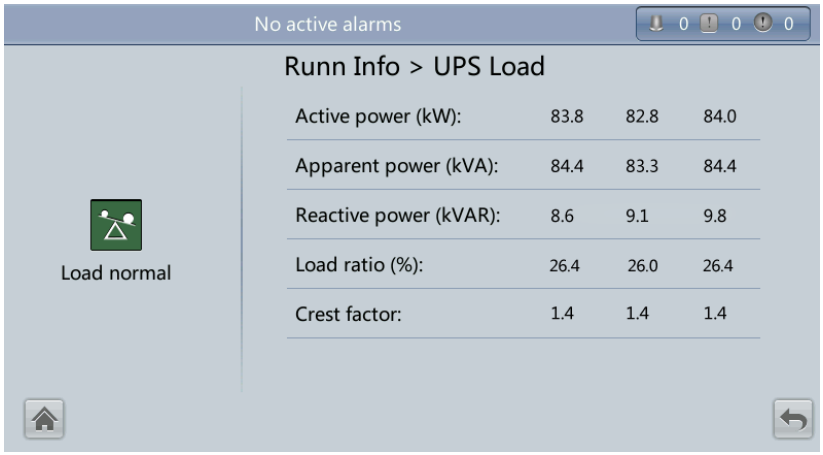
  AC output phase voltage/AC output line voltage/AC output phase current/AC output frequency.
- **Power factor**

  Proportion of output active power to output apparent power.

UPS Load

Figure 4-11 shows the **UPS Load** screen.

Figure 4-11 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 (%)**

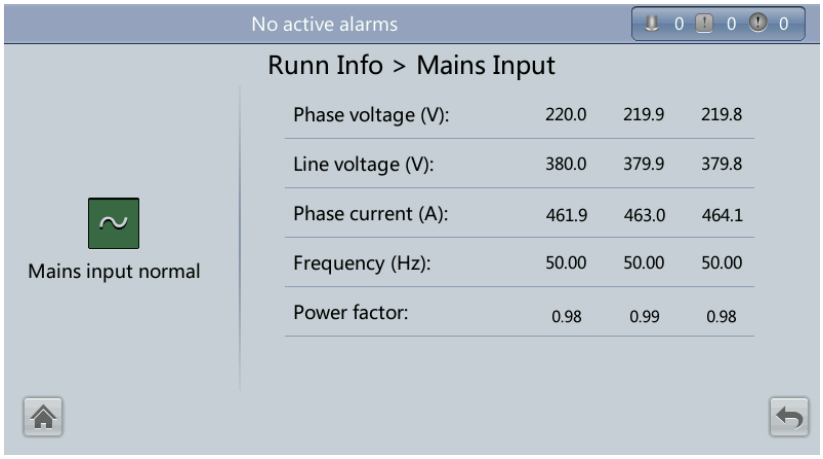
  Load ratio of each phase on the UPS, that is, proportion of actual power to rated power.
- **Crest factor**

  Proportion of the peak value of load current to the valid value.

Mains Input

Figure 4-12 shows the **Mains Input** screen.

Figure 4-12 Mains Input screen



- **Phase voltage (V)/Line voltage (V)/Phase current (A)/Frequency (Hz)**

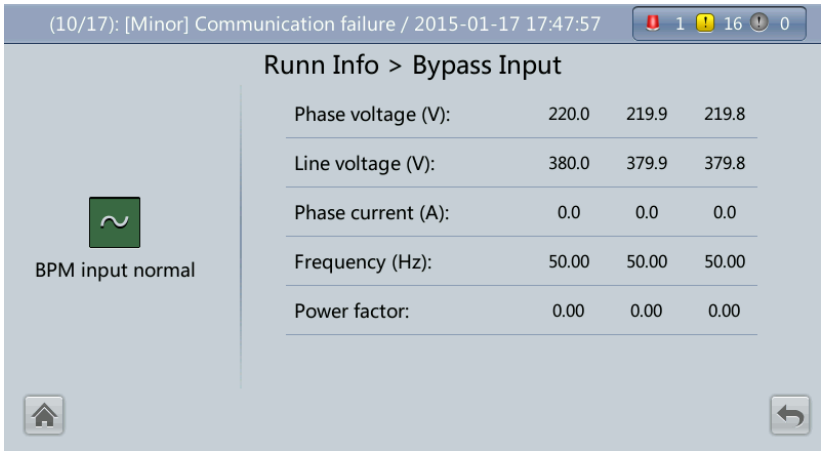
  Mains input phase voltage/Mains input line voltage/Mains input phase current/Mains input frequency.
- **Power factor**

  Proportion of the mains input active power to the mains input apparent power.

Bypass Input

Figure 4-13 shows the **Bypass Input** screen.

Figure 4-13 Bypass Input screen



- **Phase voltage (V)/Line voltage (V)/Phase current (A)/Frequency (Hz)**

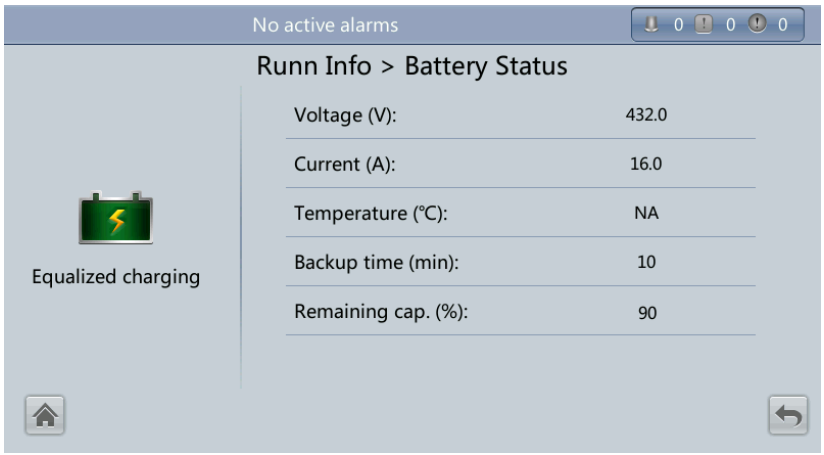
  Mains input phase voltage/Mains input line voltage/Mains input phase current/Mains input frequency.
- **Power factor**

  Proportion of the mains input active power to the mains input apparent power.

Battery Status

Figure 4-14 shows the **Battery Status** screen.

Figure 4-14 Battery Status screen



- **Battery Status**

  The value can be **Not connected**, **Not chg. or dis.**, **Hibernating, Flt. charging**, **Equalized Charging**, or **discharging**.
- **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 (℃)**

  Battery operating temperature (A battery sensor is required. If this sensor is not installed, **NA** is displayed).

- **Backup time (min)**

  Battery backup time estimated at the current load.

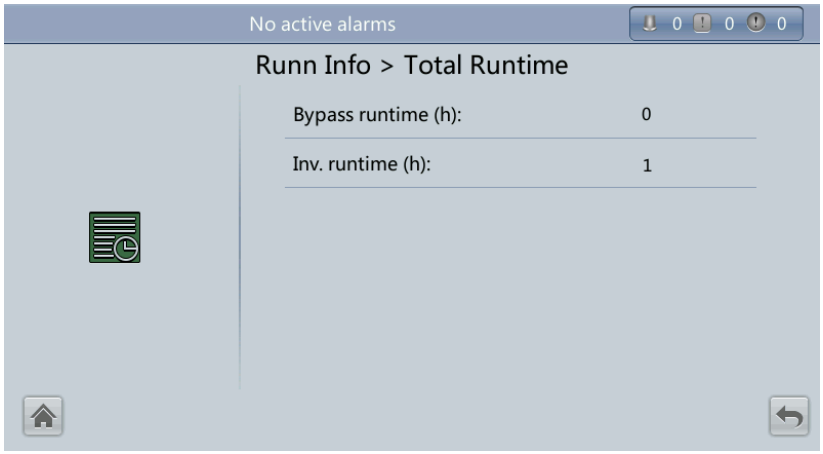
- **Remaining cap. (%)**

  Remaining battery capacity.

Total Runtime

Figure 4-15 shows the **Total Runtime** screen.

Figure 4-15 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

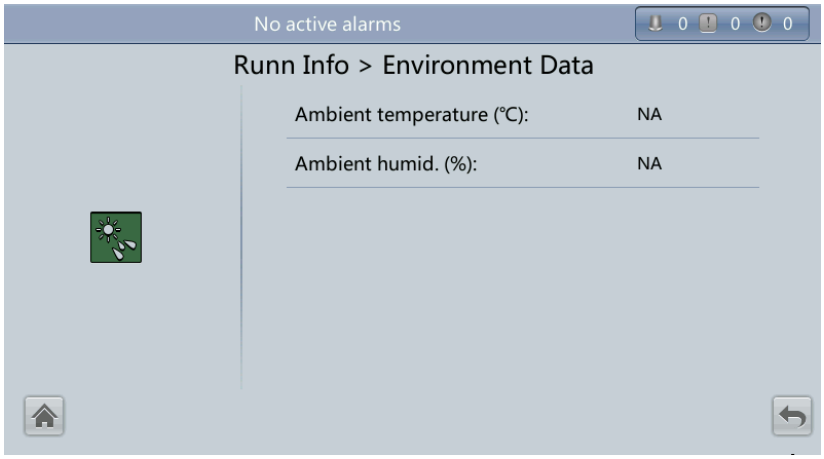
The value takes an integer. For example,

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

Environment Data

Figure 4-16 shows the **Environment Data** screen.

Figure 4-16 Environment Data screen



- **Ambient temperature (℃)**

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

  Humidity measured by the ambient temperature and humidity sensor (Install the sensor. If the sensor is not installed, **NA** is displayed.)

4.1.3.3 Alarms Screen

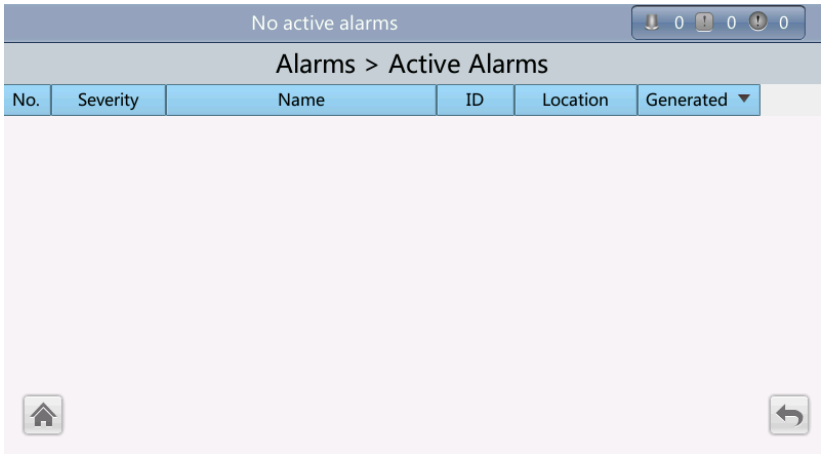
On the **System Info.** screen, tap to enter the **Alarms** screen. On the **Alarms** screen, you can view active alarms and historical alarms, clear faults, and control the buzzer, as shown in Figure 4-17.

Figure 4-17 Alarms screen

Active Alarms

Figure 4-18 shows the **Active Alarms** screen. The active alarm information, including the alarm severity, name, ID, location, and generation time, is displayed on this screen.

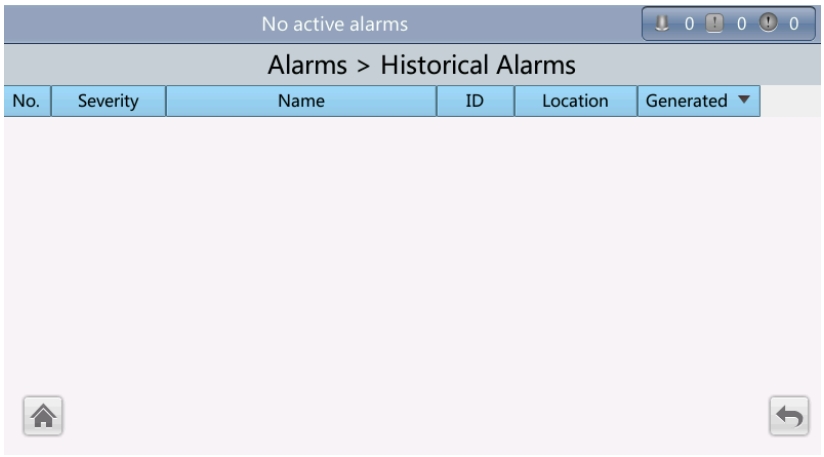
Figure 4-18 Active Alarms screen



Historical Alarms

Figure 4-19 shows the **Historical Alarms** screen. The historical alarm information, including the alarm severity, name, ID, location, generation time, and clear time, is displayed on this screen.

Figure 4-19 Historical Alarms screen



Buzzer Off

Two buzzer menus are available, that is, **Buzzer On** and **Buzzer Off**. If the buzzer is muted, **Buzzer On** is displayed on the operation screen. If the buzzer is enabled, **Buzzer Off** is displayed on the operation screen. Figure 4-20 shows the **Buzzer Off** screen.

If you enable the buzzer, the buzzer buzzes when a critical alarm, a minor alarm, or a certain warning is generated. If you mute the buzzer, it never buzzes.

Figure 4-20 Buzzer Off screen

Clear Faults

Figure 4-21 shows the **Clear Faults** menu. Tap **Clear Faults**. If you have not logged in, a login screen is displayed. Enter a user name and password, and tap  .

Figure 4-21 Clear Faults screen

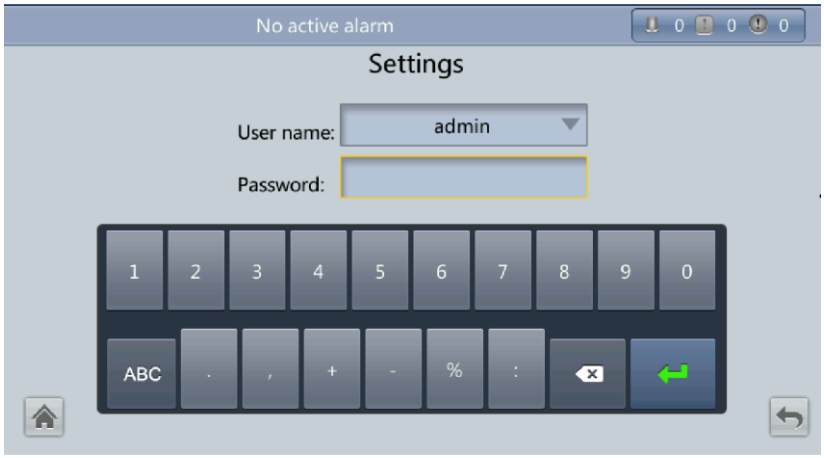
NOTE

- Table 4-4 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.

4.1.3.4 Settings Screen

On the **System Info** screen, tap  . If you have not logged in, a login screen is displayed, as shown in Figure 4-22.

Figure 4-22 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 4-23 and Figure 4-24.

NOTE

- Table 4-4 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 4-23 Settings screen 1

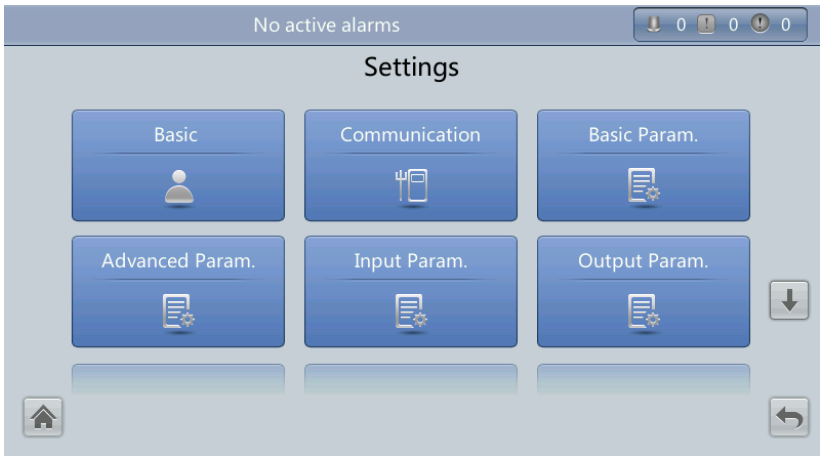


Figure 4-24 Settings screen 2

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 4-25 and Figure 4-26.

Figure 4-25 Basic screen 1

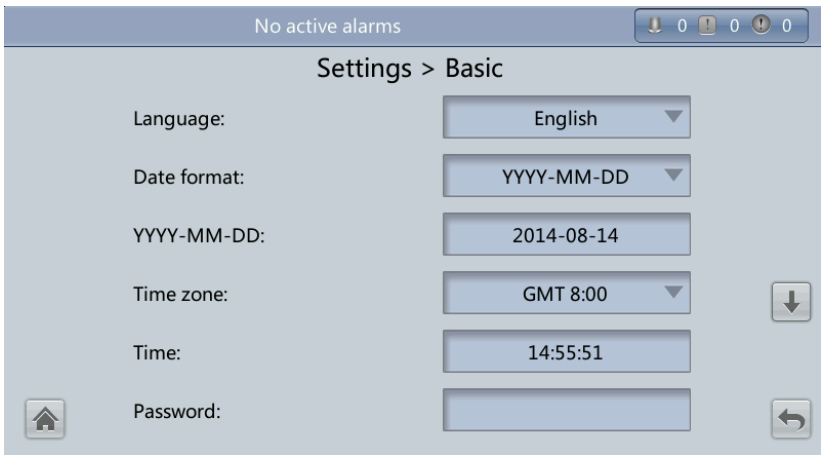
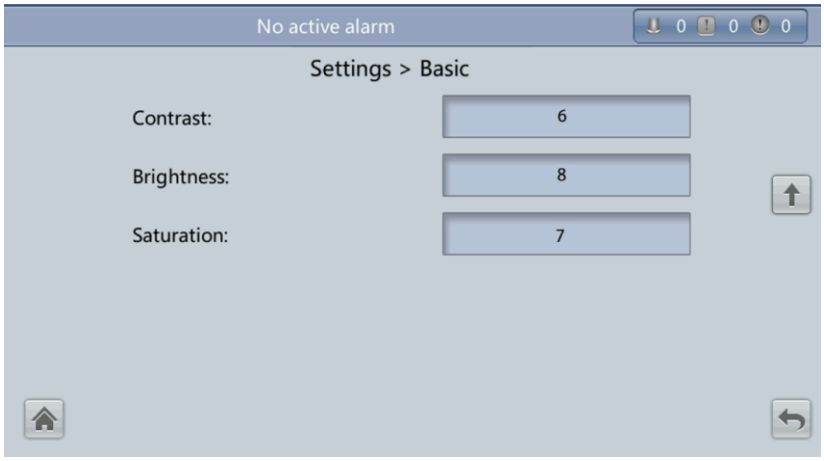


Figure 4-26 Basic screen 2



- **Language**

  Twelve languages, including English, Chinese, and Italian, are supported. The default language is English.
- **Password**

  The preset password is 000001. You can change the password.

Communications Settings

Set communications parameters, as shown in Figure 4-27, Figure 4-28 and Figure 4-29.

Figure 4-27 Communication screen 1

Figure 4-28 Communication screen 2

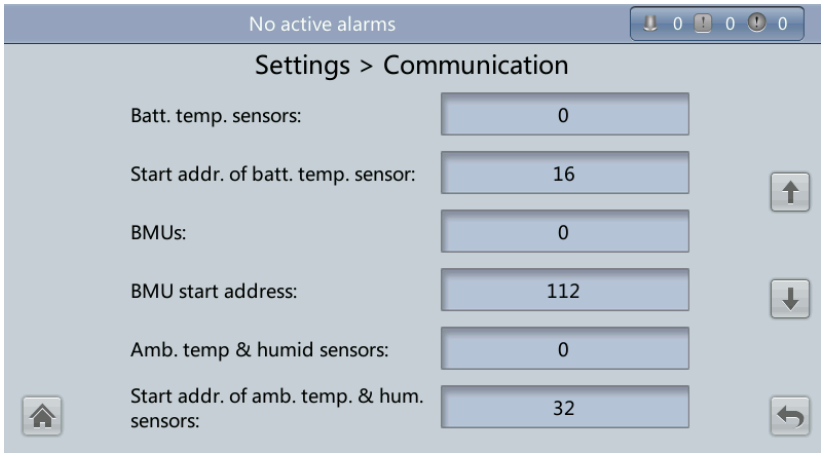
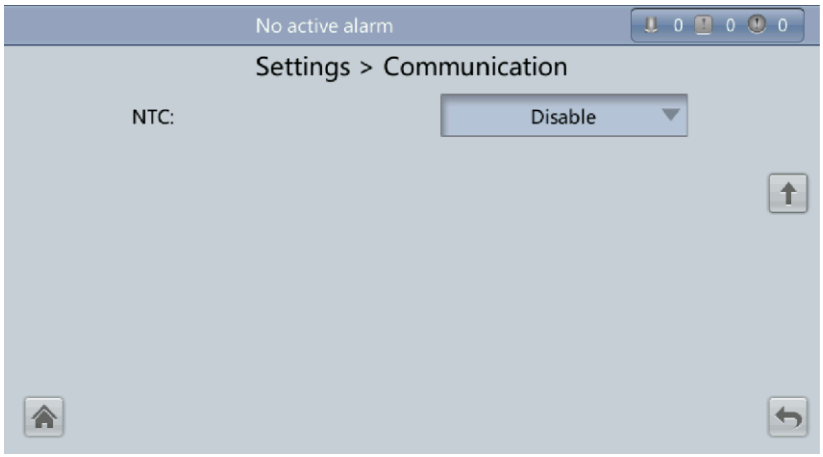


Figure 4-29 Communication screen 3



- **IP address allocation** parameter

  The value can be **Manual** or **Automatic**.

  - **Manual**: After the MDU connects to the PC over a network cable, check that their IP addresses are two different values on the same network segment.
  - **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**. **IP address** is the IP address that you have previously set.

- **IP address** parameter

  Set an Ethernet IP address that ranges from 0.0.0.0 to 255.255.255.255. 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** parameter

  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** parameter

  Set an Ethernet gateway that ranges from 0.0.0.0 to 255.255.255.255. The default value is **192.168.0.1**.

- **RS485 baud rate/RS485 address**

  Set an address that ranges from 1 to 254 for this port. **Baud rate** depends on the network management conditions.

- **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**

  BMUs can be cascaded. A maximum of 12 BMUs can be cascaded.

- **BMU start address**

  Set the BMU start address through the DIP switch on the BMU to 112. Ensure that the address that you set on the LCD is the same as that set for the DIP switch. Otherwise, communication cannot be implemented.

- **Amb. temp & humid sensors**/**Start addr. of amb. temp. & hum. sensors**

  An ambient temperature and humidity sensor has the same appearance as a battery temperature sensor. The two types of sensors (up to four) can be cascaded. 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**.

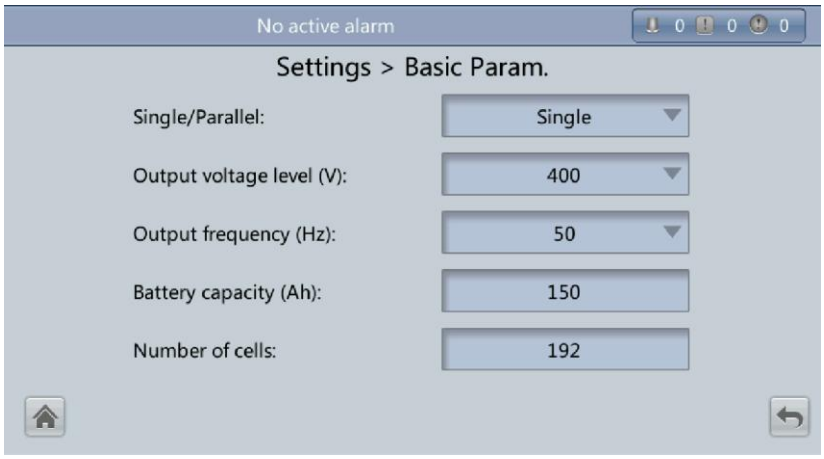
Basic Parameter Settings

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 4-30.

Figure 4-30 Basic Param. screen



- **Single/Parallel**

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

- **Output voltage level (V)**

  Set the system output voltage level. The value can be 380 V, 400 V (default), or 415 V. After you change the parameter value, 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)**

  Set the battery string capacity. The value range is 5 to 3000 Ah. The default value is 150 Ah for the UPS5000-E-120 kVA, 300 Ah for the UPS5000-E-200 kVA, and 350 Ah for the UPS5000-E-320 kVA.

- **Number of cells**

  Set the number of cells. Each 12 V battery consists of six cells. The value range is 180–276, 192 by default.

NOTE

- A cell consists of electrodes and electrolytes, which is the basic unit for the battery. Each cell has a nominal voltage of 2 V.A battery is a module consisting of single or multiple cells in a shell. Each battery has a nominal voltage of 2 V or 12 V. The number of cells must be a multiple of 12 (for example, 180 and 192).

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

Advanced Parameter Settings

NOTICE

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

Set advanced parameters, such as **UPS model**, **System capacity**, and **Power module capacity**, as shown in Figure 4-31 to Figure 4-34.

Figure 4-31 Advanced Param. screen 1

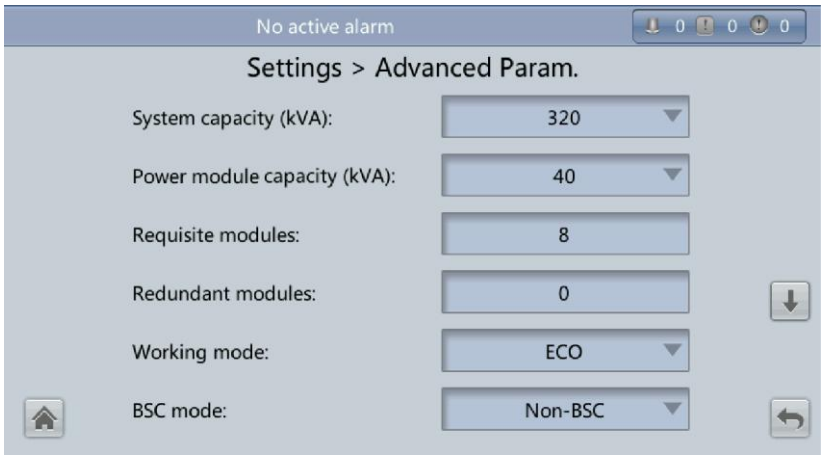


Figure 4-32 Advanced Param. screen 2

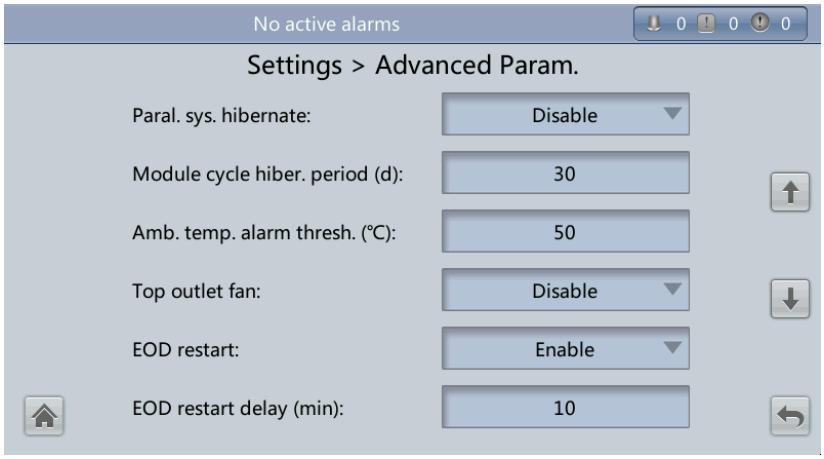


Figure 4-33 Advanced Param. screen 3

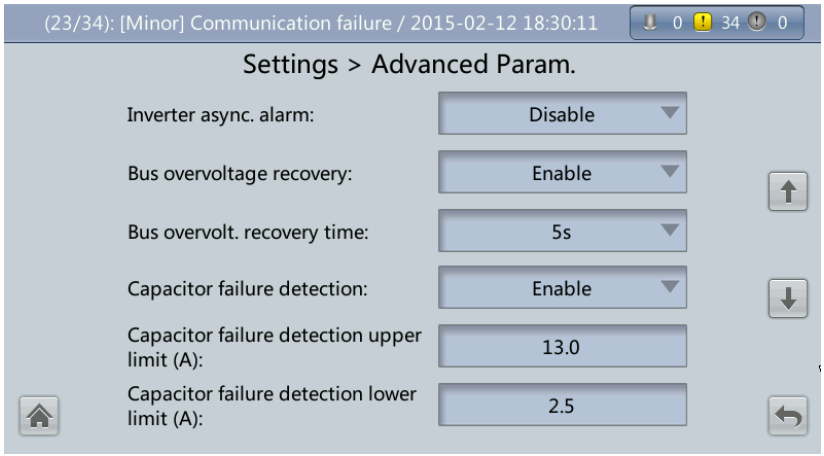
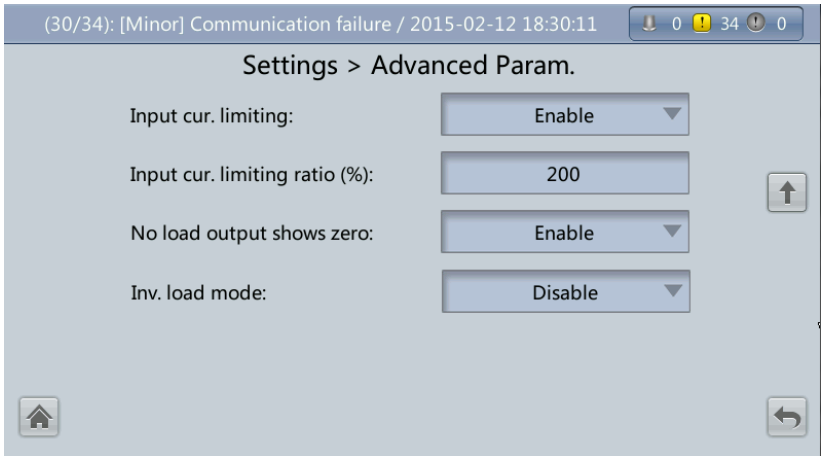


Figure 4-34 Advanced Param. screen 4



- **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.
- **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.
- Ensure that the BSC signal cable between the master and slave BSC systems is properly connected and that BSC-related hardware is properly installed.

- **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)**

  0 to 100 days can be set. The parameter **30 days** is set by default.

- **Amb. temp. alarm thresh. (℃)**

  An alarm is generated when the ambient temperature reaches the preset 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 disable and **EOD restart** is enable, the UPS will restart as soon as the mains resumes.

  If **EOD restart** is disable, 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**

  The default value is **Enable**. When **Capacitor failure detection** is set to **Enable**, the power module (power unit) performs inverter capacitor fault detection based on the settings of **Capacitor failure detection upper limit** and **Capacitor failure detection**

lower limit. If the power module determines that the inverter capacitor is faulty, it shuts down the inverter to prevent the fault from expanding.

- **Capacitor failure detection upper limit (A)**

  The value range of **Capacitor failure detection upper limit** is 10–13 A and the default value is 13 A. When the inverter capacitor current exceeds the current specified by this parameter, the power module determines that the inverter capacitor is faulty and shuts down the inverter.

- **Capacitor failure detection lower limit (A)**

  The value range of **Capacitor failure detection lower limit** is 0–2.5 A and the default value is 2.5 A. When the inverter capacitor current is lower than the current specified by this parameter, the power module determines that the inverter capacitor is faulty and shuts down the inverter. If **Capacitor failure detection lower limit** is set to 0 A, the power module does not perform inverter capacitor fault detection.

- **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.

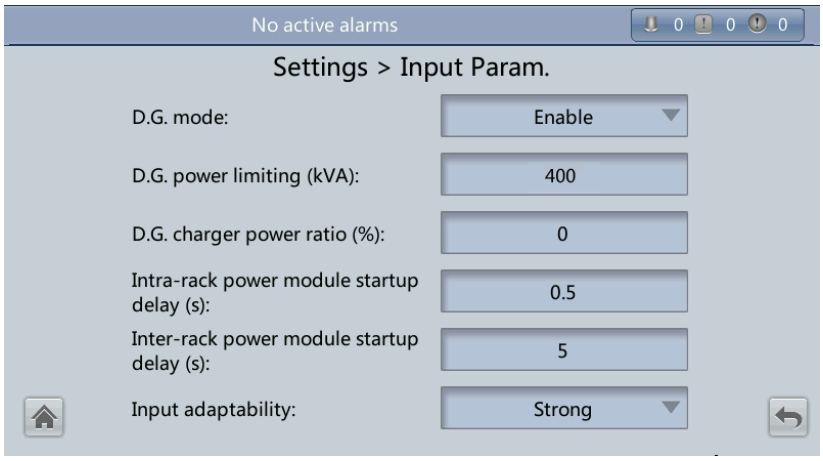
- **No-load output shows zero**

  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.

Input Parameter Settings

Set input parameters, as shown in Figure 4-35.

Figure 4-35 Input Param. screen



NOTE

It is recommended that you retain the default input parameter settings.

- **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, preventing load impact and facilitating cooperation between the UPS and the D.G. The **D.G. power limiting (kVA)** setting range is 0–5000 kVA. The default value is 150 kVA for the UPS5000-E-120 kVA, 250 kVA for the UPS5000-E-200 kVA, 400 kVA for the UPS5000-E-320 kVA. The **D.G. charger power ratio (%)** value range is 0%–100%, and the default value is 0%.

- **Intra-rack power module start delay (s)** and **Inter-rack power module start delay (s)**

  The 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.

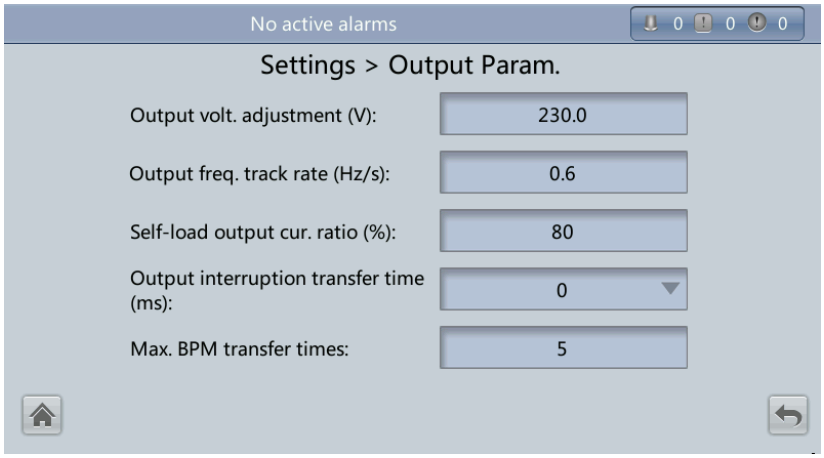
- **Input adaptability**

  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 Parameter Settings

Set output parameters, as shown in Figure 4-36.

Figure 4-36 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 ±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)**

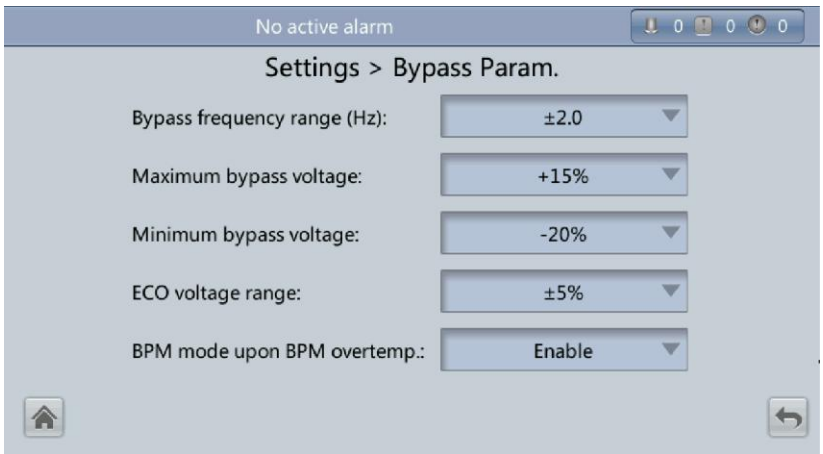
  The default value is 0 ms. The transfer from inverter mode to bypass mode takes 1–2 ms, and the transfer from bypass mode to inverter mode takes 0 to 20 ms.
- **Max. BPM transfer times**

  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 4-37.

Figure 4-37 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 bypass frequency range must be greater than the ECO frequency range. The value range is ±6 Hz, and the default value is ±2 Hz.

- **Maximum bypass voltage**

  Upper threshold for the 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**

  Lower threshold for the 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%, –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 ±5% (default), ±6%, ±7%, ±8%, ±9%, or ±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.
- **Chg. volt. over range point** and **Dis. volt. over range point** 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 4-38 to Figure 4-42.

Figure 4-38 Battery Param. screen 1

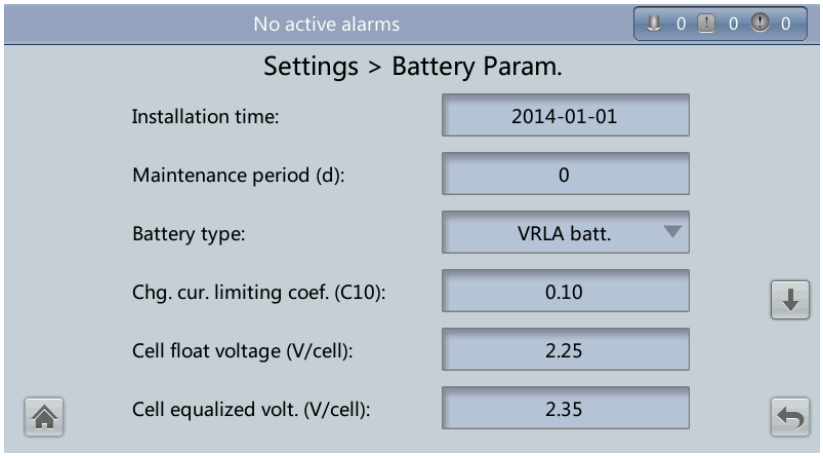


Figure 4-39 Battery Param. screen 2

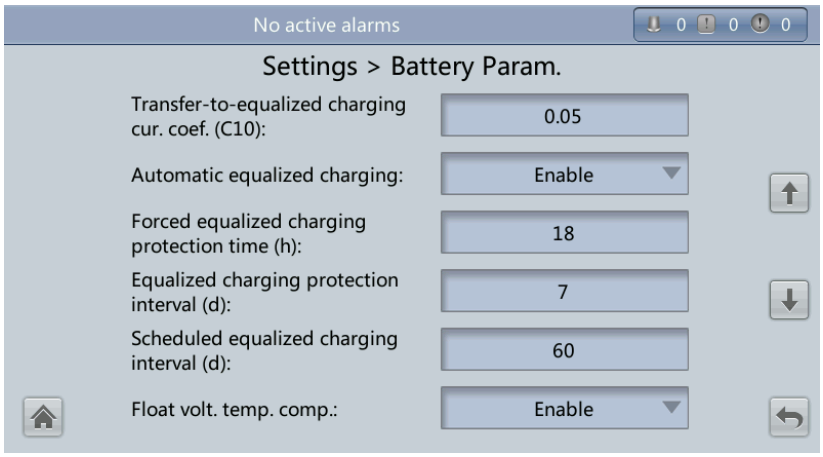


Figure 4-40 Battery Param. screen 3

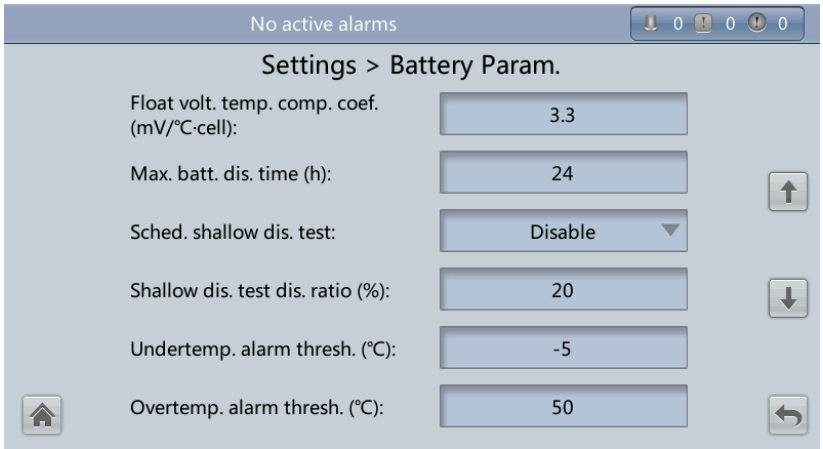


Figure 4-41 Battery Param. screen 4

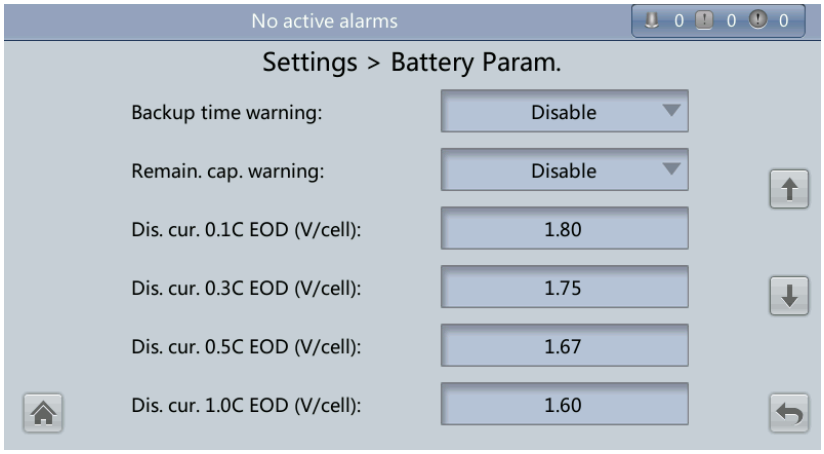
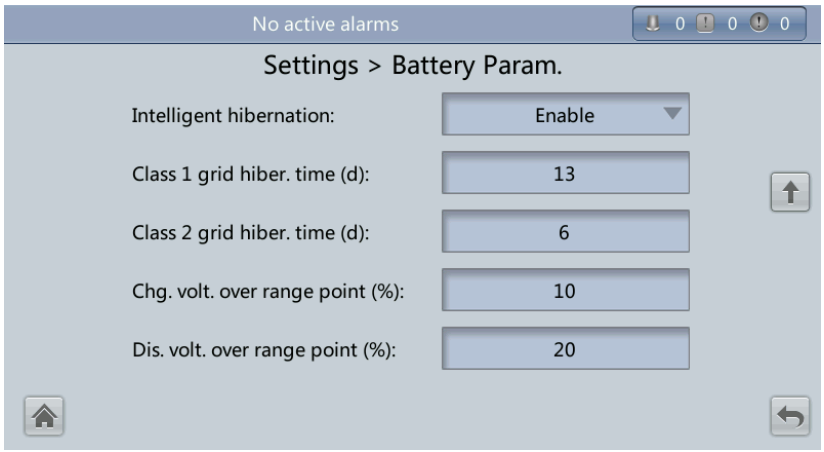


Figure 4-42 Battery Param. screen 5



- **Installation time**

  A battery maintenance reminder is displayed when the maintenance time (counted from the installation time) comes.
- **Maintenance period (d)**

  Interval for reminding users of battery maintenance.
- **Battery type**

  Set the battery type based on actual conditions. Currently, only lead-acid batteries are supported.
- **Chg. cur. limiting coef. (C10)**

  Charging current limit, which is a multiple of the battery capacity. The value can be 0.05–0.15, 0.1 by default.
- **Cell float voltage (V/cell)**

  Set the float voltage. The value can be 2.23–2.27 V/cell, 2.25 V/cell by default. The value is configurable in any mode.
- **Cell equalized volt. (V/cell)**

Set the battery equalized voltage. The value can be 2.30–2.40 V/cell, 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.

- **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.**

  Option 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/℃ cell)**

  Correction coefficient during float voltage temperature compensation.

- **Max. batt. dis. time (h)**

  Set the maximum battery discharge time. When the discharge time reaches the value, the UPS powers off. The battery discharge time can be set only to 0 hours or a value in the range 16–48 hours. The default value is 24 hours. If the time is set to 0 hours, battery discharge protection is not implemented. This parameter cannot be set to a value in the range 1–15 hours.

- **Sched. shallow dis. test**

  When certain conditions are met, the charger shuts down, and batteries supply power to loads. The system records the battery discharge data as the reference for battery capacity and lifespan.

- **Shallow dis. test dis. ratio (%)**

  Set the proportion of the discharge capacity to the total discharge capacity. The value can be 10%–50%, 20% by default. The value is configurable in any mode.

- **Undertemp. alarm thresh. (℃)** and **Overtemp. alarm thresh. (℃)**

  Battery temperatures can be monitored in a timely manner. If a battery overtemperature alarm is detected, the charging current limit decreases to 0.03 CA. Battery charging stops if a battery overtemperature protection alarm (when the temperature reaches the high temperature threshold plus 3℃) is generated.

- **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**

  If this parameter is set to **Enable**, the intelligent battery hibernation function is enable.

- **Class 1 grid hiber. time (d)** and **Class 2 grid hiber. time (d)**

  Set the hibernation time based on the power grid type. In hibernation mode, batteries are not charged or discharged, which extends the battery lifespan. The **Class 1 grid hiber. time** value range is 0–30 days, and the default value is 13 days. The value 0 indicates no hibernation. The **Class 2 grid hiber. time** value range is 0–15 days, and the default value is 6 days. The value 0 indicates no hibernation.

- **Chg. volt. over range point(%)** and **Dis. volt. over range point (%)**

  The parameters 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%.

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 disable.
- After you enable a dry contact card, its dry contact signals can be displayed on the LCD.
- Disable all the dry contacts for a dry contact card that is not connected and all the dry contacts that are not used to prevent false alarms.
- ( ) encloses a unit, and [ ] encloses silk screen.

Specify dry contact settings on the following cards:

- Dry contact card (MUE05A): provides dry contact signals for the battery grounding failure detector, D.G., BCB box, and PDCs.
- Backfeed protection board (MUE06A): provides backfeed protection signals. You need only to enable or disable this board.
- Monitoring interface card (MUS05A): provides four routes of configurable output dry contact signals.
- Dry contact extended card (MUE07A): provides two routes of input signals and one route of output signals.

Set the dry contact parameters, as shown in Figure 4-44 to Figure 4-49.

Figure 4-43 Dry Contacts screen 1

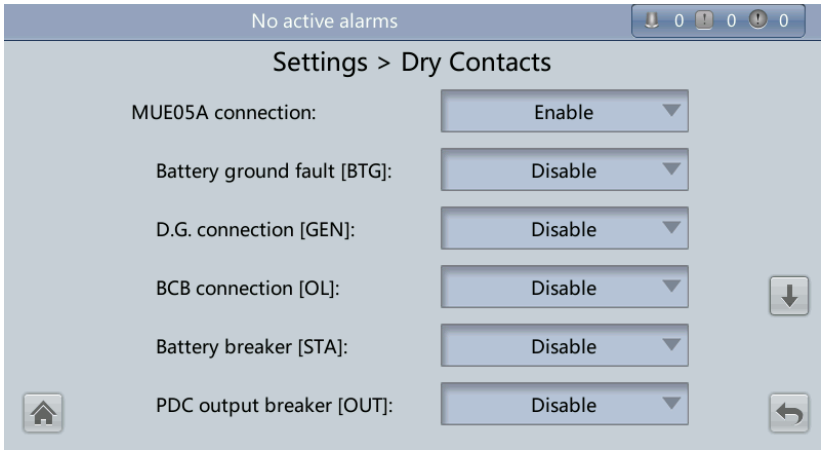


Figure 4-44 Dry Contacts screen 2

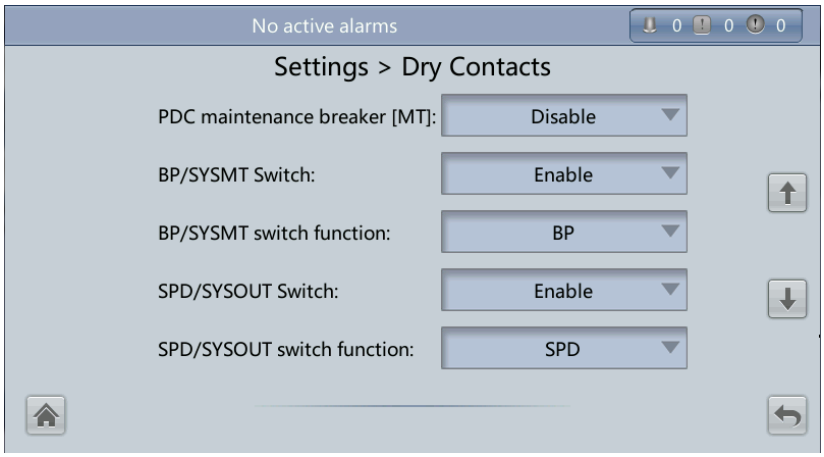


Figure 4-45 Dry Contacts screen 3

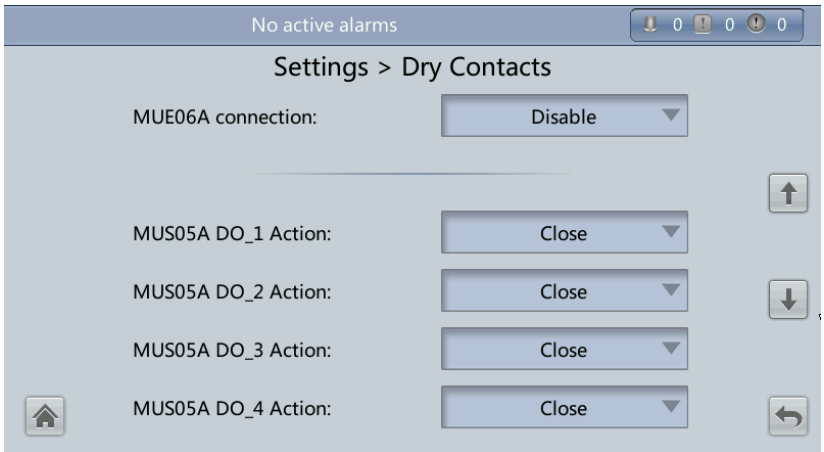


Figure 4-46 Dry Contacts screen 4

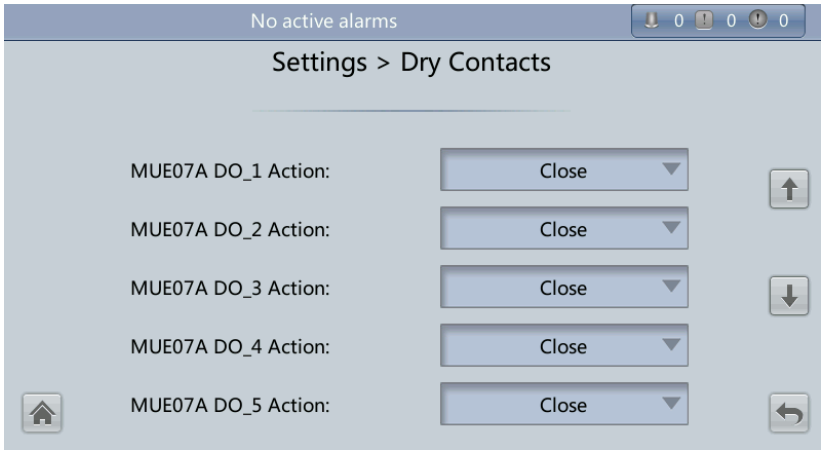


Figure 4-47 Dry Contacts screen 5

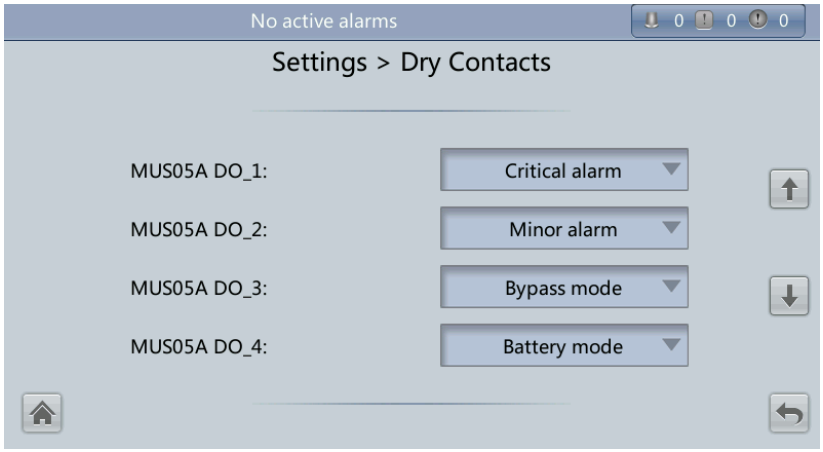


Figure 4-48 Dry Contacts screen 6

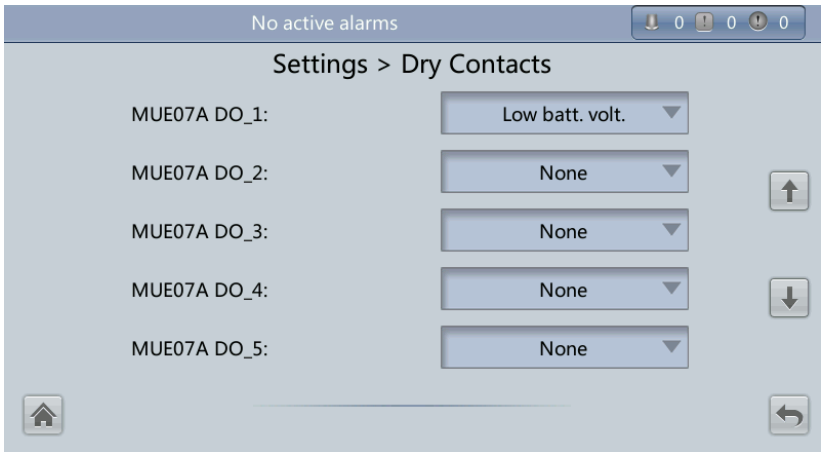
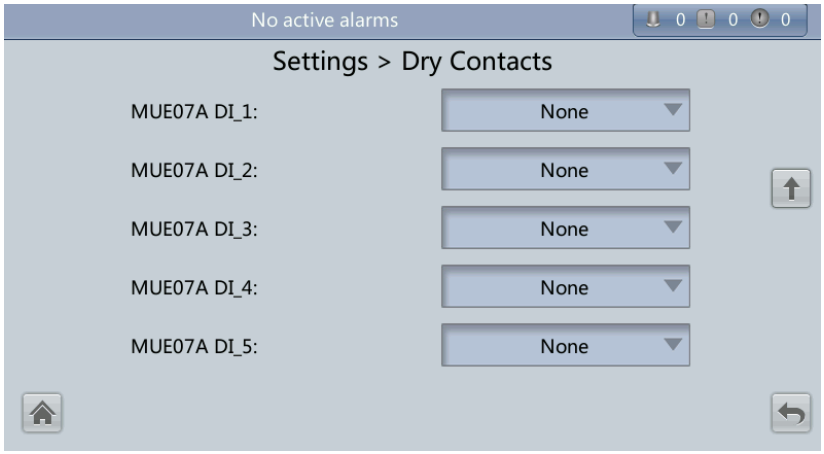


Figure 4-49 Dry Contacts screen 7



- **MUE05A connection**

  MUE05A connection status. Independent input signals can be enabled only when this parameter is set to **Enable**.
- **Batter ground fault [BTG]**

  Enable or disable the battery grounding failure detection.
- **D.G. connection [GEN]**

  Enable or disable D.G. connection detection.
- **BCB connection [OL]**

  Enable or disable BCB connection detection.
- **Batter breaker [STA]**

  Enable or disable battery circuit breaker monitoring.
- **PDC output breaker [OUT]**

  Enable or disable PDC output circuit breaker monitoring.
- **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.
- **MUE06A connection**

If this parameter is enable, the mains and bypass backfeed protection is enable.

- **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.
- **MUE07A DO_1 Action**
  Control the status of the DO_1 dry contact on the MUE07 extended dry contact card.
- **MUE07A DO_2 Action**
  Control the status of the DO_2 dry contact on the MUE07 extended dry contact card.
- **MUE07A DO_3 Action**
  Control the status of the DO_3 dry contact on the MUE07 extended dry contact card.
- **MUE07A DO_4 Action**
  Control the status of the DO_4 dry contact on the MUE07 extended dry contact card.
- **MUE07A DO_5 Action**
  Control the status of the DO_5 dry contact on the MUE07 extended dry contact card.
- **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.
- **MUE07A DO_1**
  Corresponds to signal of the output dry contact DO_1 on the MUE07A.
- **MUE07A DO_2**
  Corresponds to signal of the output dry contact DO_2 on the MUE07A.
- **MUE07A DO_3**
  Corresponds to signal of the output dry contact DO_3 on the MUE07A.
- **MUE07A DO_4**
  Corresponds to signal of the output dry contact DO_4 on the MUE07A.
- **MUE07A DO_5**
  Corresponds to signal of the output dry contact DO_5 on the MUE07A.
- **MUE07A DI_1**
  Corresponds to signal of the input dry contact DI_1 on the MUE07A.
- **MUE07A DI_2**
  Corresponds to signal of the input dry contact DI_2 on the MUE07A.
- **MUE07A DI_3**

Corresponds to signal of the input dry contact DI_3 on the MUE07A.

- **MUE07A DI_4**

  Corresponds to signal of the input dry contact DI_4 on the MUE07A.

- **MUE07A DI_5**

  Corresponds to signal of the input dry contact DI_5 on the MUE07A.

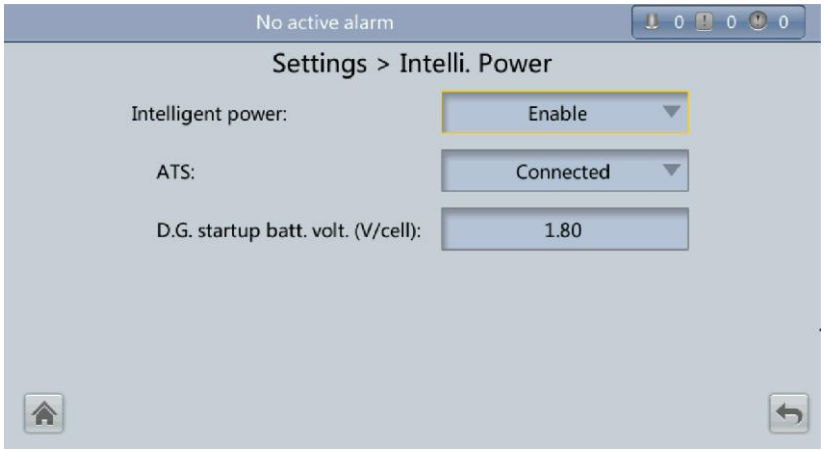
Intelligent Power Supply Settings

Figure 4-50 shows the **Intelli. Power** screen.

Figure 4-50 Intelli. Power screen

The default value of **Intelligent power** is **Disable**. If you select **Enable**, intelligent power supply parameters are displayed, as shown in Figure 4-51.

Figure 4-51 Intelligent power supply parameters



- **Intelligent power**

  Intelligent power supply mode is applicable when a D.G. is configured, which enables D.G. power supply when an outage occurs. For details about the installation and configurations, contact Huawei technical support.

- **ATS**

  Works with the intelligent power supply device.

- **D.G startup batt. volt. (V/cell)**

  Works with the intelligent power supply device. The value range is 1.80–2.00 V/cell, and the default value is 1.80 V/cell.

4.1.3.5 Maintenance Screen

On the **System Info.** screen, tap . If you have not logged in, a dialog box is displayed, asking you to enter a user name and password. After you log in, the **Maintenance** screen is displayed, as shown in Figure 4-52. You can perform **Battery Maint.**, **USB Operations**, **Inv. ON**, **Inv. OFF**, **ECM Switchover** and **Screen Calib** on the **Maintenance** screen. You can also perform **Parallel Inv. ON** and **Parallel Inv. OFF** for parallel systems, as shown in Figure 4-53.

Figure 4-52 Mainenance Screen (single UPS)

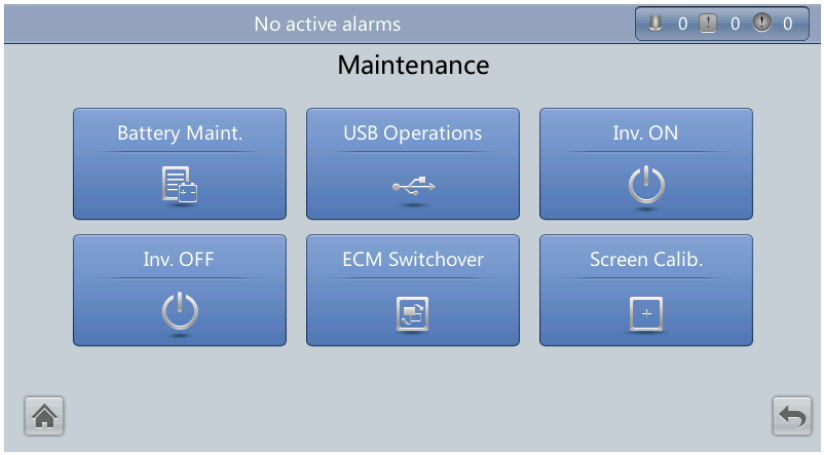
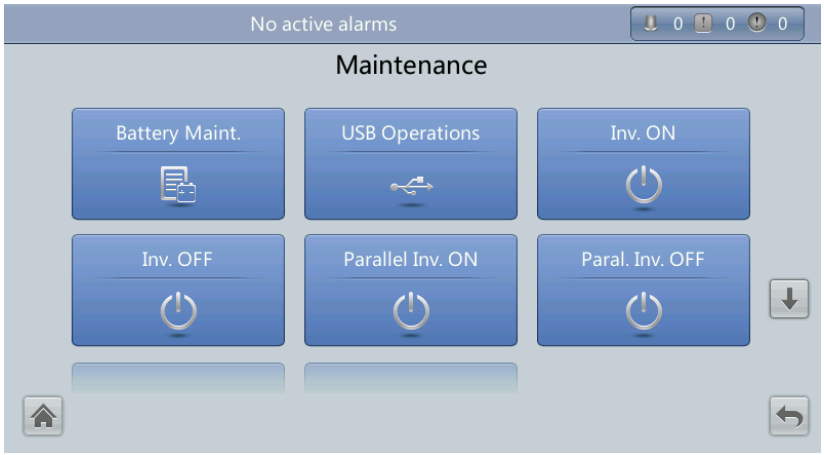


Figure 4-53 Maintenance Screen (parallel system)



Battery Maint. Menu

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 4-54 shows the **Battery Maint.** screen.

Figure 4-54 Battery Maint. screen

- **Forced Equalized Charging**

  Perform equalized charging on batteries forcibly.
- **Shallow Dis. Test**

  Discharge partial capacities of batteries.
- **Capacity Test**

  Discharge full capacities of batteries.

USB Operations

The **USB Operations** screen provides the following functions: **Remove USB**, **Upgrade Software**, **Load Config.**, **Export Config.**, **Export Logs**, **Export E-labels**, **Export Alarms**, **Multi-brand** and **Serviceable data**.

This screen allows you to load software online, upgrade software, and download system data, as shown in Figure 4-55 and Figure 4-56.

Figure 4-55 USB Operations screen 1

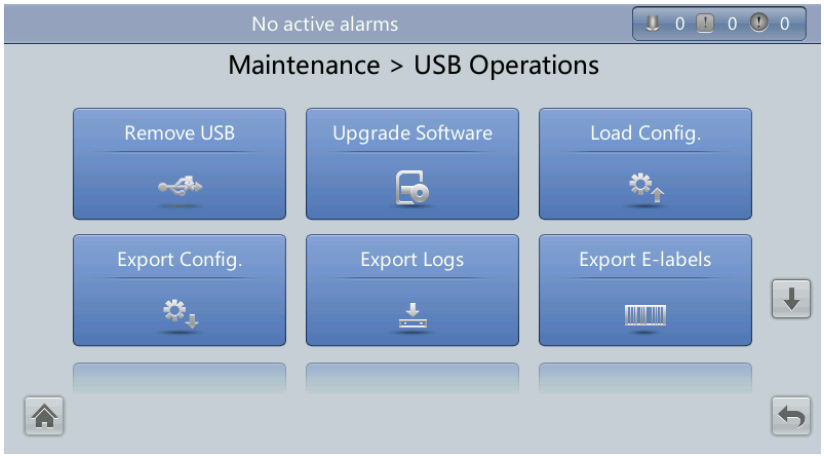


Figure 4-56 USB Operations screen 2

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 4-57 shows the **Inv. ON** screen, and Figure 4-58 shows the **Inv. OFF** screen.

Figure 4-57 Inv. ON screen

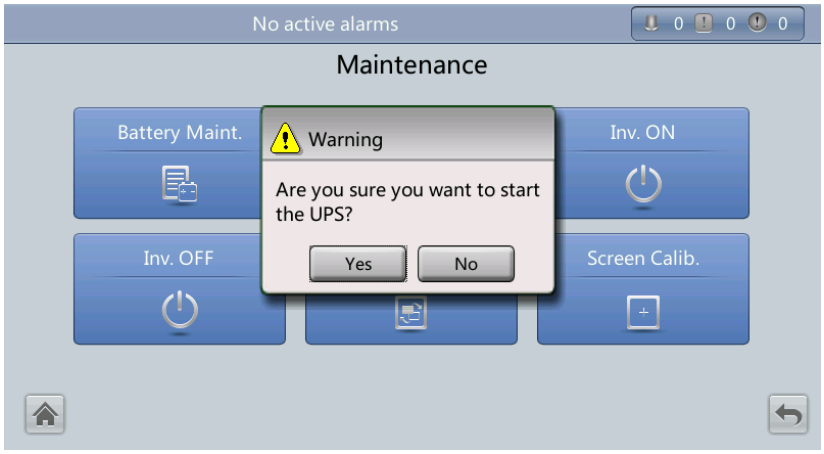


Figure 4-58 Inv. OFF screen

- **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.

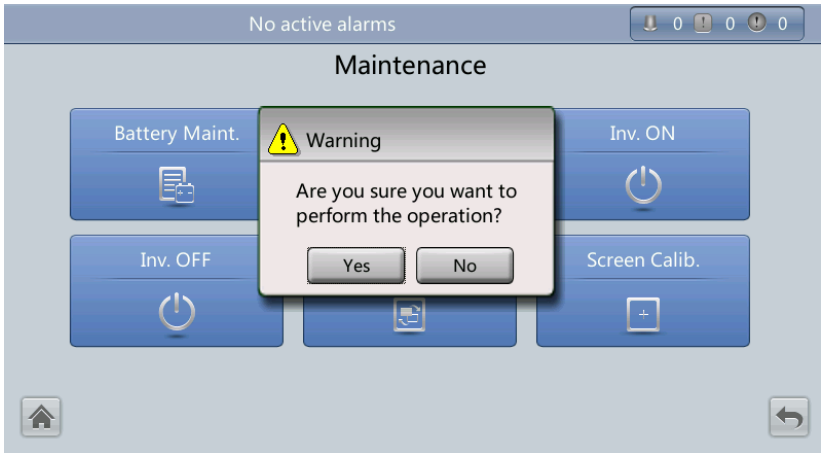
ECM Switchover Menu

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).

This menu allows you to perform active/standby switchover on the UPS. When you need to maintain an ECM and it is working, perform active/standby switchover on the ECM, as shown in Figure 4-59. After switchover, ensure that the ECM stops working (the yellow or red indicator is on, or the green indicator is blinking) before you maintain it.

Figure 4-59 ECM switchover



Screen Calib. Menu

You can calibrate the screen, as shown in Figure 4-60.

Figure 4-60 Screen Calib. screen

4.1.3.6 About Screen

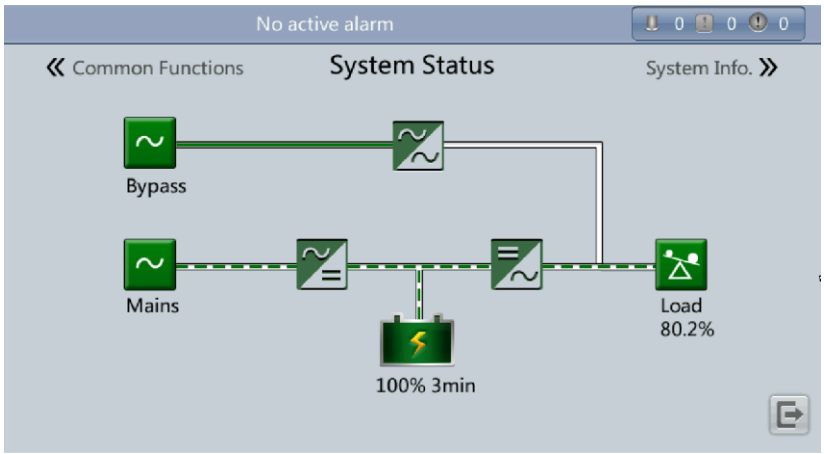
On the **System Info.** screen, tap **About**. On the **About** screen, you can view the UPS model, manufacturer name, monitoring version and power version, as shown in Figure 4-61. To view version details, tap **Version Info**.

Figure 4-61 About screen

4.1.4 System Status Screen

On the main screen, tap **System Status**. On the **System Status** screen, you can view the mains input, bypass input, load, and battery information, as shown in Figure 4-62.

Figure 4-62 System Status screen



4.1.5 Common Functions Screen

On the main screen, tap **Common Functions**. On the **Common Functions** screen, you can query the AC output, load, and mains input information, start or shut down the inverter, control the buzzer, and query the historical alarms, as shown in Figure 4-63 and Figure 4-64.

Figure 4-63 Common Functions screen 1

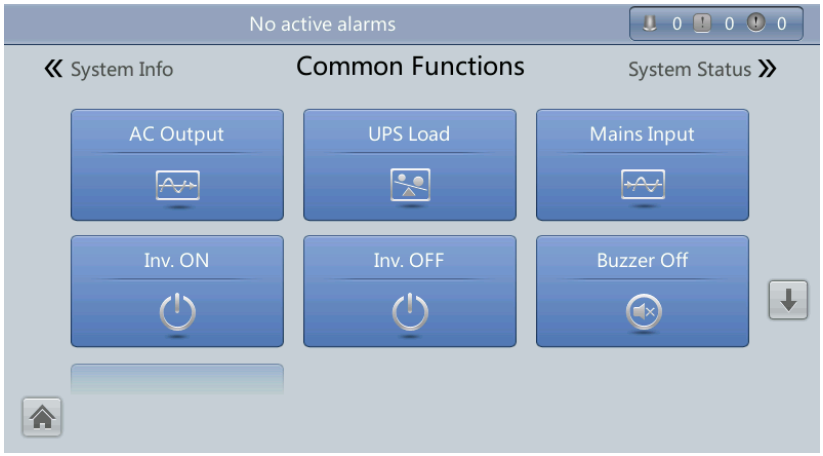
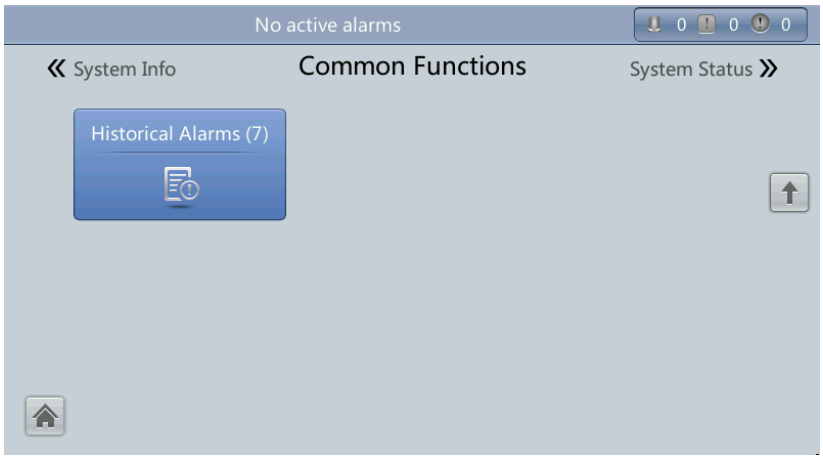


Figure 4-64 Common Functions screen 2



4.2 WebUI

4.2.1 Login

Procedure

Step 1 Open the browser (Internet Explorer 8 as an example) and choose **Tools** > **Internet Options**.

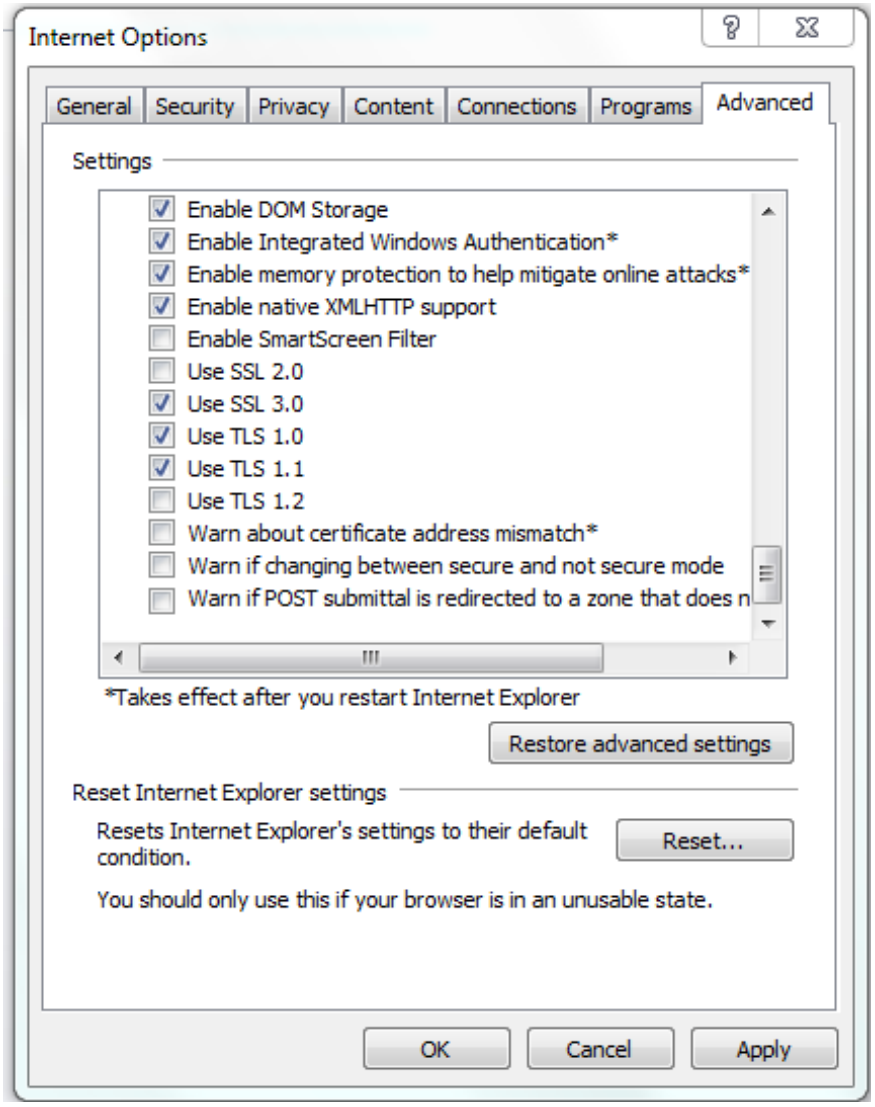
Step 2 On the **Advanced** tab page, ensure that **Use TLS 1.0**, and **Use TLS 1.1** are selected and click **OK**, as shown in Figure 4-65.

NOTE

- In monitoring and power versions earlier than V100R001C10SPC008 (software package version: V100R001C10SPC700), the software package version uses default Internet Explorer settings, that is, **Use SSL 3.0** and **Use TLS 1.0** are selected.

- In monitoring and power version V100R001C10SPC008 (software package version: V100R001C10SPC700) or later, **Use TLS 1.1** in addition to the default selected Internet Explorer items must be selected.

Figure 4-65 Settings in the Internet Options dialog box



Step 3 Enter **https://*UPS IP address*** in the address box of Internet Explorer, select a language, set **User name** and **Password**, and click **Login**. The system supports Internet Explorer 6, Internet Explorer 8, and Firefox 31.0. Table 4-4 describes the system users.

NOTE

The preset UPS IP address is 192.168.0.10. You can set the UPS Ethernet IP address on the LCD or WebUI. The value range is 0.0.0.0–255.255.255.255.

Table 4-4 User description

Default User	Preset Password		User Rights
admin (system	LCD	000001	Performs all operations on the

Default User	Preset Password		User Rights
administrator)	WEB	For a version earlier than UPS V100R002C01SPC008, the WebUI preset password is **000001**; for UPS V100R002C01SPC008 and later, the WebUI preset password is **Changeme**	LCD and WebUI, including system running information browsing, system information (historical alarms, logs, e-labels, and fault data) exporting, parameter (system parameters and battery parameters) setting, system control (startup, shutdown, troubleshooting, runtime clearing, and battery management), system 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, rectify faults, and controls the buzzer.
	WEB	For a version earlier than UPS V100R002C01SPC008, the WebUI preset password is **000001**; for UPS V100R002C01SPC008 and later, the WebUI preset password is **Changeme**	
browser (browsing user)	WEB	-	Only browses the system running information.

NOTE

- If you enter incorrect passwords for three consecutive times, you will be locked out for 5 minutes.
- After you log in to the WebUI, you will be logged out if another user logs in with the same user name.
- Change the password after your first login, preventing unauthorized access. You can change the password in **User Mgmt.** on the **Config.** page.

----End

4.2.2 Monitoring Page

After you log in to the WebUI, the **Monitoring** page is displayed by default, as shown in Figure 4-66.

Figure 4-66 Monitoring page

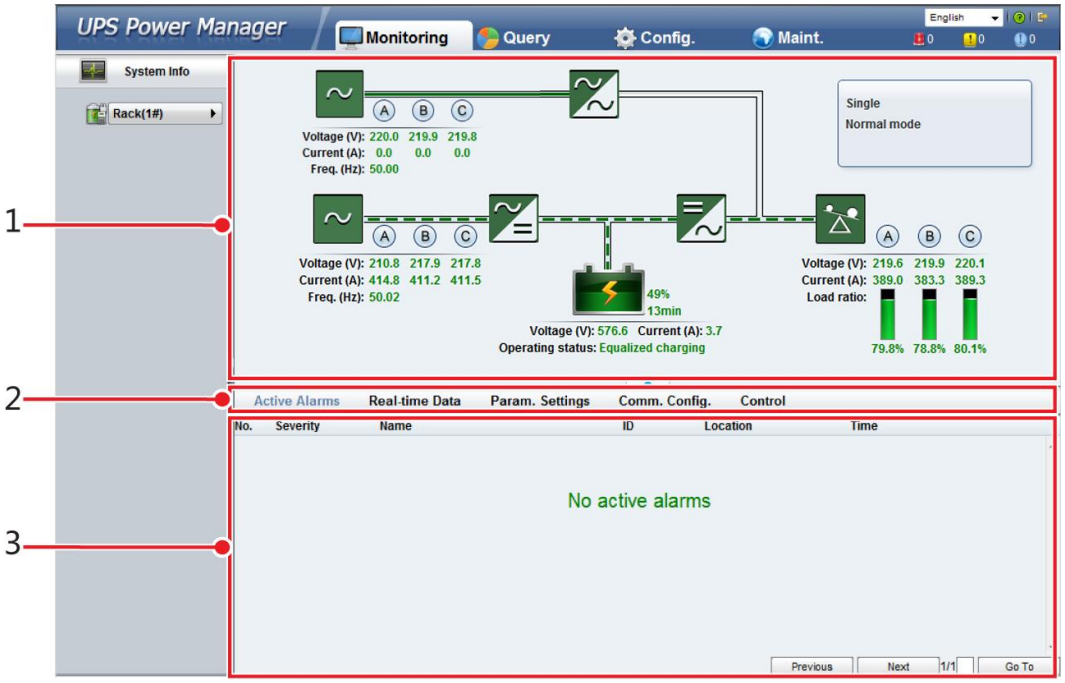


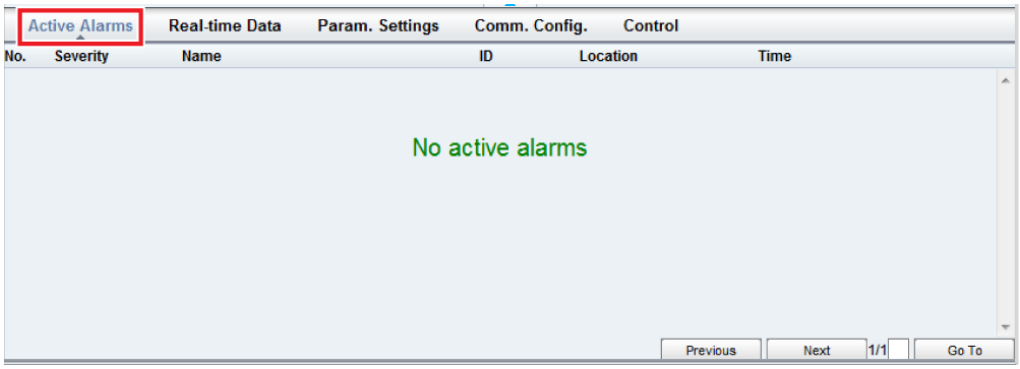
Table 4-5 Monitoring page details

Number	Area	Function
1	Running status area	Displays the power flow and UPS running information.
2	Menu bar	Displays 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

You can view active alarms on the **Active Alarms** page, as shown in Figure 4-67.

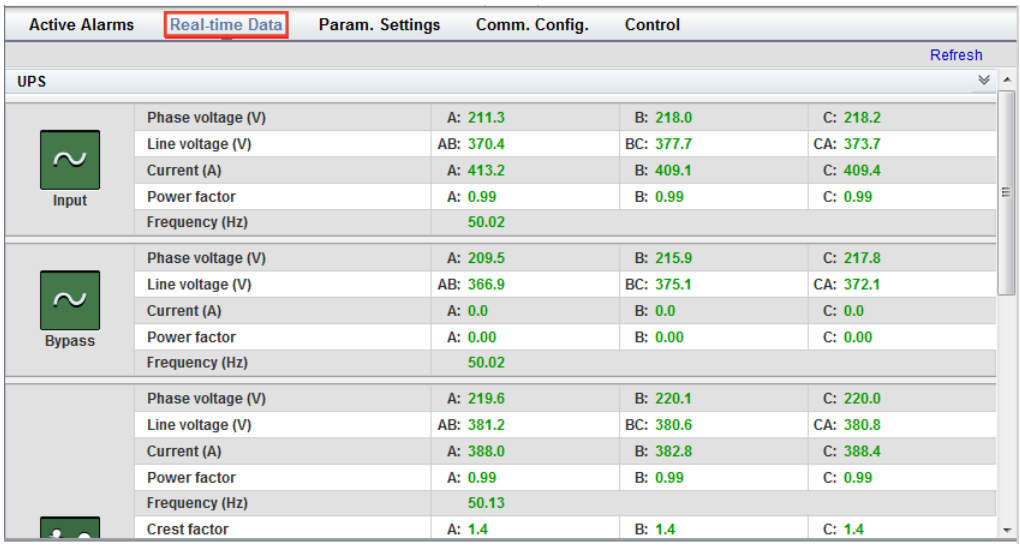
Figure 4-67 Active Alarms page



4.2.2.2 Real-time Data Page

You can view the real-time system running data on the **Real-time Data** page, as shown in Figure 4-68.

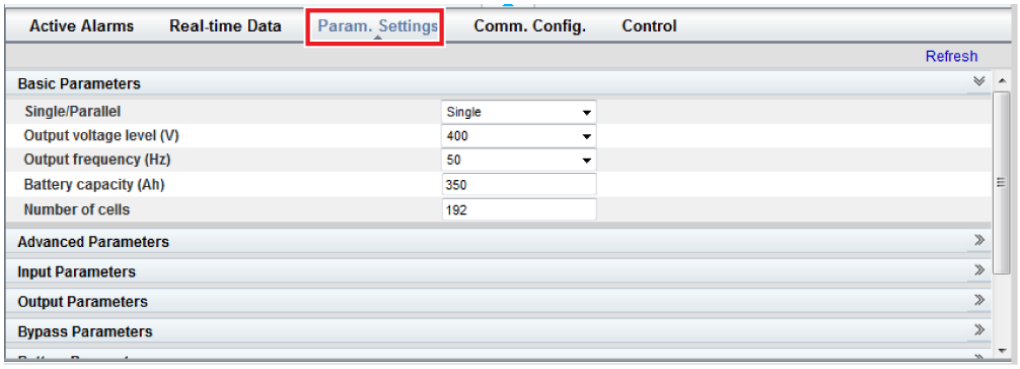
Figure 4-68 Real-time Data page



4.2.2.3 Param. Settings Page

On the **Param. Settings** page, you can set basic parameters, advanced parameters, input parameters, output parameters, bypass parameters, battery parameters, and dry contacts. The settings are the same as those on the LCD in 4.1.3 System Info. Screen. See Figure 4-69.

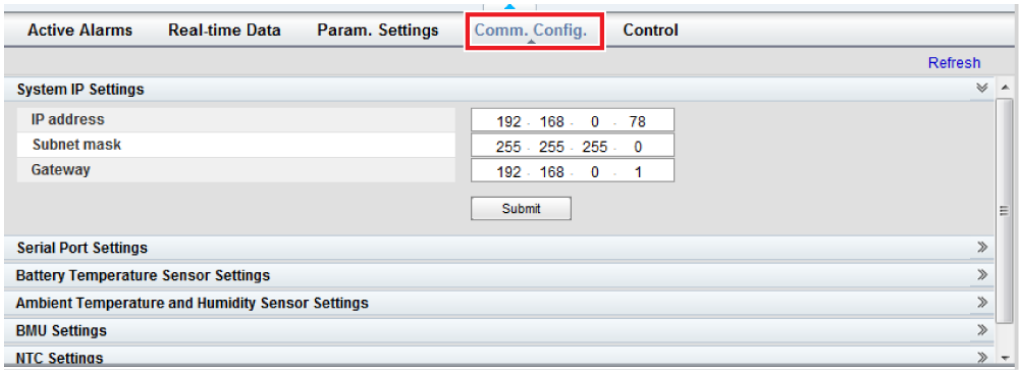
Figure 4-69 Param. Settings page



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 4.1.3 System Info. Screen. See Figure 4-70.

Figure 4-70 Comm. Config. page



4.2.2.5 Control Page

On the **Control** page, you can control the system, as shown in Figure 4-71. For parallel systems, you can also perform **Parallel Inv. ON** and **Parallel Inv. OFF**, as shown in Figure 4-72.

Figure 4-71 Control page (single UPS)

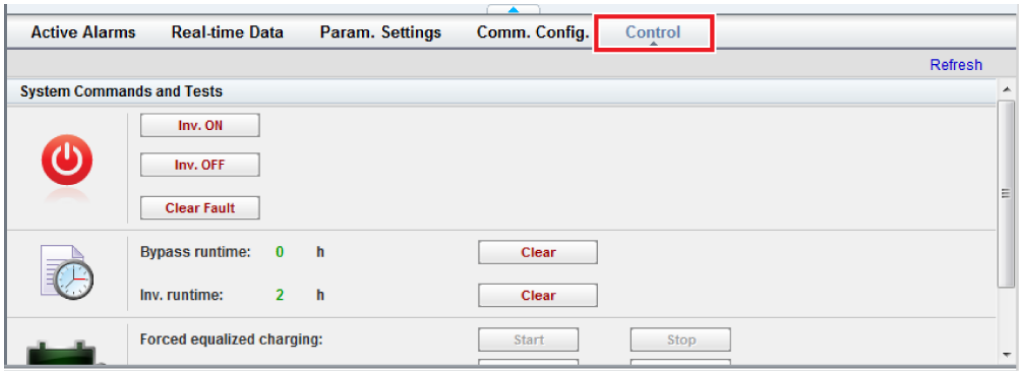
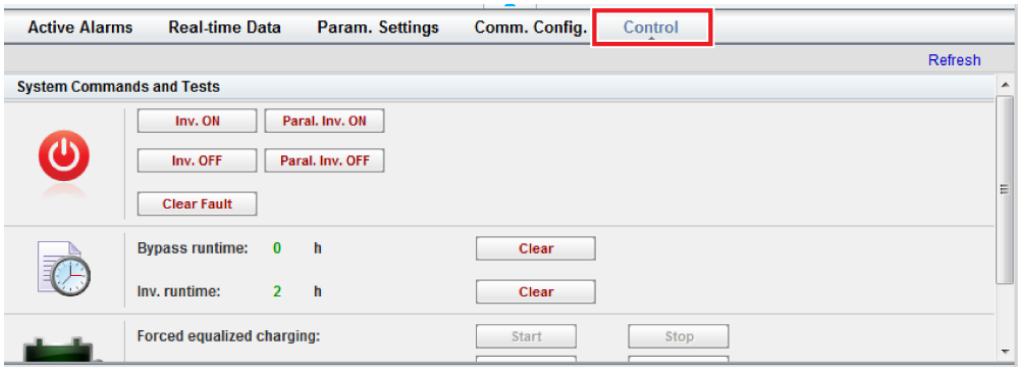


Figure 4-72 Control page (parallel system)

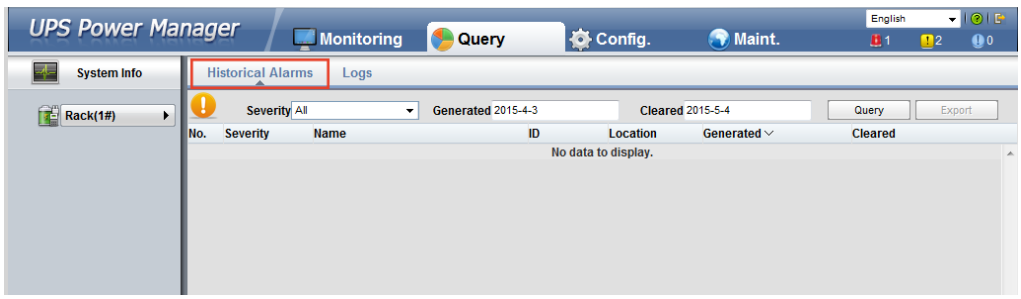


4.2.3 Query Page

4.2.3.1 Historical Alarms Page

On the homepage, click the **Query** tab. On the **Historical Alarms** page, you can query historical alarms based on severity, generation time, and clear time, as shown in Figure 4-73.

Figure 4-73 Historical Alarms page

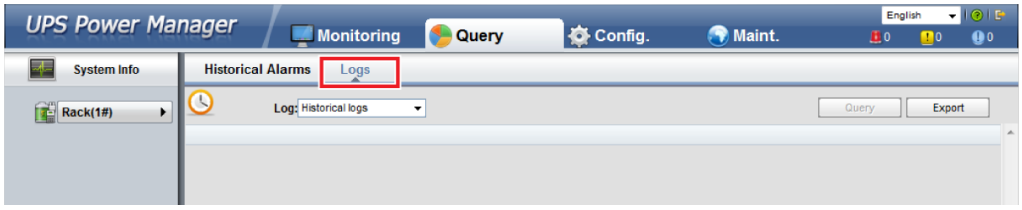


4.2.3.2 Logs Page

On the **Logs** page, you can set **Log** to **Historical logs**, **Cap. test logs**, or **Common test logs**, and query or export logs, as shown in Figure 4-74.

NOTE
You can export historical logs but cannot query them.

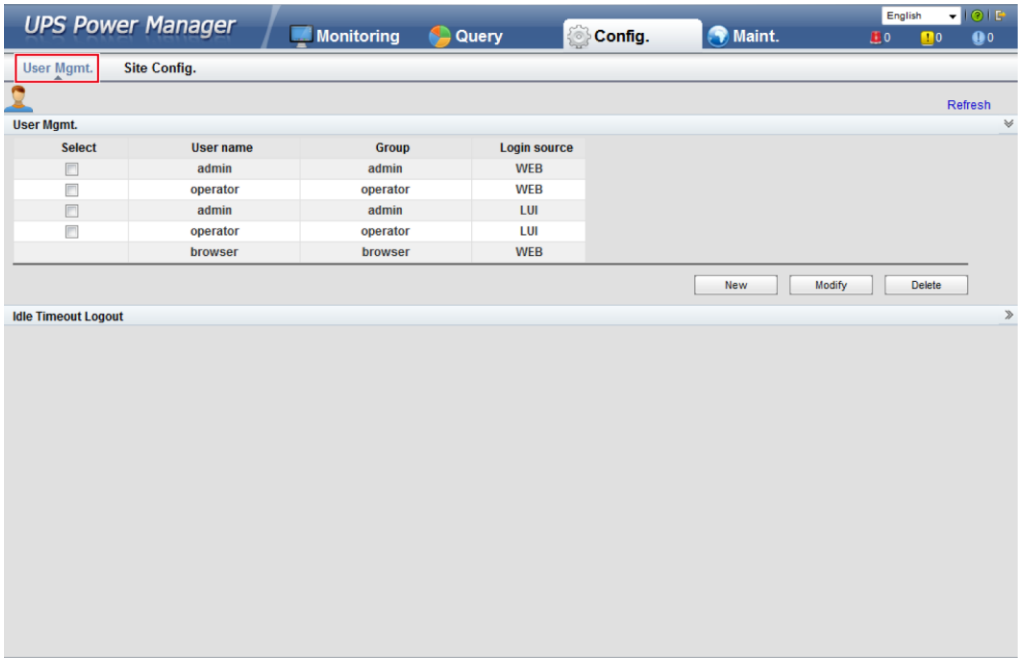
Figure 4-74 Logs page



4.2.4 Config. Page

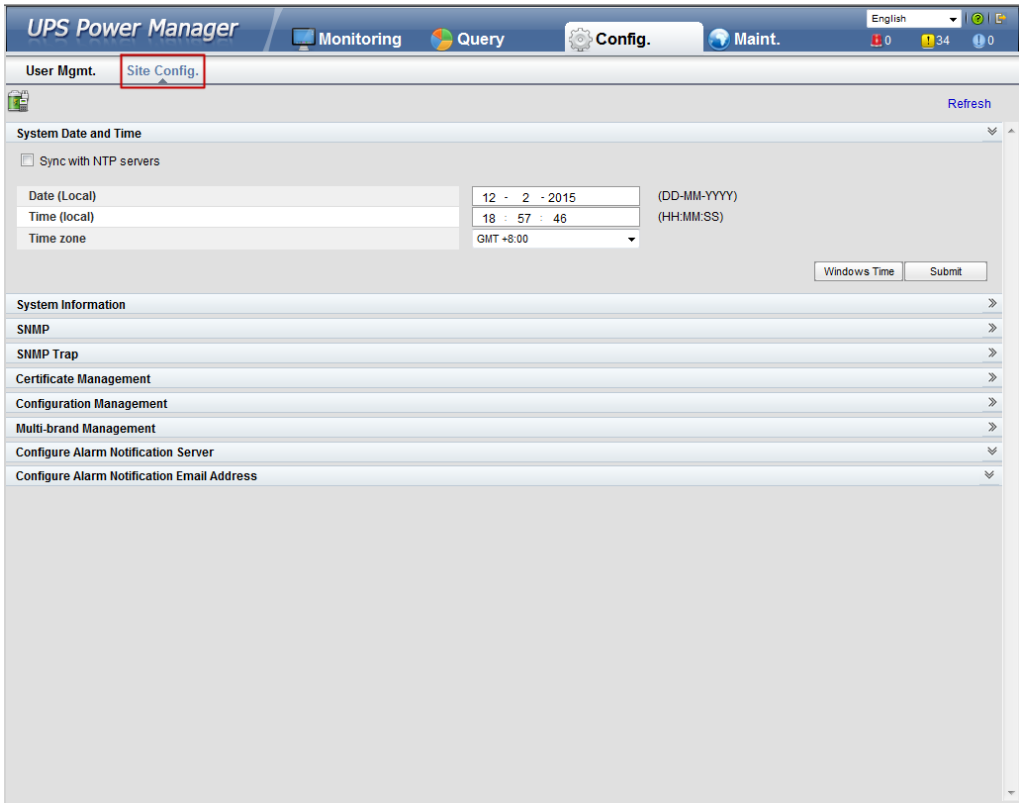
On the homepage, click **Config**. On the **Config.** page, you can set the user and site information, as shown in Figure 4-75 and Figure 4-76.

Figure 4-75 User Mgmt. page



NOTE
On the **User Mgmt.** page, you can add, modify, or delete users and change user passwords.

Figure 4-76 Site Config. page



NOTE

- The NTP parameters are used to set the NTP server address, port, and synchronization interval.
- The default SNMP version is SNMPv3. For a version earlier than UPS V100R001C10SPC008, the preset password is **12345678**; for UPS V100R001C10SPC008 and later, 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.
- For SNMPv2, the default read and write community names are **sread** and **swrite** respectively.
- To obtain the MIB file, choose **Config.** > **Site Config.** > **SNMP** > **Download HUWEI_UPS_MIB**.
- **SNMP Trap** indicates the IP address of the server configured with 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 load the brand information of a partner to the corresponding WebUI.
- **Configure Alarm Notification Server** is used to configure a server for receiving alarm emails from the monitoring system.
- **Configure Alarm Notification Email Address** is used to configure the email address for receiving alarm emails from the monitoring system.

4.2.5 Maint. Page

On the homepage, click the **Maint.** tab. The **Maint.** page provides the **Calib.**, **Commissioning Var.**, **Upgrade**, and **Download** tabs. The maintenance operations cover the

bypass module, power module, and ECM, as shown in Figure 4-77, Figure 4-78, Figure 4-79, and Figure 4-80.

Figure 4-77 Calib. page

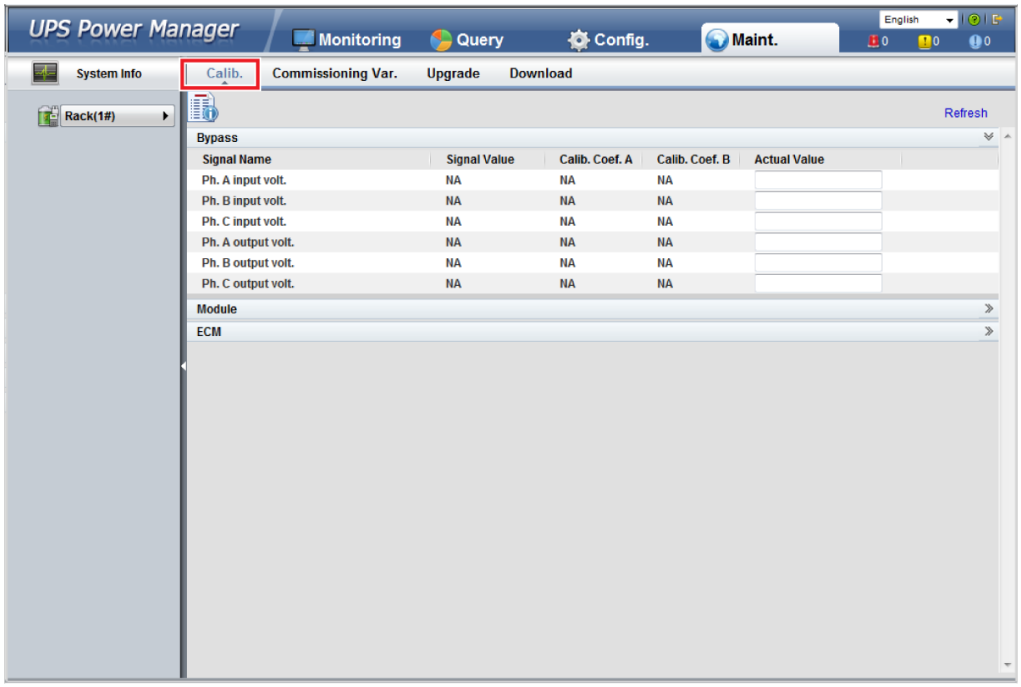


Figure 4-78 Commissioning Var. page

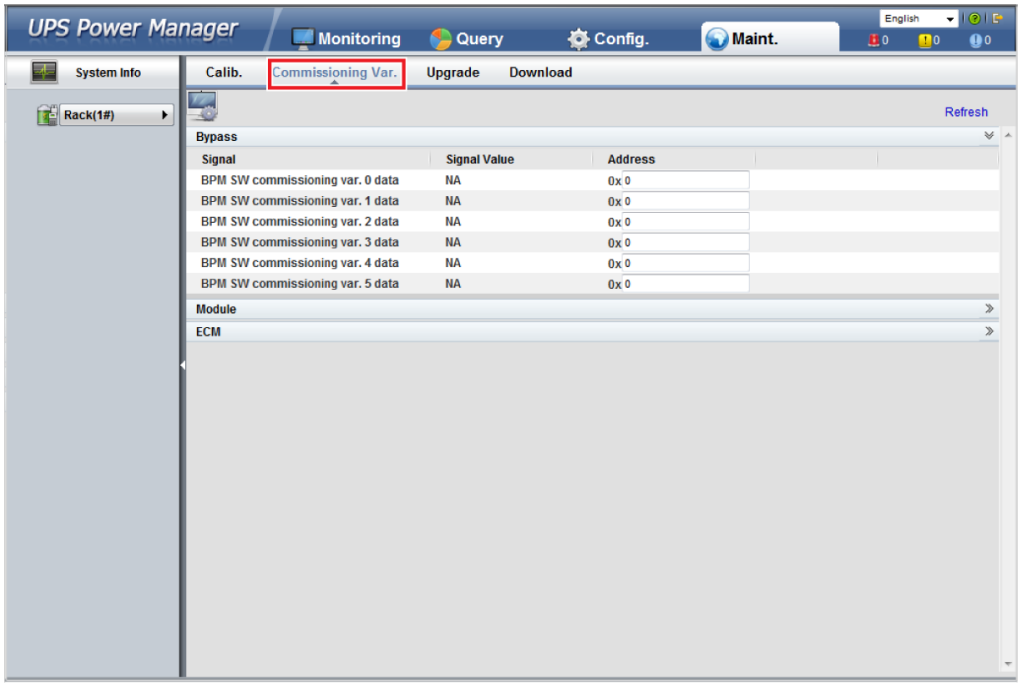


Figure 4-79 Upgrade page

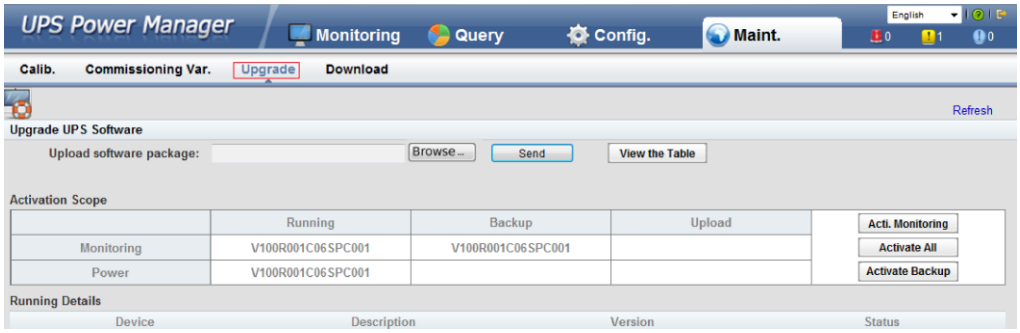
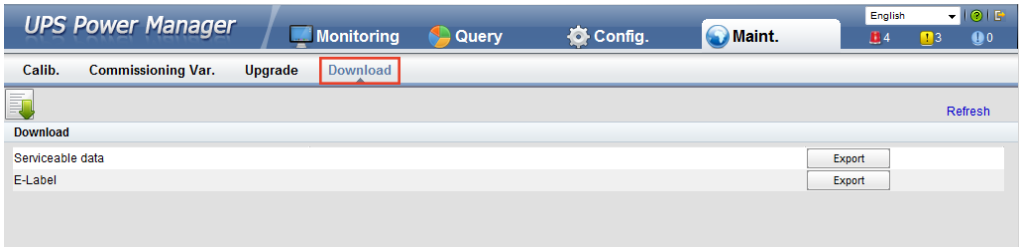


Figure 4-80 Download page



5 Operations

5.1 Powering On and Starting the UPS

Prerequisites

NOTICE

Measure the voltage and frequency where the UPS input circuit breakers (mains and bypass input circuit breakers) on the input PDC or the external input switch is located. The voltage range is 138-485 V AC, and the frequency range is 40-70 Hz.

Context

NOTICE

- The following operations are specified for a single UPS. For parallel systems, contact Huawei technical support.
- Before you power on the UPS, check that the UPS has passed all check items described in section 3.4 Verifying the Installation.
- Before you power on the UPS, check that all external and internal switches are OFF (except that the ready switches for the power module and bypass module are in locked state). Figure 5-1 shows the bypass module ready switch. Figure 5-2 shows the power module ready switch.

Figure 5-1 Bypass module ready switch

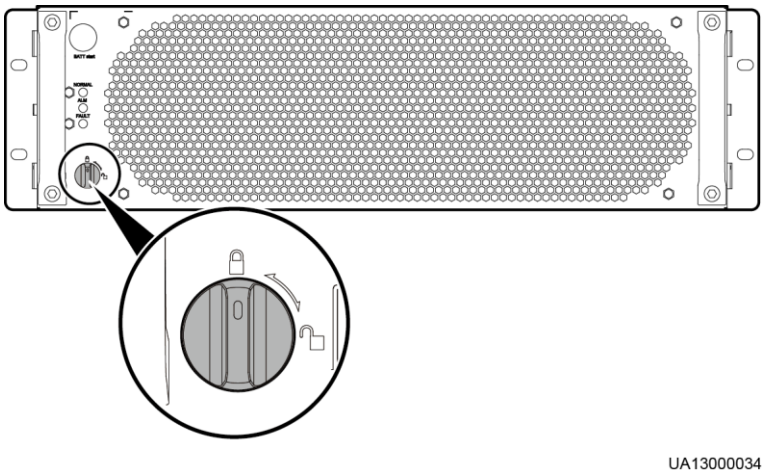
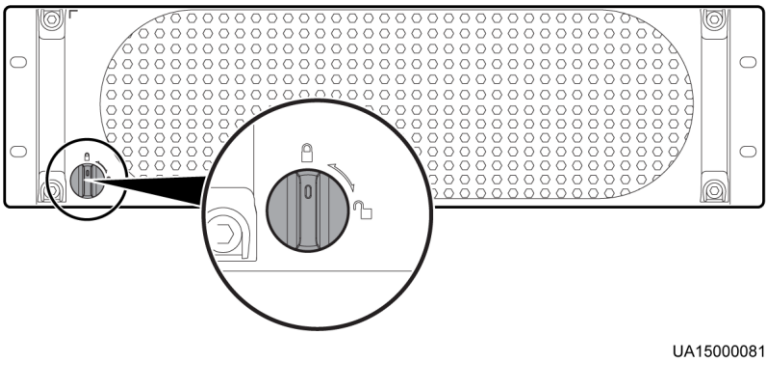


Figure 5-2 Power module ready switch



Procedure

Step 1 Close the UPS input circuit breakers (bypass and mains input circuit breakers) on the input PDC, or turn on the external input power distribution switch.

The UPS works in normal mode and starts initialization. The LCD displays the Huawei logo and an initialization progress bar.

Step 2 Close the input surge protection circuit breaker on the input PDC.

NOTE

If no input surge protection circuit breaker is configured, go to the next step. If the input surge protection circuit breaker is not closed, an alarm is generated and a message is displayed to prompt you to close it.

Step 3 After the LCD starts, perform the following steps:

- If the UPS is starting for the first time, set the language, date and time, network parameters, and system parameters on the **Settings Wizard** screen.
- If this is not the first startup, retain the previous settings.

NOTE

After you specify the settings, the **Bypass mode** and **No battery** alarms are displayed on the LCD.

The main buttons on the **Settings Wizard** screen are described as follows:

- Tap **Previous** to return to the upper-level screen.
- Tap **Next** to go to the next screen.
- Tap **Cancel** to exit the **Settings Wizard** screen.

1. Various languages are available, such as Chinese and English. Press **Down** and **Up** to view the language types, as shown in Figure 5-3.

Figure 5-3 Language screen

2. Tap **Next** on the **Time** screen, select a date format, as shown in Figure 5-4.

NOTICE

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

Figure 5-4 Time screen

3. On the **Network Param.** screen, set **IP address allocation**, **IP address**, **Subnet mask**, and **Gateway**, as shown in Figure 5-5. For details, see Communications Settings in section 4.1.3.4 Settings Screen.

Figure 5-5 Network Param. screen

NOTE

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.

4. On the **System Param.** screen, select **Single** (default value) or **Parallel**, as shown in Figure 5-6. Set the **Output voltage level**, **Output frequency**, **Battery capacity**, and **Number of cells**, as shown in Figure 5-7.

NOTICE

System parameter settings affect UPS operation. When you set system parameters, note the following:

- Set **Single/Parallel** with caution. Incorrect setting may affect the normal running of the UPS.
- **Output voltage level** refers to the line voltage level. Set it based on the site requirements.
- Set **Output frequency** correctly; otherwise, loads may not work properly.

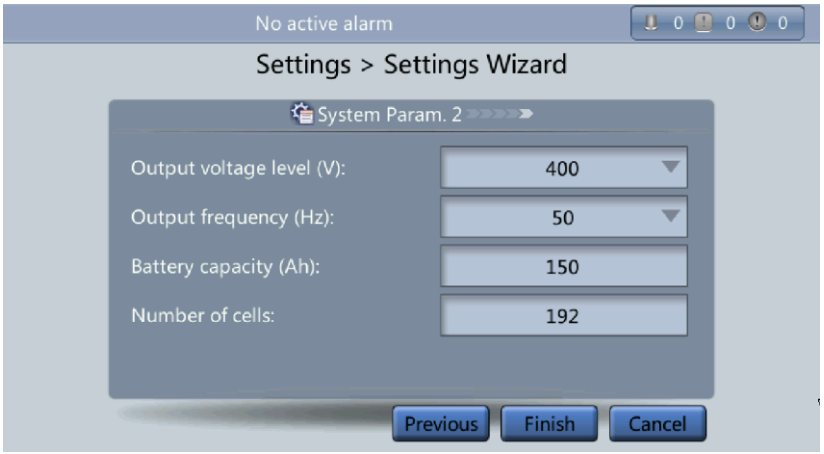
Figure 5-6 System Param. 1 screen

NOTICE

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

- Set **Battery capacity** after repeated confirmation. Incorrect setting reduces the charging power.
- When a battery string is 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 battery capacity of the single UPS.
- A high or low charging power tends to shorten the battery lifespan, or even damages batteries. If you do not know how to confirm the battery capacity, contact Huawei technical support.
- **Number of cells** refers to the number of 2 V cells in a single battery string connected to the UPS. For example, if 36 batteries (150 Ah, 12 V) are connected in series to form a battery string, and two of such battery strings are connected in parallel and then to the UPS, set **Number of cells** to **216** (36 x 6) and **Battery capacity** to **300 Ah** (150 Ah + 150 Ah). If 192 batteries (300 Ah, 2 V) are connected in series to form a battery string, and two of such battery strings connected in parallel and then to the UPS, set **Number of cells** to **192** (192 x 1) and **Battery capacity** to **600 Ah** (300 Ah + 300 Ah). It affects the charge voltage and discharge time. An incorrect setting will cause a high or low charge voltage, which greatly shortens the battery lifespan. In addition, the UPS may shut down before the batteries are fully discharged, which may lead to a data backup fault.

Figure 5-7 System Param. 2 screen



Step 4 If no alarm is displayed on the **Monitoring** screen, skip this step; if an alarm is displayed, clear the alarm.

NOTE

- After you set parameters on the **Settings Wizard** screen, tap **System Info.** > **Settings** > **Advanced Param.**. Check that **System Capacity**, **Power module capacity**, **Requisite modules**, and **Redundant modules** match the actual values.
- Tap **System Info.** > **Settings** > **Dry contacts**. Set the dry contacts that are used to **Enabled** and the dry contacts that are not used to **Disabled**.

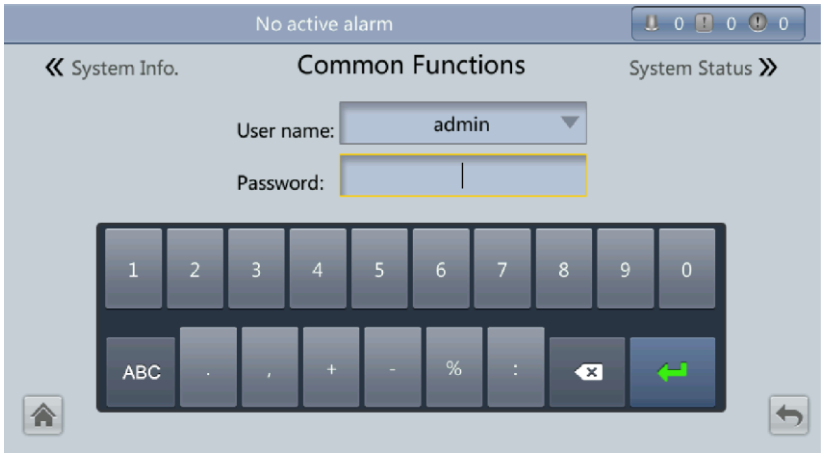
Step 5 Check that the bypass input is normal and the system has transferred to bypass mode. You can confirm this by viewing the system running diagram on the LCD.

Step 6 Start the inverter.

- Method for starting the inverter on the LCD
  a. On the main screen, tap **Common Functions**. Tap **Inverter On**.

b. If you have not logged in, enter a user name and password, and tap  on the login screen displayed, as shown in Figure 5-8.

Figure 5-8 Login



NOTE

- Table 4-4 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.

c. In the displayed dialog box, tap **Yes** to start the inverter, as shown in Figure 5-9.

Figure 5-9 Starting the inverter

NOTE

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

- Method for starting the inverter on the WebUI

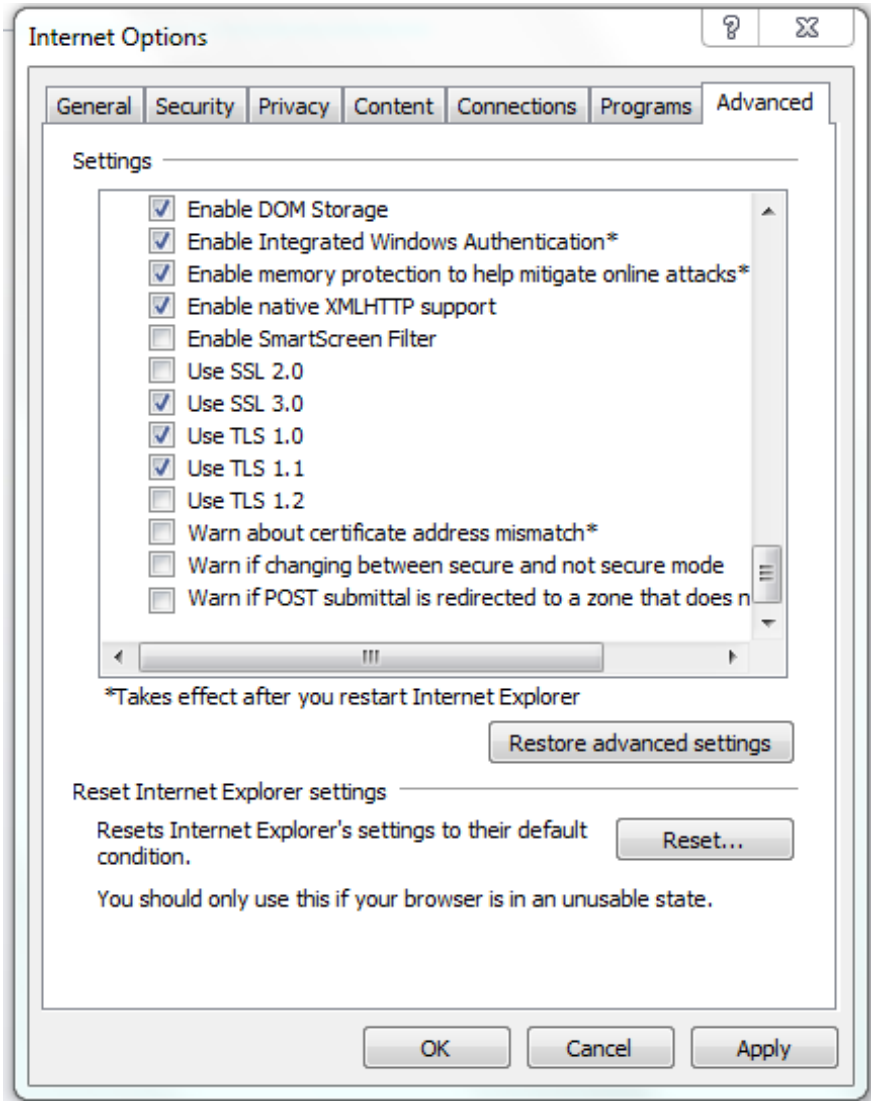
  a. Open the browser (Internet Explorer 8 as an example) and choose **Tools** > **Internet Options**.

  b. On the **Advanced** tab page, ensure that **Use TLS 1.0**, and **Use TLS 1.1** are selected and click **OK**, as shown in Figure 5-10.

NOTE

- In monitoring and power versions earlier than V100R001C10SPC008 (software package version: V100R001C10SPC700), the software package version uses default Internet Explorer settings. In this case, ensure that **Use SSL 3.0** and **Use TLS 1.0** are selected.
- In monitoring and power version V100R001C10SPC008 (software package version: V100R001C10SPC700) or later, the software package version also requires the selection of **Use TLS 1.1** in addition to the default Internet Explorer settings. In this case, ensure that **Use TLS 1.0** and **Use TLS 1.1** are selected.

Figure 5-10 Settings in the Internet Options dialog box



c. Enter **https://*UPS IP address*** in the address box of Internet Explorer.

d. On the login page, select a display language, enter a user name and password, and click **Login**, as shown in Figure 5-11. The UPS supports Internet Explorer 6, Internet Explorer 8, and Firefox 31.0.

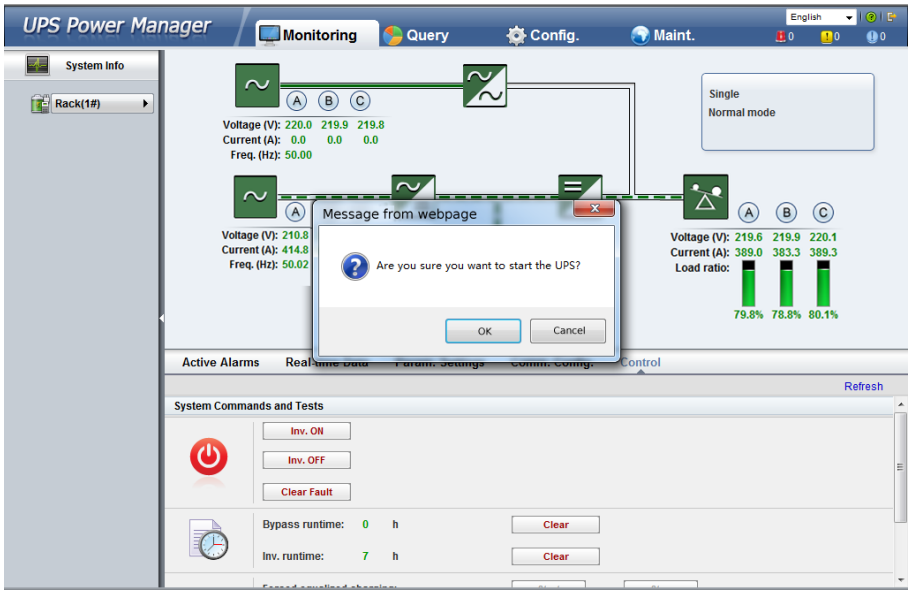
Figure 5-11 Login

NOTE

- Table 4-4 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.

e. On the homepage, choose **Monitoring** > **Control**, and click **Inverter On**. In the displayed dialog box, click **OK** to start the inverter, as shown in Figure 5-12.

Figure 5-12 Starting the inverter



NOTE

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

Step 7 Ensure that the UPS transfers to normal mode. View the system running diagram to check that the **Bypass mode** alarm disappears on the LCD. Check the UPS three-phase output voltage and frequency by viewing the AC Output data on the LCD, as shown in Figure 5-13 and Figure 5-14. Use a multimeter to measure the three-phase output voltage and frequency.

Figure 5-13 Common Functions screen

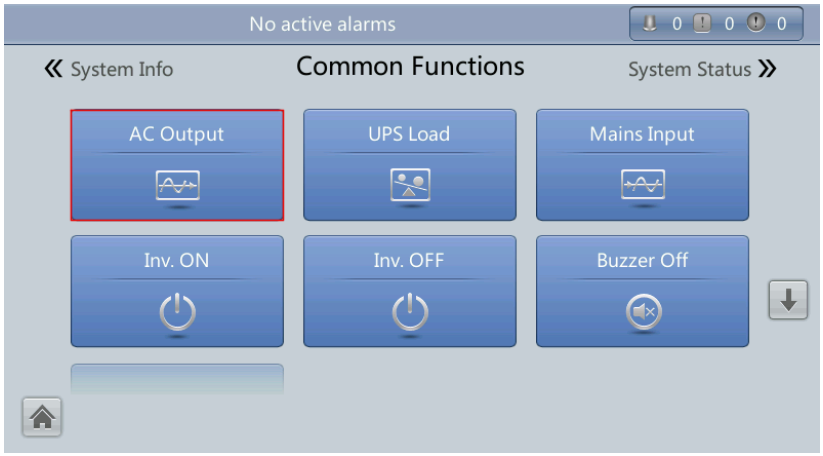
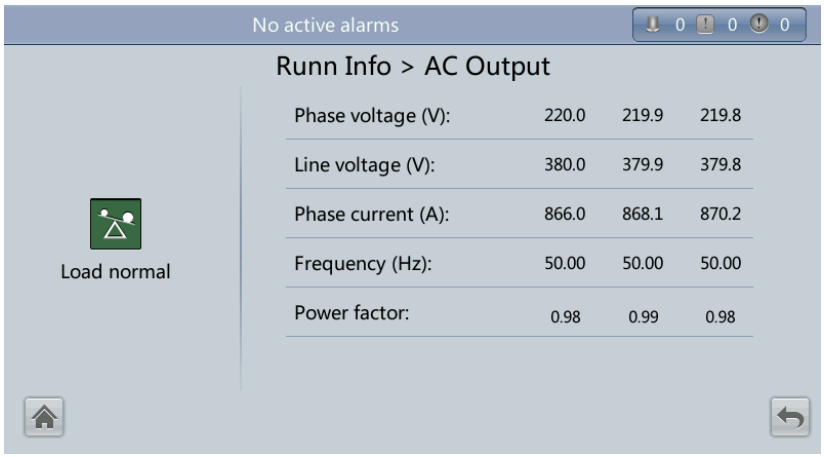


Figure 5-14 AC Output screen



Step 8 Verify that the number of battery strings is consistent with the result calculated based on the **number of cells** displayed on the LCD. Each cell is 2 V. For example, if a battery provides a voltage of 12 V, it is regarded as six cells. If each battery provides a voltage of 2 V, the number of cells is the same as the number of batteries. Verify that the sum of the absolute values of the voltages of the positive and negative battery strings is greater than a specified value (1.9 x number of cells) using a multimeter. If the sum is greater than the specified value, the battery strings are properly connected.

NOTICE

Number of cells indicates the number of 2 V cells connected to the UPS. **Number of cells** affects the charge voltage and discharge time. Incorrect setting will cause a high or low charge voltage, which greatly shortens the battery lifespan. In addition, the UPS may shut down before the discharging is completed, which may result in data backup failure. The Table 5-1 lists examples of setting battery parameters.

Table 5-1 Battery parameter settings

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

Step 9 After checking that the battery strings are properly connected, turn on the battery switch (if there are multiple battery strings, turn on the switch for each battery string, and then turn on the general switch between the battery strings and the UPS).

NOTE
After you turn on the battery switch, the **No battery** alarm disappears on the MDU.

Step 10 Close the UPS output circuit breaker on the output PDC, or turn on the external output distribution switch to supply power to loads.

NOTE
- If the UPS has powered on or is working in bypass mode and you need to transfer the UPS to normal mode, check that no alarm has been generated and perform Step 6.
- If the UPS has powered off, perform all of the preceding steps.

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

NOTE

- Table 4-4 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.

  c. In the displayed dialog box, tap **Yes**to shut down the inverter, as shown in Figure 5-15.

Figure 5-15 Inverter Off screen

NOTE

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

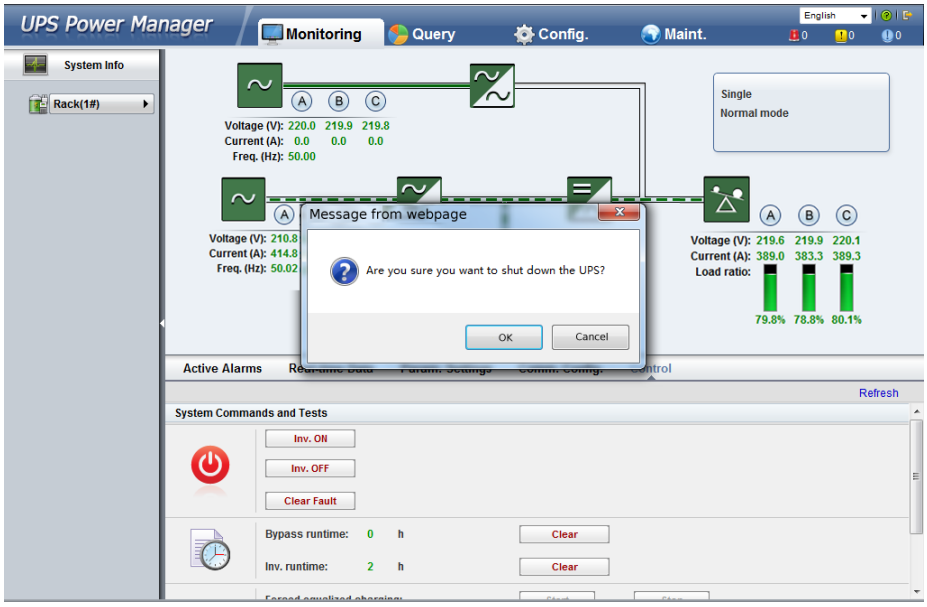
- Method for shutting down the inverter on the WebUI
  a. In a web browser, enter the UPS IP address.
  b. On the login page, select a display language, enter a **user name** and **password**, and click **Login**.

NOTE

- Table 4-4 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.

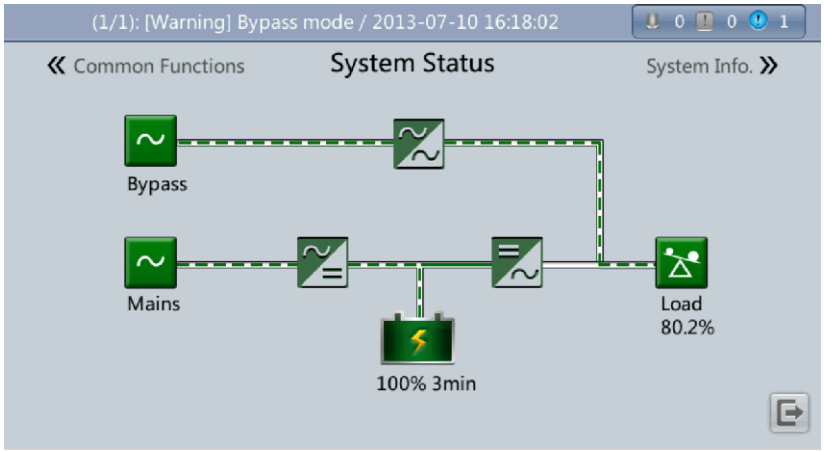
c. On the homepage, choose **Monitoring** > **Control**, and click **Inverter Off**. In the displayed dialog box, click **OK** to shut down the inverter, as shown in Figure 5-16.

Figure 5-16 Shutting down the inverter



Step 2 After the inverter shuts down, if the bypass is normal, the UPS transfers to bypass mode; if the bypass is abnormal, the UPS supplies no power, and the loads shut down, as shown in Figure 5-17.

Figure 5-17 Bypass mode



NOTE

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

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 Turn off the battery circuit breaker. If there are multiple battery strings, turn off the general circuit breaker between battery strings and the UPS and then the circuit breaker for each battery string.

Step 5 Open the mains and bypass input circuit breakers on the input PDC, or turn off the external input power distribution switch.

Step 6 (Optional) Open the input surge protection circuit breaker (if there is) on the input PDC.

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 Ensure that batteries are properly connected. Use a multimeter to check that the absolute values of the positive and negative battery string voltages are both greater than a specified value (1.9 x 6 x Number of batteries).

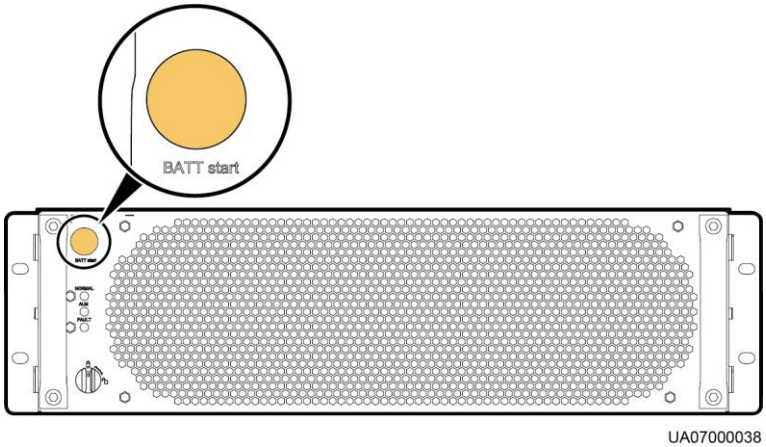
Step 2 Open the mains and bypass input circuit breakers. If the mains and bypass have no input, turn on the battery circuit breaker. If there are multiple battery strings, turn on the circuit breaker for each battery string and then the general circuit breaker between battery strings and the UPS.

Step 3 Use a multimeter to check that the absolute values of the positive and negative battery string voltages at the UPS battery input terminals are both greater than a specified value (1.9 x 6 x Number of batteries).

Step 4 Press the **Batt. start** button on the bypass module, as shown in Figure 5-18.

The UPS enters battery mode. The LCD displays the Huawei logo and an initialization progress bar.

Figure 5-18 Battery startup button



Step 5 After LCD initialization, start the inverter by following Step 3, Step 4, and Step 6 in section 5.1 Powering On and Starting the UPS.

NOTE
If no input is available, perform battery cold startup.

----End

5.4 Transferring to Bypass Mode

NOTICE
Before you shut down the inverter, ensure that the bypass is normal. If the bypass is abnormal, after you shut down the inverter, the UPS supplies no power, and the loads shut down.

Perform Step 1 in section 5.2 Shutting Down and Powering Off the UPS to shut down the inverter over the LCD or WebUI. After you shut down the inverter, the UPS transfers to bypass mode.

NOTE
If you shut down the inverter 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

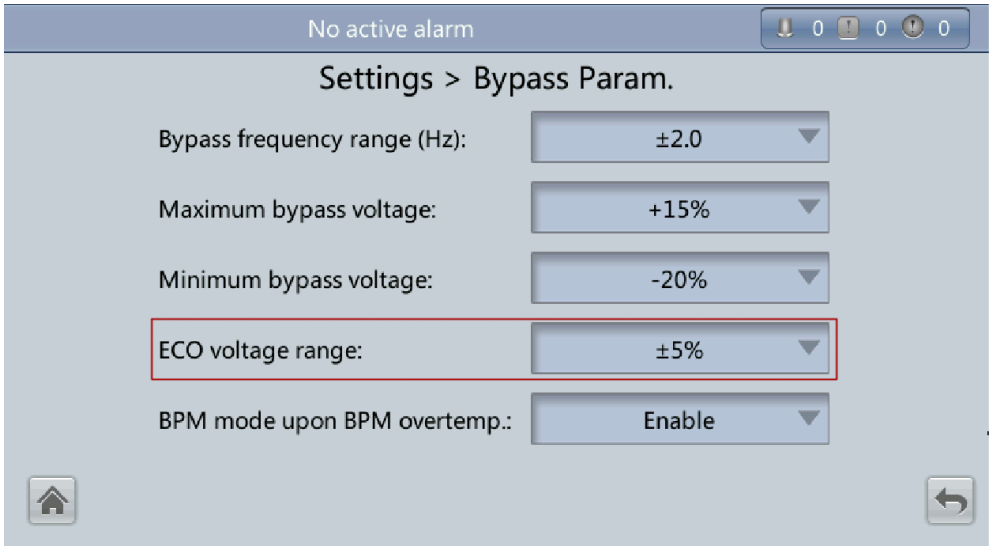
- The UPS is set to non-ECO mode by default. Set the UPS to ECO mode when energy saving is required.
- When the UPS works in ECO mode, the bypass module takes precedence over the power module in supplying power to loads. When the bypass module is disconnected, the UPS switches to the power module. The 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.

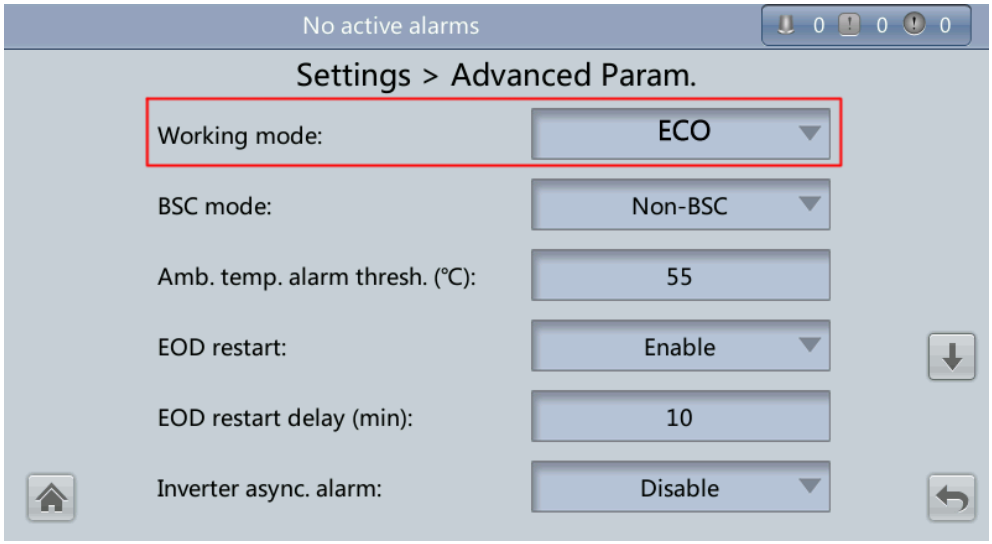
Step 2 Select a value (**±5%**, **±6%**, **±7%**, **±8%**, **±9%**, or **±10%**) from the **ECO voltage range** drop-down list box, as shown in Figure 5-19.

Figure 5-19 Setting ECO voltage range



Step 3 Set **Working mode** to **ECO**, as shown in Figure 5-20. Information indicating that the UPS works in ECO mode is displayed on the LCD.

Figure 5-20 Setting ECO mode

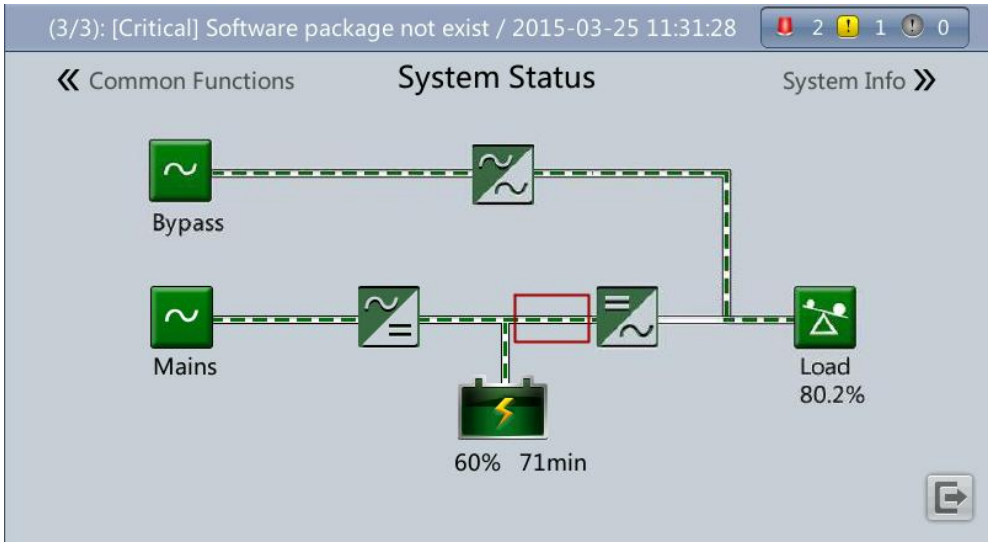


Step 4 Manually start the inverter.

NOTICE

After the inverter starts, the UPS still works in bypass mode and the inverter is standby. Figure 5-21 shows the power flow displayed on the **System Status** screen. If the bypass is abnormal, the inverter supplies power immediately. If the inverter is not started, the UPS may be disconnected.

Figure 5-21 System Status screen



----End

5.6 Testing Batteries

5.6.1 Forced Equalized Charge Test

Context

NOTICE

Before a forced equalized charge test, ensure that:

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

Procedure

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

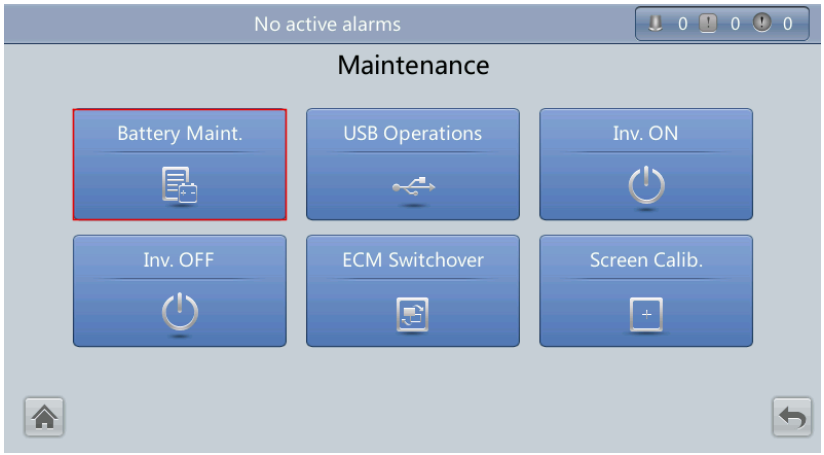
Step 2 (Optional) If you have not logged in, enter a user name and a password, and then tap .

NOTE

- Table 4-4 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.

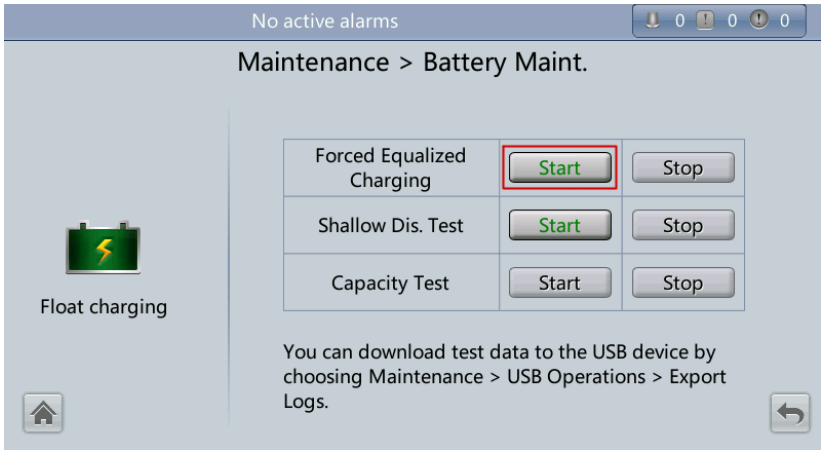
Step 3 On the **Maintenance** screen, tap **Battery Maint.**, as shown in Figure 5-22.

Figure 5-22 Maintenance screen



Step 4 Tap **Start** for **Forced Equalized Charging** to start a forcible equalized charging test, as shown in Figure 5-23.

Figure 5-23 Starting a forced equalized charge test



NOTE

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

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

You tap **Stop** on the right of **Forced Equalized Charging**.

----End

5.6.2 Shallow Discharge Test

Context

NOTICE

Before a shallow discharge test, ensure that:

- The UPS works in normal mode at a stable load rate with a change rate 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 (Optional) If you have not logged in, enter a user name and a password, and then tap .

NOTE

- Table 4-4 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.

Step 3 On the **Maintenance** screen, tap **Battery Maint.**, as shown in Figure 5-22.

Step 4 Tap **Start** on the right of **Shallow Dis. Test** to start a shallow discharge test, as shown in Figure 5-24.

Figure 5-24 Starting a shallow discharge test

NOTE

When the battery test is complete, the test data is used as common test data. You need to record the data obtained from the latest five tests.

The shallow discharge test 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 alarm threshold (calculated in real time).
- The load change rate exceeds 10%.
- An alarm is generated.

You tap **Stop** on the right of **Shallow Dis. Test**.

----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%; the UPS works in normal mode at a stable load rate with a change rate 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 (Optional) If you have not logged in, enter a user name and a password, and then tap .

NOTE

- Table 4-4 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.

Step 3 On the **Maintenance** screen, tap **Battery Maint.**, as shown in Figure 5-22.

Step 4 Tap **Start** on the right of **Capacity Test** to start a capacity test, as shown in Figure 5-25.

Figure 5-25 Starting a capacity test

NOTE

The capacity test stops in any of the following cases:

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

You tap **Stop** on the right of **Capacity Test**.

When the EOD voltage reaches EOD + 0.01 V, the test is complete. The test data is used as capacity test data. You need to select the test data obtained from a capacity test that has the maximum discharge capacity as the test data for the current month. Store the test data that you have obtained from the latest 36 tests.

----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 (Optional) If you have not logged in, enter a user name and a password, and then tap .

NOTE

- Table 4-4 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.

Step 4 Choose **USB Operations** > **Download Logs**, and select a log download path, as shown in Figure 5-26.

Figure 5-26 Downloading logs

Step 5 Tap **Next**. In the displayed dialog box, tap **Yes** to download data, as shown in Figure 5-27.

Figure 5-27 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 **Cap. test logs** or **Common test logs** from the **Log** drop-down list box, then click **Export** to export logs, as shown in Figure 5-28 and Figure 5-29.

Figure 5-28 Capacity test logs

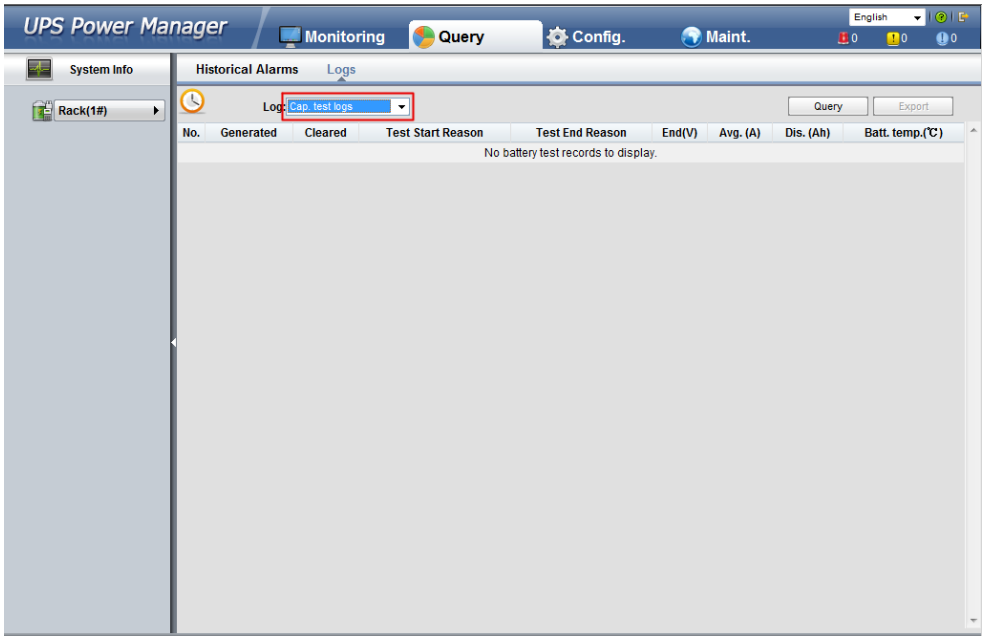
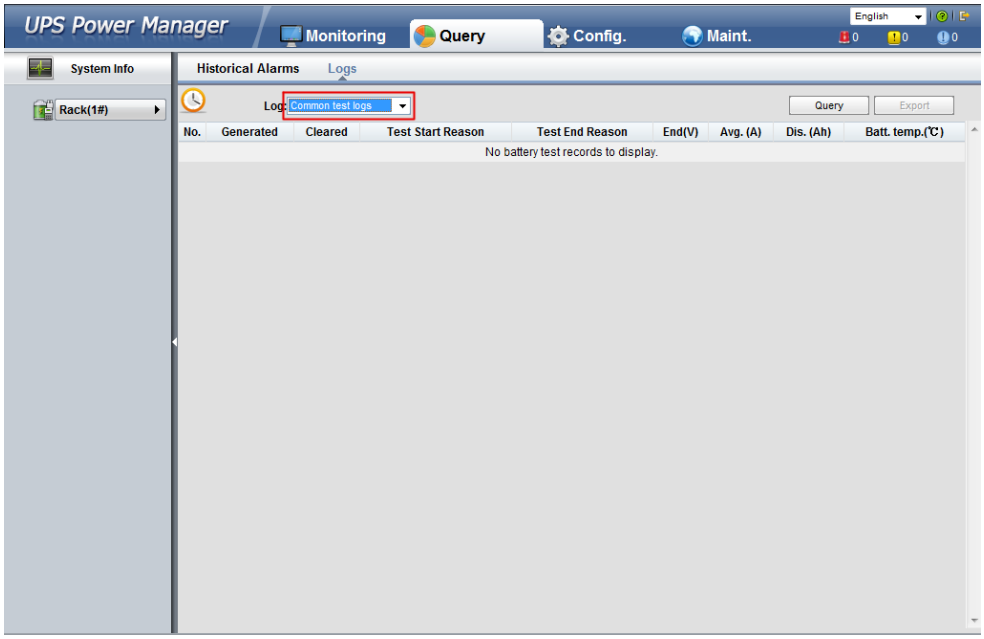


Figure 5-29 Common test logs



----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 by following the steps in section 5.4 Transferring to Bypass Mode.

Step 2 Turn on the maintenance bypass switch.

If the maintenance bypass switch is locked, unlock it first. Figure 5-30 shows a locked maintenance bypass switch. Turn on the switch to transfer the UPS to maintenance bypass mode.

- For the UPS5000-E-120 kVA and UPS5000-E-200 kVA, 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 5-31.
- For the UPS5000-E-320 kVA, the maintenance bypass switch is OFF by default and the handle points to the ground. Turn on the switch by turning the handle clockwise 90 degrees until it points left horizontally, as shown in Figure 5-32 (for the UPS5000-E-320K-F320) and Figure 5-33 (for the UPS5000-E-320K-F320T).

The **Maint. breaker closed** alarm is displayed in the alarm list, as shown in Figure 5-34. The UPS transfers to maintenance bypass mode.

Figure 5-30 Locked maintenance bypass switch

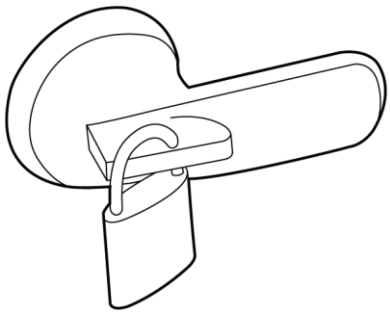


Figure 5-31 Turning on the maintenance bypass switch (UPS5000-E-200K-F200)

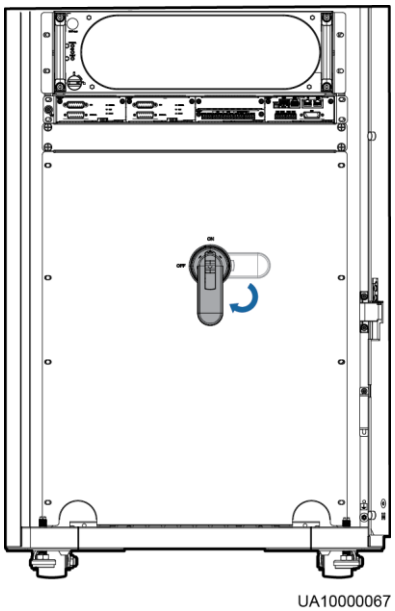


Figure 5-32 Turning on the maintenance bypass switch (UPS5000-E-320K-F320)

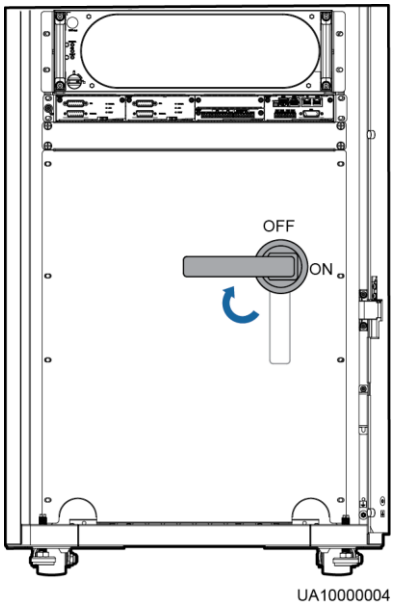
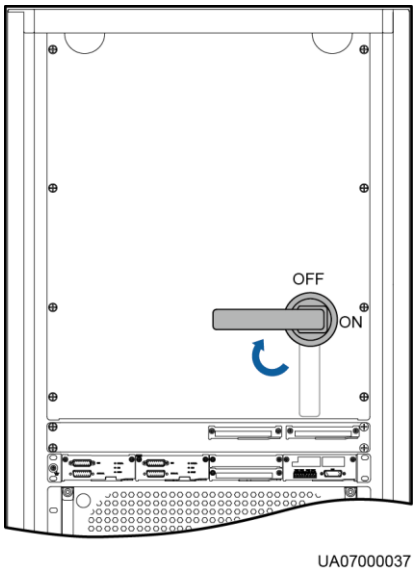


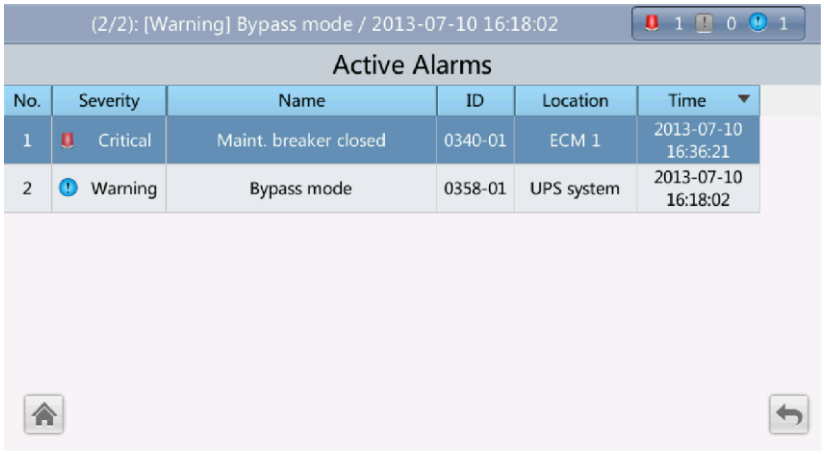
Figure 5-33 Turning on the maintenance bypass switch (UPS5000-E-320K-F320T)



NOTE

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

Figure 5-34 Maint. breaker closed alarm



NOTE

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

----End

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.

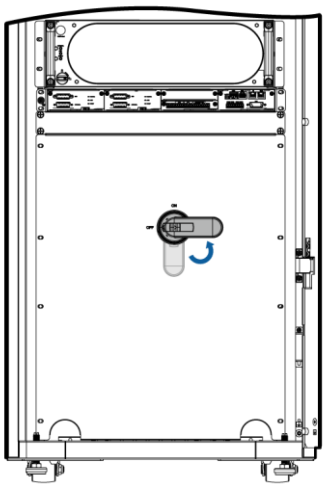
Procedure

Step 1 Turn off the maintenance bypass switch.

- For the UPS5000-E-120 kVA/200 kVA, 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 5-35.
- For the UPS5000-E-320 kVA, the maintenance bypass switch points left horizontally when it is turned on. To turn off the switch, face the cabinet and turn the handle counterclockwise 90 degrees until it points to the ground.

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 5-35 Turning off the maintenance bypass switch on the UPS5000-E-200 kVA



NOTE
This figure applies to the UPS5000-E-200 kVA.

Step 2 Start the inverter by following Step 5 to Step 6 in section 5.1 Powering On and Starting the UPS.

----End

5.9 Performing EPO

NOTICE

- After you turn on the EPO switch, the UPS supplies no power, and the loads shut down.
- In maintenance bypass mode, the UPS still supplies power after you turn on the EPO switch.

Press the EPO switch connected to the dry contact card on the UPS or remove the 4-pin terminal from the EPO port on the dry contact card, as shown in Figure 5-36. The UPS transfers to the EPO state. An alarm is generated on the MDU and WebUI, as shown in Figure 5-37 and Figure 5-38.

Figure 5-36 EPO ports

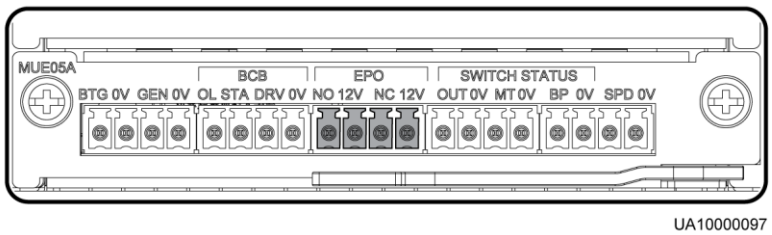


Figure 5-37 EPO alarm on the LCD

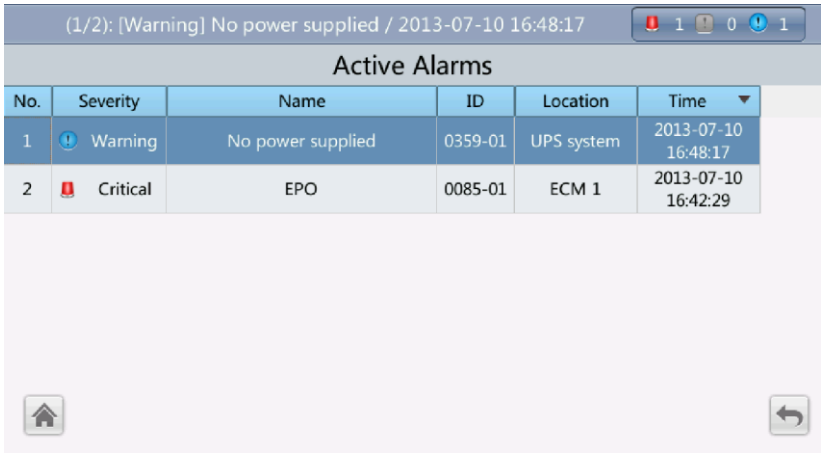
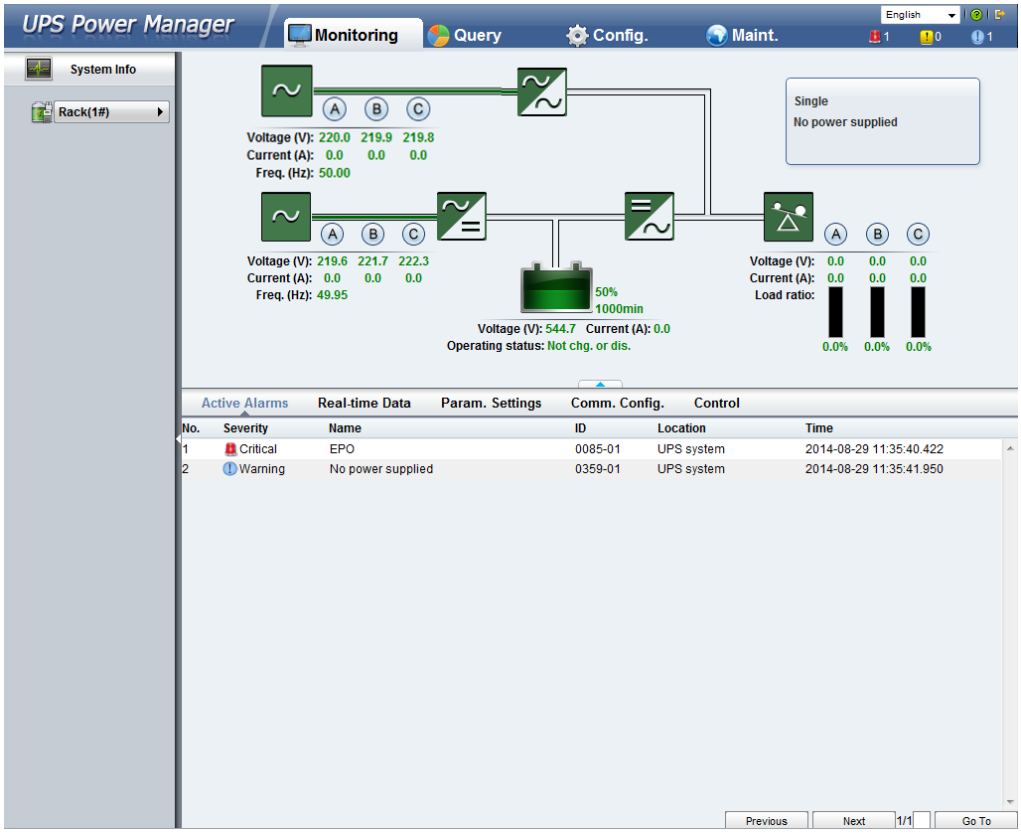


Figure 5-38 EPO alarm on the WebUI



NOTE

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

5.10 Clearing the EPO State

Procedure

Step 1 Turn off the EPO switch to clear the EPO state. Ensure that the EPO switch connected to the dry contact card is not in the EPO state.

Step 2 Clear the EPO alarm.

- LCD

  On the main screen, tap **System Info.** and . On the **Alarms** screen, tap **Clear Faults**.

  If you have not logged in, enter a user name and password, and tap on the login screen displayed. In the displayed dialog box, tap **Yes** to clear the EPO alarm, as shown in Figure 5-39 and Figure 5-40.

Figure 5-39 Alarms screen

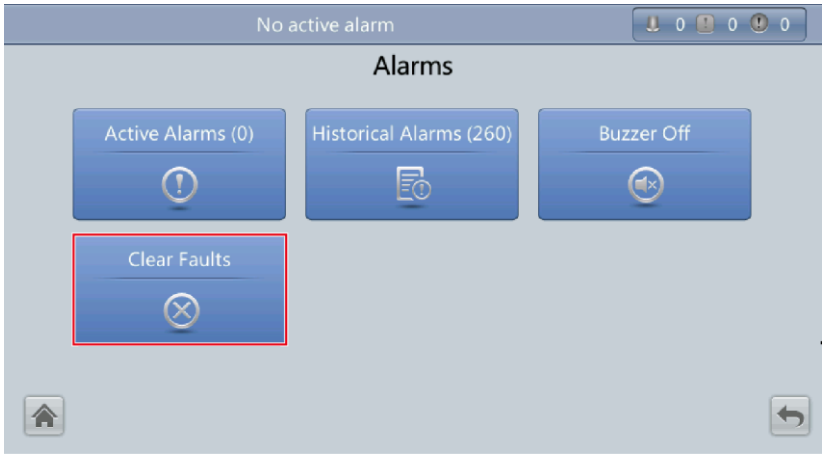
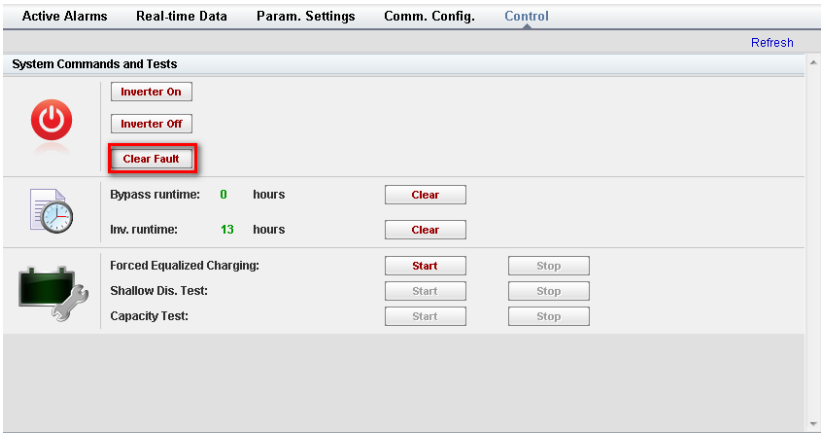


Figure 5-40 Clearing the alarm

- WebUI

  In a web browser, enter the UPS IP address. On the login page, select a display language, enter a user name and password, and click **Login**. On the homepage, choose **Monitoring** > **Control**, and click **Clear Fault** to clear the EPO alarm, as shown in Figure 5-41.

Figure 5-41 Clearing the alarm

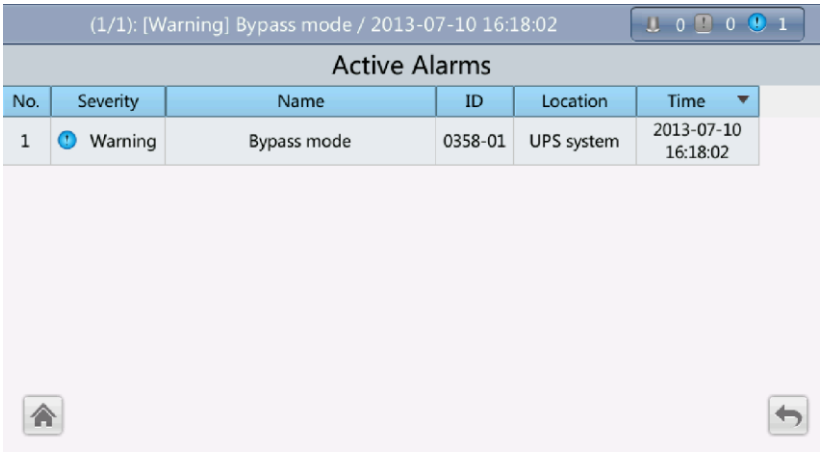


Step 3 View active alarms and ensure that the EPO alarm is cleared. If the input of the system bypass is normal, the UPS transfers to the bypass mode.

- LCD

  On the main screen, tap **System Info.** and . On the **Alarms** screen, tap **Active Alarms** to check that the EPO alarm disappears from the alarm list, as shown in Figure 5-42.

Figure 5-42 Active Alarms screen

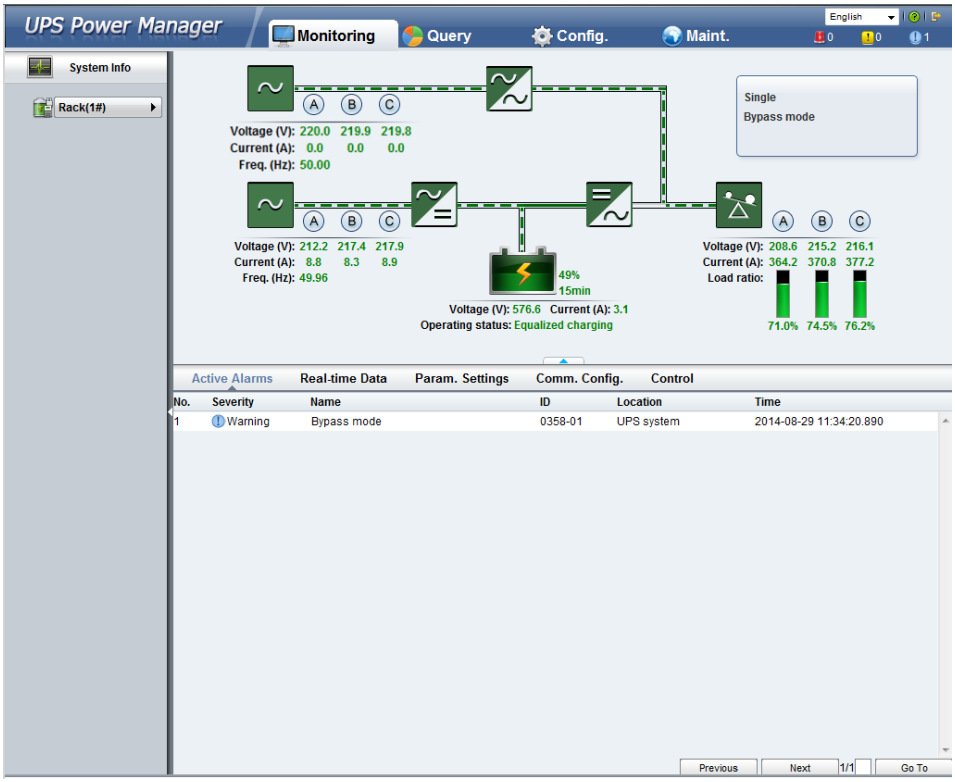


- WebUI

  In a web browser, enter the UPS IP address. On the login page, select a display language, enter a user name and password, and click **Login**. On the homepage, choose **Monitoring** > **Active Alarms** to check that the EPO alarm disappears from the alarm list.

  If the bypass is normal, the UPS transfers to bypass mode, as shown in Figure 5-43.

Figure 5-43 Active Alarms page



Step 4 Start the inverter by following Step 3 to Step 6 in section 5.1 Powering On and Starting the UPS.

----End

5.11 Setting Hibernation Mode

Context

When the load power is small and stable, the inverters in some power modules shut down so that these power modules 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.

NOTICE

- Before you start 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 6.67 kVA for a 40 kVA module), the UPS may enter and exit from hibernation mode repeatedly.
- Before you start hibernation mode, check the number of redundant power modules and the number of redundant UPSs. If the number is insufficient, the UPS may not enter hibernation mode.

You can set hibernation mode on the LCD and WebUI.

5.11.1 LCD

Procedure

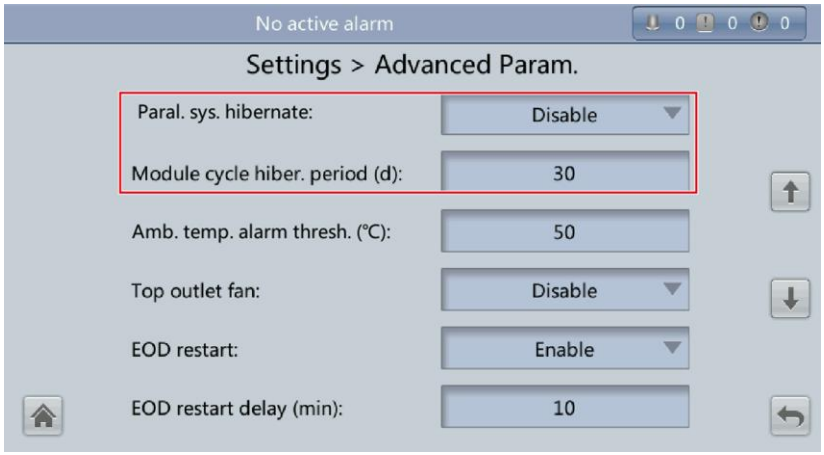
Step 1 On the main screen, tap **System Info.** and . The **Settings** screen is displayed.

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 5-44.

Figure 5-44 Hibernation parameters on the LCD



Step 3 On the LCD, set **Para. sys. hibernate** to **Enabled**. A confirmation message and security warning are displayed, as shown in Figure 5-45 and Figure 5-46.

Figure 5-45 Confirmation message

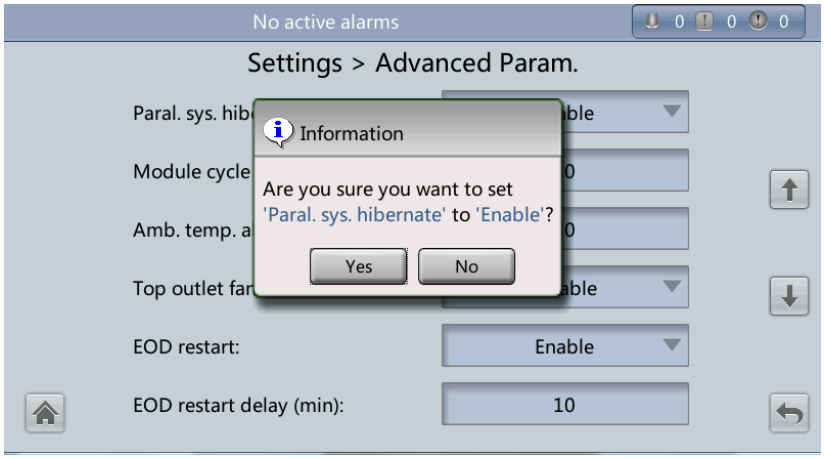
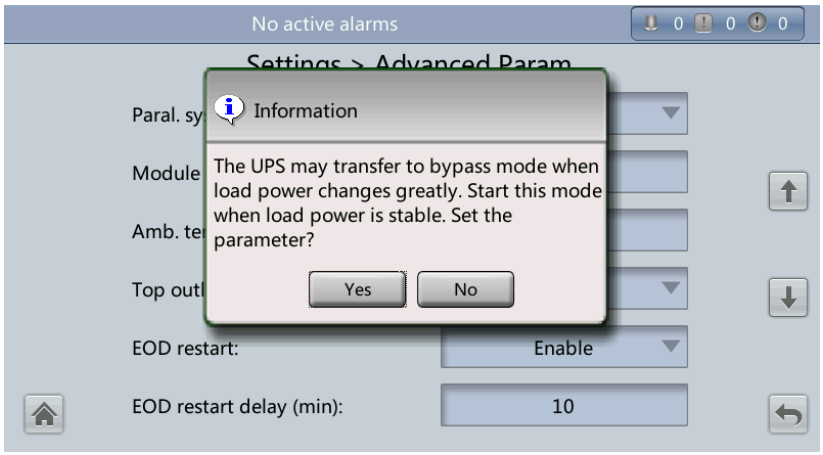


Figure 5-46 Security warning on the LCD



Step 4 Check that the load power is stable (overload due to transient surge may cause the UPS to transfer to bypass mode), and click **Yes**.

Step 5 Set the **Module cycle hiber. period (days)** parameter to an integer ranging from **0** to **100**. The default value is **30**. If the value is **0**, the hibernation period is 2 minutes. That is, the module starts automatically after 2-minute hibernation.

----End

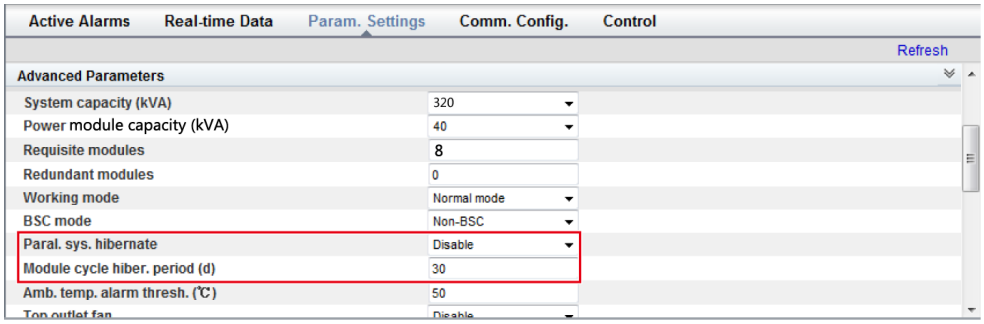
5.11.2 WebUI

Procedure

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

Step 2 Choose **Monitoring** > **Param. Settings** > **Advanced Param.**, as shown in Figure 5-47.

Figure 5-47 Hibernation parameters on the WebUI



Step 3 On the WebUI, set **Para. sys. hibernate** to **Enable**, and click **Submit**. A security waning is displayed, and click **OK**.

Step 4 Set the **Module cycle hiber. period (days)** parameter to an integer ranging from **0** to **100**. The default value is **30**. If the value is **0**, the hibernation period is 2 minutes. That is, the module starts automatically after 2-minute hibernation.

NOTE

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

----End

5.12 Setting Intelligent Mode

Context

NOTICE

Before you connect the D.G. to a UPS system, check that the system is a single UPS system and that the system is working in non-inverter mode and has connected to batteries.

When the UPS is working, the D.G. starts if a main outage occurs and the battery voltage reaches the specified threshold. To set intelligent mode on the LCD or WebUI, perform the following steps:

5.12.1 LCD

Procedure

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

NOTE

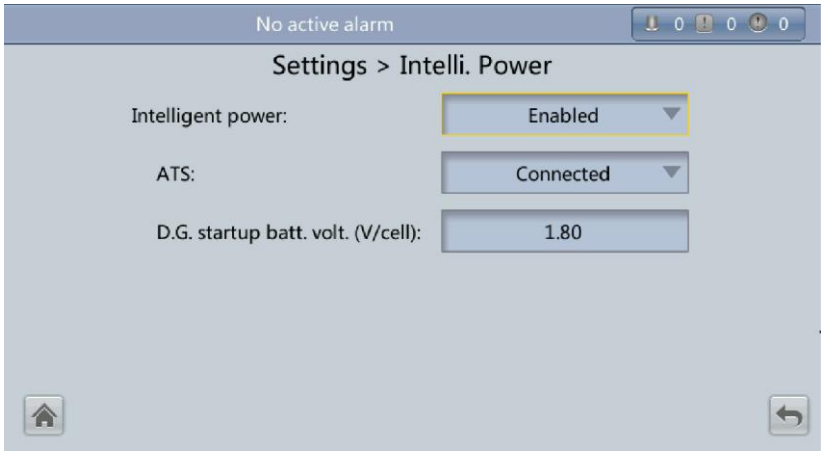
If you have not logged in, enter a user name and password, and tap on the login screen displayed

Step 2 On the **Settings** screen, tap **Intelli. Power**. The **Intelli. Power** screen is displayed, as shown in Figure 5-48.

Figure 5-48 Intelli. Power screen

Step 3 Set **Intelligent power** to **Enabled**. In the warning dialog box, tap **Yes**. The intelligent power parameters are displayed, as shown in Figure 5-49.

Figure 5-49 Intelligent power parameters on the LCD



- **Intelligent Power Supply** parameter

  The value can be **Enabled** or **Disabled**. The intelligent power supply function is available only if the value is **Enabled**. The default value is **Disabled**.

- **ATS** parameter

  The value can be **Connected** or **Not connected**. When the value is **Connected**, the UPS works in the ATS scenario; when the value is **Not connected**, the UPS works in the reuse scenario. The default value is **Connected**. This parameter is available only after you set **Intelligent Power Supply** to **Enabled**.

- **D.G. startup batt. volt. (V/cell)** parameter

  The value ranges from **1.80** to **2.00**. The default value is **1.80**. This parameter is available only after you set **Intelligent Power Supply** to **Enabled**.

NOTE

Set the preceding three parameters when you connect the D.G. to the UPS.

Step 4 After you set **Intelligent Power** supply to **Enabled**, the system changes some parameter values associated with intelligent power supply. Figure 5-50 to Figure 5-55 show the changed parameter values on the LCD.

Figure 5-50 Associated intelligent power supply parameters on the LCD (1)

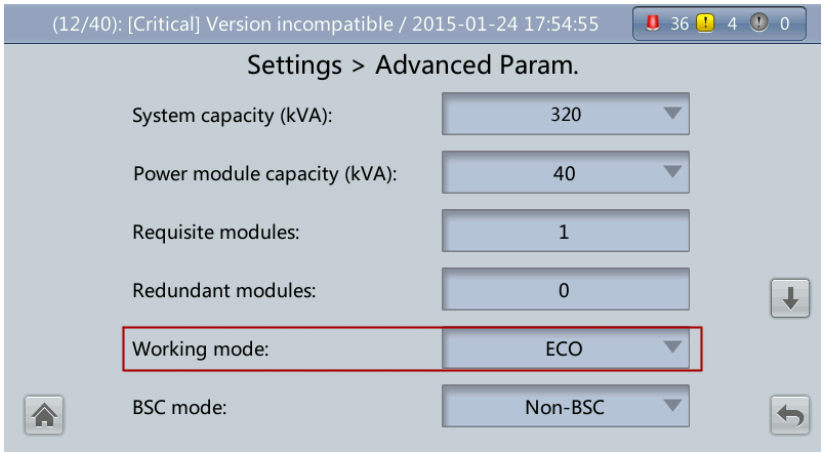


Figure 5-51 Associated intelligent power supply parameters on the LCD (2)

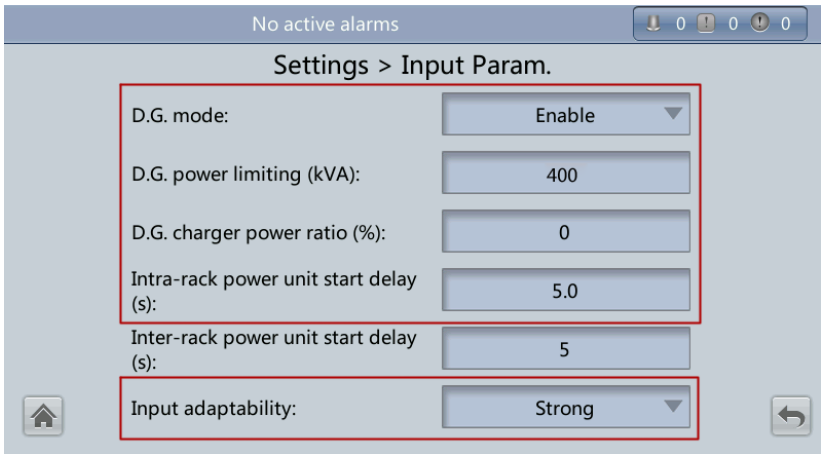


Figure 5-52 Associated intelligent power supply parameters on the LCD (3)

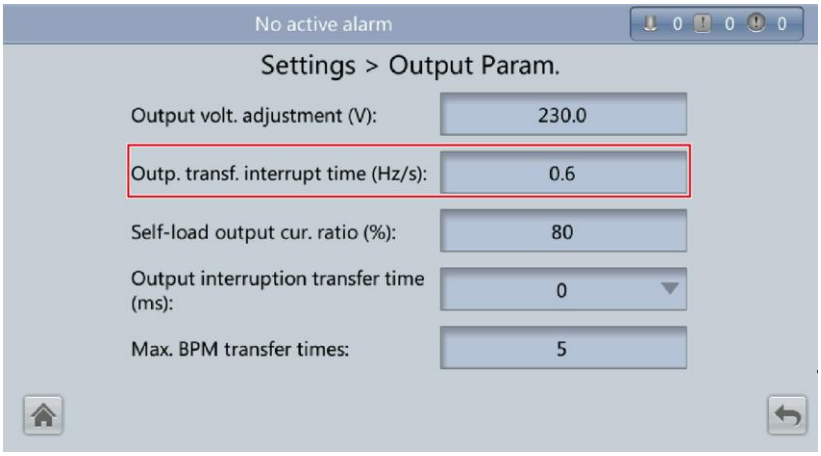


Figure 5-53 Associated intelligent power supply parameters on the LCD (4)

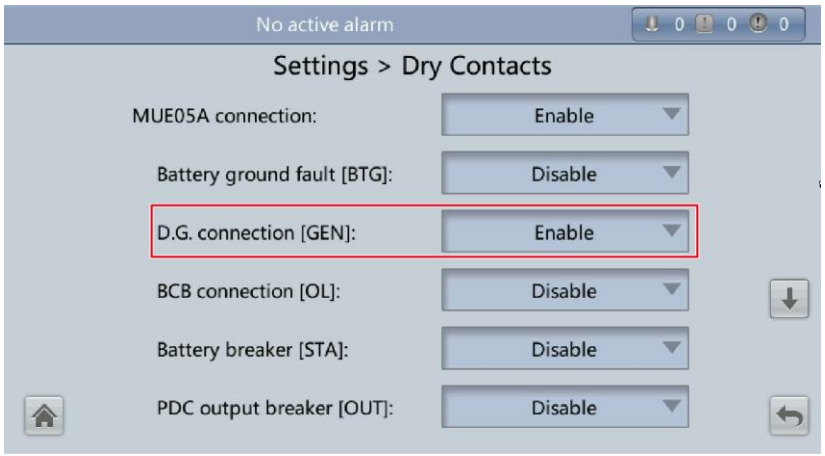


Figure 5-54 Associated intelligent power supply parameters on the LCD (5)

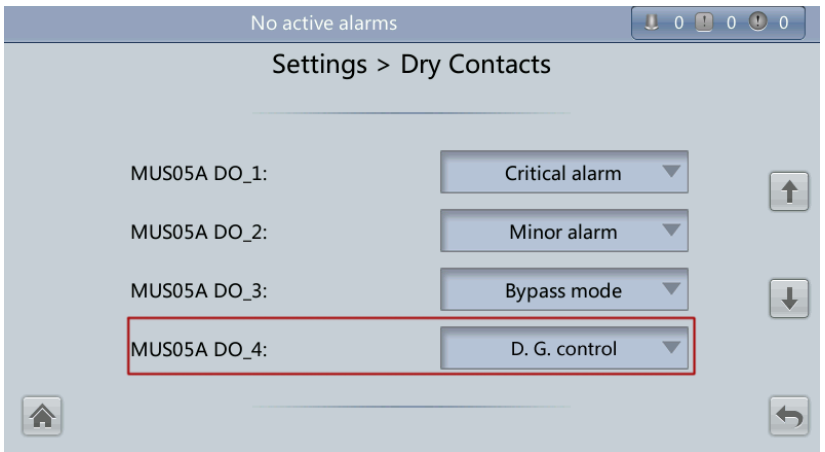


Figure 5-55 Associated intelligent power supply parameters on the LCD (6)

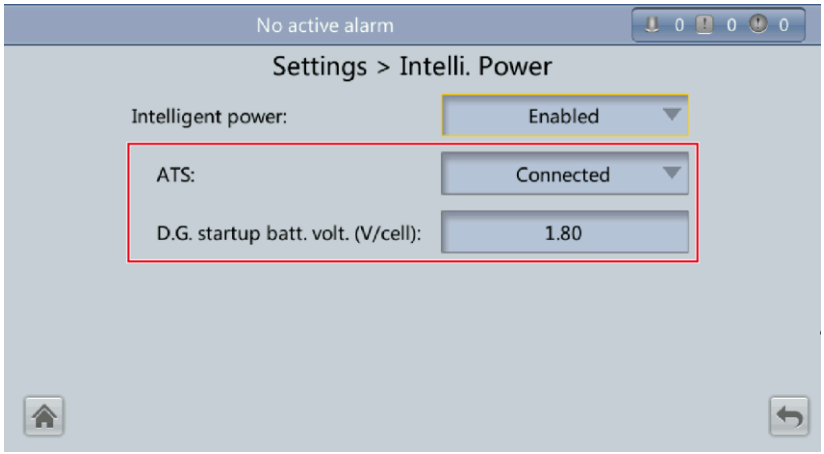


Table 5-2 lists the associated intelligent power supply parameters.

Table 5-2 Associated intelligent power supply parameters

Parameter	Value	Remarks
Working mode	ECO	N/A
D.G. mode	Enabled	You cannot change the value.
Intra-rack power unit start delay (s)	5	N/A
Input adaptability	Strong	N/A
Output freq. track rate (Hz/s)	0.6	N/A
D.G. connection [GEN]	Enabled	N/A
MUS05A DO_4	D.G. control	N/A
ATS	Connected	N/A
D.G. startup batt. volt. (V/cell)	1.80	N/A
D.G. power limiting (kVA)	N/A	Indicates the actual D.G. power. Set it as required.
D.G. charger power ratio	N/A	Indicates the percentage of the battery power provided by the charger. Set it as required.

NOTE

- In battery mode (not battery test state), when the battery voltage reaches **D.G. startup batt. volt.** or **Low battery voltage**, the UPS triggers D.G. startup signals.
- In normal mode or bypass mode, if the mains is normal (the mains supplies power for 1 minute and the D.G. runs for 15 minutes), the UPS triggers D.G. shutdown signals.

- If the battery voltage is greater than **D.G. startup batt. volt.**, the UPS exits intelligent mode and triggers D.G. shutdown signals. If the battery voltage is less than **D.G. startup batt. volt.**, a dialog box is displayed, indicating potential risks. Tap **OK** to exit intelligent mode.
- To disable the D.G. from the UPS system, set **Intelligent Power Supply** to **Disabled**. The system changes **Working mode** to **Normal mode**, **Intra-rack power unit start delay (s)** to 5, **Output freq. track rate (Hz/s)** to **0.6**, **Input adaptability** to **Non-strong input**, **D.G. mode** to **Disabled**, and **D.G. connection [GEN]** to **Disabled**. You can change the values.

----End

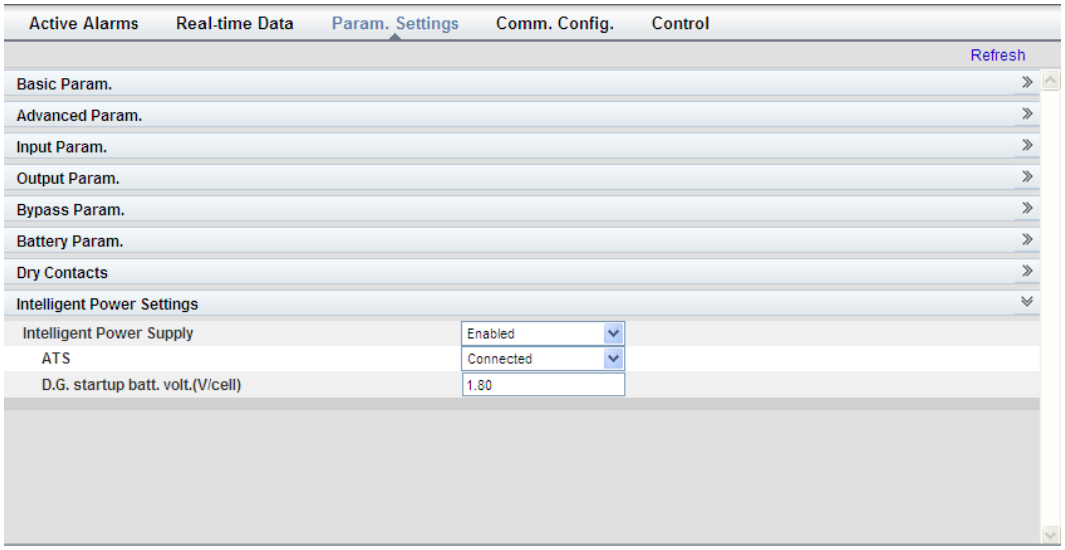
5.12.2 WebUI

Procedure

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

Step 2 Choose **Monitoring** > **Param. Settings**. Under **Intelligent Power Settings**, set **Intelligent Power Supply** to **Enabled**, as shown in Figure 5-56.

Figure 5-56 Intelligent power parameters on the WebUI



- **Intelligent Power Supply** parameter

  The value can be **Enabled** or **Disabled**. The default value is **Disabled**.
- **ATS** parameter

  The value can be **Connected** or **Not connected**. When the value is **Connected**, the UPS works in the ATS scenario; when the value is **Not connected**, the UPS works in the reuse scenario. The default value is **Connected**. This parameter is available only after you set **Intelligent Power Supply** to **Enabled**.
- **D.G. startup batt. volt. (V/cell)** parameter

  The value ranges from **1.80** to **2.00**. The default value is **1.80**. This parameter is available only after you set **Intelligent Power Supply** to **Enabled**.

NOTE

Set the preceding three parameters when you connect the D.G. to the UPS.

Step 3 After you set **Intelligent Power Supply** to **Enabled**, the system changes some parameter values associated with intelligent power supply. Figure 5-57 to Figure 5-62 show the changed parameter values on the WebUI.

Figure 5-57 Associated intelligent power supply parameters on the WebUI (1)

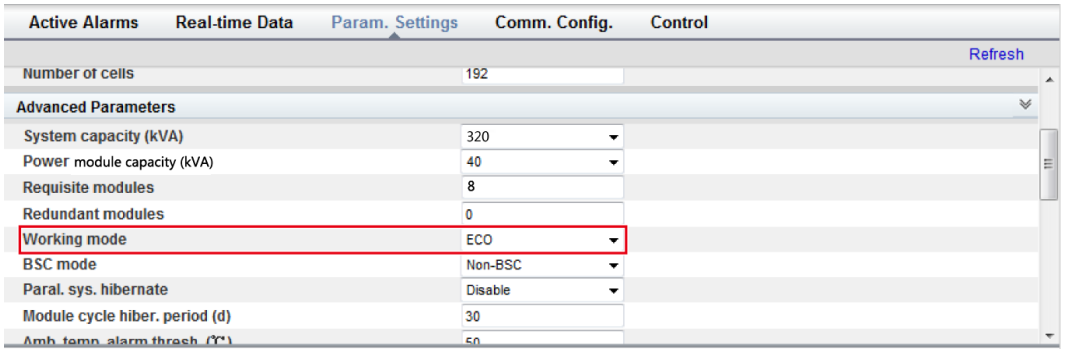


Figure 5-58 Associated intelligent power supply parameters on the WebUI (2)

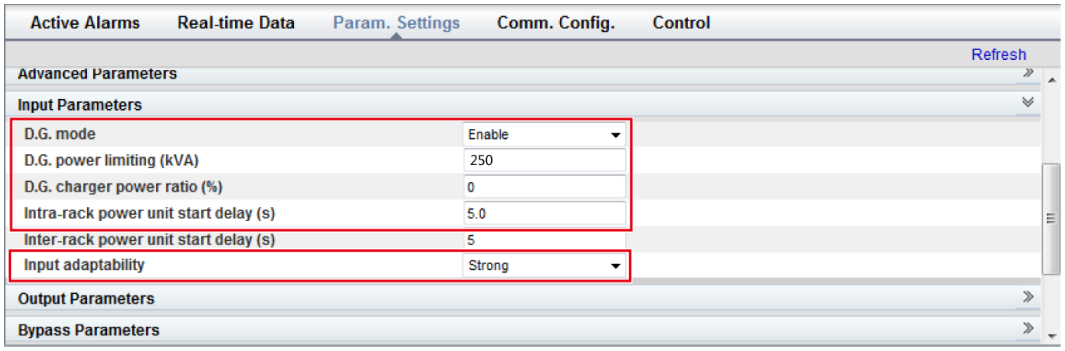


Figure 5-59 Associated intelligent power supply parameters on the WebUI (3)

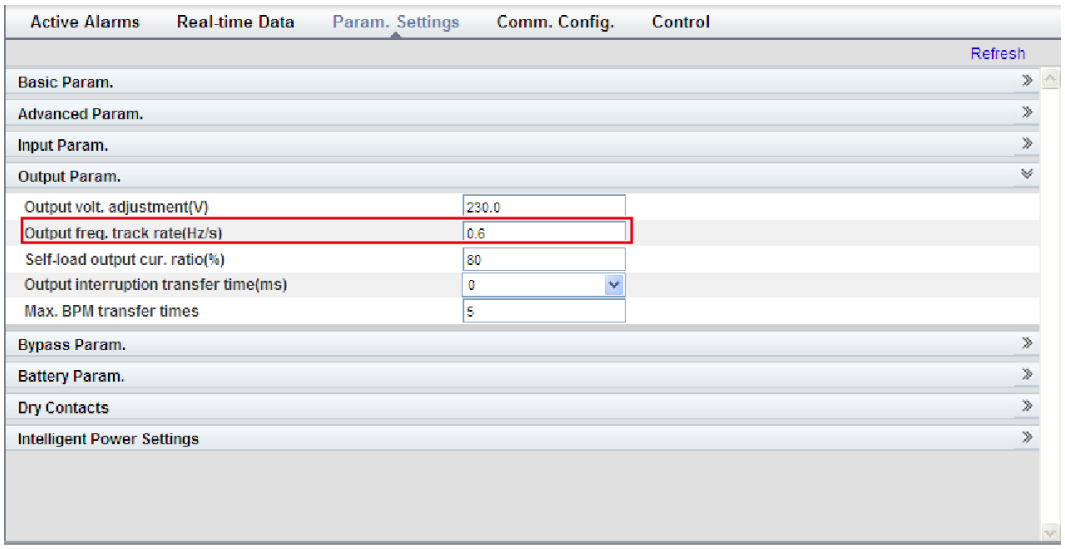


Figure 5-60 Associated intelligent power supply parameters on the WebUI (4)

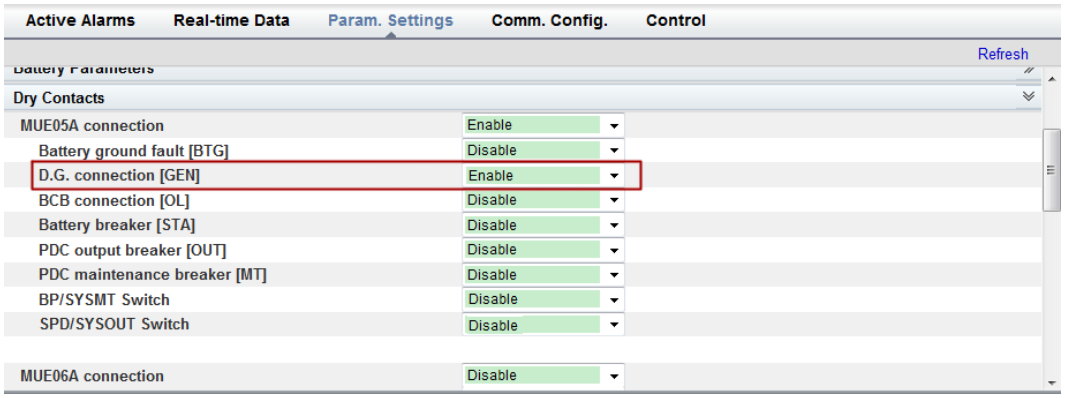


Figure 5-61 Associated intelligent power supply parameters on the WebUI (5)

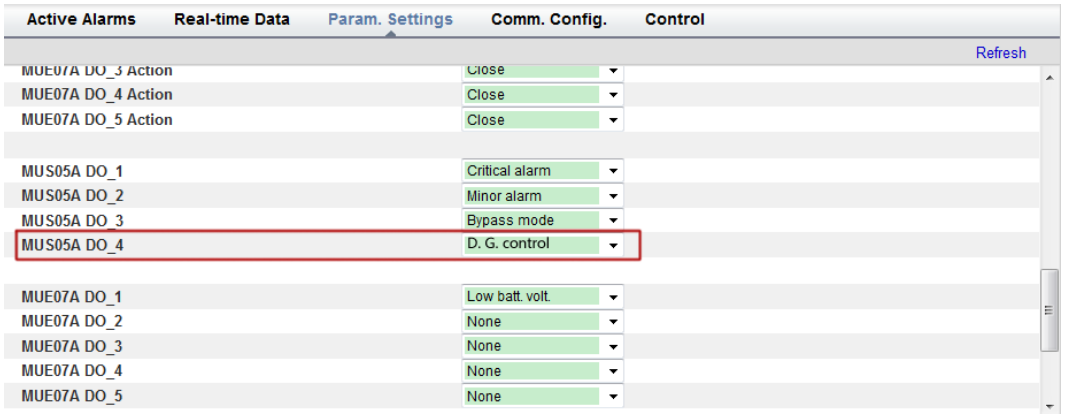


Figure 5-62 Associated intelligent power supply parameters on the WebUI (6)

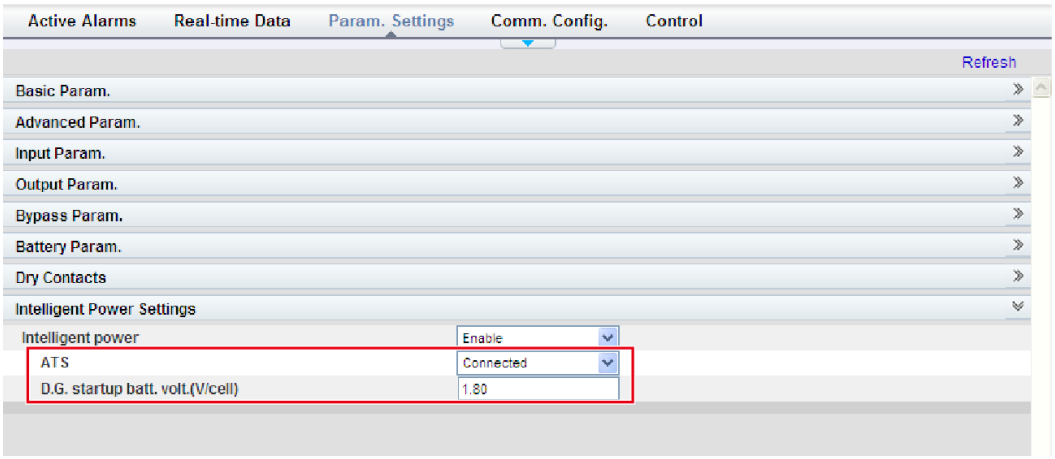


Table 5-3 lists the associated intelligent power supply parameters.

Table 5-3 Associated intelligent power supply parameters

Parameter	Value	Remarks
Working mode	ECO	N/A
D.G. mode	Enabled	You cannot change the value.
Intra-rack power unit start delay (s)	5	N/A
Input adaptability	Strong	N/A
Output freq. track rate (Hz/s)	0.6	N/A
D.G. connection [GEN]	Enabled	N/A
MUS05A DO_4	D.G. control	N/A
ATS	Connected	N/A
D.G. startup batt. volt. (V/cell)	1.80	N/A
D.G. power limiting (kVA)	N/A	Indicates the actual D.G. power. Set it as required.
D.G. charger power ratio	N/A	Indicates the percentage of the battery power provided by the charger. Set it as required.

NOTE

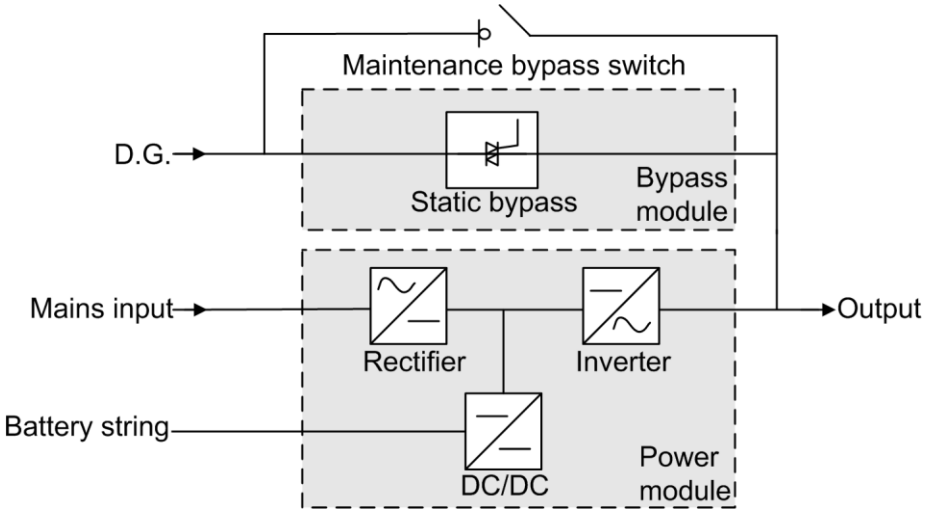
- In battery mode (not battery test state), when the battery voltage reaches **D.G. startup batt. volt.** or **Low battery voltage**, the UPS triggers D.G. startup signals.
- In normal mode or bypass mode, if the mains is normal (the mains supplies power for 1 minute and the D.G. runs for 15 minutes), the UPS triggers D.G. shutdown signals.
- If the battery voltage is greater than **D.G. startup batt. volt.**, the UPS exits intelligent mode and triggers D.G. shutdown signals. If the battery voltage is less than **D.G. startup batt. volt.**, a dialog box is displayed, indicating potential risks. Tap **OK** to exit intelligent mode.
- To disable the D.G. from the UPS system, set **Intelligent Power Supply** to **Disabled**. The system changes **Working mode** to **Normal mode**, **Intra-rack power unit start delay (s)** to 5, **Output freq. track rate (Hz/s)** to **0.6**, **Input adaptability** to **Non-strong input**, **D.G. mode** to **Disabled**, and **D.G. connection [GEN]** to **Disabled**. You can change the values.

----End

5.12.3 Reuse Scenario

In reuse scenarios, the D.G. connects to the UPS over the bypass module. Dry contacts control D.G. startup and shutdown. Figure 5-63 shows the working principles.

Figure 5-63 Reuse scenario

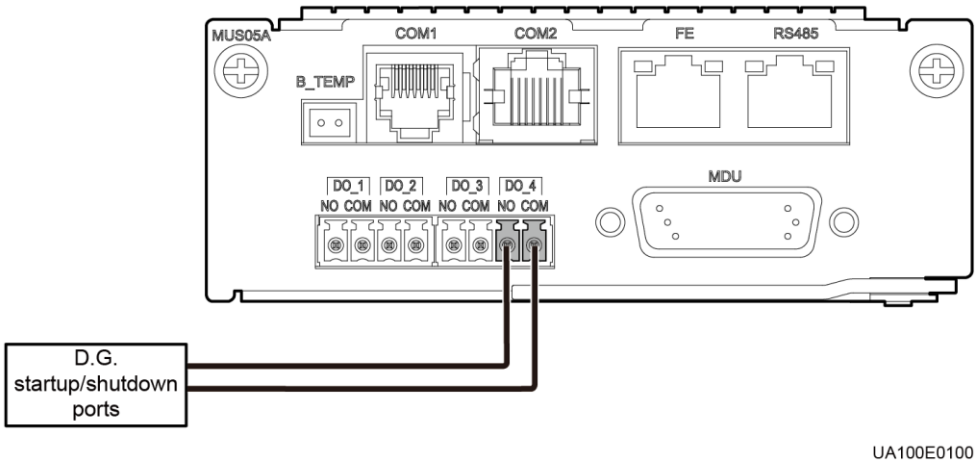


In reused D.G. scenarios, the following parameters need to be set:

- Set **ATS** to **Not connected**.
- **Working mode** is by default set to **ECO** and is unchangeable.

The dry contact port DO_4 of the UPS monitoring port card connects to the startup/shutdown control port of the D.G. The DO_4 port is normally on (NO) initially. When it is on, the D.G. starts. Figure 5-64 shows the signal cable connection between the UPS and the D.G. in reused scenarios.

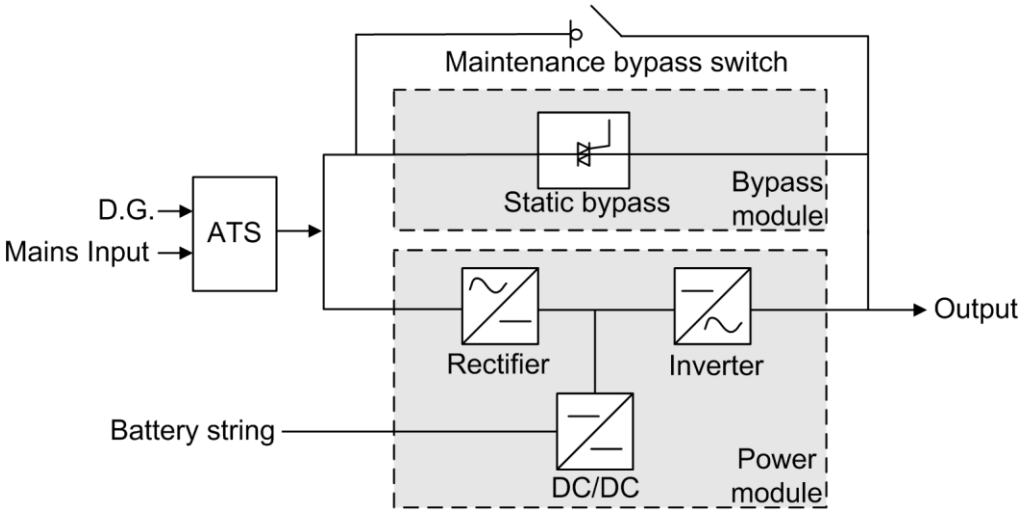
Figure 5-64 Connecting signal cables in the reused scenario



5.12.4 ATS Scenario

The D.G. and mains connect to the UPS over an ATS. The MDU obtains the D.G. startup/shutdown status over the dry contact signals sent from the ATS, and controls D.G. startup/shutdown over dry contacts. Figure 5-65 shows the working principles.

Figure 5-65 ATS scenario

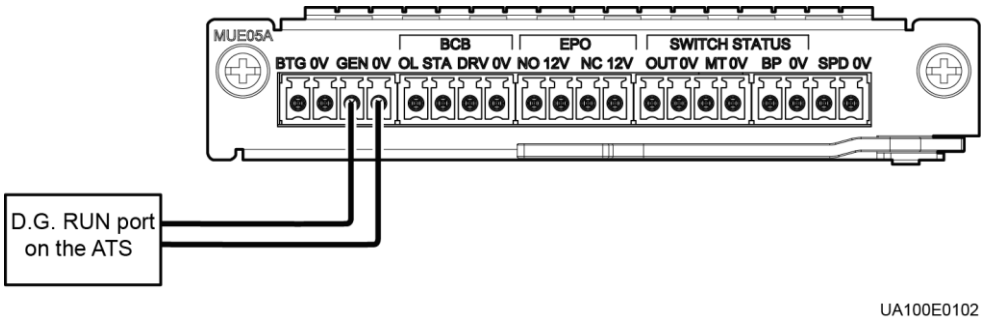


In ATS scenarios, the default parameter settings are used. **Working mode** can be set based on the site requirements.

Connect the DO_4 dry contact port on the UPS monitoring interface card to the startup/shutdown control port on the D.G. The initial status of the DO_4 dry contact is NO. When it is closed, the D.G. starts. Figure 5-64 shows the signal cable connection between the UPS and the D.G.

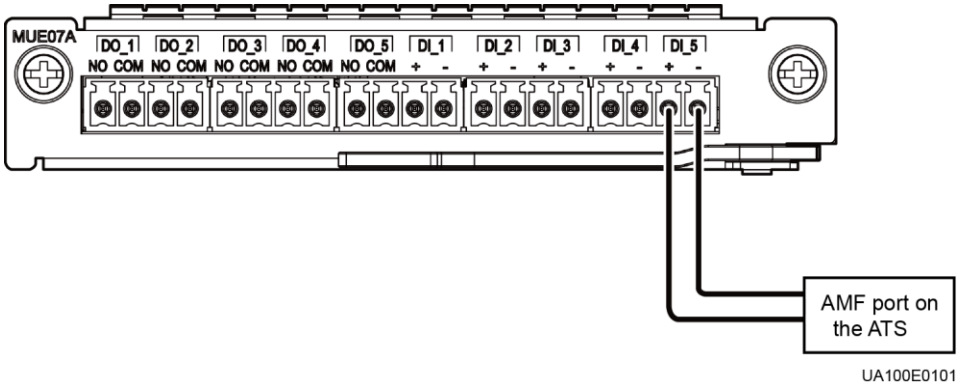
The D.G. RUN port of the ATS connects to the dry contact card, as shown in Figure 5-66.

Figure 5-66 Connecting signal cables in the ATS scenario



The AMF port of the ATS connects to the DI_5 port on the dry contact extended card, as shown in Figure 5-67.

Figure 5-67 Connecting signal cables in the ATS scenario



6 Routine Maintenance

6.1 UPS Maintenance

NOTICE

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

6.1.1 Monthly Maintenance

Table 6-1 Monthly Maintenance

Check Item	Expected Result	Troubleshooting
Operating environment	• Ambient temperature: 0–40 ℃ • Humidity: 0–95% RH (non-condensing)	• If the humidity and temperature are abnormal, check the air conditioner status. • If the input voltage is abnormal, check the power grid status and input cable connection.
Liquid crystal display (LCD)	According to the status icons on the LCD, all units are operating properly. No	If an alarm is present, rectify the fault by checking the device status and

Check Item	Expected Result	Troubleshooting
	fault or alarm information is found in the active and historical alarm records.	parameters.

6.1.2 Quarterly Maintenance

Table 6-2 Quarterly Maintenance

Check Item	Expected Result	Troubleshooting
Operating environment	• Ambient temperature: 0–40 ℃ • Humidity: 0–95% RH (non-condensing)	• If the humidity and temperature are abnormal, check the air conditioner status. • If the input voltage is abnormal, check the power grid status and input cable connection.
Liquid crystal display (LCD)	According to the status icons on the LCD, all units are operating properly. No fault or alarm information is found in the active and historical alarm records.	If an alarm is present, rectify the fault by checking the device status and parameters.
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.
Power cables and terminals (between the UPS and the power distribution cabinet)	The insulation layer of cables is intact and terminals are free from noticeable sparks.	• Replace the cables. • Secure output terminals.

6.1.3 Yearly Maintenance

Table 6-3 Yearly Maintenance

Check Item	Expected Result	Troubleshooting

Check Item	Expected Result	Troubleshooting
Operating environment	• Ambient temperature: 0–40 ℃ • Humidity: 0–95% RH (non-condensing)	• If the humidity and temperature are abnormal, check the air conditioner status. • If the input voltage is abnormal, check the power grid status and input cable connection.
Liquid crystal display (LCD)	According to the status icons on the LCD, all units are operating properly. No fault or alarm information is found in the active and historical alarm records.	If an alarm is present, rectify the fault by checking the device status and parameters.
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.
Power cables and terminals (between the UPS and the power distribution cabinet)	The insulation layer of cables is intact and terminals are free from noticeable sparks.	• Replace the cables. • Secure output terminals.

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 lists the service life parameters for key components and recommended replacement intervals.

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 (131,000 hours)	7–10 years
Bypass module	≥ 15 years (131,000 hours)	7–10 years
Fan	≥ 7 years (62,000 hours)	5–6 years
Valve regulated lead acid (VRLA) battery	5 years	3–4 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 rubber 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

- 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

Content	Expected Results	Troubleshooting
Battery management alarm	No battery management alarm is generated.	Identify the cause of an alarm based on the alarm information.
Battery appearance	1. The battery shell is intact, without acid leaks, deformation, or bulges. 2. The battery is free from dust or dirt.	1. Take photos of the deformed parts and faulty parts of batteries. 2. Check and record the charge voltage and charge current of the battery string, and the voltage of every single battery in this battery string. 3. Check the battery surface temperature. 4. Power off the battery string and

Content	Expected Results	Troubleshooting
		remove faulty batteries. After 30 minutes, check and record the open-circuit voltages of the faulty batteries. 5. If the fault persists, contact Huawei technical support.
Battery operating temperature	1. The battery operating temperature is lower than 45 ℃. 2. The ambient battery temperature is 25±5 ℃.	1. Identify the cause of an abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.

6.2.3 Quarterly Maintenance

Table 6-6 Quarterly Maintenance

Item	Expected Result	Troubleshooting
Battery management alarm	No battery management alarm is generated.	Identify the cause of an alarm based on the alarm information.
Battery appearance	1. The battery shell is intact, without acid leaks, deformation, or bulges. 2. The battery is free from dust or dirt.	1. Take photos of the deformed parts and faulty parts of batteries. 2. Check and record the charge voltage and charge current of the battery string, and the voltage of every single battery in this battery string. 3. Check the battery surface temperature. 4. Power off the battery string and remove faulty batteries. After 30 minutes, check and record the open-circuit voltages of the faulty batteries. 5. If the fault persists, contact Huawei technical support.
Battery operating temperature	1. The battery operating temperature is lower than 45 ℃. 2. The ambient battery temperature is 25±5 ℃.	1. Identify the cause of an abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical

Item	Expected Result	Troubleshooting
		support.
Battery specifications	Settings of parameters, including the capacity, number of batteries, and charging current limiting coefficient, are consistent with configured batteries.	Set parameters correctly.
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	1. Locate the cause when an exception is identified. 2. If the fault persists, contact Huawei technical support.

6.2.4 Yearly Maintenance

Table 6-7 Yearly Maintenance

Item	Expected Result	Troubleshooting
Battery management alarm	No battery management alarm is generated.	Identify the cause of an alarm based on the alarm information.
Battery appearance	1. The battery shell is intact, without acid leaks, deformation, or bulges. 2. The battery is free from dust or dirt.	1. Take photos of the deformed parts and faulty parts of batteries. 2. Check and record the charge voltage and charge current of the battery string, and the voltage of every single battery in this battery string. 3. Check the battery surface temperature. 4. Power off the battery string and remove faulty batteries. After 30 minutes, check and record the open-circuit voltages of the faulty batteries. 5. If the fault persists, contact Huawei technical support.
Battery operating temperature	1. The battery operating temperature is lower than 45 ℃.	1. Identify the cause of an abnormal battery operating temperature.

Item	Expected Result	Troubleshooting
	2. The ambient battery temperature is 25±5℃.	2. If the fault persists, contact Huawei technical support.
Battery specifications	Settings of parameters, including the capacity, number of batteries, and charging current limiting coefficient, are consistent with configured batteries.	Set parameters correctly.
Capacity Test (recommended)	When the UPS is backed up, discharge a battery to the undervoltage alarm threshold, to refresh the capacity of the battery.	1. Locate the cause when an exception is identified. 2. If the fault persists, contact Huawei technical support.
Tightness of screws on battery terminals	Battery terminals and cables are in good contact. (A torque wrench is used for checking the contact.)	Tighten the terminals and ensure that battery terminals and cables are in good contact.
Battery voltage	• Equalized charging voltage: 2.35 V/cell ± 0.02 V/cell • Float charging voltage: 2.25 V/cell ±0.02 V/cell	1. Check whether the equalized charging voltage and float charging voltage of a battery are normal. 2. If the charging voltage of a battery exceeds the specifications requirement, perform a complete forcible equalized charging for the battery, and check again whether the voltage is normal. 3. If the fault persists, contact Huawei technical support.

7 Troubleshooting

CAUTION

When a UPS is faulty, alarm information is displayed on the LCD. Critical alarms must be processed before the UPS is powered on again. Otherwise, the fault may be extended, or the UPS may be damaged.

NOTICE

- When batteries reach EOD, the battery switch in the BCB box trips if the BCB box is configured. To restore battery discharge, turn on the battery switch in the BCB box (if any) first.
- To restore battery discharge after batteries reach EOD, use one of the following methods:

  Switch to another battery string. Ensure that each battery has a voltage greater than the EOD voltage and 11.3 V.

  Restore the mains power supply to start the inverter. Turn on the battery switch and charge batteries until each battery has a voltage greater than the EOD voltage and 11.3 V.

For details about how to rectify common faults, see Table 7-1. If any faults that cannot be located or solved are met, or any other unmentioned faults occur, see Alarm List and contact Huawei technical support.

Table 7-1 Troubleshooting

No.	Case	Symptom	Possible Cause	Measure
1	The rectifier is abnormal.	The rectifier cannot work, and the bus voltage is not boosted.	The mains voltage exceeds the upper threshold 278 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.
			PFC soft-startup	Replace the power

No.	Case	Symptom	Possible Cause	Measure
			fails.	module.
			The power module is faulty.	Replace the power module.
2	The inverter is abnormal.	The buzzer buzzes, 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.
3	The charger generates an alarm.	The buzzer buzzes, 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.
4	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.
5	The bypass is abnormal.	The buzzer buzzes, 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.

8 Technical Specifications

8.1 Physical Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Cabling mode	Cables are routed from the top or bottom.		Cables are routed from the bottom. Cables can be routed from the top if a top entry cabinet is installed.	Cables are routed from the top.
Protection level	IP20 (or IP21)			IP20
Dimensions (H x W x D)	2000 mm x 600 mm x 850 mm			
Communication	Dry contacts, RS485, and SNMP			
Weight	• UPS5000-E-120K-F120: 321.5 kg at full load. Each power module is 32.5 kg. A maximum of three power modules are supported. • UPS5000-E-200K-F200: 386.5 kg at full load. Each power module is 32.5 kg. A maximum of five power modules are supported. • UPS5000-E-320K-F320: 484.0 kg at full load. Each power module is 32.5 kg. A maximum of eight power modules are supported. • UPS5000-E-320K-F320T: 484.0 kg at full load. Each power module is 32.5 kg. A maximum of eight power modules are supported.			

8.2 Environmental Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Operating temperature	0–40 ℃			
Storage temperature	–40 ℃ to +70 ℃			
Humidity	0%–95% RH (non-condensing)			
Altitude	1000–4000 m When the altitude is above 1000 m, the load that the UPS can support decreases by 1% for each additional 100 m.			
Noise	< 65 dB		< 68 dB	

8.3 Safety Regulations and EMC

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Safety regulations	EN62040-1: 2008 IEC62040-1: 2008 YD/T2165-2010 GB/T14715-93			EN62040-1: 2013 IEC62040-1: 2013 YD/T1095-2000
EMC	EN62040-2 IEC62040-2 IEC61000-3-11 IEC61000-3-12 IEC61000-2-2 IEC61000-4-2 EN61000-4-3 EN61000-4-6 IEC61000-4-8 IEC61000-4-11			

8.4 Mains Input Electrical Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Input system	Three-phase, five-wire			
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)			
Input voltage	138–485 V AC (line voltage) The UPS power is not derated at 305–485 V AC and is linearly derated at 305–138 V AC.			
Input frequency	40–70 Hz			
Input PF	0.99			
THDi	< 3% (full linear load); < 5% (full non-linear load)			

8.5 Bypass Input Electrical Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Input system	Three-phase, five-wire			
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)			
Input frequency	50 Hz or 60 Hz (tolerance ±6 Hz)			
Bypass synchronization tracking frequency	50 Hz or 60 Hz (tolerance ±6 Hz)			

8.6 Battery Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Battery voltage	360–552 V DC (30–46 batteries, 32 by default); 6% derated when 30 batteries are configured.			
Battery monitoring	The BMU (optional) monitors batteries.			
Battery management	Intelligent battery management			
One-button cold start	In the case of a mains failure, batteries can start the UPS to power loads.			
Battery string sharing	The UPSs connected in parallel can share battery strings. By default, battery strings are not shared.			
Charge voltage	• Equalized voltage: 2.35 V/cell • Float voltage: 2.25 V/cell			

NOTE

In monitoring and power versions earlier than V100R001C10SPC008 (software package version: V100R001C10SPC700), the battery voltage is 360–480 V DC (30 to 40 batteries, 32 by default).

8.7 Output Electrical Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Output system	Three-phase, five-wire			
Voltage	380 V AC, 400 V AC, or 415 V AC (tolerance ±1%) (line voltage)			
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 ±0.25%).			
Total harmonic distortion of output voltage (THDv)	< 1% (full linear load); < 3% (full non-linear load)			
Output PF	1			
Transfer time	0 ms			

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
Output voltage unbalance	Voltage unbalance: ±3%; phase unbalance: ±2 °			
Overload capability	Inverter overload capability: • 105% < load ≤ 110%: transfer to bypass mode after 60 min • 110% < load ≤ 125%: transfer to bypass mode after 10 min • 125% < load ≤ 150%: transfer to bypass mode after 1 min Bypass overload capability: • Load ≤ 135%: run continuously at 30°C or lower • 1000% load: run for 100 ms			

8.8 System Electrical Specifications

Item	UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-320K-F320T
System efficiency	96%			
Redundancy design	The auxiliary power supplies, centralized controllers, and parallel signals use redundancy design.			
Number of UPSs connected in parallel	≤ 4			

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	-
		UPS Load	-
		Mains Input	-
		Bypass Input	-
		Battery Status	-
		Module Data	-
		Total Runtime	-
		Environment Data	-
	Alarms	Active Alarms	-
		Historical Alarms	-
		Buzzer Off	-
		Clear Faults	-
	Settings	Basic	-
		Communication	-
		Basic Param.	-
		Advanced Param.	-
		Input Param.	-
		Output Param.	-
		Bypass Param.	-
		Battery Param.	-

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu
		Dry Contacts	-
		Intelli. Power	-
		Settings Wizard	-
		Parameter Sync. (available in parallel UPS mode)	-
	Maintenance	Battery Maint.	-
		USB Operations	Remove USB
			Upgrade Software
			Load Config.
			Export Config.
			Export Logs
			Export E-labels
			Export Alarms
			Multi-brand
			Serviceable data
		Inv. ON	-
		Inv. OFF	-
		ECM Switchover	-
		Screen Calib.	-
	About	Model	-
		Manufacturer	-
		Monitoring Version	-
		Power Version	-
		Version Info	-
Common Functions	AC Output	Phase voltage	-
		Line voltage	-
		Phase current	-
		Frequency	-
		Power factor	-
	UPS Load	Active power	-
		Apparent power	-

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

A.2 Menus on the WebUI

Level–1 Menu	Level–2 Menu	Level– 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– 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

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

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			cells	
		Advanced Param.	System capacity	N/A
			Power module capacity	N/A
			Requisite modules	N/A
			Redundant modules	N/A
			Working mode	N/A
			BSC mode	N/A
			Inverter operating mode	N/A
			Converter mode	N/A
			Paral. sys. hibernate	N/A
			Module cycle hiber. period	N/A
			Amb. temp. alarm thresh	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
			Input cur. limiting	N/A
			Input cur. limiting ratio	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			No-load output shows zero	N/A
			Inv. load mode	N/A
		Input Param.	D.G. mode	N/A
			D.G. power limiting	N/A
			D.G. charger power ratio	N/A
			Intra-rack power module start delay (s)	N/A
			Inter-rack power module start delay (s)	N/A
			Input adaptability	N/A
		Output Param.	Output volt. adjustment	N/A
			Outp. transf. interrupt time	N/A
			Self-load output cur. ratio	N/A
			Output interruption transfer time	N/A
			Max. BPM transfer times	N/A
		Bypass Param.	Bypass frequency range	N/A
			Maximum bypass voltage	N/A
			Minimum bypass voltage	N/A
			ECO voltage range	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			BPM supply on OL & Overtemp.	N/A
		Battery Param.	Installation time	N/A
			Maintenance period	N/A
			Battery type	N/A
			Chg. cur. limiting coef.	N/A
			Cell float voltage	N/A
			Cell equalized volt	N/A
			Transfer-to-equalized charging cur. coef.	N/A
			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

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			Sched. shallow dis. test	N/A
			Sched. shallow dis. test time	N/A
			Sched. shallow dis. test interval	N/A
			Shallow dis. test dis. ratio	N/A
			Undertemp. alarm thresh.	N/A
			Overtemp. alarm thresh.	N/A
			Backup time warning	N/A
			Backup time warn. thresh.	N/A
			Remain. cap. warning	N/A
			Remain. cap. warn. thresh.	N/A
			Dis.cur.0.1C EOD	N/A
			Dis. cur.0.3C EOD	N/A
			Dis. cur.0.5C EOD	N/A
			Dis. cur.1.0C EOD	N/A
			Intelligent hibernation	N/A
			Class 1 grid hiber. time	N/A
			Class 2 grid hiber. time	N/A
			Chg. volt. over range	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			point	
			Dis. volt. over range point	N/A
		Dry Contacts	MUE05A connection	N/A
			Battery ground fault	N/A
			D.G. connection	N/A
			BCB connection	N/A
			Battery breaker	N/A
			PDC output breaker	N/A
			PDC maintenance breaker	N/A
			BP/SYSMT Switch	N/A
			BP/SYSMT switch function	N/A
			SPD/SYSOUT Switch	N/A
			SPD/SYSOUT switch function	N/A
			MUE06A connection	N/A
			MUS05A DO_1 Action	N/A
			MUS05A DO_2 Action	N/A
			MUS05A DO_3 Action	N/A
			MUS05A DO_4 Action	N/A
			MUE07A	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			DO_1 Action	
			MUE07A DO_2 Action	N/A
			MUE07A DO_3 Action	N/A
			MUE07A DO_4 Action	N/A
			MUE07A DO_5 Action	N/A
			MUS05A DO_1	N/A
			MUS05A DO_2	N/A
			MUS05A DO_3	N/A
			MUS05A DO_4	N/A
			MUE07A DO_1	N/A
			MUE07A DO_2	N/A
			MUE07A DO_3	N/A
			MUE07A DO_4	N/A
			MUE07A DO_5	N/A
			MUE07A DI_1	N/A
			MUE07A DI_2	N/A
			MUE07A DI_3	N/A
			MUE07A DI_4	N/A
			MUE07A DI_5	N/A
		Intelligent	Intelligent	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
		Power Settings	power supply	
	Comm. Config.	System IP Settings	IP Address	N/A
			Subnet Mask	N/A
			Default Gateway	N/A
		Serial Port Settings	RS485 Com Baud Rate	N/A
			RS485 Com Address	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 Addr. of ambient temp. & H. sensor	N/A
			Ambient Temp. & H. sensors	N/A
		BMU Settings	BMU start address	N/A
			BMUs	N/A
		NTC Settings	NTC	N/A
	Control	System Commands and Tests	Inverter On	N/A
			Inverter Off	N/A
			Clear Fault	N/A
			Bypass runtime	N/A
			Inv. runtime	N/A
			Forced Equalized Charging	N/A
			Shallow Dis. Test	N/A
			Capacity Test	N/A
Query	Alarm History	Query	N/A	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
		Export	N/A	N/A
	Logs	Historical log	N/A	N/A
		Cap. test log	N/A	N/A
		Common test log	N/A	N/A
Config.	User Mgmt.	New	N/A	N/A
		Modify	N/A	N/A
		Delete	N/A	N/A
	Site Config.	System Date and Time	Date(Local)	N/A
			Time(Local)	N/A
			Time zone	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
		Certificate Management	Upload	N/A
			Export certificate	N/A
		Configuration Management	Upload configuration file	N/A
			Export configurations	N/A
		Multi-brand Management	Upload	N/A
		Configure Alarm Notification	Email server IP address	N/A
			Sender's email	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
		Server	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
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
			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

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			Zero sequence cur.	N/A
			Pos. batt. volt.	N/A
			Pos. batt. chg. volt.	N/A
			Pos. batt. chg. cur.	N/A
			Pos. batt. dis. cur.	N/A
			Neg. batt. volt.	N/A
			Neg. batt. chg. volt.	N/A
			Neg. batt. chg. cur.	N/A
			Neg. batt. dis. cur.	N/A
			Inv. ph. A volt.	N/A
			Inv. ph. B volt.	N/A
			Inv. ph. C volt.	N/A
			Ph. A output volt.	N/A
			Ph. B output volt.	N/A
			Ph. C output volt.	N/A
			Inv. ph. A cur.	N/A
			Inv. ph. B cur.	N/A
			Inv. ph. C cur.	N/A
			Inv. ph. A induc. cur.	N/A
			Inv. ph. B induc. cur.	N/A
			Inv. ph. C	N/A

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			induc. cur.	
		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
		Module	Rec. SW commissioning var. 0 data	N/A

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

Level–1 Menu	Level–2 Menu	Level– Menu	Level–4 Menu	Level–5 Menu
			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	Serviceable data	N/A
			E-Label	N/A

B Alarm List

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
0001-1	Mains voltage abnormal	Minor	• Cable connections are incorrect. • The mains is abnormal. • The power module is faulty.	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 abnormal; if the mains voltage is less than 272 V, the sampling circuit of the power module is abnormal. Replace the faulty module.
0001-2			• Cable connections are incorrect. • The mains is abnormal. • The mains input fuse for the power module is blown.	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 abnormal; if the mains voltage exceeds 88 V, the power module sampling circuit or fuse may be abnormal. Replace the faulty module.
0001-3			The mains is abnormal.	Check the mains power.
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.	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	• The mains is abnormal. • The power module sampling circuit is abnormal.	Check whether the mains voltage ranges from 80 V (excluding 80 V) to 176 V. If no, the mains monitoring circuit for the power module is faulty. Replace the faulty module.
0010-1	Abnormal bypass voltage	Minor	• The bypass voltage range is not correctly set. • The bypass input voltage is abnormal.	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			• The bypass frequency range is not correctly set. • The bypass input frequency is abnormal.	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.
0011-1	Bypass ph. reversed	Minor	The phase sequence of the three-phase bypass input	Check whether the cable phase sequence is correct based on the phase sequence table. If no phase sequence table is available, exchange the positions of any two

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			is reversed.	cables.
0012-1	Bypass neutral absent	Minor	The neutral wire of bypass input is absent.	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.	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, turn on the BCB-BOX switch.
0022-1	No battery	Minor	• There is no battery string. • The battery string is not properly installed. • The power module battery fuse is blown.	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.
0025-1	Battery overvoltage	Minor	• The configured number of batteries is less than the	1. Check whether battery parameters are correctly set. 2. If they are correctly set, certain batteries may be faulty. 3. Check whether the battery neutral wire is correctly connected.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			actual number. • The battery neutral wire is absent.	
0026-1	Low battery voltage	Minor	• Battery discharge results in low battery voltage. • The battery neutral wire is absent. • The charger is faulty.	1. If the low battery voltage alarm is generated in battery mode, check whether the mains voltage recovers. If yes, charge batteries immediately. 2. Check whether the battery neutral wire is correctly connected. 3. If this alarm is generated in normal mode, check whether the battery switch is ON. If yes, the charger may be faulty. Replace the related power module.
0530-1	Battery ground fault	Critical	• The battery string is not properly grounded. • The battery ground monitoring cable is faulty. • The dry contact board is faulty.	1. Check whether the positive and negative terminals of the battery string are grounded or have sufficient resistance to the ground. 2. Check whether the battery grounding failure detector is faulty by replacing it with a new one. 3. If no battery grounding failure detector is available, check on the dry contact board whether the battery grounding failure detector is enabled. If yes, disable it and check whether the alarm is cleared. If the alarm persists, the dry contact board may be faulty. Replace the board.
0032-1	Battery overvoltage protection	Critical	• The battery voltage is greater than the upper	1. Check the battery voltage. 2. Check that the configured number of batteries matches the actual number. 3. Check that the actual number of batteries meets requirements.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			threshold. • The configured number of batteries is less than the actual number. • The actual number of batteries does not meet requirements.	
0036-2	Battery maintenance reminder	Warning	The time for maintenance arrives.	Maintain the batteries.
0037-1	Battery undervoltage	Critical	• The UPS works long in battery mode. • The charger is faulty.	1. Check whether the battery voltage is normal. 2. Check whether the output is overloaded. 3. Check whether any battery is damaged. If yes, replace the battery. 4. Check whether any battery charger generates an alarm. If yes, replace the faulty module.
0040-7	Rectifier abnormal	Critical	• The fan for the power module is abnormal. • The air channel of the power module is obstructed.	1. Check that the air channel for the module is free from blockage. 2. Check whether the fan is abnormal. Replace the power module if the fan is faulty.
0043-1	Fan abnormal	Critical	• The fan for the power module is	Replace the faulty power module.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			abnormal. • The fan monitoring cable for the power module is abnormal.	
0043-2			The fan is faulty.	Check the fan or replace the bypass unit or module.
0043-3			• The fan is faulty. • The fan monitoring cable is faulty.	1. Replace the fan. 2. Check the fan monitoring cable.
0043-4				
0047-1	Not ready	Critical	The ready switch is OFF.	Turn on the ready switch.
0060-4	Inverter abnormal	Critical	• A load short-circuit occurs. • A short circuit occurs inside the module. The fault seldom occurs.	1. Check load cable connections. 2. If load cable distributions are normal, replace the power module.
0061-7	Inverter alarm	Minor	The bypass waveform is abnormal.	1. If not all modules generate the alarm, start the UPS and transfer it to normal mode and replace the faulty module. 2. If all modules generate the alarm, open the bypass input circuit breaker. After the inverter relay is closed, close the bypass input circuit breaker 10 seconds later.
0564-1	Overload timeout	Critical	• The load is excessive. • Derating	1. Check that there is no overload. 2. Check that the module power is not derated due to a fan fault. 3. If the alarm persists, replace the

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			reduces the rated system power. • The module is damaged.	power module.
0565-1	Load impact transfer-to-bypass	Minor	• A large-power RCD load is instantly connected, or the output load short-circuits. • The inverter bridge short-circuits.	1. Check the load. 2. If the load is normal, replace the power module.
0566-1	Output overload	Minor	• The load is excessive. • Derating reduces the rated system power. • The module is damaged.	1. Check that there is no overload. 2. Check that the module power is not derated due to a fan fault. 3. If the alarm persists, replace the power module.
0570-4	BPM module abnormal	Critical	• The bypass fan is abnormal, or the air channel is blocked. • The ambient temperature exceeds	1. Check the bypass fan and air channel. If the fan is faulty, replace it. 2. Check that the ambient temperature is within 40 ℃. 3. Check that there is no overload.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			the upper threshold. • The load is excessive.	
0583-1	Inter-rack par. cable abnormal	Critical	• The inter-rack parallel system CAN bus is disconnected or short-circuited. • Only one rack works in a parallel system. • An ECM is faulty.	1. Check the inter-rack parallel system CAN bus. 2. Rectify the disconnection or short-circuit fault. 3. Replace the ECM.
0583-4			The inter-rack industrial-frequency synchronization cable is broken.	Replace the parallel cable.
0583-5			The inter-rack carrier synchronization cable is broken.	
0583-6			• The intra-rack INVBYP cable is broken. • The parallel CAN bus is broken.	

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
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	Minor	The neighboring UPS is abnormal and transfers to bypass mode.	Check the reason why the neighboring UPS transfers to bypass mode.
0088-1	Rack address conflict	Critical	The configured rack address conflicts with another one.	Check the rack address setting.
0089-1	Rack output overload	Minor	• The load is excessive. • The rack capacity setting is not appropriate.	1. Check the load. Remove some loads or expand the UPS power capacity if the UPS is overloaded. 2. Check that the configured rack capacity meets requirements.
0090-1	Dry contact	Critical	The dry	Replace the dry contact board

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
	board fault		contact board MUE05A I2C communication fails.	MUE05A.
0090-2			The dry contact board MUE06A I2C communication fails.	Replace the dry contact board MUE06A.
0356	Battery mode	Minor	Battery mode.	Running status displayed. See details about how to handle other alarms.
0359	No power supplied	Warning	No power supplied.	Running status displayed. See details about how to handle other alarms.
0332	Output disabled	Minor	The output is disabled.	Running status displayed. See details about how to handle other alarms.
0334	BSC master system	Warning	BSC master system.	Running status displayed. No suggested measures.
0334	BSC slave system		BSC slave system.	Running status displayed. No suggested measures.
0337	PDC bypass input breaker open	Critical	The bypass input circuit breaker on the PDC is OFF.	Running status displayed. No suggested measures.
0338	PDC output breaker open	Critical	The output circuit breaker on the PDC is OFF.	1. Check that all UPS output switches 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	Running status displayed. No suggested measures.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			ON.	
0342	Mains input breaker open	Critical	The mains input circuit breaker is OFF.	Running status displayed. No suggested measures.
0343	BPM input breaker open	Critical	The bypass input circuit breaker is OFF.	Running status displayed. No suggested measures.
0340	Maint. breaker closed	Minor	The maintenance circuit breaker is ON.	Running status displayed. No suggested measures.
0345	Battery breaker open	Critical	The battery circuit breaker is OFF.	Running status displayed. See details about how to handle other alarms.
0335	Generator connected	Warning	The generator is connected.	Running status displayed. No suggested measures.
0594-1	Insufficient redundant racks	Minor	• The load is excessive. • The configured number of redundant racks is incorrect.	1. Reduce the load. 2. Decrease the configured number of redundant racks.
0095-1	Insuffi. redundancy	Minor	• The load is excessive. • The configured number of redundant modules is incorrect.	1. Reduce the load. 2. Decrease the configured number of redundant modules.
0096-1	ECO volt.	Minor	• The ECO bypass	1. Check the bypass input voltage and frequency.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
	abnormal		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.	2. Check that the rated voltage, rated frequency, ECO bypass voltage range, and frequency range are correctly set. 3. Check that the bypass power cable or circuit breaker is connected.
0098-1	Bypass current not shared	Minor	• The output and input circuit breakers are OFF. • The length of the bypass input or output cables is incorrect. • The bypass SCR open-circuits.	1. Check that the output and bypass input circuit breakers on each rack are ON. 2. Check that bypass input and output power cables on each rack meet the length requirements. 3. Rectify any bypass SCR open-circuit.
0150-1	Inverter asynchronous	Minor	• The bypass frequency changes fast. • The slew	1. Check that the bypass input does not frequency change fast. 2. Check that the **configured slew rate** is correct.

Alarm ID (Alarm ID-Cause ID)	Alarm Name	Severity	Cause	Solution
			rate is incorrectly set.	
0101-1	BSC signal abnormal	Minor	• The dual bus connector is loose. • Parameters are set incorrectly.	1. Check the dual bus connector. 2. Check the parameter settings.
0102-1	Maint. breaker misoperation	Critical	The user operation is incorrect.	1. Shut down the inverter and then turn on the maintenance circuit breaker. 2. After maintenance, turn off the maintenance circuit breaker and then start the inverter.
0380	In self-check	Warning	The inverter is in self-check.	Wait until the inverter self-check is complete.

C 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	energy 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