

UPS5000-E-(360 kVA-480 kVA)

User Manual (40 kVA Power Modules)

Issue 07
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About This Document

Purpose

This document describes the UPS5000-E-(360 kVA-480 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
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

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

Change History

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

Issue 07 (2020-01-10)

Added SNMP descriptions to the sections about site configuration.

Added the SNMP V1 and V2 protocol description.

Updated the safety information.

Issue 06 (2017-11-17)

Updated the section "Battery Electrical specifications".

Issue 05 (2017-10-09)

Updated the recommended cable data.

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Updated the voltage data of the monitoring interface card and the content of routine maintenance.

Issue 03 (2016-01-20)

Updated the maximum voltage and current which the monitoring interface card can support, optimized the dual bus scenario, and updated the routine maintenance.

Issue 02 (2015-08-20)

Deleted V100R001 from the version information.

Issue 01 (2015-04-02)

This is the first release.

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1 Safety Information

1.1 General Safety

Statement

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

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

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

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

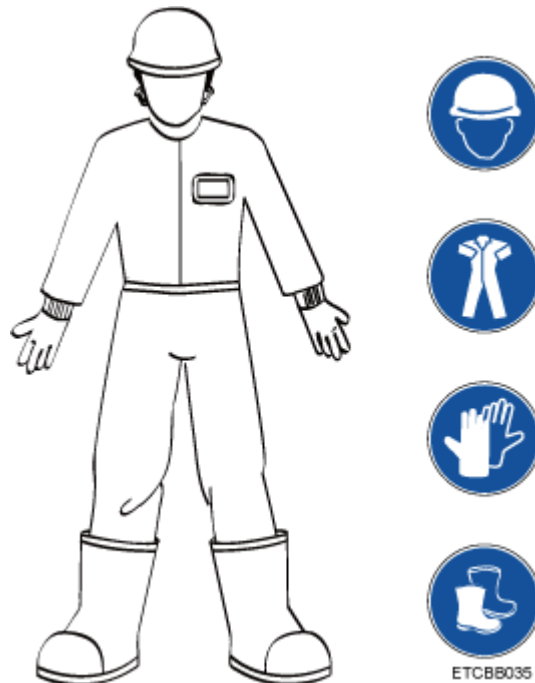
Huawei will not be liable for any consequences of the following circumstances:

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

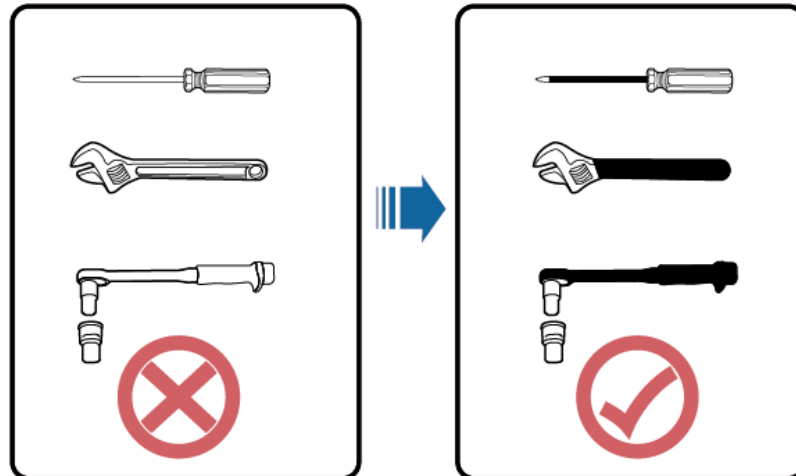
General Requirements

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

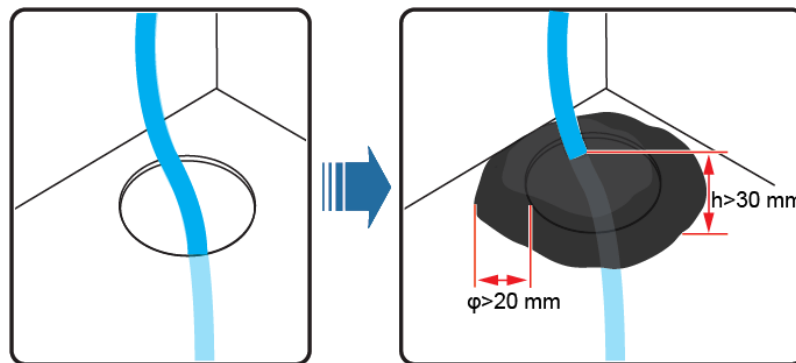
- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves,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



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



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



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

Personal Safety

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

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

1.2 Personnel Requirements

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

1.3 Electrical Safety

Grounding

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

General Requirements

Use dedicated insulated tools when performing high-voltage operations.

AC and DC Power

 **DANGER**

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

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

Cabling

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

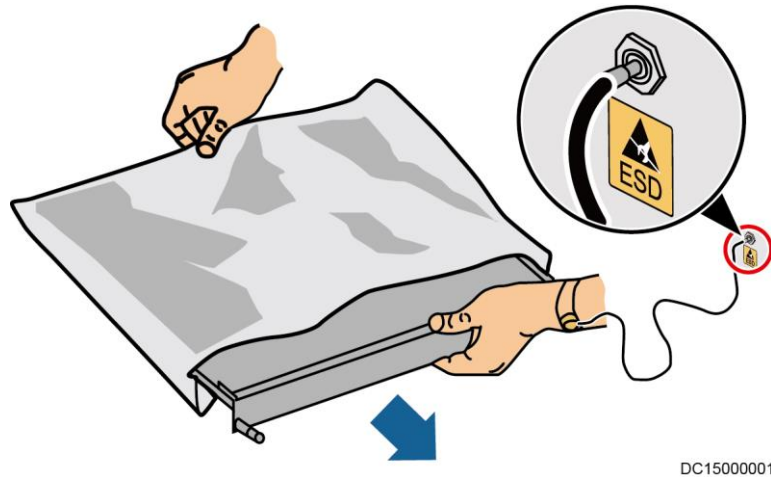
ESD

NOTICE

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

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

Figure 1-1 Wearing an ESD wrist strap



Neutral-Ground Voltage

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

1.4 Installation Environment Requirements

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

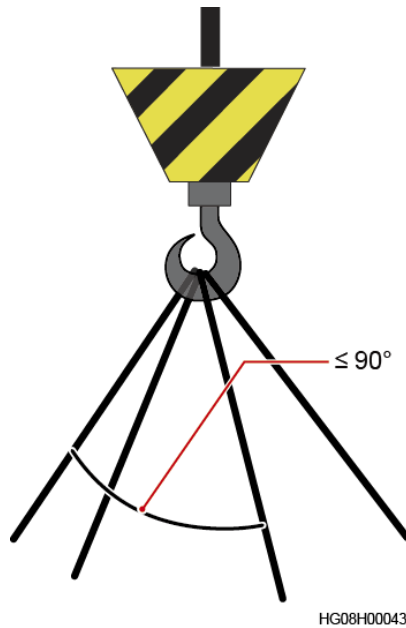
Installation at Heights

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

1.5 Mechanical Safety

Hoisting Devices

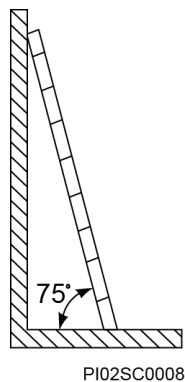
- Do not walk under hoisted objects.
- Only trained and qualified personnel should perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the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



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

Using Ladders

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



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

Drilling Holes

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

NOTICE

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

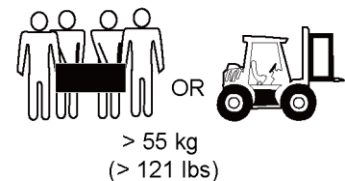
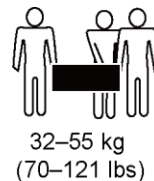
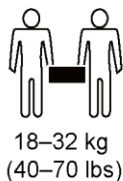
- Obtain the consent from the customer, subcontractor, and Huawei before drilling.
- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

Moving Heavy Objects

DANGER

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

- Be cautious to avoid injury when moving heavy objects.



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

1.6 Device Running Safety

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

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

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

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

NOTICE

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

DANGER

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

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

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

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

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

Do not use the UPS in the following places:

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

1.7 Battery Safety

Basic Requirements

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

 **DANGER**

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

- Keep the battery loop disconnected during installation and maintenance.
- Use batteries of specified models. Using batteries of other models may damage the batteries.
- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. If a battery is disposed of improperly, it may explode.
- The site must be equipped with qualified fire extinguishing facilities, such as firefighting sands and powder fire extinguishers.

NOTICE

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

Battery Installation

Before installing batteries, observe the following safety precautions:

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

Battery Short Circuit

DANGER

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

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

Flammable Gas

NOTICE

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

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

Battery Leakage

NOTICE

Battery overheating causes deformation, damage, and electrolyte spillage.

WARNING

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

- If the battery temperature exceeds 60°C, check for and promptly handle any leakage.
- Electrolyte overflow may damage the equipment. It will corrode metal parts and boards, and ultimately damage the boards.
- If the electrolyte overflows, follow the instructions of the battery manufacturer or neutralize the electrolyte by using sodium bicarbonate (NaHCO₃) or sodium carbonate (Na₂CO₃).

Lithium Battery

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

WARNING

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

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

- Use batteries within the allowed temperature range; otherwise, the battery performance and safety will be compromised.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

1.8 Others

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

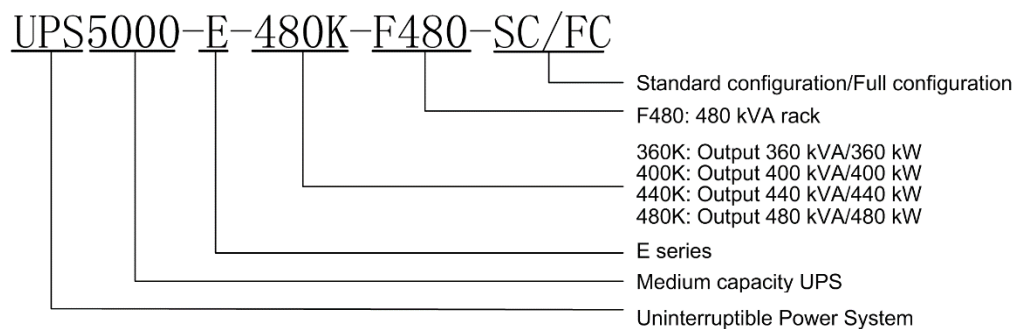
2 Overview

2.1 Model Description

NOTE

The structural drawings and graphical user interface (GUI) appeared in this document are those of UPS5000-E-480 kVA.

Figure 2-1 Model number



2.2 Working Principle

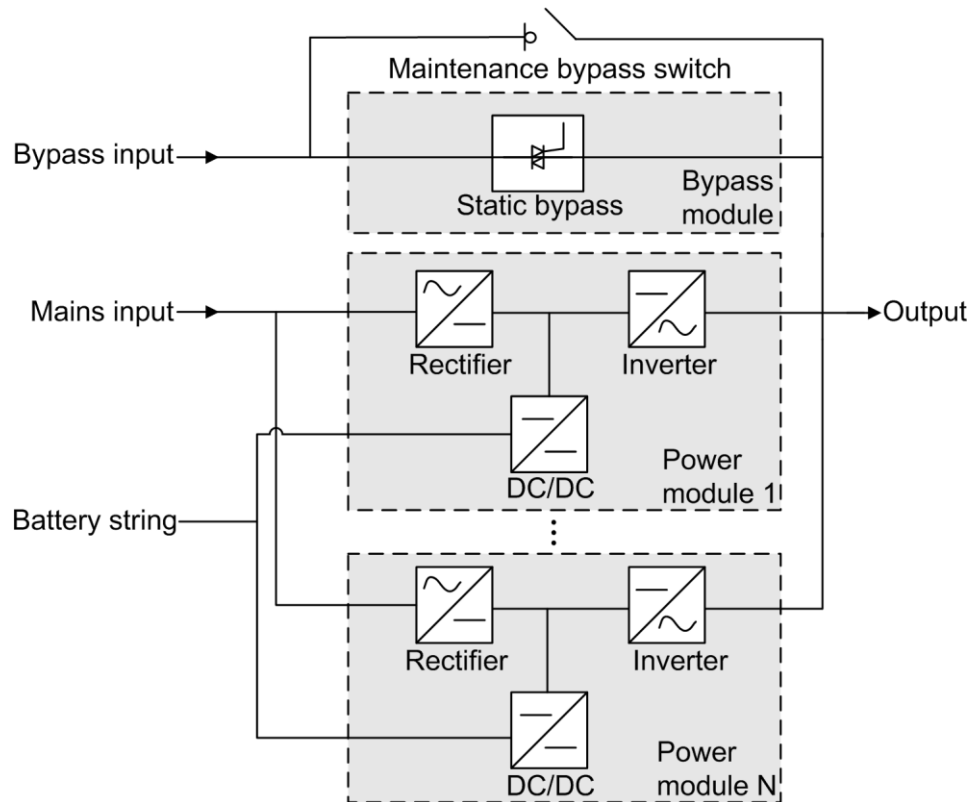
NOTE

- → indicates an input mode.
- → indicates the energy flow direction.

2.2.1 Conceptual Diagram

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

Figure 2-2 UPS conceptual diagram

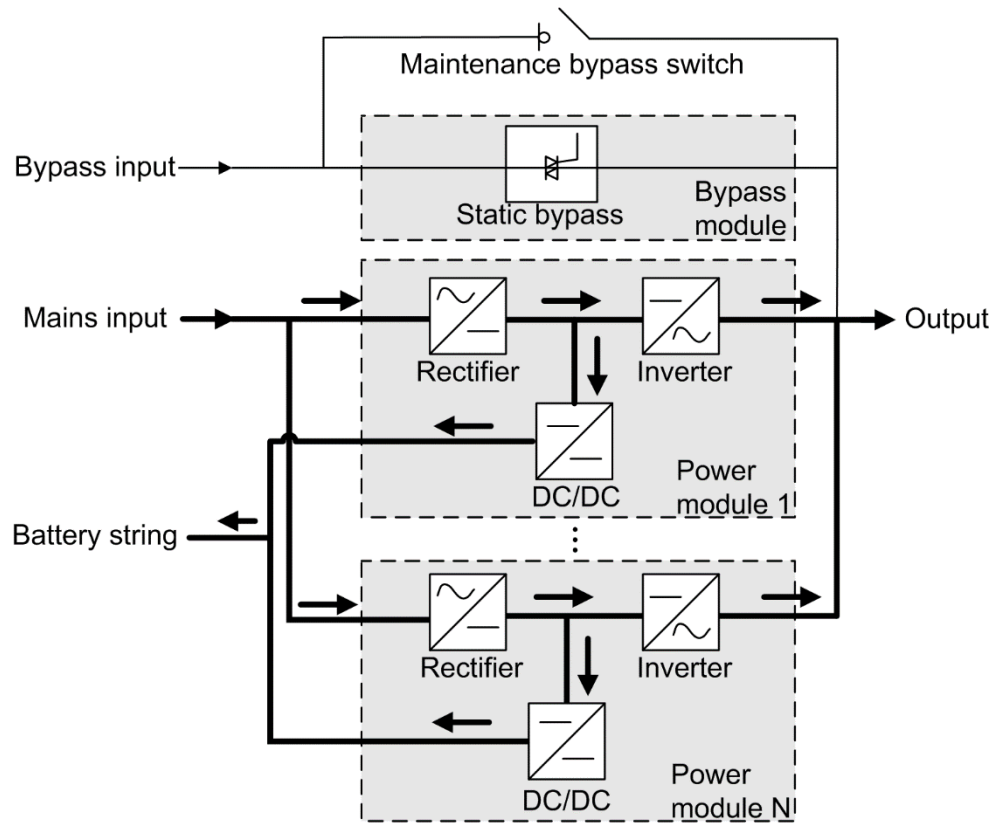


2.2.2 Working Modes

2.2.2.1 Normal Mode

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

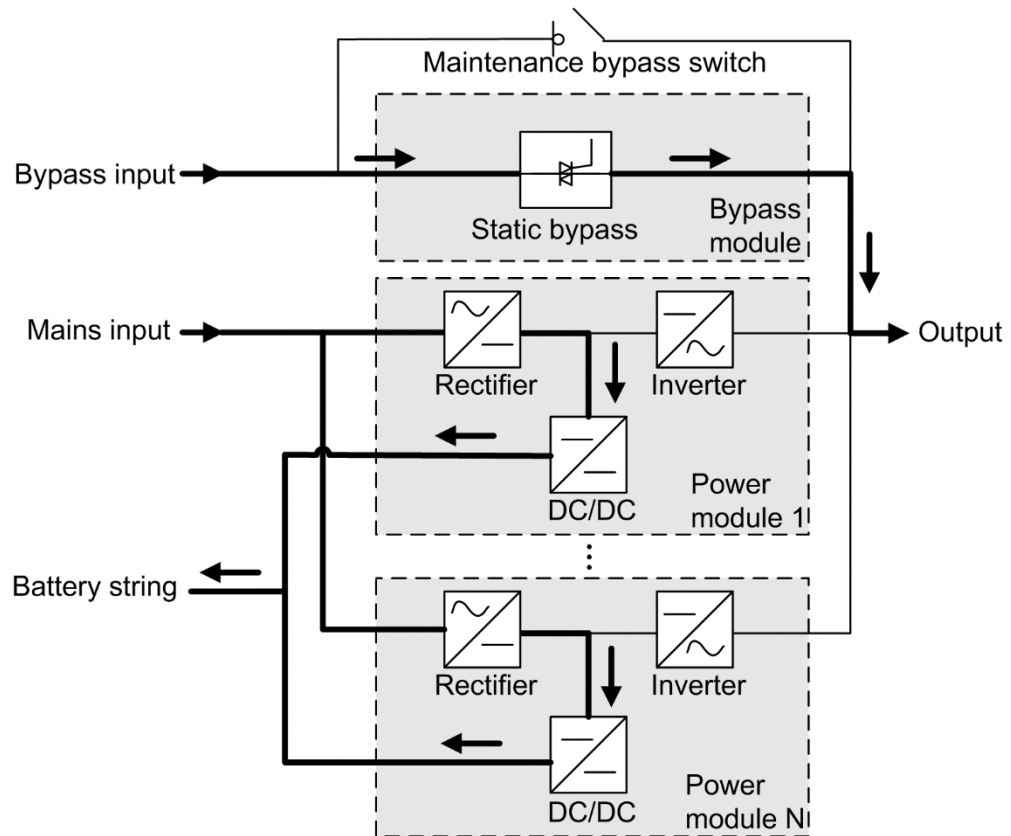
Figure 2-3 UPS conceptual diagram in normal mode



2.2.2.2 Bypass Mode

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

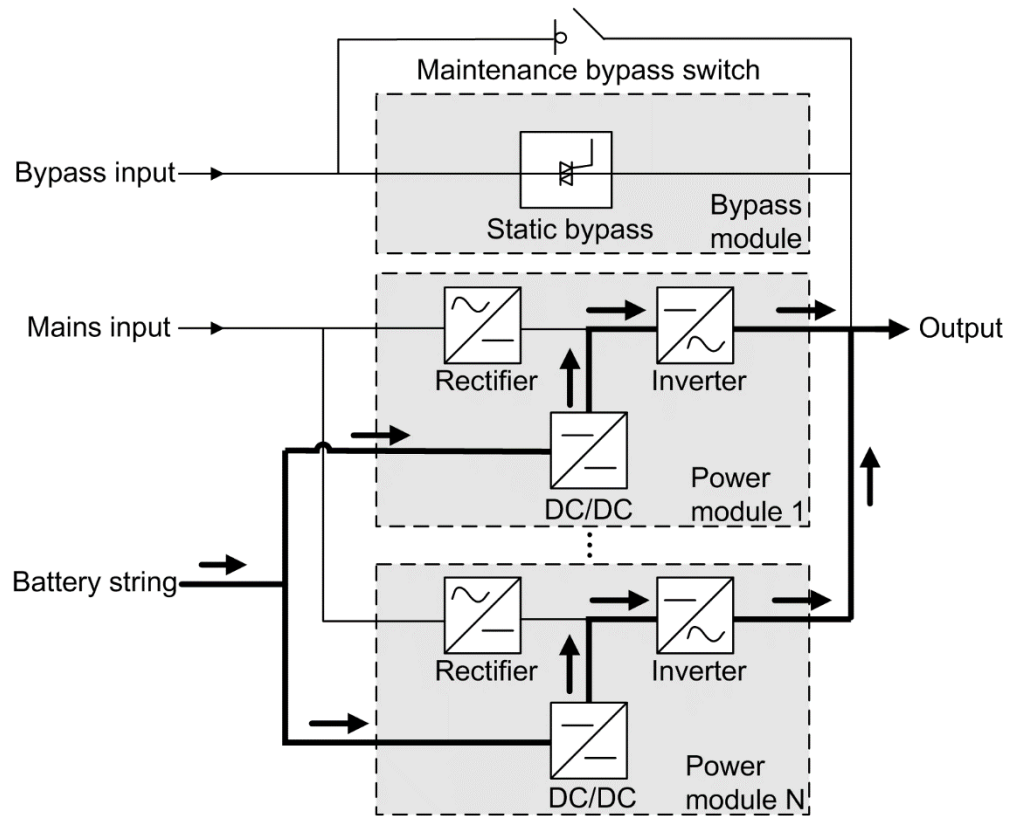
Figure 2-4 UPS conceptual diagram in bypass mode



2.2.2.3 Battery Mode

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

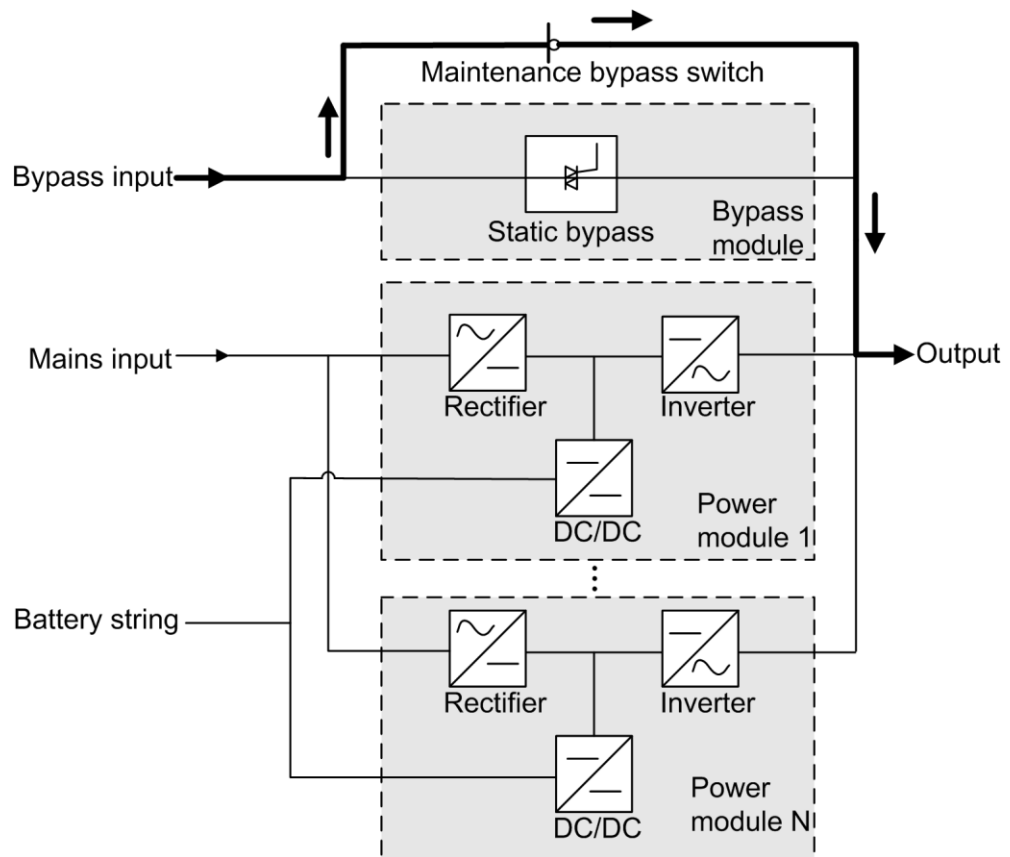
Figure 2-5 UPS conceptual diagram in battery mode



2.2.2.4 Maintenance Bypass Mode

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

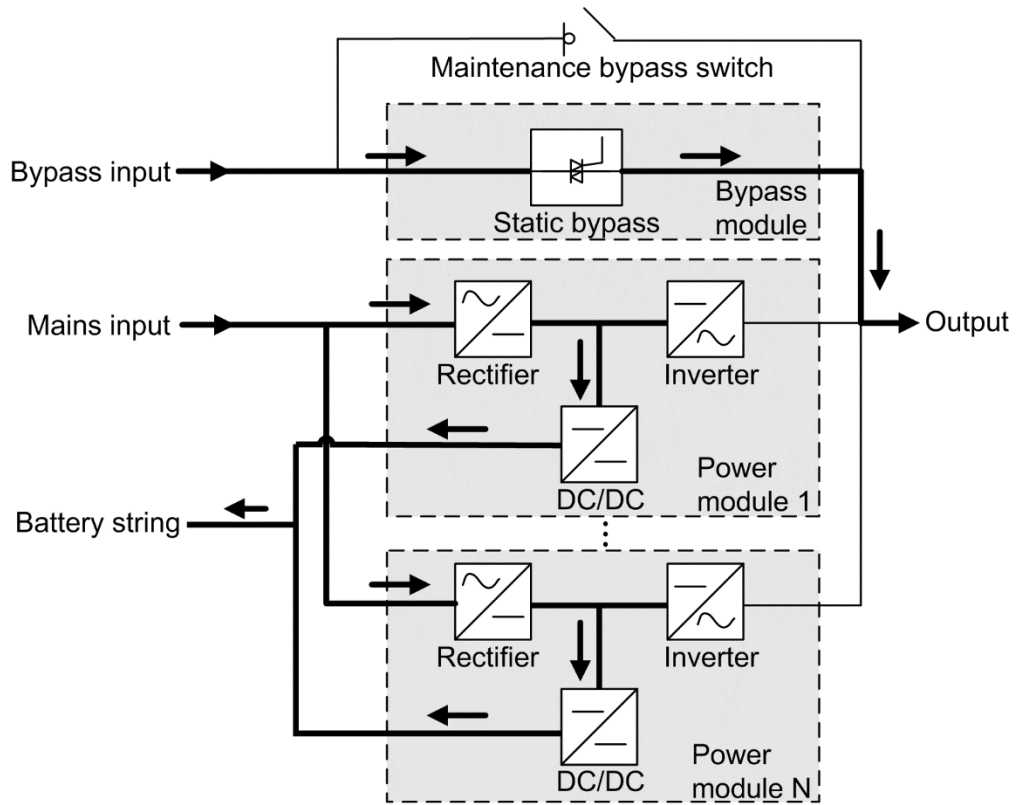
Figure 2-6 UPS conceptual diagram in maintenance bypass mode



2.2.2.5 ECO Mode

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

Figure 2-7 UPS conceptual diagram in ECO mode



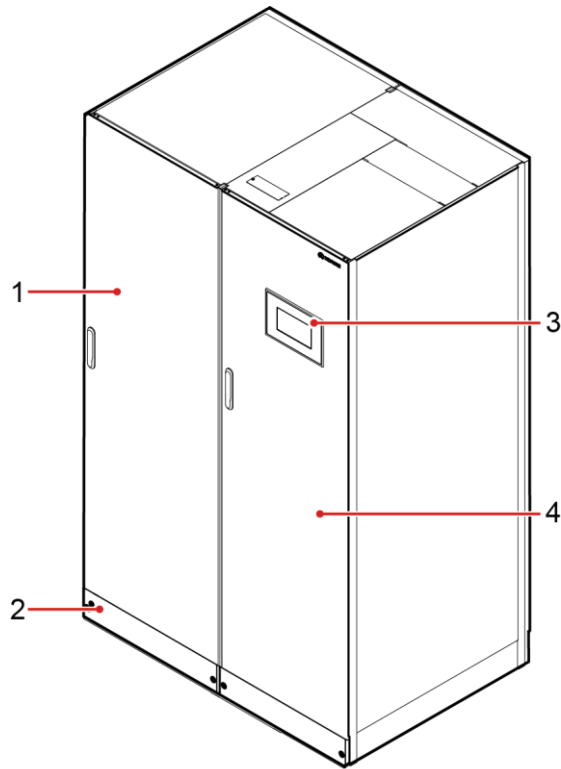
NOTE

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

2.3 Product Description

2.3.1 Appearance

Figure 2-8 UPS



UA13000002

(1) Power cabinet

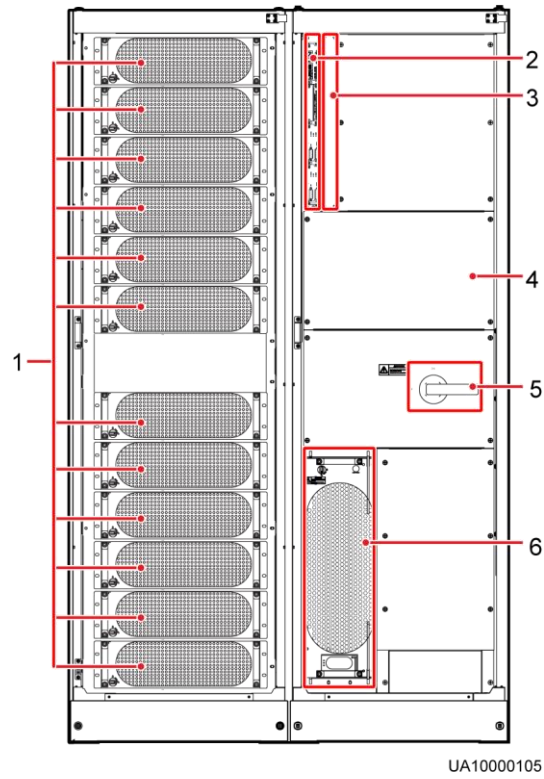
(2) Anchor baffle plates

(3) Monitor display unit (MDU)

(4) Bypass cabinet

2.3.2 Product Structure

Figure 2-9 Product structure (UPS with standard line configurations)



(1) Power modules

(2) Control module

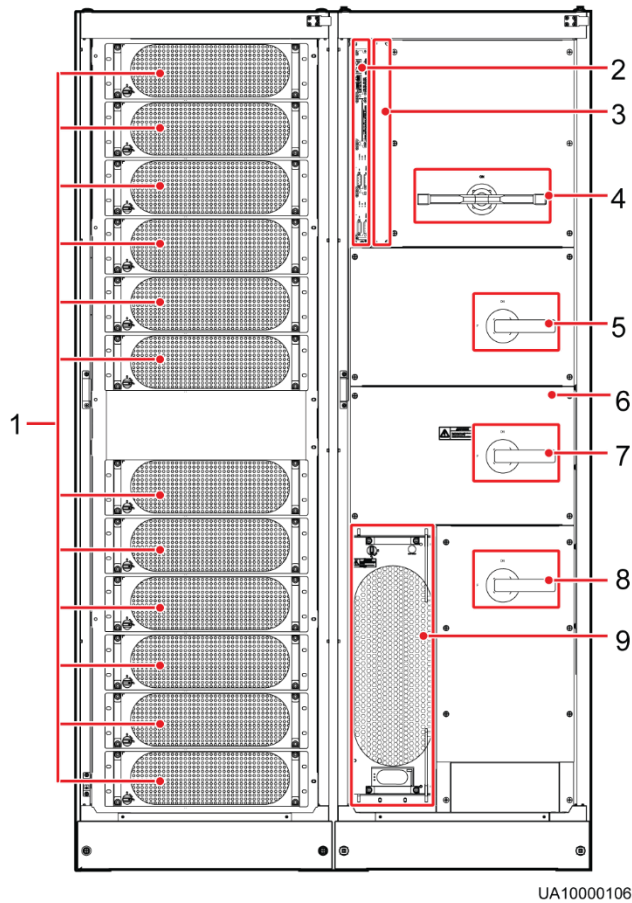
(3) Optional card slot
(behind the filler panel)

(4) Power distribution unit (PDU)
covers (four pieces)

(5) Maintenance
bypass switch

(6) Bypass module

Figure 2-10 Product structure (UPS with full copper bar configurations)



- | | | |
|-------------------------------|-------------------------|--|
| (1) Power modules | (2) Control module | (3) Optional card slot (behind the filler panel) |
| (4) Mains input switch | (5) Output switch | (6) Power distribution unit covers (four pieces) |
| (7) Maintenance bypass switch | (8) Bypass input switch | (9) Bypass module |

NOTE

A UPS in standard configurations has only one switch, that is, the maintenance bypass switch. A UPS in full configurations has four switches. They are the mains input switch, mains output switch, maintenance bypass switch, and bypass input switch from the top to the bottom.

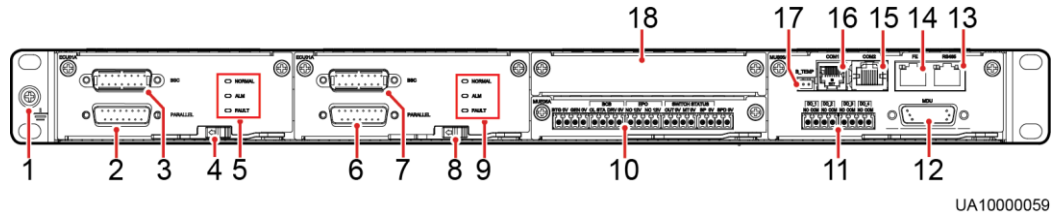
2.4 Control Module

2.4.1 Overview

In a standard configuration, the control module consists of two ECMs, one dry contact card, and one monitoring interface card (from left to right). The four cards are hot swappable. One

subrack is reserved above the dry contact card. A backfeed protection card or dry contact extended card can be inserted into this subrack.

Figure 2-11 Signal panel on the control module



UA10000059

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

NOTE

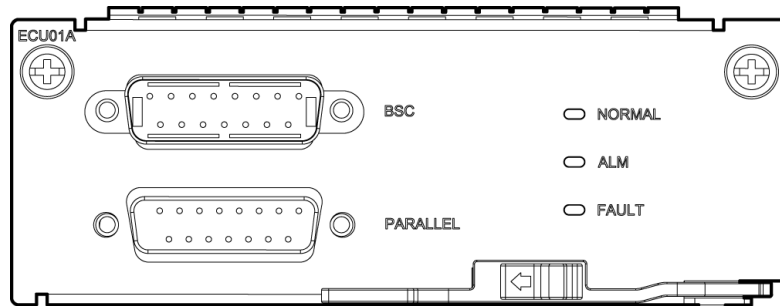
Ports are protected by a security mechanism.

2.4.2 ECM

Appearance

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

Figure 2-12 ECM



UA10000060

Table 2-1 Ports on the ECM

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

 **NOTE**

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

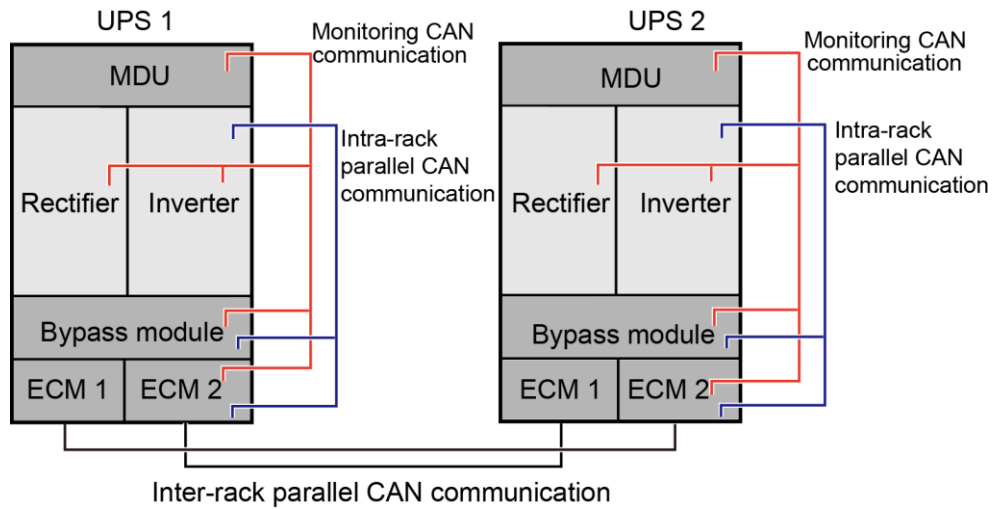
Table 2-2 Indicator description

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

Functions

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

Figure 2-13 Logical connections for CAN communication



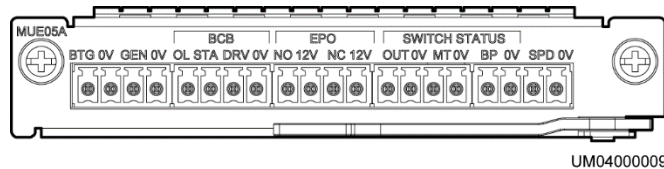
Specifications

- Hot-swappable
- 1 U high

2.4.3 Dry contact card

Appearance

Figure 2-14 Dry contact card



UM0400009

Table 2-3 Ports on the dry contact card

Silk Screen	Description	Status	Initial Status
BTG	Port for detecting battery grounding faults	<ul style="list-style-type: none"> • Connected: battery grounding fault • Disconnected: no battery grounding fault 	Disconnected
0V	Port for signal ground		
GEN	Port for detecting diesel generator (D.G.) mode	<ul style="list-style-type: none"> • Connected: D.G. mode • Disconnected: non-D.G. mode 	Disconnected
0V	Port for signal ground		

Silk Screen	Description	Status	Initial Status
BCB_OL	Port for detecting the BCB box	<ul style="list-style-type: none"> Grounded: BCB box connected Disconnected: BCB box not connected 	Grounded
BCB_STA	Port for monitoring the battery switch	<ul style="list-style-type: none"> Connected: battery switch ON Disconnected: battery switch OFF 	Disconnected
BCB_DRV	Controls battery circuit breaker trip. When the voltage is +12 V, the circuit breaker trips.	<ul style="list-style-type: none"> 0 V: battery switch not tripped 12 V: battery switch tripped 	0 V
BCB_0V	Port for signal ground		
EPO_NO	Emergency power-off (EPO) port	If the normally open (NO) port is connected to the EPO_12V port, EPO is triggered.	Disconnected
EPO_12V	+12 V		
EPO_NC	EPO port	If the normally closed (NC) port is disconnected from the EPO_12V port, EPO is triggered.	Connected
EPO_12V	+12 V		
SWITCH STATUS_OUT	Port for monitoring the UPS output circuit breaker	<ul style="list-style-type: none"> Connected: circuit breaker ON Disconnected: circuit breaker OFF 	Connected
SWITCH STATUS_0V	Port for signal ground		
SWITCH STATUS_MT	Port for monitoring the maintenance circuit breaker	<ul style="list-style-type: none"> Disconnected: circuit breaker ON Connected: circuit breaker OFF 	Disconnected
SWITCH STATUS_0V	Port for signal ground		
SWITCH STATUS_BP	Port for monitoring the bypass input circuit breaker	<ul style="list-style-type: none"> Connected: circuit breaker ON Disconnected: circuit breaker OFF 	Connected
SWITCH STATUS_0V	Port for signal ground		
SPD	Port for monitoring the input AC surge protective device (SPD)	<ul style="list-style-type: none"> Connected: SPD enabled Disconnected: SPD disabled 	Connected
0V	Port for signal ground		

 **NOTE**

- The dry contact interface card takes effect only after it is set on the monitoring system. Set the unused dry contact signal to the unused status.
- Set the EPO port to NO or NC as required.
- When multiple UPSs are paralleled, all dry contact signals to be used need to connect to each UPS.
- Single cables require dual-insulated twisted cables. If the length of a power cable is within 25–50 m, its cross-sectional area must be 0.5 mm² to 1.5 mm².

Functions

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

Specifications

- Hot-swappable
- 0.5 U high

2.4.4 (Optional) Backfeed Protection Card

Backfeed can cause damage to the UPS, loads, and maintenance personnel. If backfeed occurs, the backfeed protection card triggers alarm signals, or 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 *UPS5000 Backfeed Protection Card User Manual (03021KQQ)*.

2.4.5 (Optional) Dry Contact Extended Card

The dry contact extended card provides five signal output ports and five signal input ports. For details, see the *UPS5000 Dry Contact Extended Card User Manual (03021RKN)*.

2.4.6 Monitoring Interface Card

NOTICE

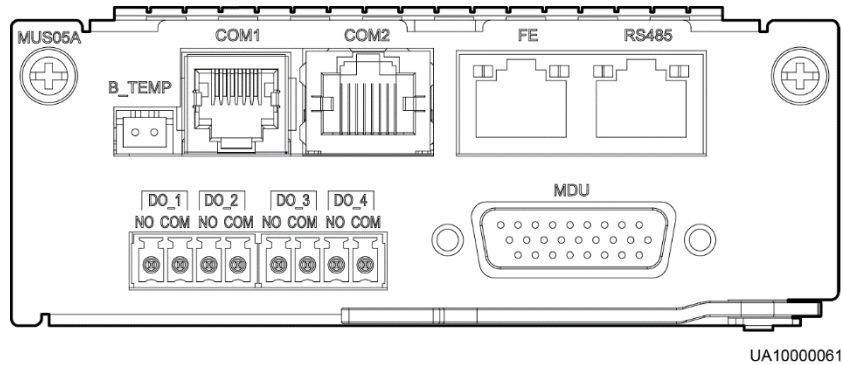
- The FE port resembles the RS485 port. Follow the silk screen when connecting communications cables as, if the RS485 port is mistaken for the FE port during cable connection, the WebUI cannot be connected and MDU communication fails. Conversely, if the FE port is mistaken for the RS485 port during cable connection, RS485 communication fails.
- Only once being set will dry contact signals take effect. Set unused dry contact signals to the unused state on the LCD.
- In a parallel system, ensure that used dry contacts properly connect to each UPS.

The monitoring interface card provides external ports as well as monitoring and control functions for the MDU. The ports include the ambient temperature and humidity sensor port, battery monitoring unit (BMU) port, FE port, battery temperature monitoring port, and network management port. MDU functions include monitoring of the UPS, allowing users to

set parameters, command delivery, information reports, and UPS key information and parameters displayed on the LCD.

Figure 2-15 shows the signal ports on the monitoring interface card.

Figure 2-15 Monitoring interface card



UA10000061

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

NOTE

DO_1 to DO_4 meet the maximum voltage and current requirements of 30 V DC/1 A or 60 V DC/0.5 A.

Table 2-4 Ports on the monitoring interface card

Port	Silk Screen	Description
DO_1	NO	DO_1 is used to output alarms and indicates critical alarms by default. It can be set to indicate minor alarms, bypass mode, battery mode, or low battery voltage.
	COM	
DO_2	NO	DO_2 is used to output alarms and indicates minor alarms by default. It can be set to indicate critical alarms, bypass mode, battery mode, or low battery voltage.
	COM	
DO_3	NO	DO_3 is used to output alarms and indicates bypass mode by default. It can be set to indicate critical alarms, minor alarms, battery mode, or low battery voltage.
	COM	
DO_4	NO	DO_4 is used to output alarms and indicates battery mode by default. It can be set to indicate critical alarms, minor alarms, bypass mode, or low battery voltage. When the UPS works in intelligent power mode, DO_4 indicates D.G. control, which cannot be changed.
	COM	
DB26	MDU	Provides FE, RS485, I2C, and CAN signals.
Battery temperature sensor port	B_TEMP	Connects to an indoor battery temperature sensor.
Southbound	COM1	Connects to an ambient temperature and humidity

Port	Silk Screen	Description
communications port 1		sensor over two wires.
Southbound communications port 2	COM2	Connects to a southbound device, such as a BMU.
Network port	FE	Connects to the network port on a PC.
Northbound communications port	RS485	Connects to a northbound network management device or a third-party network management device over two wires.

NOTE

- Signal cables must be double-insulated twisted cables. If the cable length is 25–50 m, the cross-sectional area must be 0.5–1.5 mm².
- RS485 cables and FE cables must be shielded cables.

Figure 2-16 and Figure 2-17 are recommended wiring methods for DO ports.

Figure 2-16 Wiring method 1

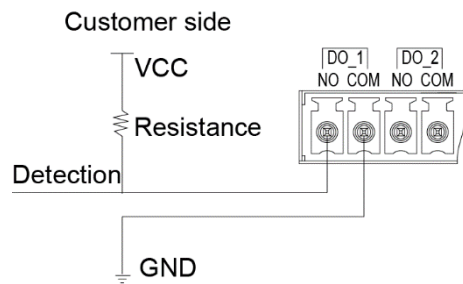


Figure 2-17 Wiring method 2

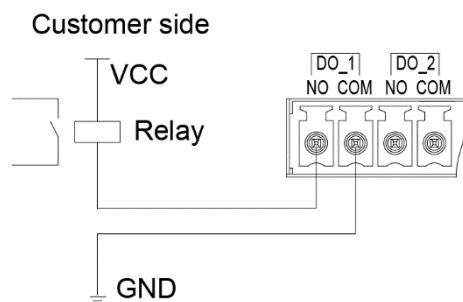


Figure 2-18 and Table 2-5 describe the COM1 pin definitions.

Figure 2-18 COM1 pins

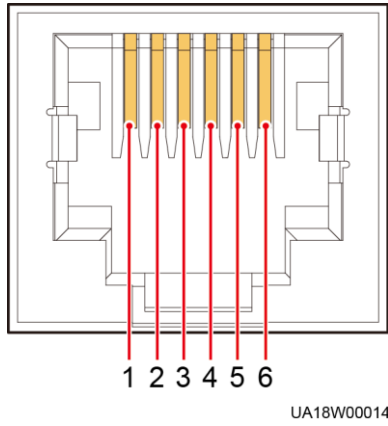


Table 2-5 COM1 pin definition

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

Figure 2-19 and Table 2-6 describe the COM2 pin definitions.

Figure 2-19 COM2 pins

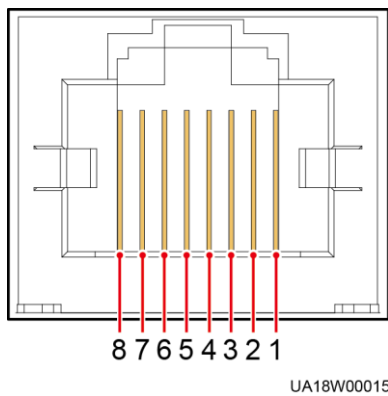


Table 2-6 COM2 pin definition

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

Figure 2-20 and Table 2-7 describe the RS485 pin definitions.

Figure 2-20 RS485 pins

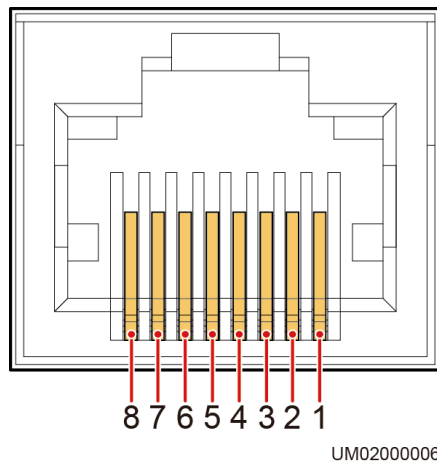


Table 2-7 RS485 pin definition

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

Pin	Description
7	N/A
8	N/A

NOTE

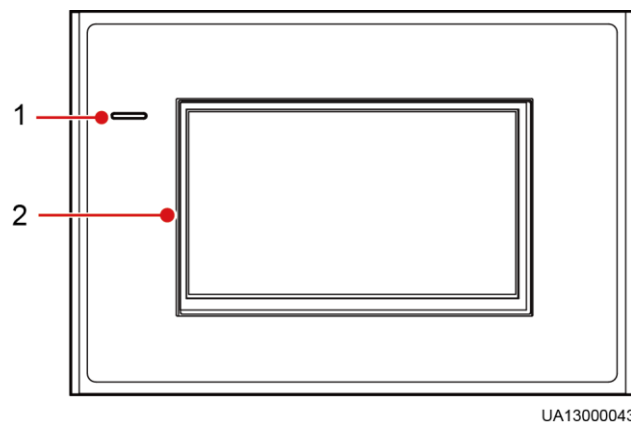
If cables are prepared onsite, follow the three methods below:

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

2.5 MDU

Appearance

Figure 2-21 MDU



(1) Status indicator

(2) LCD touchscreen

Table 2-8 Status indicator

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

NOTE

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

Figure 2-22 MDU ports

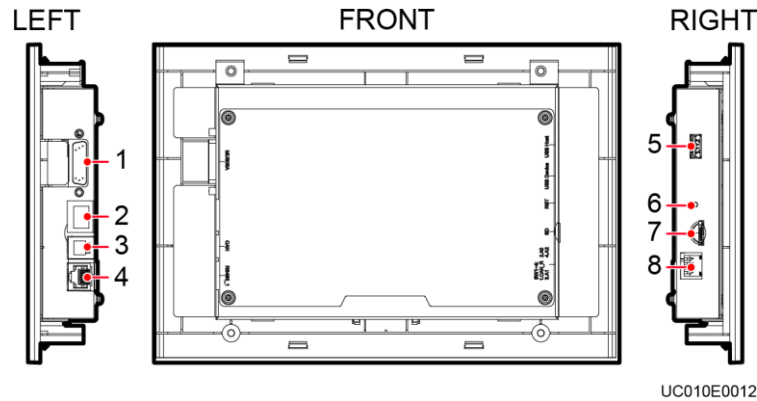


Table 2-9 Description of MDU ports

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

Functions

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

Specifications

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

2.6 Typical configurations

Table 2-10 Typical UPS configurations

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

NOTE

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

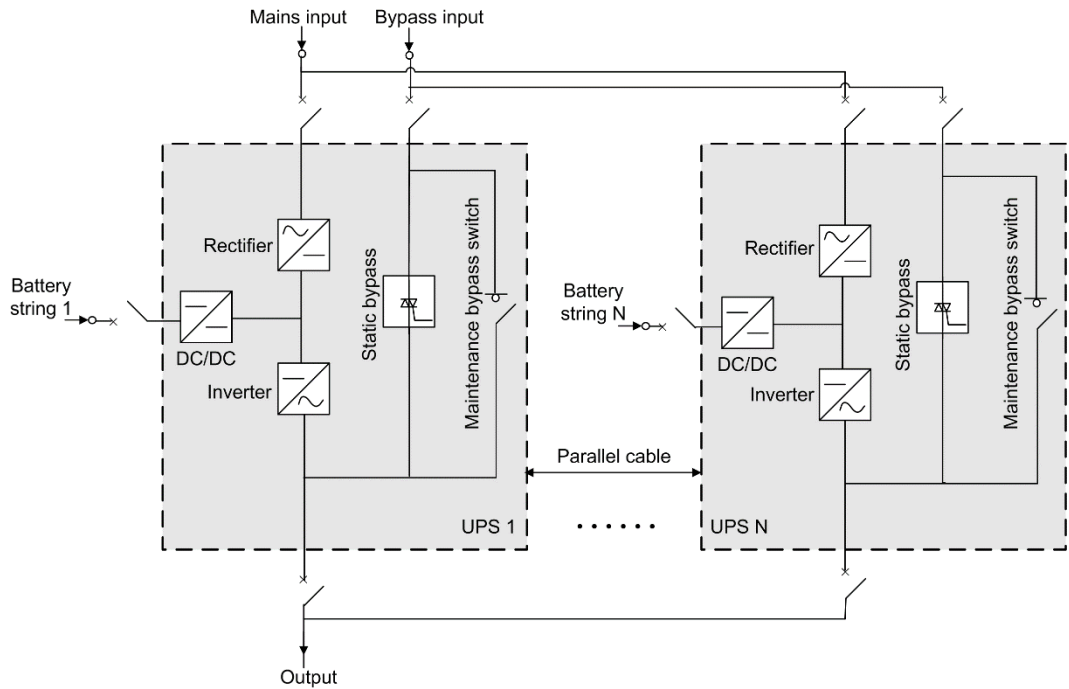
2.6.1 Single UPS

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

2.6.2 Parallel System

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

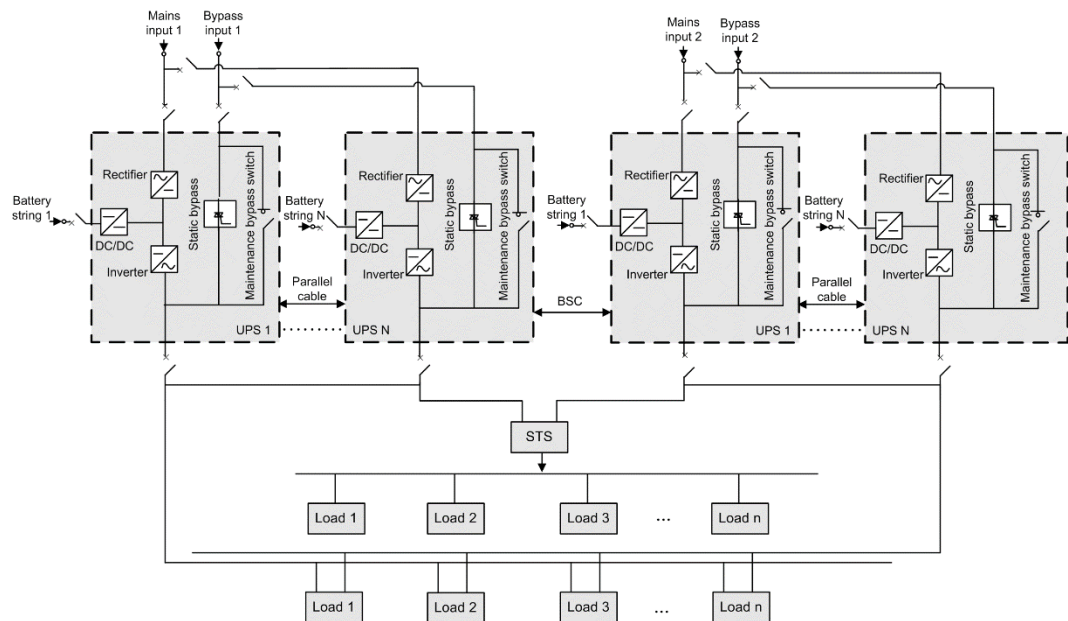
Figure 2-23 Conceptual diagram of an N+X parallel system



2.6.3 Dual-Bus System

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

Figure 2-24 Conceptual diagram of a dual-bus system



2.7 Optional Components

The UPS provides a variety of optional components to address various customer requirements.

Table 2-11 List of optional components of Huawei UPS5000-E

Component	Model	Function
Battery circuit breaker (BCB) box	<ul style="list-style-type: none"> PDU8000-0400DCV8-BXA001 PDU8000-0630DCV8-BXA001 PDU8000-0800DCV8-BXA001 	<ul style="list-style-type: none"> Controls the connection between battery strings and the UPS. Provides overload protection, short-circuit protection, and remote trip control.
Battery bus bar (BBB) box	<ul style="list-style-type: none"> PDU8000-1250DCV8-BGA001 PDU8000-2000DCV8-BGA001 	Converges the energy of multiple battery strings.
Antiseismic ki	N/A	Reinforces the cabinet so that the cabinet meets the requirements of 9 degree seismic fortification intensity.
Air filter	N/A	Prevents the UPS from dust and ensure normal operations.
IP21 component	N/A	Prevents water from dropping into the cabinet, protecting the cabinet to IP21.

Component	Model	Function
ECM extended subrack	N/A	Install this subrack when the UPS is equipped with a backfeed protection card and dry contact extended card.
Dry contact extended card	N/A	Provides extended monitoring ports: five routes of relay output ports and five routes of input ports.
Backfeed protection card	N/A	Detects mains and bypass backfeed and provides protection.
Battery monitor unit (BMU)	N/A	<ul style="list-style-type: none"> Monitors battery voltages and temperatures and battery string charge and discharge currents. Communicates with the UPS over Modbus.
Battery grounding failure detector	N/A	<ul style="list-style-type: none"> Detects current leakage and generates alarms. When equipped with a remote trip switch, the detector protects devices and prevents fire disasters. Detects battery grounding failures and generates alarms when the ground leakage current exceeds the specified value
Ambient temperature and humidity sensor	N/A	Collects ambient temperatures and humidity.
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 UPS5000-E. Huawei will install the ECM extended subrack before delivery.

3 Installation

3.1 Installation Preparations

3.1.1 Site

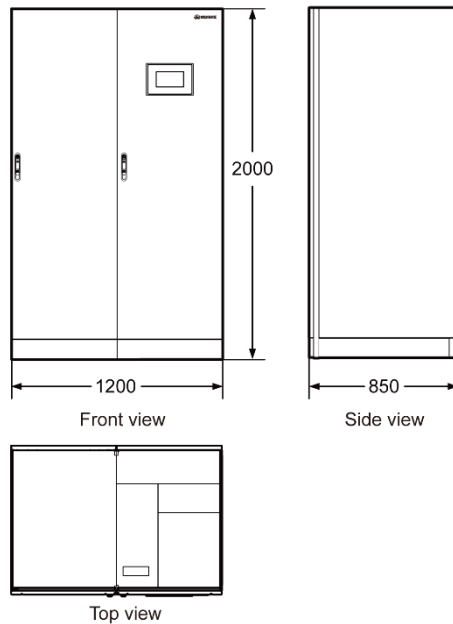
Weight and Dimensions

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

Table 3-1 UPS weight

Model	Capacity	Weight
UPS5000-E	360 kVA	910 kg
	400 kVA	942 kg
	440 kVA	974 kg
	480 kVA	1006 kg

Figure 3-1 Dimensions (unit: mm)



UA130E0013

Installation Environment

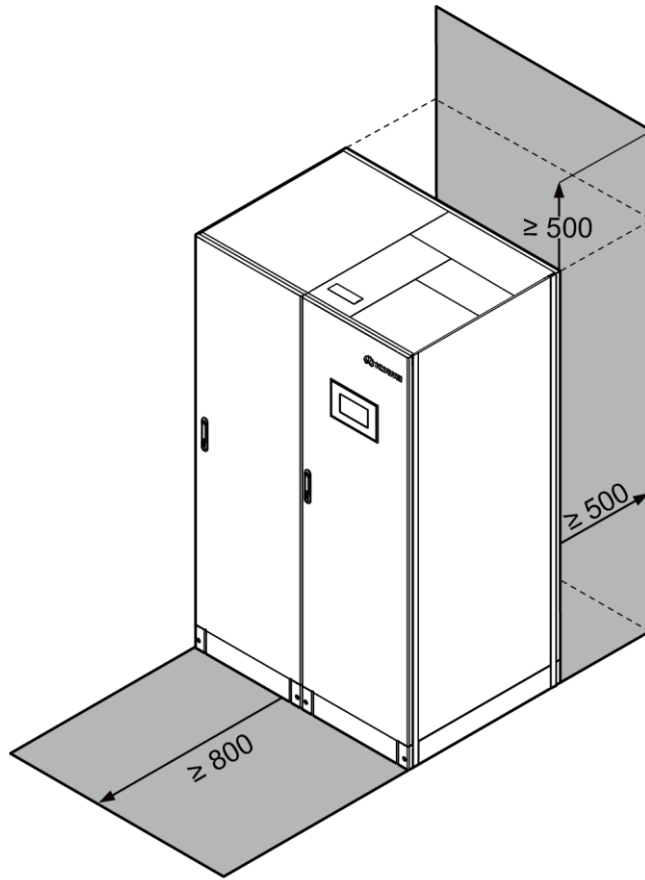
- Do not install the UPS in high temperature, low temperature, and damp areas.
- Install the UPS far away from water sources, heat sources, and inflammable or explosive materials. Keep the UPS free from direct sunlight, dust, volatile gases, corrosive materials, and salty air.
- Do not install the UPS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

Installation Clearances

Reserve sufficient clearances around the cabinet for operations and ventilation:

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

Figure 3-2 Reserved clearances (unit: mm)



UA13000095


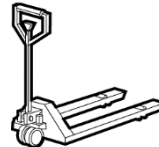


3.1.2 Tools and Instruments

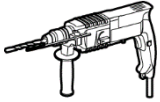
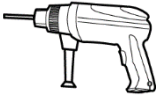
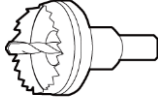
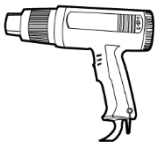
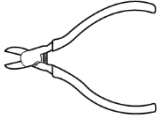
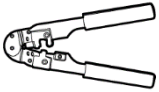
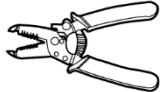

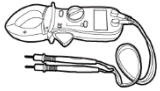


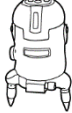

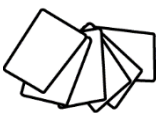
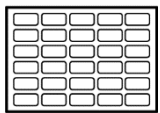
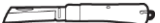
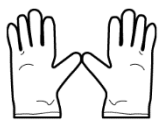



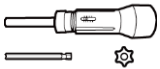
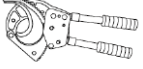


⚠ CAUTION


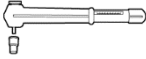
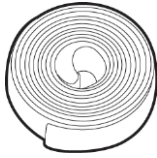

Insulate installation tools to prevent electric shocks.

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

Table 3-2 Tools and meters

Tools and Meters			
Electric pallet truck	Manual pallet truck	Ladder	Rubber mallet
			
Hammer drill and	Hand-held electric	Alloy hole saw	Heat gun

Tools and Meters			
drill bit $\Phi 16$	drill		
			
Diagonal pliers	Crimping tools	Wire stripper	Electric hydraulic pliers
			
Clamp meter	Multimeter	Cable tie	Level instrument
			
Polyvinyl chloride (PVC) insulation tape	Cotton cloth	Label	Electrician's knife
			
Electrostatic discharge (ESD) gloves	Protective gloves	Insulated gloves	Insulation protective shoes
			
Torque screwdriver	Cable cutter	Brush	Flat-head screwdriver (2-5 mm)
			
Phillips screwdriver (M3/M4/M5/M6/M)	Insulated torque wrench	Heat shrink tubing	Insulated adjustable wrench

Tools and Meters			
8)	(M6/M8/M12/M16)		
			

NOTE

Table 3-2 lists only the common tools for installation and cable connection. For more dedicated tools required, see the corresponding component manuals. Prepare tools based on site requirements.

3.1.3 Power Cables

NOTICE

If UPSs are connected in parallel, input and output power cables for each UPS should have the same length and specifications.

Table 3-3 lists the recommended cross-sectional areas for power cables. Table 3-4 lists the requirements for power cable connectors. Table 3-5 lists the recommended UPS input switch configurations.

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

Item		360 kVA	400 kVA	440 kVA	480 kVA	
Mains input	Mains input current (A)	640	711	782	853	
	Recommended cross-sectional area (mm ²)	L1	2 x (4 x 185)	2 x (4 x 240)	3 x (4 x 185)	3 x (4 x 240)
		L2				
		L3				
		N				
PE	185	240	240	240		
Bypass input	Bypass input current (A)	547	608	669	729	
	Recommended cross-sectional area (mm ²)	L1	2 x (4 x 185)	2 x (4 x 240)	3 x (4 x 185)	3 x (4 x 240)
		L2				
		L3				
		N				
PE	185	240	240	240		
Output	Output current (A)	547	608	669	729	

Item			360 kVA	400 kVA	440 kVA	480 kVA
	Recommended cross-sectional area (mm ²)	U	2 x (4 x 185)	2 x (4 x 240)	3 x (4 x 185)	3 x (4 x 240)
		V				
		W				
		N				
		PE	185	240	240	240
Battery input	Nominal discharge current (384 V current; thirty-two 12 V batteries) (A)		987	1096	1206	1316
	Maximum discharge current (end of discharge current of thirty-two 12 V batteries, namely, 1.67 V/cell discharge current of 192 2 V cells) (A)		1181	1321	1443	1574
	Recommended cross-sectional area (mm ²)	+	3 x 150	3 x 185	3 x 185	3 x 240
		N	3 x 150	3 x 185	3 x 185	3 x 240
		-	3 x 150	3 x 185	3 x 185	3 x 240
		PE	150	185	185	240

 **NOTE**

When there is one mains input, configure input cables as mains input cables.

Additionally, cables listed in [Table 3-3](#) are available only under the following conditions:

- Routing mode: Routed over the ladder or bracket in a single layer (the routing mode for DC cables is F in IEC60364-5-52 and the routing mode for AC cables is E in IEC60364-5-52).
- Ambient temperature: 30°C.
- The drop amplitude of AC voltage is less than 3% and DC voltage less than 1%. It is recommended that AC power cables be no longer than 30 m and DC power cables be no longer than 50 m.
- 70°C copper flexible cable.

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

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

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.

CAUTION

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

Table 3-4 Power cable connector requirements

Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Torque
Mains input connector	Crimped DT terminals	M16	18 mm	120 N m
Bypass input connector	Crimped DT terminals	M16	18 mm	120 N m
Battery input connector	Crimped DT terminals	M16	18 mm	120 N m
Output connector	Crimped DT terminals	M16	18 mm	120 N m
Grounding connector	Crimped DT terminals	M12	N/A	47 N m

NOTICE

The UPS can generate large leakage currents. A circuit breaker that provides leakage current protection is not recommended.

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

UPS Capacity	Component	Specifications ^a
360 kVA	Mains input circuit breaker	800 A/3P
	Bypass input circuit breaker	630 A/3P
	Output branch circuit breaker	630 A/3P
400 kVA	Mains input circuit breaker	800 A/3P
	Bypass input circuit breaker	630 A/3P
	Output branch circuit breaker	630 A/3P
440 kVA	Mains input circuit breaker	800 A/3P
	Bypass input circuit breaker	800 A/3P
	Output branch circuit breaker	800 A/3P
480 kVA	Mains input circuit breaker	1000 A/3P

UPS Capacity	Component	Specifications ^a
	Bypass input circuit breaker	800 A/3P
	Output branch circuit breaker	800 A/3P

Circuit breakers configured for the UPS5000-E-360/400/440 kVA are used in circuits with a short-circuit current of less than 35 kA, and those for the UPS5000-E-480 kVA are used in circuits with a short-circuit current of less than 50 kA.

 **NOTE**

- The input front-end and output back-end circuit breakers recommended in [Table 3-5](#) are for reference only.
- If multiple loads are connected, branch circuit breaker specifications 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

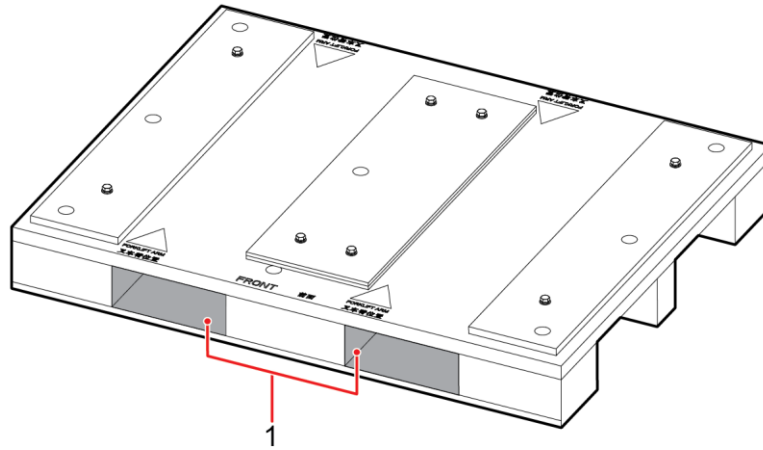
NOTICE

- 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** Visually inspect the UPS appearance for shipping damage. If any shipping damage is founded, report it to the carrier immediately.
- Step 2** Use an electric pallet truck to transport the UPS to the installation position. Special design is adopted for the pallet as the center of gravity of the UPS is in the power cabinet side.

Figure 3-3 Pallet

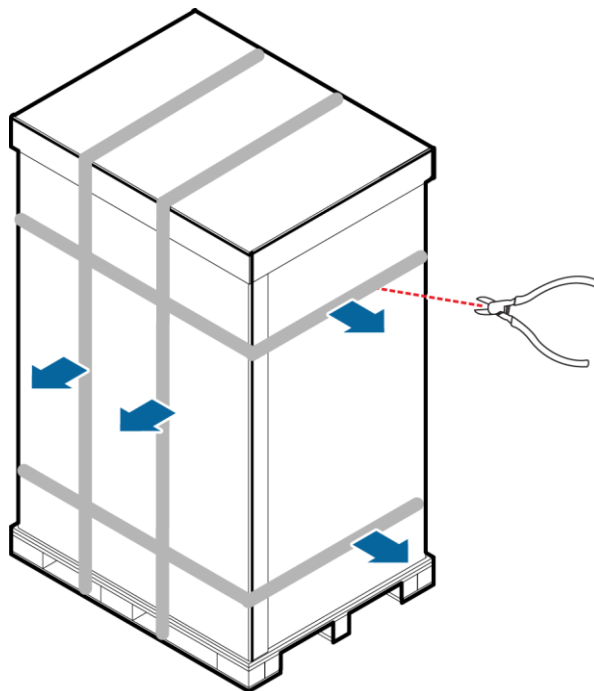


UA13000051

(1) Insertion positions of the pallet truck

Step 3 Cut off and remove the binding straps.

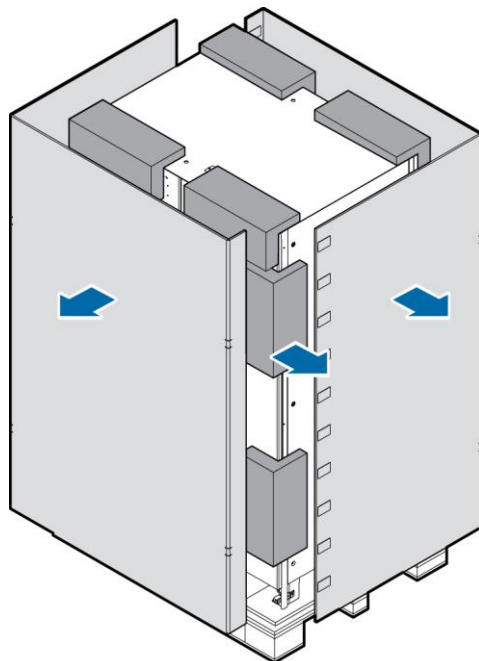
Figure 3-4 Removing binding tapes



UA13000015

Step 4 Remove the packing materials and foam.

Figure 3-5 Removing the packing materials and foam



UA13000016

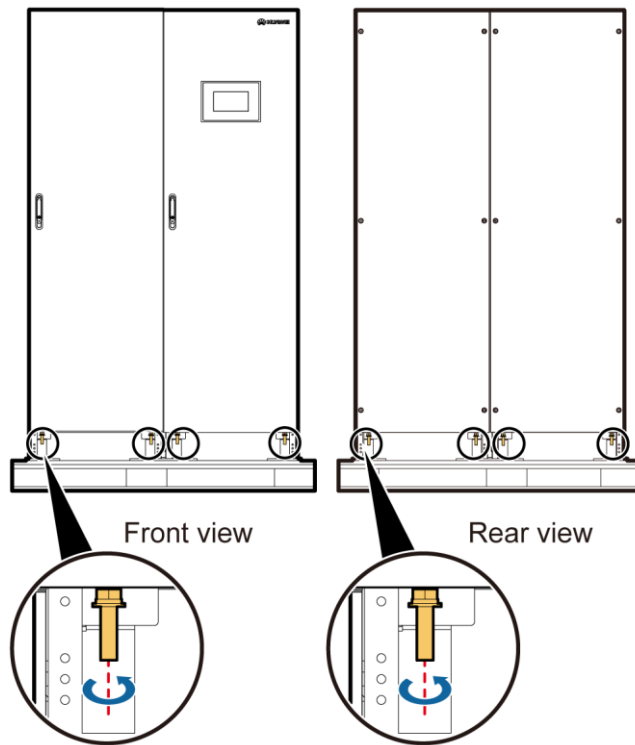
Step 5 Remove the moisture-proof plastic bags and take out the fittings box.

Step 6 Check whether the UPS is intact.

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

Step 7 Remove the screws that secure the cabinet and pallet.

Figure 3-6 Removing the screws that secure the cabinet and pallet



UA130E0018

Step 8 Use an electric pallet truck to transport the cabinet near the installation position.

----End

3.1.5 (Optional) Splitting the Power Cabinet and Bypass Cabinet

Context

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

NOTICE

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

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

Table 3-6 Specifications for removed screws

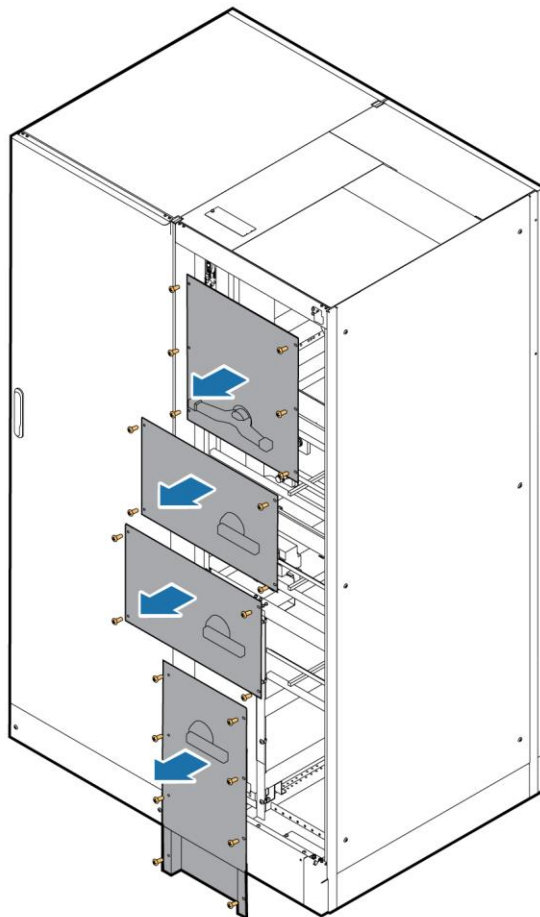
Position	Specifications	Quantity (PCS)
Front covers on the bypass cabinet	M6 panel screw	22

Position	Specifications	Quantity (PCS)
Soft busbar	M12×35	13
Battery copper bar component	M8×25	4
Top connecting plate	M6×20	8
Middle connecting plate	M6×20	8
Bottom connecting plate	M12×35	8

Procedure

Step 1 Open the front door from the bypass cabinet and remove the four covers, as shown in [Figure 3-7](#).

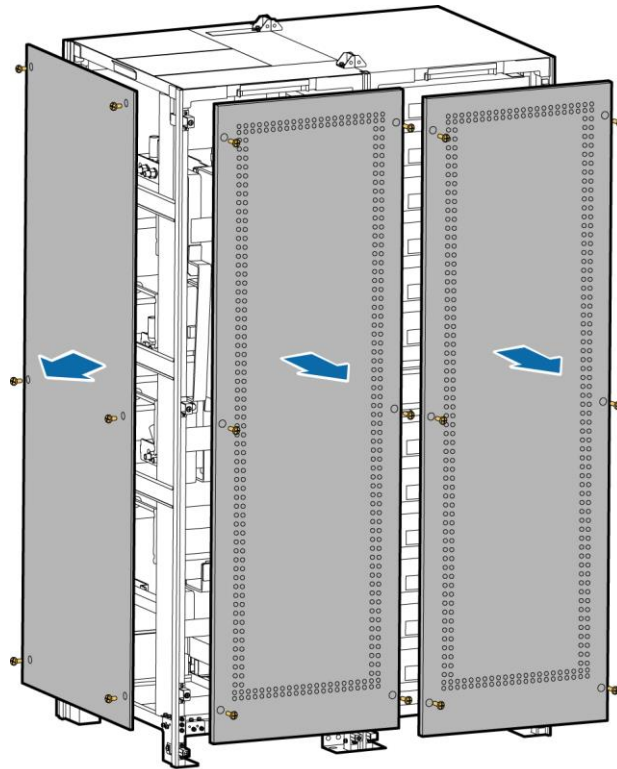
Figure 3-7 Removing front covers from the bypass cabinet



UA13000027

Step 2 Remove the side cover and rear cover from the bypass cabinet and the rear cover from the power cabinet, as shown in [Figure 3-8](#).

Figure 3-8 Removing the side panel and rear covers

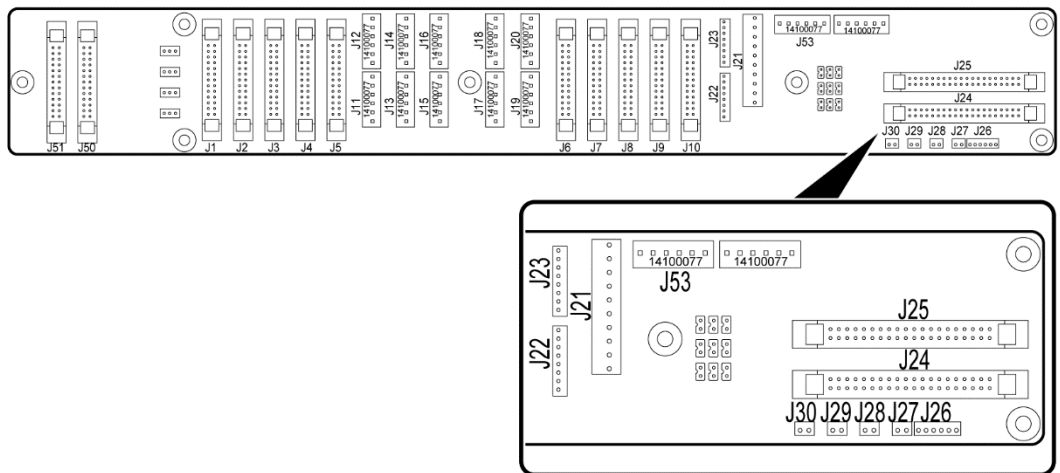


UA13000055

Step 3 Remove the cable terminals that connect the power cabinet parallel board and the bypass cabinet.

Figure 3-9 shows the port screen silks on the power cabinet parallel board. Table 3-7 shows the mapping between cables and ports on the power cabinet parallel board. Disconnect cables by referring to Figure 3-9 and Table 3-7, and cut off the cable tie from the removed cables.

Figure 3-9 Port silk screens on the power cabinet parallel board



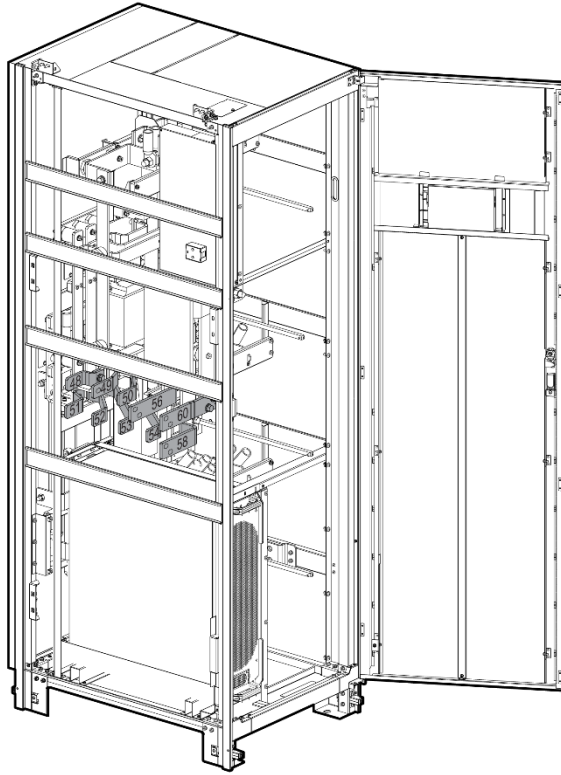
UA13000071

Table 3-7 Mapping between cables and parallel board ports

Bypass Cabinet Cable Name	Bypass Cabinet Cable Number (Copper Bar Configurations)	Parallel Board Cable Label	Port Silk Screen on the Power Cabinet Parallel Board	Quantity (PCS)
Bypass unit DL37 cable	04091308-01	W301_J21	J21	1
		W303_J24	J24	1
ECM 8-pin cable	04091308-02	W305_J22	J22	1
ECM monitoring bus	04091308-03	W307_J25	J25	1
CT cable	04091308-05	W309_J26	J26	1
Switch cable	04091308-06	SW1_J27	J27	1
		SW2_J28	J28	1
		SW4_J30	J30	1

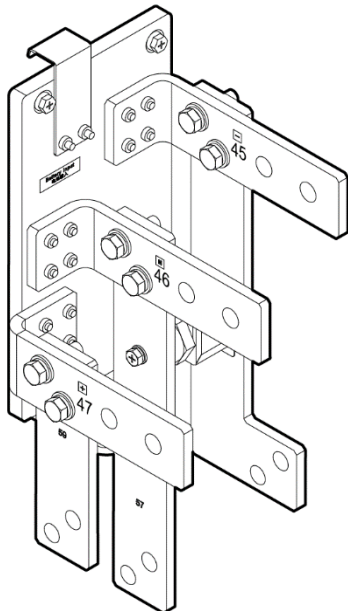
Step 4 Remove the connecting copper bars. The connecting copper bars include soft copper bars and battery copper bars. [Figure 3-10](#) shows the layout of soft copper bars. [Figure 3-11](#) shows the layout of battery copper bars.

Figure 3-10 Layout of soft copper bars



UA13000070

Figure 3-11 Battery copper bar component



UA13000075

 **CAUTION**

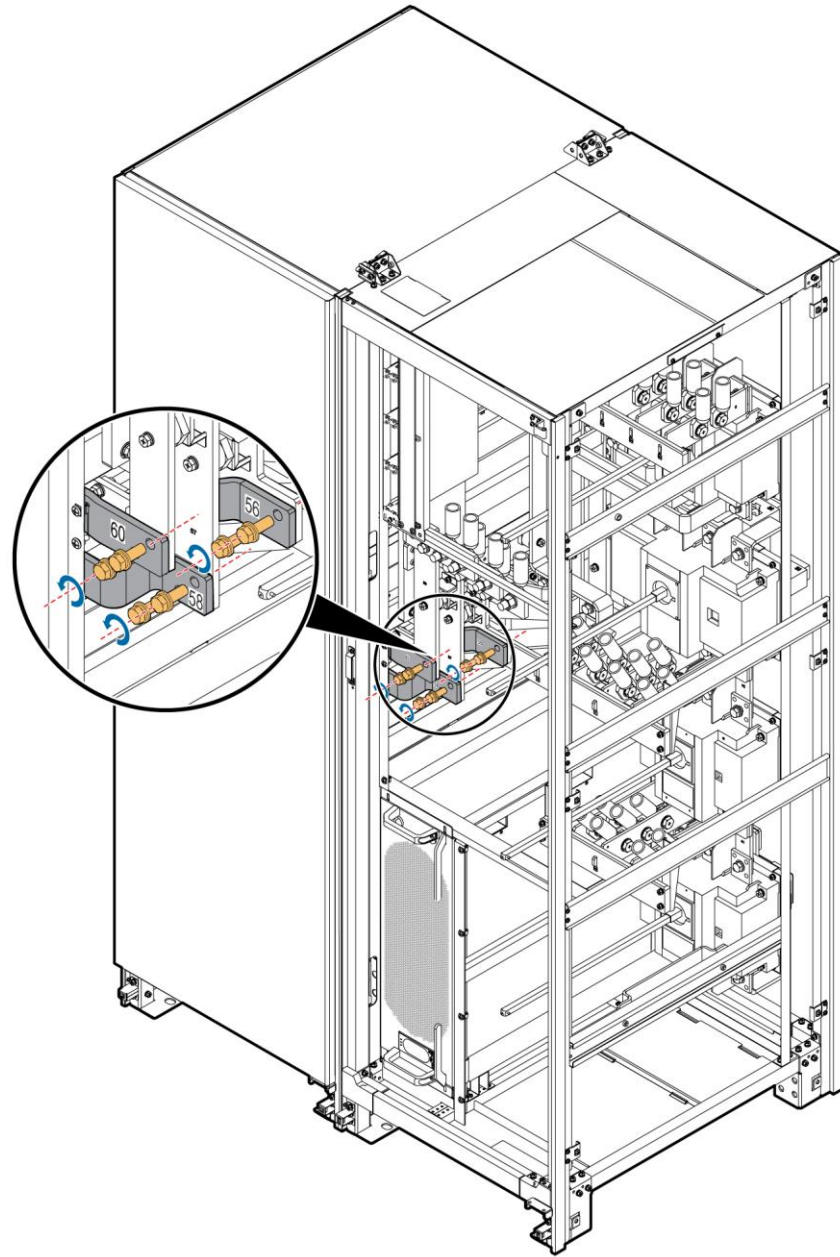
Because the switch extension pole is sharp, exercise caution when you remove the connecting copper bars to prevent personal injury.

NOTICE

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

1. Remove soft copper bars 60, 58, and 56, as shown in [Figure 3-12](#).

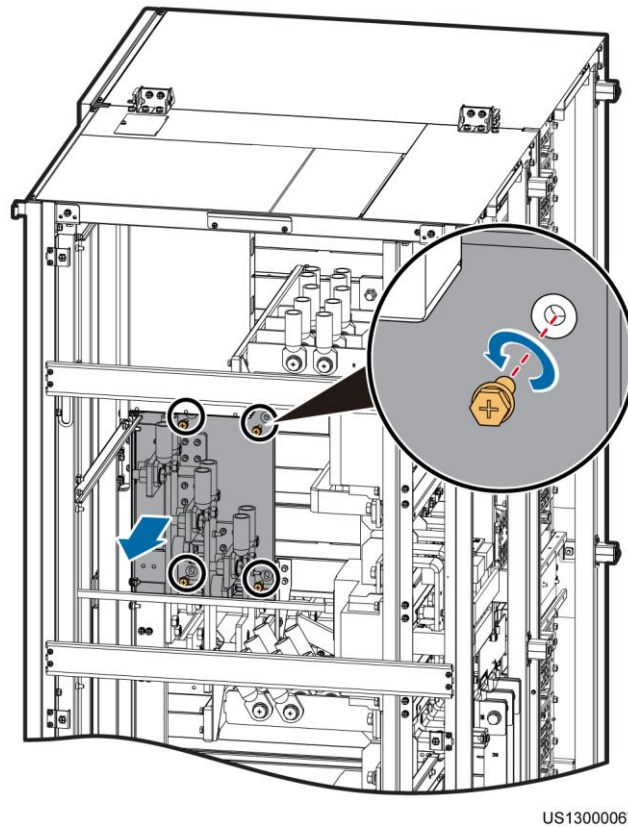
Figure 3-12 Removing soft copper bars 60, 58, and 56



UA13000064

2. Remove the battery copper bar component, as shown in [Figure 3-13](#).

Figure 3-13 Removing a battery copper bar component



US13000067

3. Remove the seven soft copper bars numbered from 54 to 48.

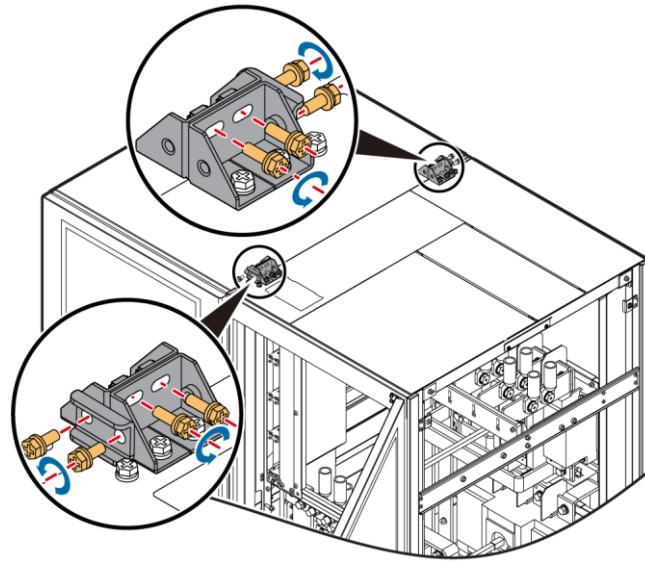
Step 5 Remove the connecting plate between the power cabinet and the bypass cabinet.

1. Remove the two top connecting plates, as shown in [Figure 3-14](#).

NOTICE

Use a step ladder when removing the top connecting plates as the cabinet is high.

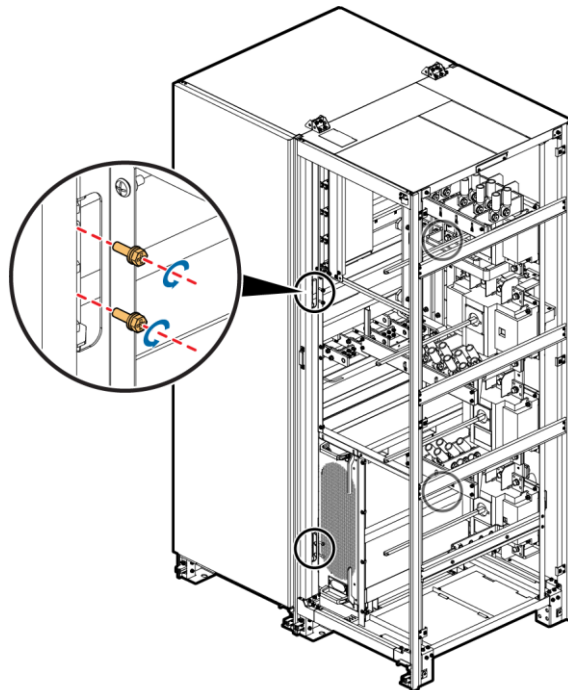
Figure 3-14 Removing the top connecting plates



UA13000065

2. Remove the four connecting plates in the middle of the cabinet, as shown in [Figure 3-15](#).

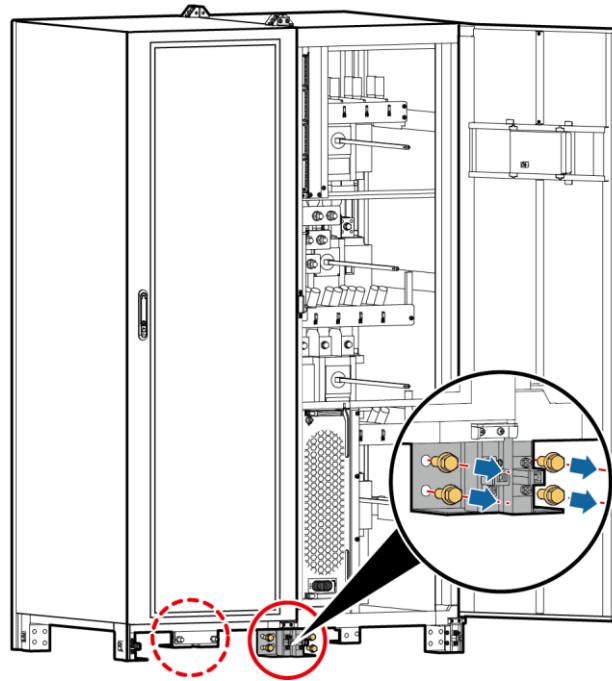
Figure 3-15 Removing the middle connecting plates



UA13000068

3. Remove the two connecting plates from the bottom, as shown in [Figure 3-16](#).

Figure 3-16 Removing the bottom connecting plates



UA13000066

Step 6 Use a manual pallet truck to transport the power cabinet and bypass cabinet to the installation position. Ensure that the two cabinets align with each other.

----End

3.1.6 Optional) Combining the Power Cabinet and Bypass Cabinet

Procedure

- Step 1** Install the bottom, middle, and top connecting plates for the power cabinet and bypass cabinet.
- Step 2** Connect the removed copper bars and battery copper bar components based on their numbers.
- Step 3** Reconnect the removed cables to the power cabinet system signal interface board, and bind the cables.
- Step 4** Check that the combination of the power cabinet and bypass cabinet is complete and secure.
- Step 5** Reinstall the side cover and rear cover.

----End

3.2 Single UPS Installation

UPSs in standard configurations and full configurations have the same installation procedures and cable connection modes. This section uses UPSs in full configurations as an example.

3.2.1 Installing a UPS

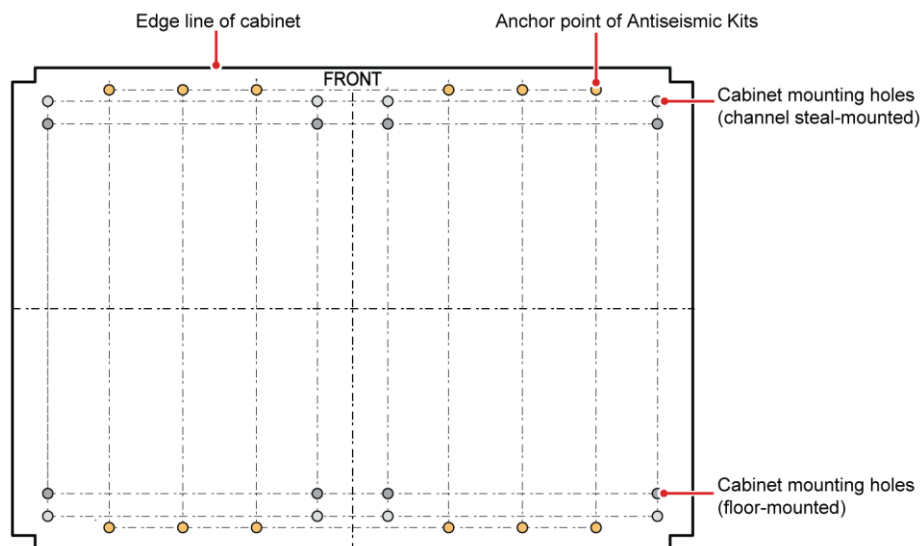
Installing a UPS on the Ground

NOTICE

- Ensure that the installation floor is flat.
- The marking-off template is delivered with the UPS and is placed at the top of the UPS.

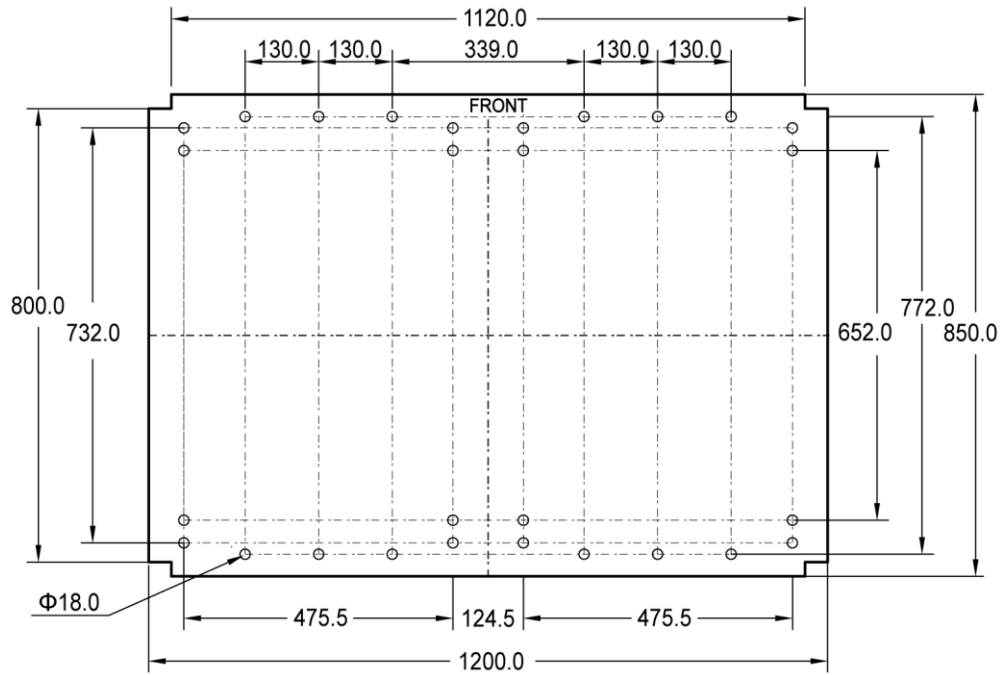
Step 1 Determine the position for installing the UPS and mark mounting holes, as shown in [Figure 3-17](#). [Figure 3-18](#) shows the hole dimensions.

Figure 3-17 Marking-off template



UA130E0081

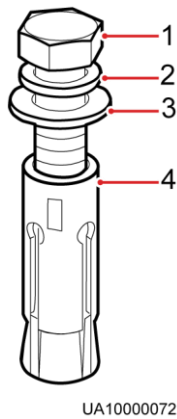
Figure 3-18 Hole dimensions (Unit of measurement :mm)



UA13000080

Step 2 Use a hammer drill to drill holes for installing the expansion bolts and then install the eight expansion bolts in the holes. [Figure 3-19](#) shows an expansion bolt. [Figure 3-20](#) shows how to install an expansion bolt.

Figure 3-19 Expansion bolt



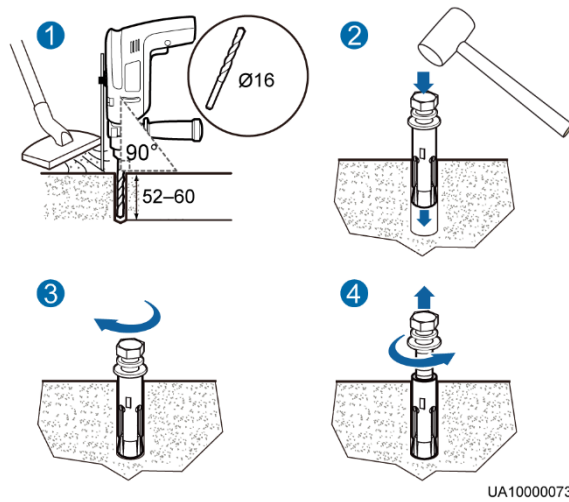
UA10000072

- (1) Bolt (2) Spring washer (3) Flat washer (4) Expansion tube

NOTICE

Knock the expansion bolts into the holes until the expansion tubes completely fit into the holes. The expansion tubes must be completely buried under the ground to facilitate subsequent installation.

Figure 3-20 Installing expansion bolts (unit: mm)

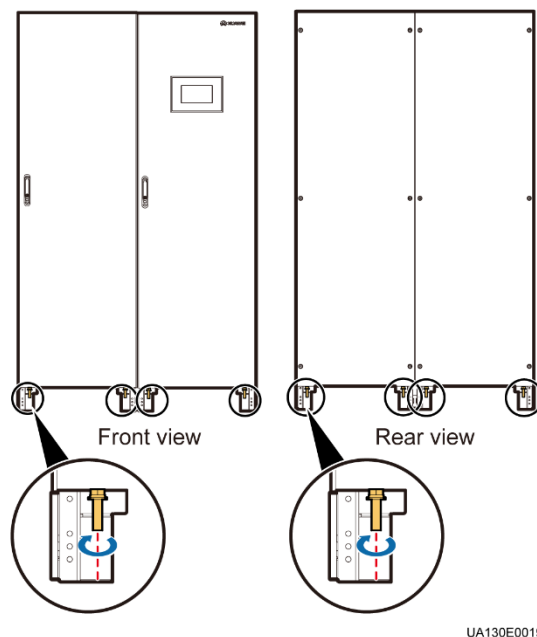


1. Drill holes in the ground by using a hammer drill. The hole depth is 52 mm to 60 mm.
2. Partially tighten the expansion bolt and vertically insert it into the hole. Knock the expansion bolt using a rubber mallet until the expansion sleeve is fully inserted into the hole.
3. Partially tighten the expansion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

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

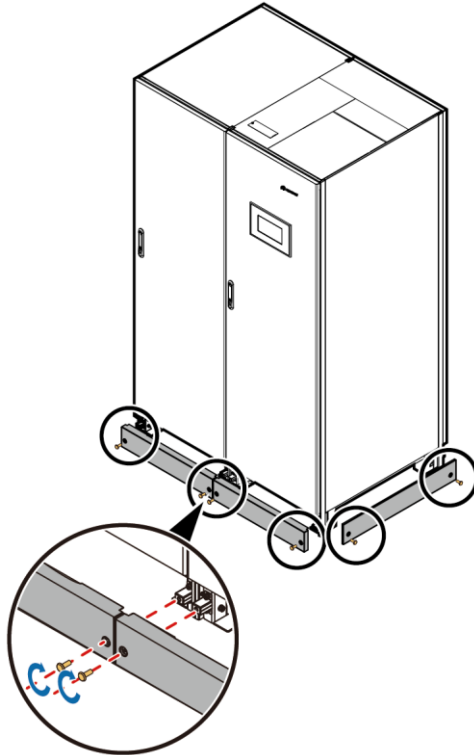
Step 4 Use eight M12x60 expansion bolts to secure the cabinet to the expansion bolt holes on the ground and tighten the expansion bolts, as shown in [Figure 3-21](#).

Figure 3-21 Tightening expansion bolts



Step 5 Install the front and rear anchor baffle plates and left and right anchor baffle plates, as shown in [Figure 3-22](#).

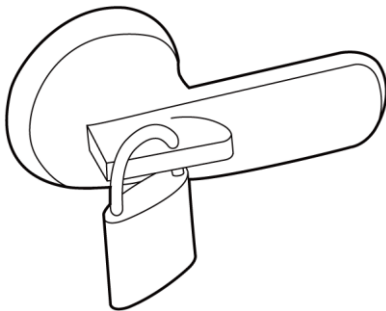
Figure 3-22 Installing front and rear anchor baffle plates and left and right anchor baffle plates (front view)



UA13000017

Step 6 (Recommended) Install a lock for the maintenance bypass switch to prevent misoperations, as shown in [Figure 3-23](#). The required lock core diameter is 5–10 mm.

Figure 3-23 Lock for the maintenance bypass switch



UA10000066

----End

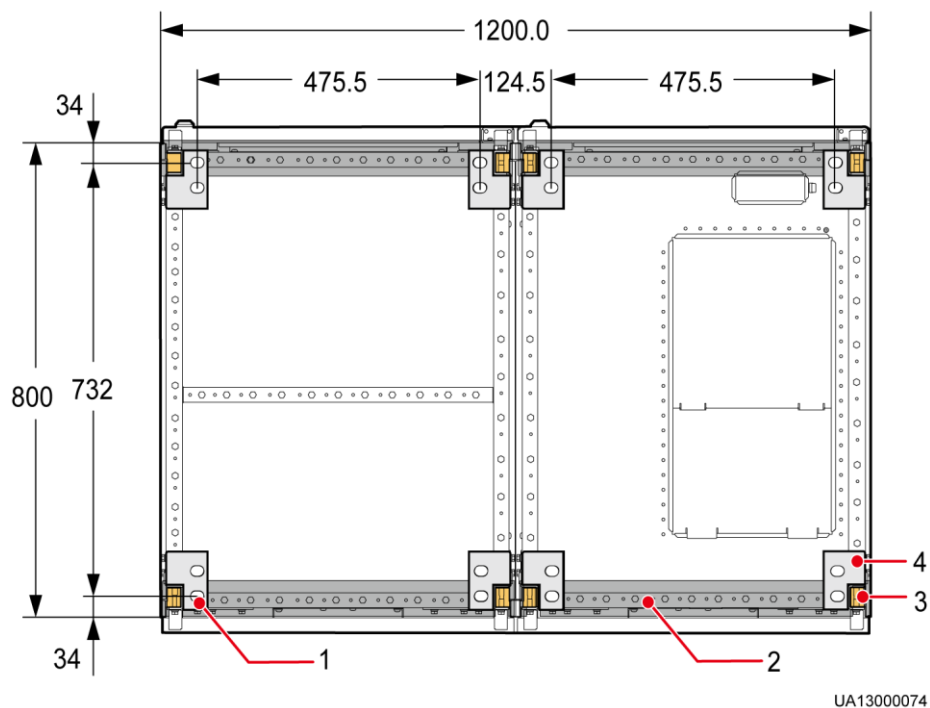
Installing a UPS in Channel Steels

NOTICE

Ensure that the installation channel steels is flat.

- Step 1** According to required mounting hole dimensions at the cabinet base, the channel steel spacing is 800 mm, and the hole spacing is 732 mm. The recommended channel steel width is 50 mm or more. Determine the position for installing the cabinet on the channel steel, as shown in Figure 3-24.

Figure 3-24 Installing a base on the channel steel (Unit of measurement :mm)



- (1) Channel steel mounting hole (2) Channel steel (3) Column (4) Base

NOTICE

- The external sides of front and rear channel steels must be aligned with the column. The channel steel spacing is 800 mm. The recommended channel steel width is 50 mm or more.
- Cabinet mounting holes must align channel steels. Tighten screws to secure the base to channel steels.

- Step 2** Drill holes in the mounting hole marks by using a hammer drill.

NOTICE

This installation scenario uses common bolts rather than expansion bolts.

- Step 3** Use a pallet truck to move the cabinet to the installation position.
- Step 4** Use eight M12x45 bolts to secure the cabinet to the mounting holes in the channel steel and tighten the bolts.
- Step 5** Install the front and rear anchor baffle plates and left and right anchor baffle plates, as shown in [Figure 3-22](#).
- Step 6** (Recommended) Install a lock for the maintenance bypass switch to prevent misoperations, as shown in [Figure 3-23](#). The required lock core diameter is 5–10 mm.

----End

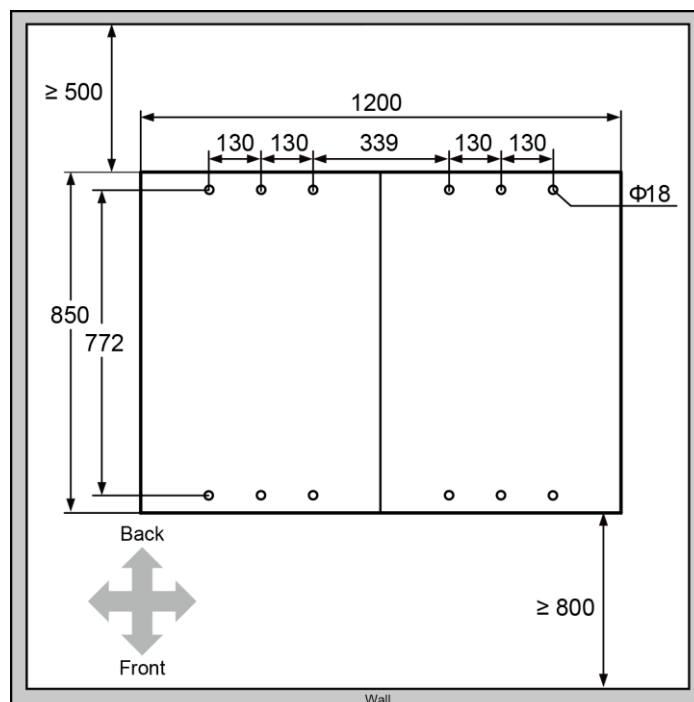
3.2.2 Installing Antiseismic Kits

NOTICE

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

- Step 1** Determine the positions for installing the antiseismic kits. Mark mounting holes based on the drawings. [Figure 3-25](#) shows the hole dimensions.

Figure 3-25 Mounting holes (Unit of measurement: mm)

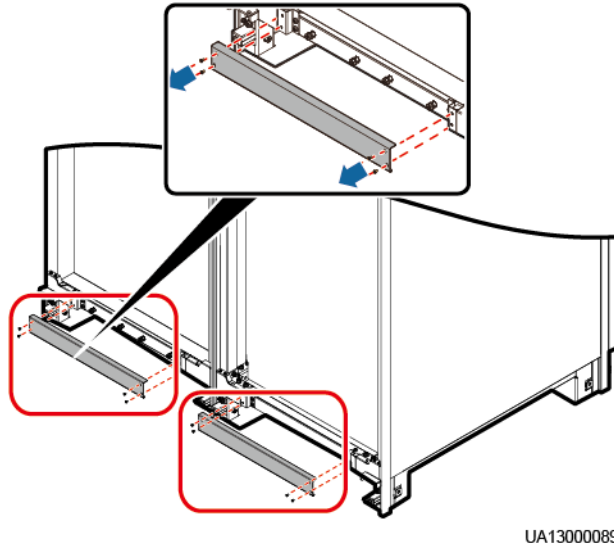


UA130E0042

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

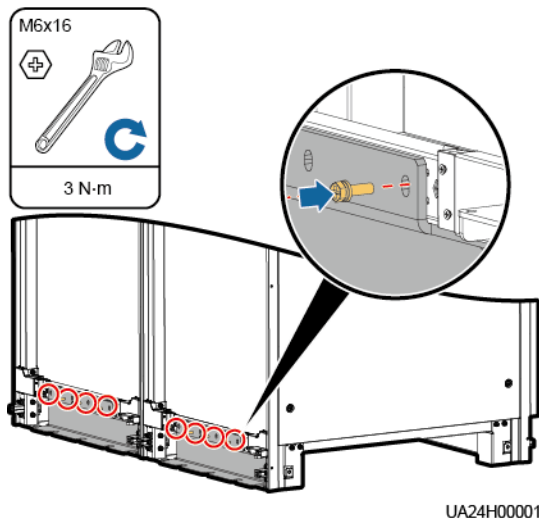
Step 3 Open the front door and remove support baffle plates on the front of the cabinets, as shown in [Figure 3-26](#). Remove the rear covers.

Figure 3-26 Removing support baffle plates



Step 4 Use sixteen M6 screws to secure the four antiseismic kits to the front and rear of the cabinet respectively, as shown in [Figure 3-27](#).

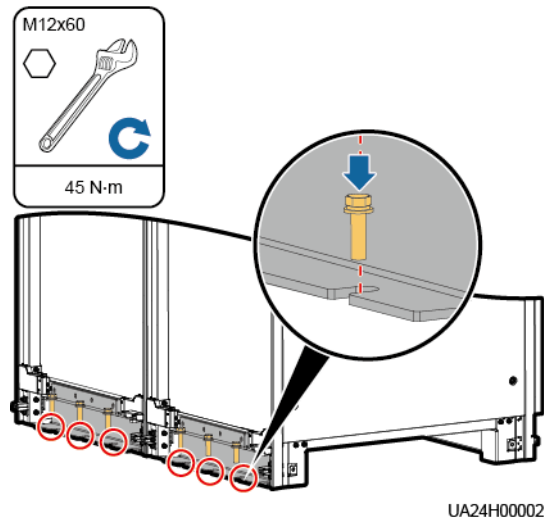
Figure 3-27 Securing the antiseismic kits to the cabinet



Step 5 Adjust the cabinet to ensure that the expansion bolts holes align with the beneath twelve half holes.

Step 6 Use twelve M12 x 60 expansion bolts to firmly lock the four front and rear antiseismic kits to the ground, as shown in [Figure 3-28](#).

Figure 3-28 Locking the antiseismic kits to the ground



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

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

----End

3.2.3 Installing an IP21 Component

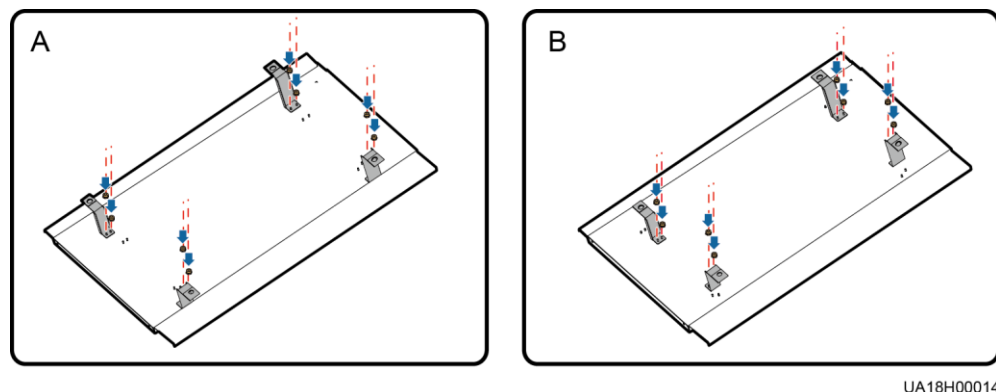
Procedure

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

NOTE

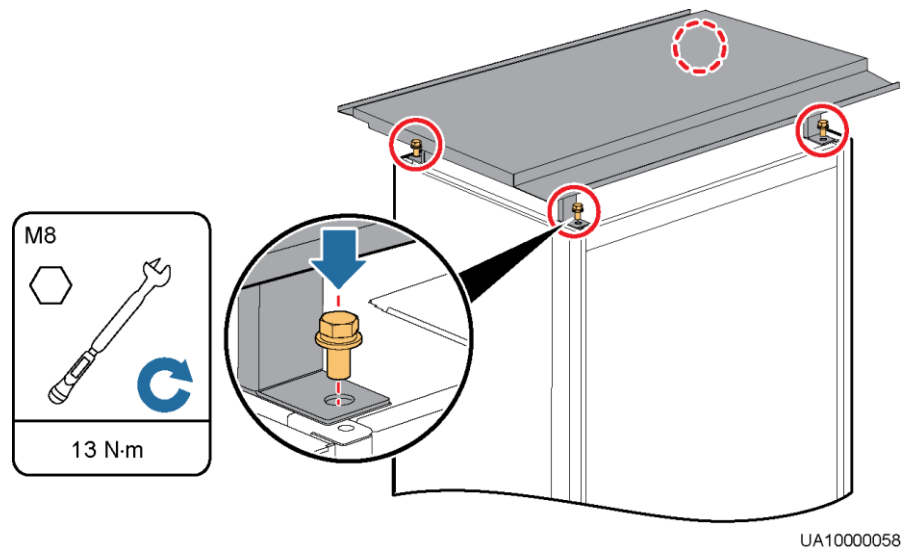
- Refer to the "front" and "back" silk screens on the surface of the IP21 component.
- Select the mounting holes for leveling feet based on the cabinet width onsite.

Figure 3-29 Installing leveling feet



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

Figure 3-30 Installing the IP21 component

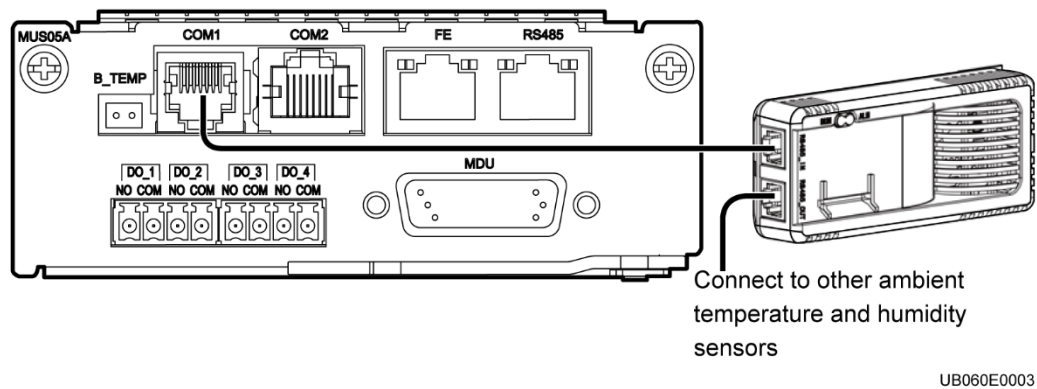


----End

3.2.4 (Optional) Installing an Ambient Temperature and Humidity Sensor

See the *UPS Ambient Temperature and Humidity Sensor User Manual*.

Figure 3-31 Connecting a UPS to an ambient temperature and humidity sensor



3.2.5 Installing Batteries

Context

NOTICE

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

Procedure

Step 1 Install a battery rack and batteries.

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

NOTICE

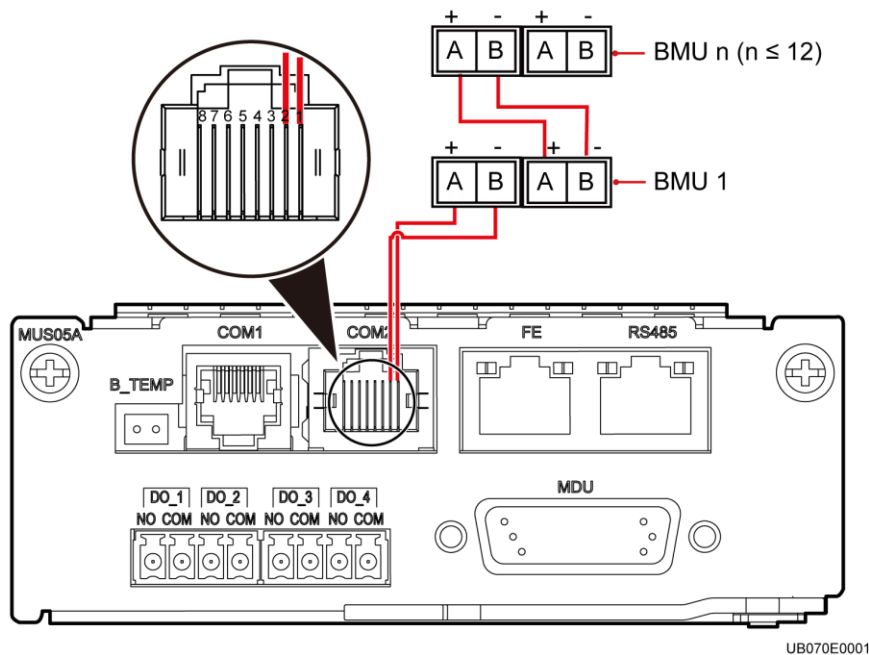
After you install the BCB box, adjust the disconnection protection threshold of the end-of-discharge (EOD) based on backup time to avoid overcurrent disconnection. The default values are as follows:

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

Step 2 (Optional) Install a battery monitoring unit.

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

Figure 3-32 Connecting the UPS and BMU

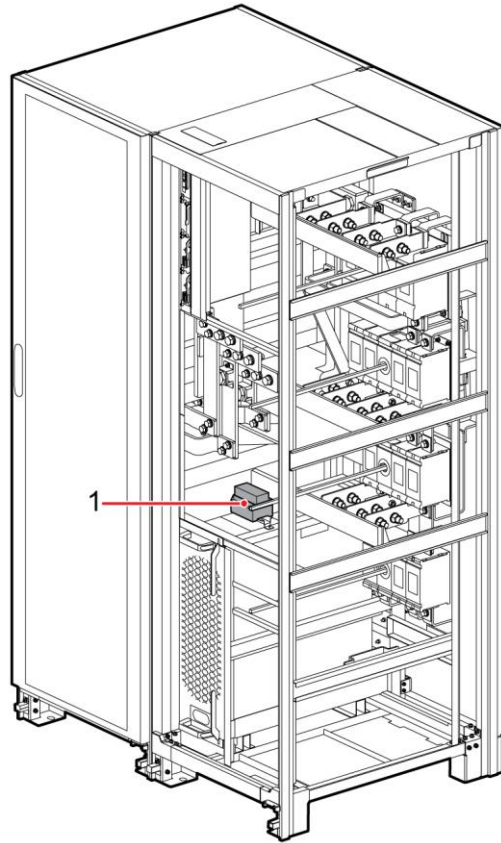


UB070E0001

Step 3 (Optional) Install a battery grounding failure detector.

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

Figure 3-33 Position of the battery grounding failure detector on the UPS



UA13000061

(1) Battery grounding failure detector

----End

3.2.6 (Optional) Installing Fuses

Prerequisites

- Fuses are optional and are used together with an insulation board.
- Fuses are installed only for the UPS in full configuration.
- If you require fuses, inform Huawei when you purchase the UPS. Huawei installs fuses before delivery.

Context

The fuse provides overcurrent protection. The fuse is blown if the UPS current exceeds the upper threshold. If the fuse is blown, replace it.

⚠ DANGER

To prevent electric shocks, do not touch the copper bar behind the insulation board when replacing a fuse.

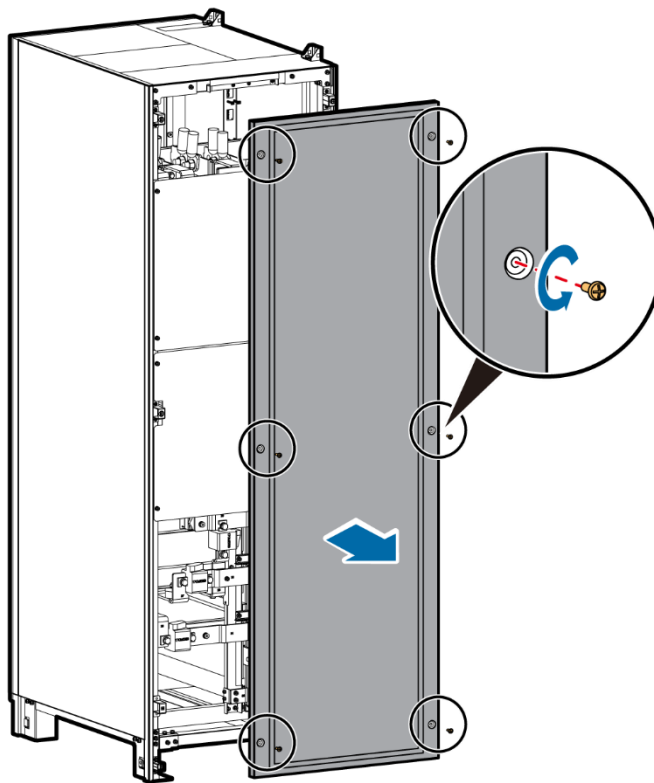
NOTICE

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.

Procedure

Step 1 Remove the rear cover from the bypass cabinet.

Figure 3-34 Removing the rear cover from the bypass cabinet



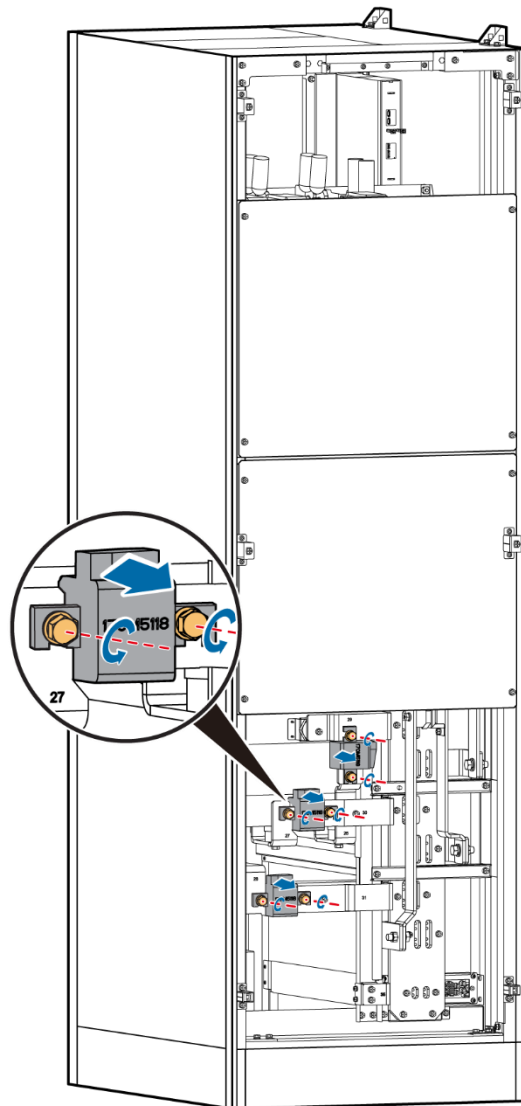
UA10000109

Step 2 Remove the damaged fuse. Replace the fuse.

NOTICE

To prevent security risks, tighten wiring terminals to a torque of 27 N.m when replacing the fuse.

Figure 3-35 Replacing a fuse



UA10000108

Step 3 Reinstall the rear cover for the bypass cabinet.

----End

3.2.7 Routing Cables

3.2.7.1 Top Cable Routing

Context

NOTE

- Top cable routing is recommended. Bottom cable routing is applicable only to channel steel installation or ground cabling trough installation.
- If an IP21 component is installed, cables cannot be routed from the top of the cabinet.
- Route cables through holes, remove the power cable tray cover, spare power cable tray cover and battery cable tray cover and drill holes. After you drill holes, paste grommet strip to the hole edge to protect cables. Reinstall the covers on the cabinet.
- After routing cables, use firestop putty to fill in the gap between the cables and the cabinet.

Procedure

- Step 1** Open the front door of the cabinet, and remove the four power distribution covers from the bypass cabinet, as shown in [Figure 3-7](#).
- Step 2** Route power cables.

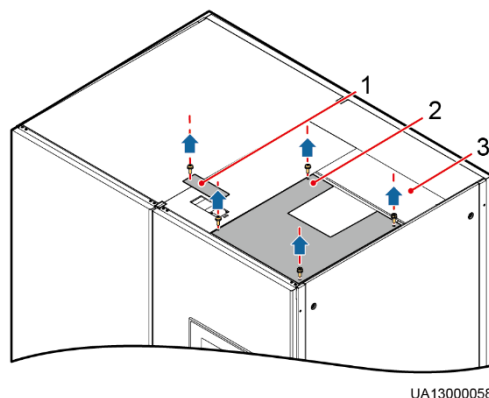
NOTICE

- Connect cables from top to bottom in this sequence: mains input power cables, output power cables, bypass input power cables, and battery input cables.
 - When you connect each phase wire, tighten screws from inside to outside to secure wires.
1. Remove the cable tray cover from the top of the cabinet. Use a hole saw to drill holes in the power cable tray cover, attach grommet strips around the holes to protect cables, and reinstall the power cable tray cover on the cabinet, as shown in [Figure 3-36](#).

NOTE

The hole size and quantity are for reference only.

Figure 3-36 Removing the top cover and drilling holes

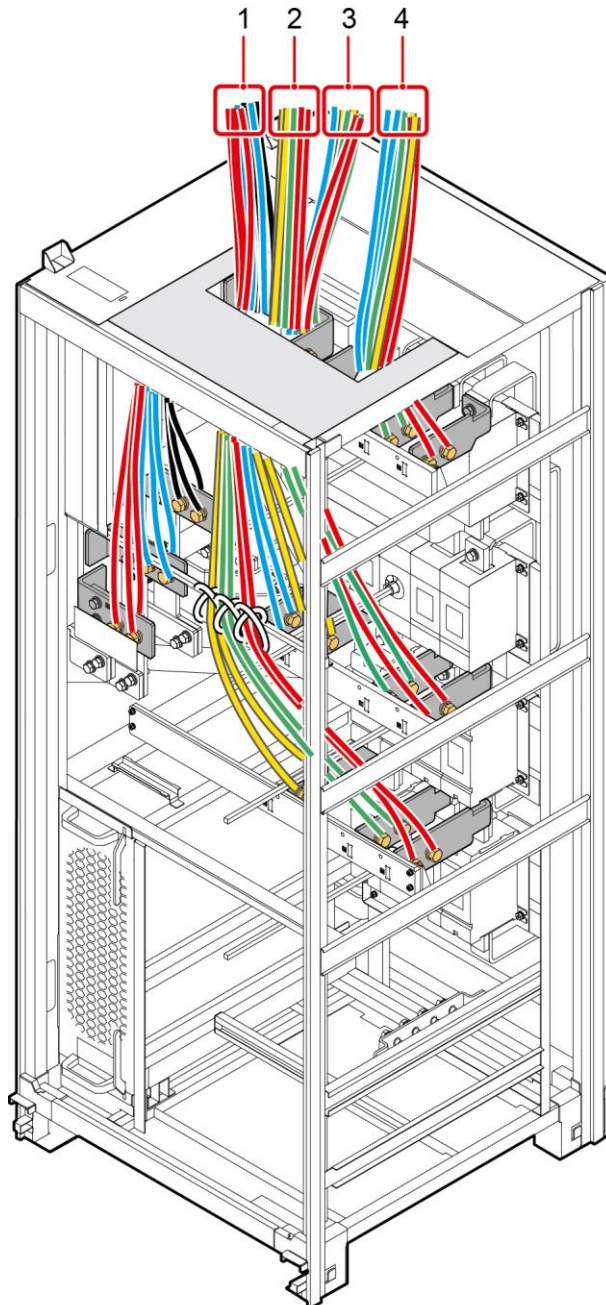


- (1) Signal cable tray cover (2) Power cable tray cover (3) Spare power cable tray

cover

2. **Figure 3-37** shows the power cables routed from the top of the cabinet.

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



UA15000021

(1) Battery cables

(2) Bypass input power cables

(3) Output power cables

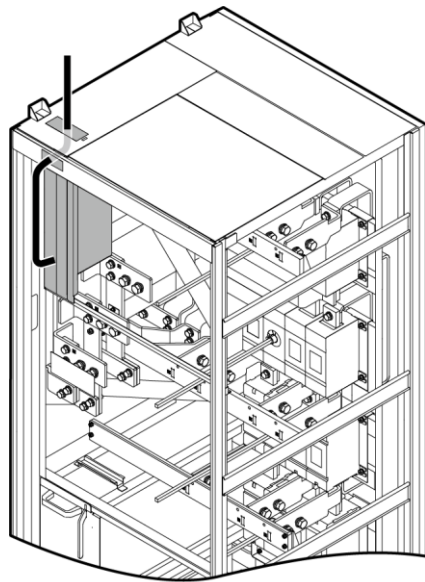
(4) Mains input power cables

NOTICE

Bind signal cables and power cables separately.

- Step 3** Route signal cables. Bind cables to the cabinet. [Figure 3-38](#) shows the signal cables routed from the top of the cabinet.

Figure 3-38 Routing control cable from the top of the cabinet



UA15000115

NOTE

The number and colors of control cables in [Figure 3-38](#) are for reference only.

----End

3.2.7.2 Bottom Cable Routing

Prerequisites

NOTICE

- If you choose to route cables from the bottom of the cabinet, ensure sufficient space at the bottom of the cabinet.
- If you choose to route cables through holes, remove power cable tray covers and drill holes. After you drill holes, paste grommet strip to the hole edge to protect cables. Reinstall the covers on the cabinet.
- After routing cables, use firestop putty to fill in the gap between the cables and the cabinet.

Procedure

- Step 1** Open the front door of the cabinet, and remove the power distribution covers from the bypass cabinet, as shown in [Figure 3-7](#).
- Step 2** Route power cables.

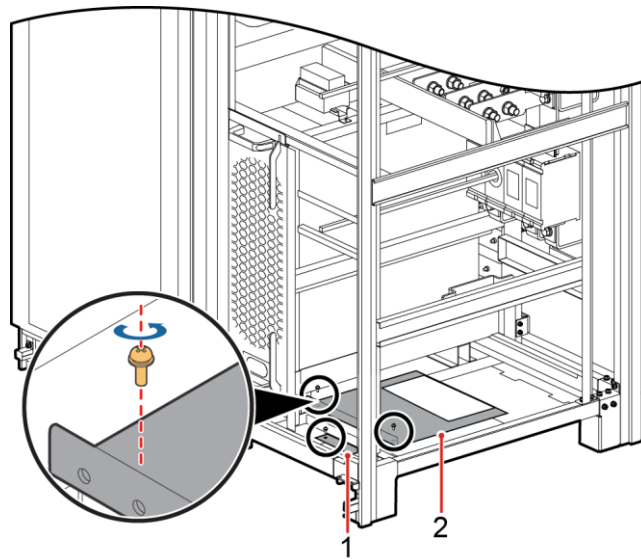
NOTICE

- Connect cables from bottom to top in this sequence: bypass input power cables, output power cables, mains input power cables, and battery input cables.
 - When you connect each phase wire, tighten screws from inside to outside to secure wires.
1. Remove the power cable tray cover and signal cable tray cover from the bottom of the cabinet. Use a hole saw to drill holes in the power cable tray cover, attach grommet strips around the holes to protect cables, and reinstall the power cable tray cover on the cabinet, as shown in [Figure 3-39](#).

NOTE

The mains input, bypass input, output, and battery cables should each be routed through a hole.

Figure 3-39 Removing the bottom cover and drilling holes



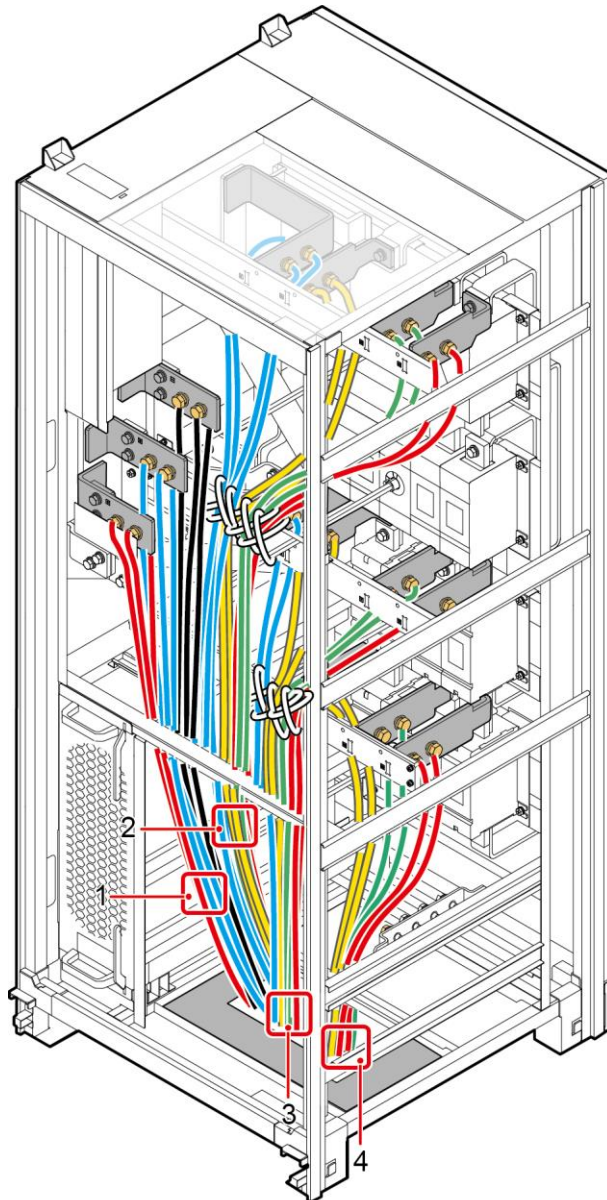
UA13000063

(1) Signal cable tray cover

(2) Power cable tray cover

2. [Figure 3-40](#) shows the power cables routed from the bottom of the cabinet.

Figure 3-40 Routing power cables from the bottom of the cabinet



UA15000022

(1) Battery
cables

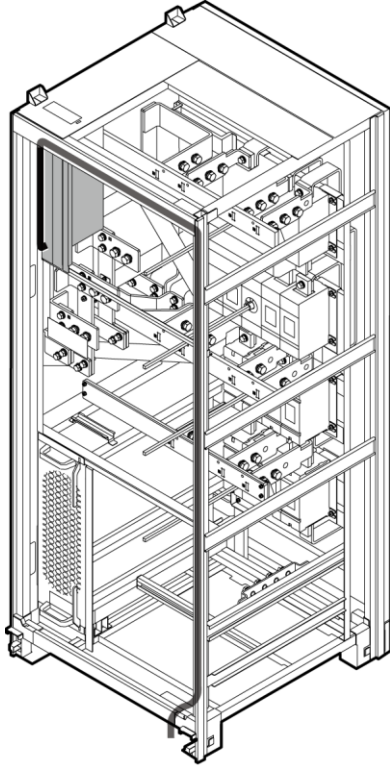
(2) Mains input power
cables

(3) Output power
cables

(4) Bypass input power
cables

Step 3 Route control cables. Bind cables to the cabinet. [Figure 3-41](#) shows the control cables routed from the bottom of the cabinet.

Figure 3-41 Routing control cable from the bottom of the cabinet



UA13000087

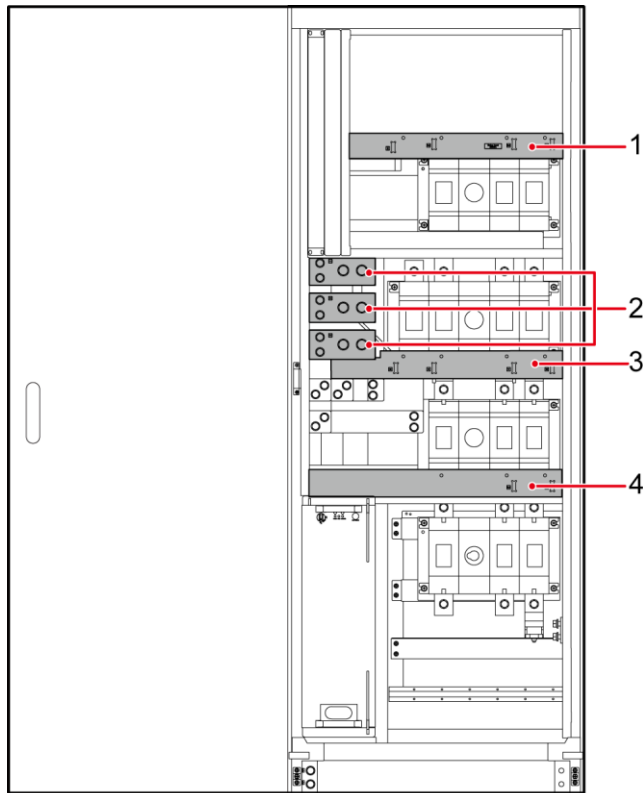
NOTE

The number and colors of control cables in [Figure 3-41](#) are for reference only.

----End

3.2.8 Connecting Ground Cables

Figure 3-42 Layout of the power cable wiring terminals in a PDU



UA13000088

(1) Mains input
wiring terminal

(2) Battery input
wiring terminal

(3) Output wiring
terminal

(4) Bypass input
wiring terminal

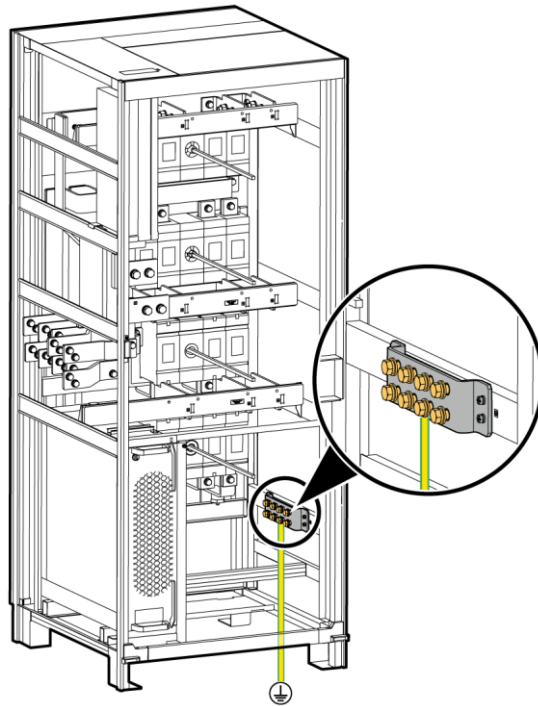
CAUTION

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

NOTICE

- Before cable connections, ensure that all UPS input switches are OFF. Paste warning labels to prevent operation on the switches.
- Connect input power cables to the UPS and then to customer equipment.
- This figure is for reference only. For details about recommended cable specifications and numbers, see [Table 3-3](#). Select and install cables based on site requirements.
- In the case of top cable routing, the ground cable is routed from the top. [Figure 3-43](#) shows how to route a ground cable from the bottom.

Figure 3-43 Ground cable



UA15000048

3.2.9 Connecting AC Input Power Cables

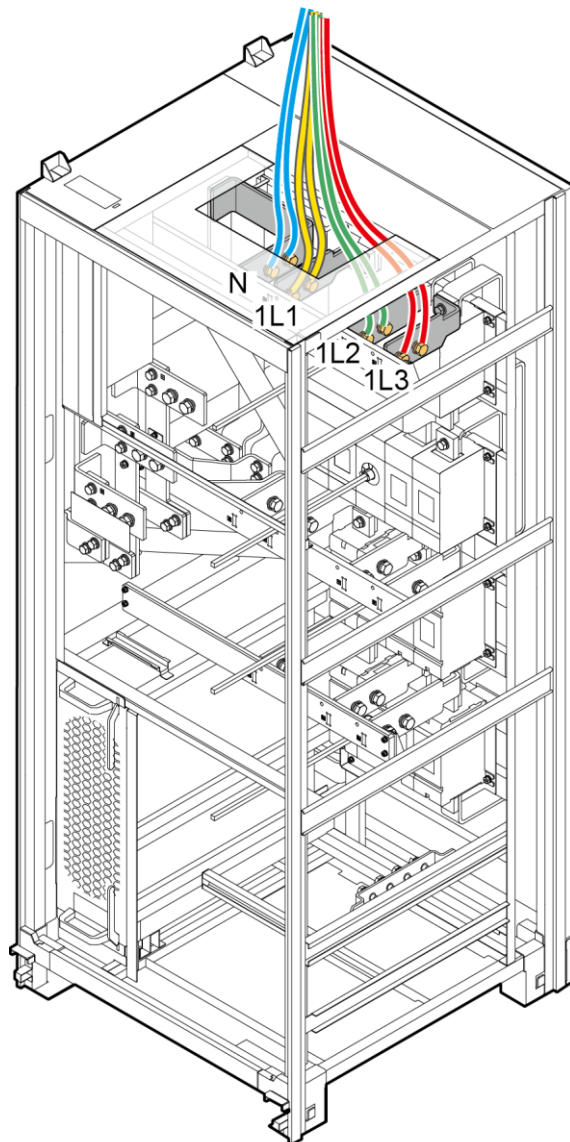
3.2.9.1 Single Mains

NOTICE

This figure is for reference only. For details about recommended cable specifications and numbers, see [Table 3-3](#). Select and install cables based on site requirements.

Connecting the AC input power cable to mains input power distribution terminals 1L1, 1L2, 1L3, and N respectively, as shown in [Figure 3-44](#).

Figure 3-44 AC input power cable connection



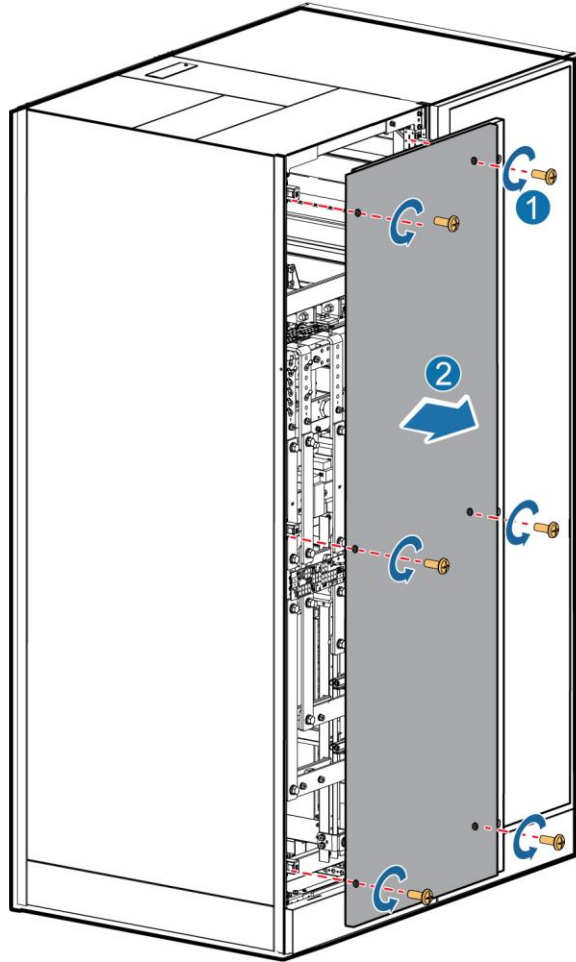
UA15000072

3.2.9.2 Dual Mains

Procedure

Step 1 Remove the rear cover of the bypass cabinet.

Figure 3-45 Removing the rear cover

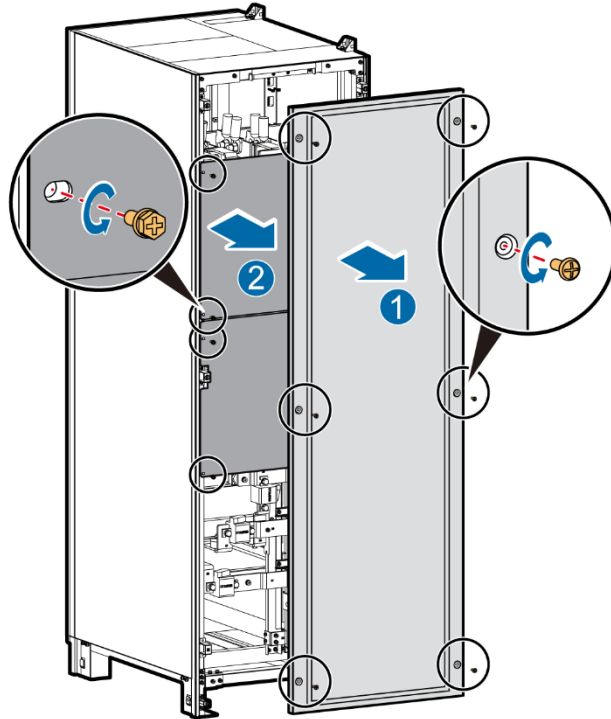


UA13000025

NOTE

If fuses are installed, before you remove connecting copper bars, remove the rear cover and insulation board from the bypass cabinet.

Figure 3-46 Removing the rear cover and insulation board from the bypass cabinet



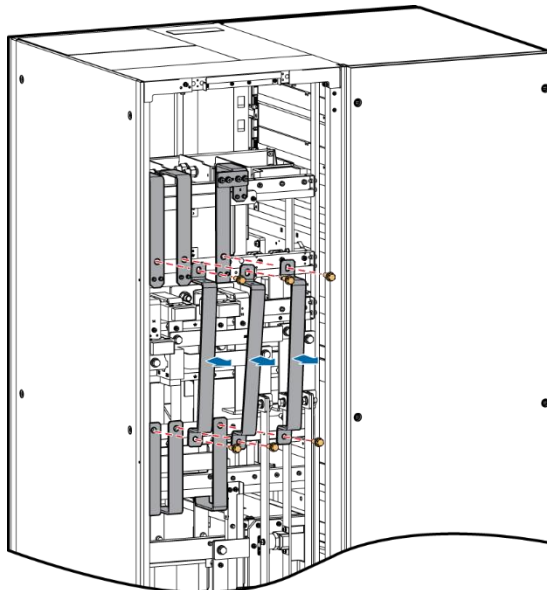
UA10000110

Step 2 Remove the connecting copper bars between mains and bypass input terminals.

NOTE

Properly keep the removed copper bars and bolts.

Figure 3-47 Removing the connecting copper bars



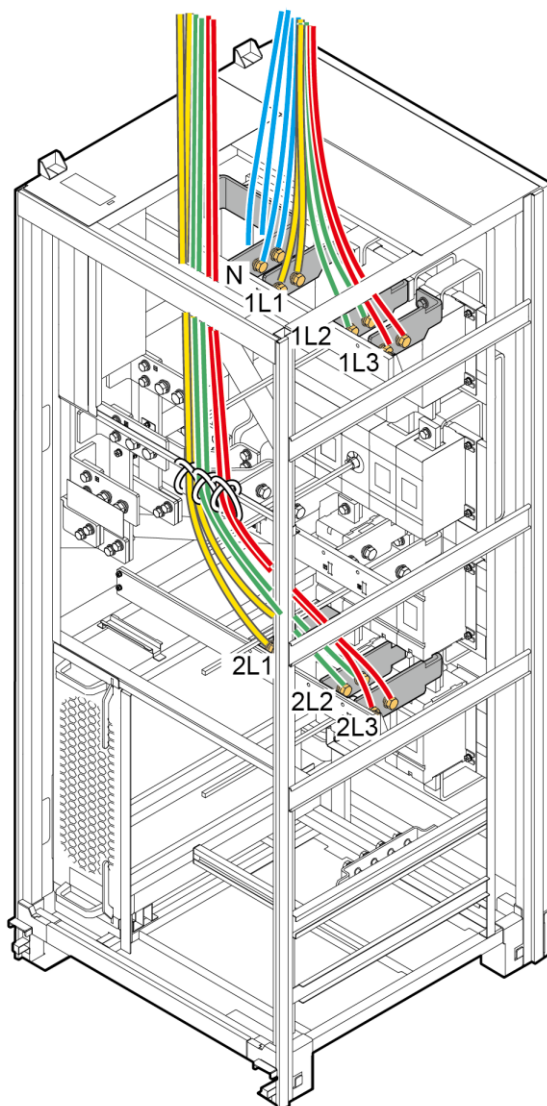
UA13000026

- Step 3** Connect mains input power cables to mains input terminals 1L1, 1L2, and 1L3 respectively. Connect the neutral wires of mains input power cables to input N wiring terminals.
- Step 4** Connect bypass input power cables to bypass input terminals 2L1, 2L2, and 2L3. Connect the neutral wires of bypass input power cables to input N wiring terminals.

NOTICE

When the mains input and bypass input use different power sources, you need to connect four N wires.

Figure 3-48 Connecting AC input power cables



UA15000060

----End

3.2.10 Connecting AC Output Power Cables

CAUTION

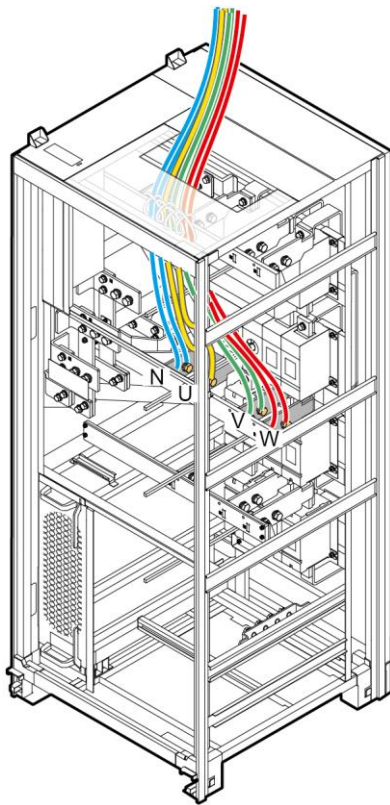
After you connect output power cables, if loads are not ready to be powered, insulate the end of the system output power cable.

NOTICE

This figure is for reference only. For details about recommended cable specifications and numbers, see [Table 3-3](#). Select and install cables based on site requirements.

Connecting the AC output power cables to output power distribution wiring terminals N, U, V, and W, as shown in [Figure 3-49](#).

Figure 3-49 Connecting AC Output Power Cables



UA15000061

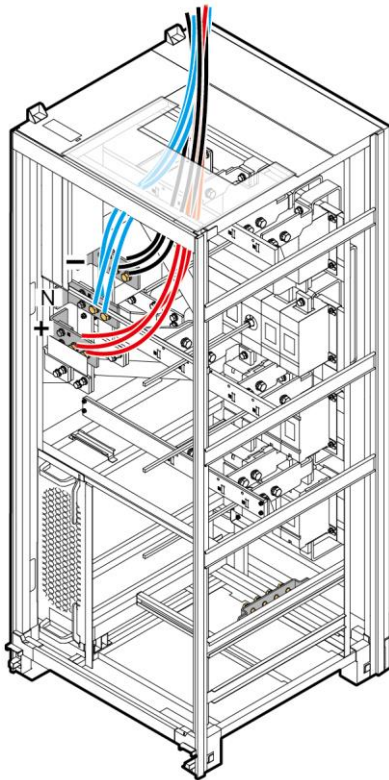
3.2.11 Connecting Battery Cables

⚠ DANGER

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

Connect the battery cables to battery power distribution wiring terminals -, N, and +, as shown in [Figure 3-50](#).

Figure 3-50 Connecting Battery Cables

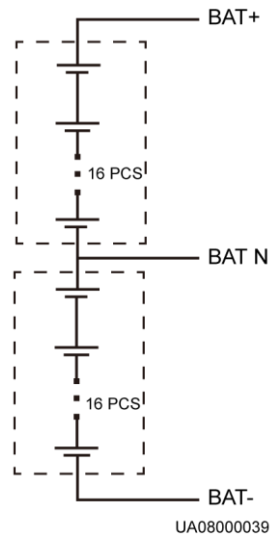


UA1500062

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

Take a battery string consisting of 32 batteries as an example. [Figure 3-51](#) shows a neutral wire routed from the middle of positive and negative battery strings, each consisting of 16 batteries.

Figure 3-51 Neutral wire



3.2.12 Remote EPO

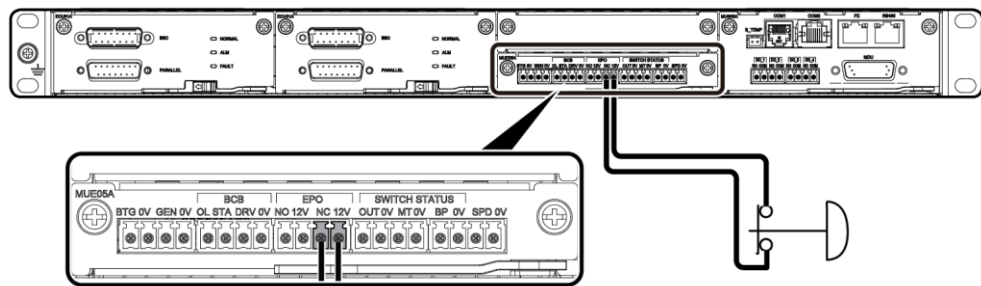
NOTICE

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

Connect the requisite EPO switch to UPS dry contacts.

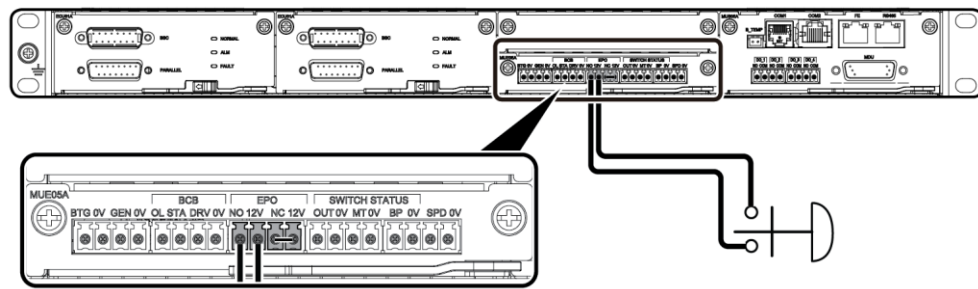
- [Figure 3-52](#) shows the cable connections for an NC EPO switch.
- [Figure 3-53](#) shows the cable connections for an NO EPO switch.

Figure 3-52 Cable connection for an NC EPO switch



UA10000063

Figure 3-53 Cable connection for an NO EPO switch



UA10000062

NOTE

- When the EPO switch is in the NC state, remove the jumper between EPO_NC and EPO_12V before connection. When the EPO switch is turned off, EPO is triggered.
- When the EPO switch is in the NO state, ensure that the jumper is connected between EPO_NC and EPO_12V. When the EPO switch is turned on, EPO is triggered.

3.2.13 Connecting Communications Cables

Procedure

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

3.3 Parallel System Installation

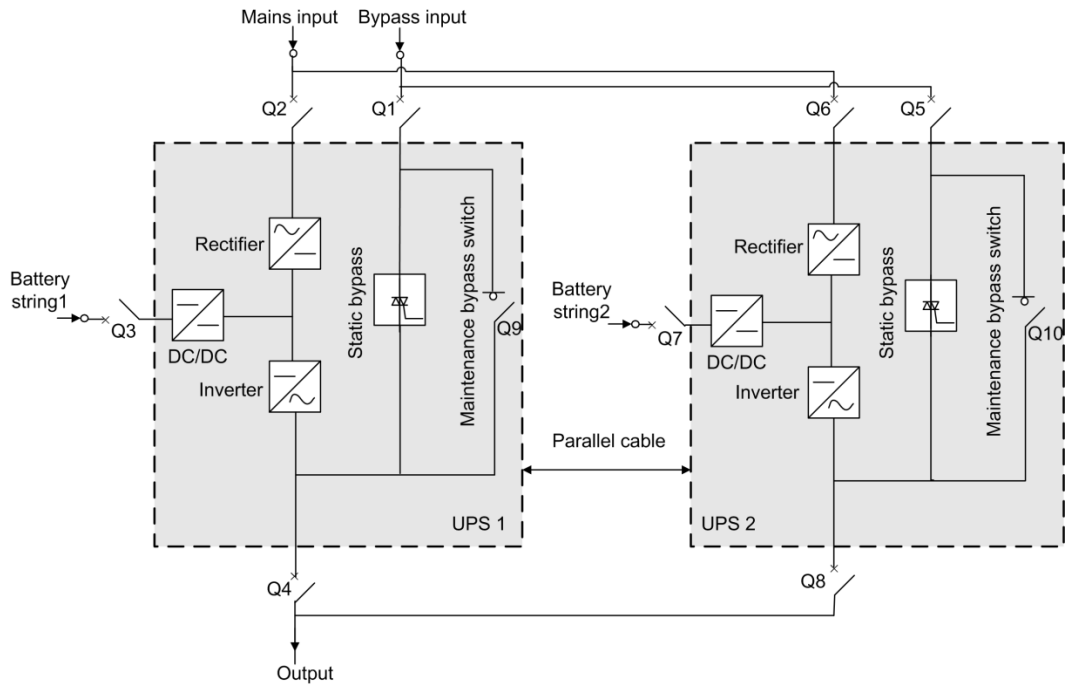
3.3.1 Connecting Power Cables

Procedure

- Step 1** Ground each single UPS.
- Step 2** Connect AC Input and output Power Cables.
- Step 3** Connect battery power cables of each UPS.
- Step 4** Choose a parallel mode and connect cables to the parallel system based on site requirements.

Take the typical installation scenario 1+1 parallel system as an example. [Figure 3-54](#) shows the conceptual diagram and [Figure 3-55](#) shows the cable connection.

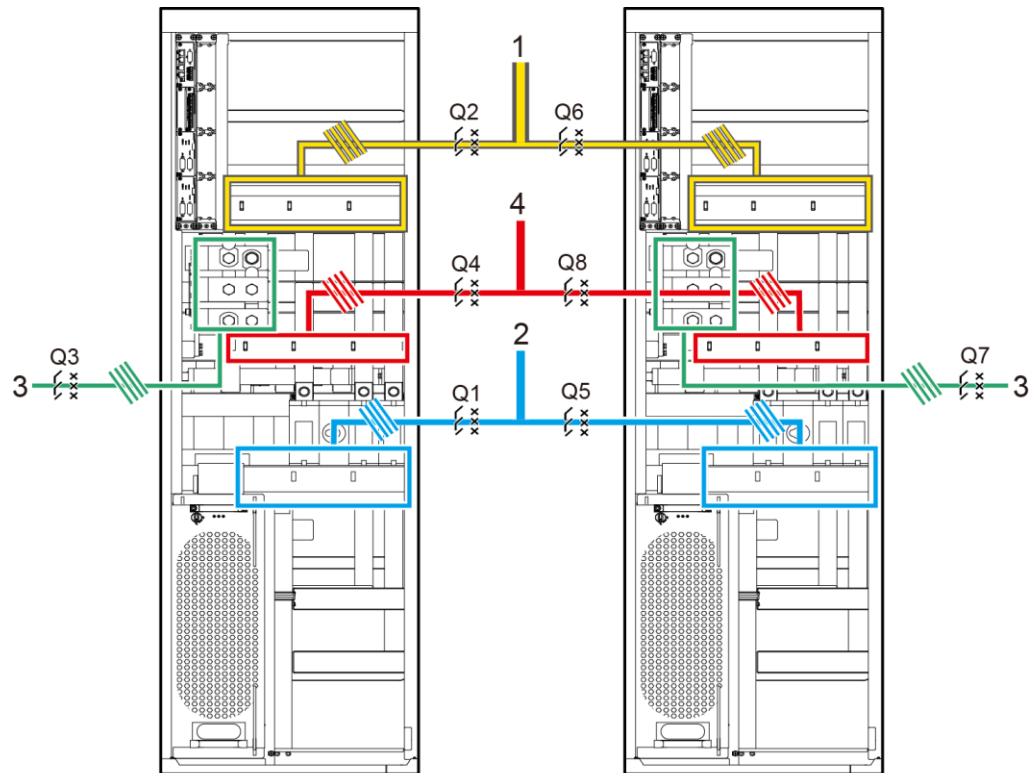
Figure 3-54 Conceptual diagram of a 1+1 parallel system



NOTICE

- To clearly and simply show cable connections, this document uses "the number of oblique lines" to indicate the number of power cables of the same type.
- Connect power cables according to port silk screen.

Figure 3-55 Connecting cables to a 1+1 parallel system



UA13000035

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

Take the dual-bus system as an example. The conceptual diagram and connection diagram of a dual-bus system are shown in [Figure 3-56](#) and [Figure 3-57](#) respectively.

NOTICE

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

Figure 3-56 Conceptual diagram of a dual-bus system

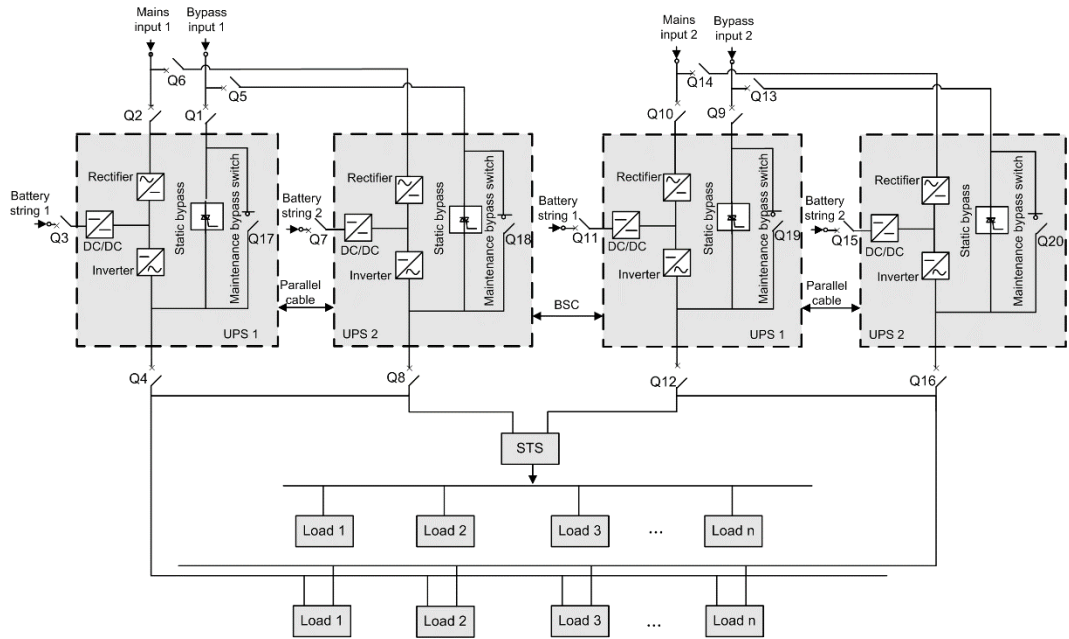
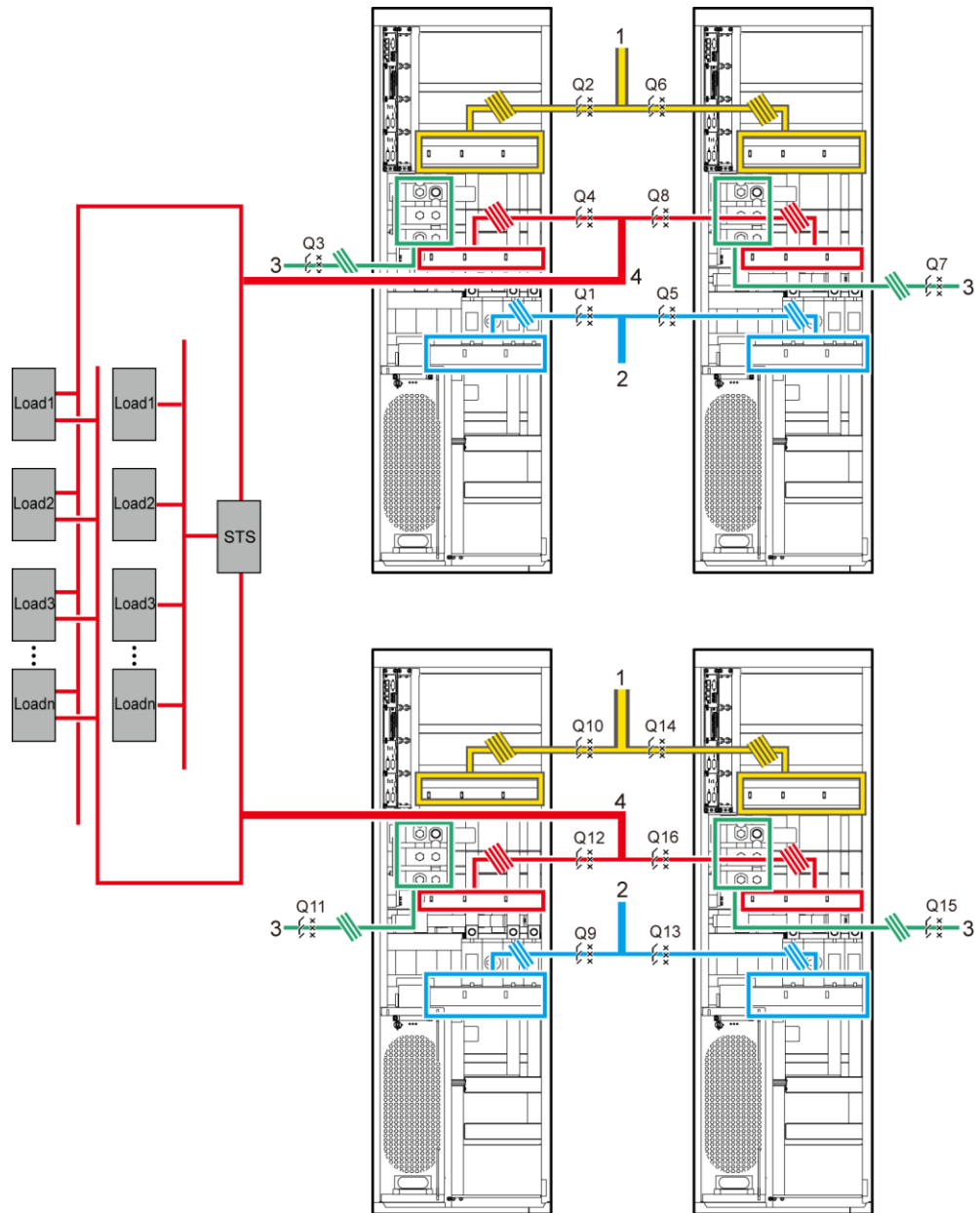


Figure 3-57 Connecting cables to a dual-bus system



UA13000036

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

----End

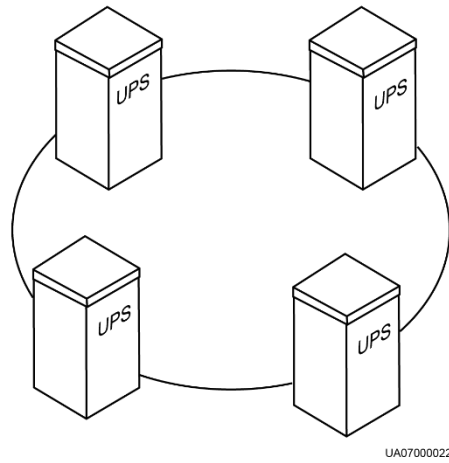
3.3.2 Connecting Signal Cables

Connecting Signal Cables to a Parallel System

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

- [Figure 3-58](#) and [Figure 3-59](#) show the wiring principle for an N+X parallel system.

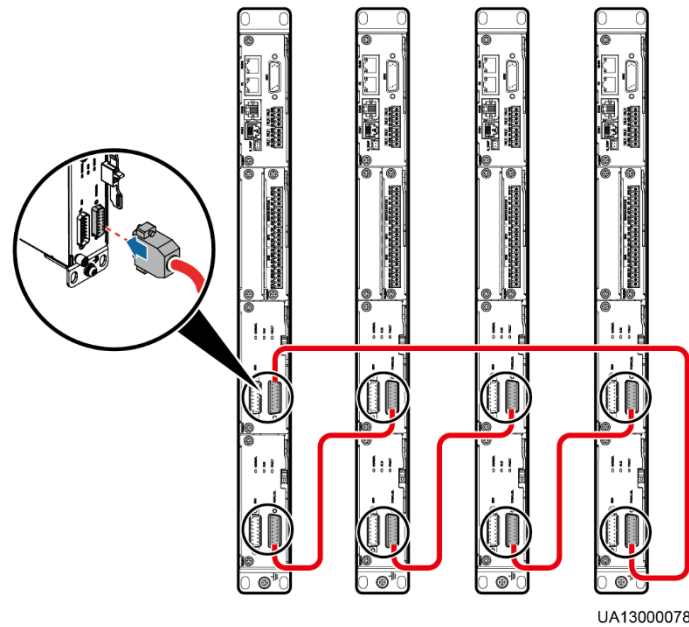
Figure 3-58 N+X parallel system topology



NOTICE

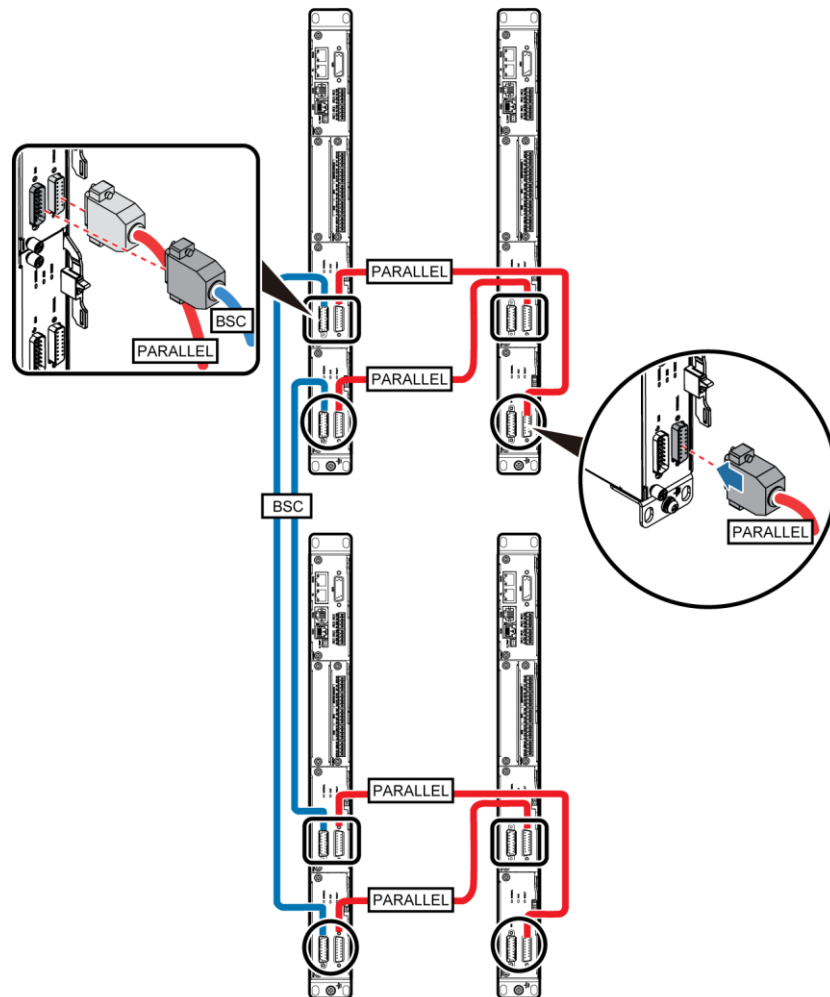
This figure shows the control module only. The control module is the substitute of a single UPS.

Figure 3-59 Signal cable connections of N+X parallel system



- In a dual-bus parallel system, BSC cables are added for the master and slave systems. [Figure 3-60](#) shows cable connections in a dual-bus system consisting of two master systems in parallel.

Figure 3-60 Connecting signal cables to a dual-bus system



UA13000034

Connecting Other Signal Cables

Connect signal cables to each UPS in the parallel system.

3.4 Installation Verification

Table 3-8 lists check items.

NOTICE

If the check results of listed items 10 and 12 in Table 3-8 do not meet the acceptance criteria, the UPS may be damaged.

Table 3-8 Installation checklist

No.	Item	Acceptance Criteria
01	System configurations	The system configurations, including models and the number of modules, comply with the contract.
02	Cable routing	Cables outside the cabinets are properly routed and arranged neatly without jump cables or suspending cables. Cables are routed based on the drawing.
03	Secure cable connections	Input and output power cables and battery cables are securely connected, and spring washers have been flattened to prevent them from falling off and causing accidents. There is no risk of disconnection.
04	Marks for tightened screws	Tightened screws are marked.
05	Signal cable connections	Signal cables are connected properly and securely.
06	Cable labels	Both ends of each cable are labeled. Labels are easy to understand.
07	Ground cable connections	The ground cable is securely connected to the equipment room ground bar. Use a multimeter to measure the resistance between the UPS ground cable and the equipment room ground bar. The resistance must be less than 1 ohm.
08	Distances between cable ties	Distances between cable ties are the same (recommended distance is 30 cm), and no burr exists.
09	Correct cable connections	Cables are properly connected according to wiring diagrams.
10	Input and output cable 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.
11	Battery input connections	The positive and negative battery input terminals, and battery N are connected correctly.
12	Phase sequence of live wires	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.
13	Battery strings	Use a multimeter to check that the sum of the absolute voltage of the negative battery string and the voltage of the positive battery string is

No.	Item	Acceptance Criteria
		greater than a certain value (2 x Number of cells), and that the difference between the absolute voltage of the negative battery string and the voltage of the positive battery string is less than the voltage of a battery (2 V or 12 V).
14	Short circuits between input, output, and battery copper bars	Copper busbars are confirmed as being open-circuited using a multimeter, or an insulation resistance tester.
15	Foreign matter cleaning inside the cabinet	<p>The inside and outside of the cabinet, and other operating components, are free from conductive dust.</p> <ol style="list-style-type: none"> 1. There is no foreign matter (such as copper wires and screws) on the top of the cabinet. 2. There is no foreign matter on the copper bar terminals. 3. There is no foreign matter around switch terminals. 4. There is no foreign matter on the bottom plate of the cabinet. 5. There is no foreign matter on the rear module subrack.

 **NOTE**

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

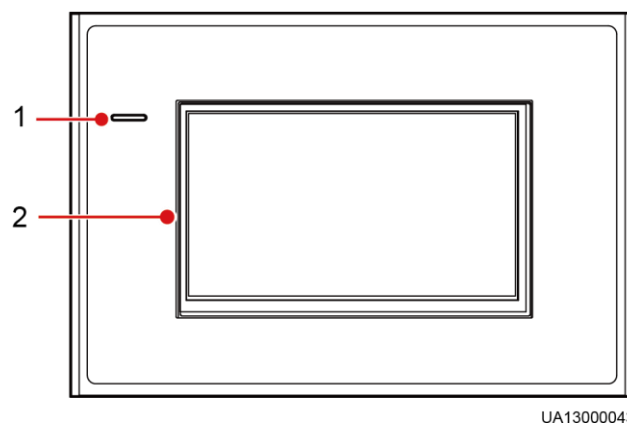
4 User Interface

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

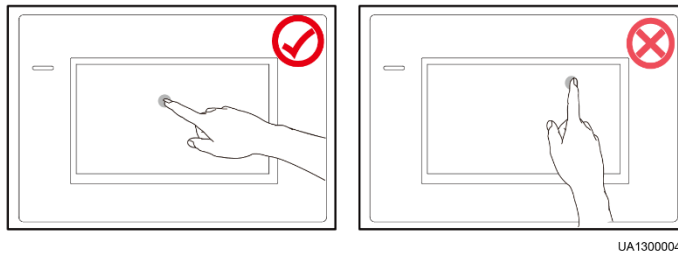


Table 4-1 describes the status indicator.

Table 4-1 Status indicator

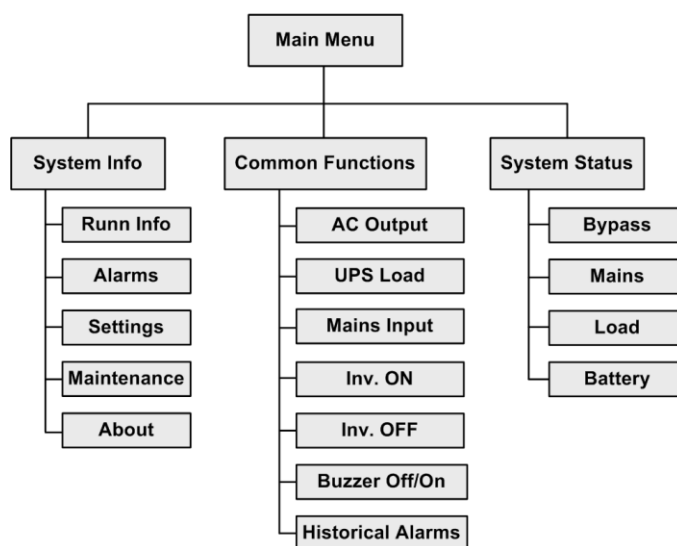
Status	Color	Meaning
On	Red	A critical alarm has been generated, and the buzzer sounds continuously.
	Yellow	A minor alarm has been generated, and the buzzer buzzes at 2 Hz.
	Green	The UPS is running properly.
Off	N/A	The MDU is powered off.

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 software 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

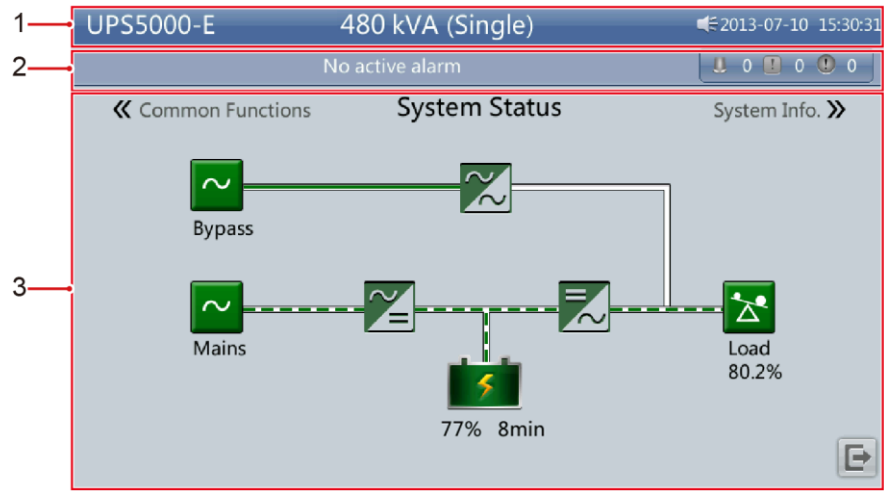


Table 4-2 Main screen description

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


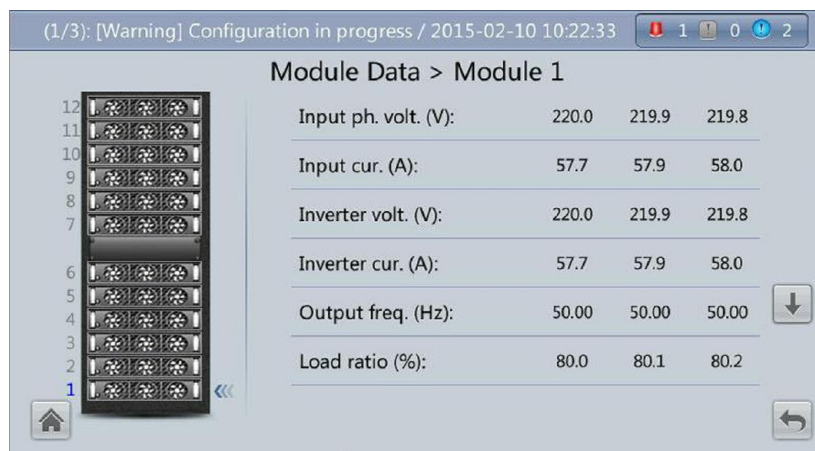
On the **System Info** screen, tap the UPS picture. On the **Module Data** screen, select a module to view its running data.  points to a selected module.

Figure 4-7 Module Data screen



4.1.3.2 Runn Info Screen


On the **System Info** screen, click  to access the **Runn Info** screen. On this screen, you can query **AC Output**, **UPS Load**, **Mains Input**, and **Bypass Input**.

Figure 4-8 Runn Info screen 1

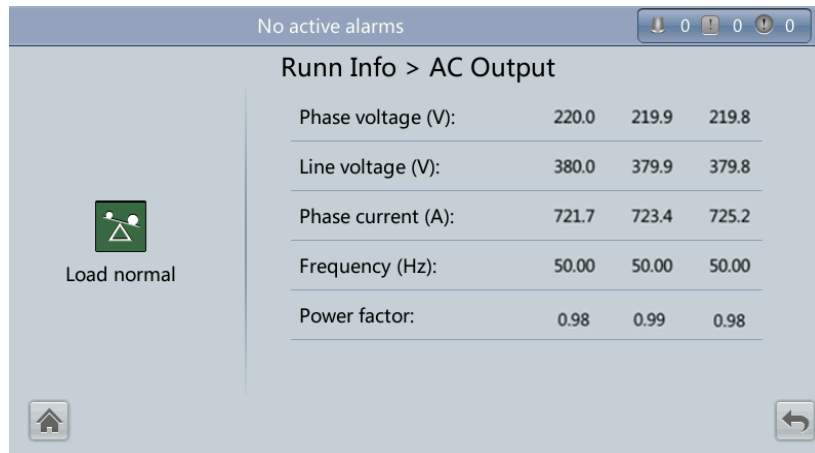


Figure 4-9 Runn Info screen 2



AC Output

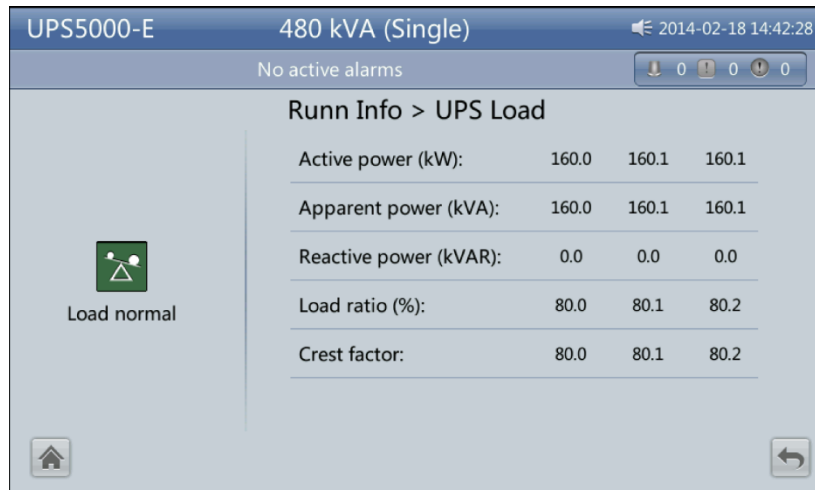
Figure 4-10 AC Output screen



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

UPS Load

Figure 4-11 UPS Load screen

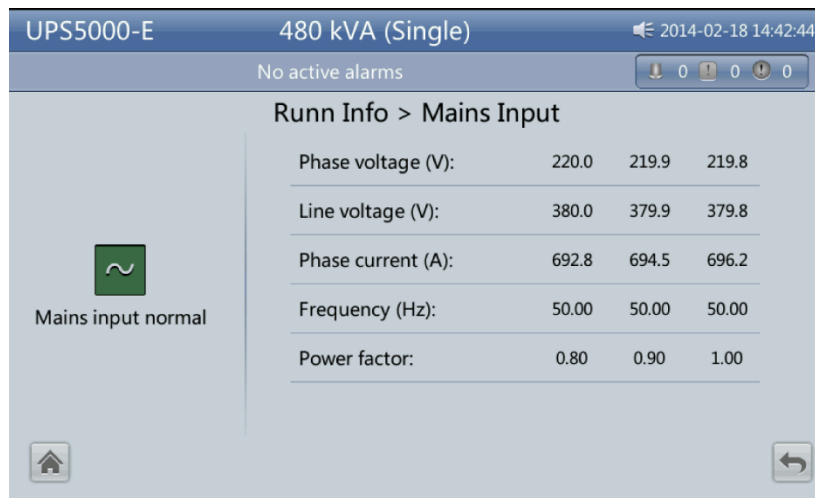


- Active power (kW)
Output active power of each phase on the UPS.
- Apparent power (kVA)
Total output power of each phase, consisting of active power and reactive power.

- 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

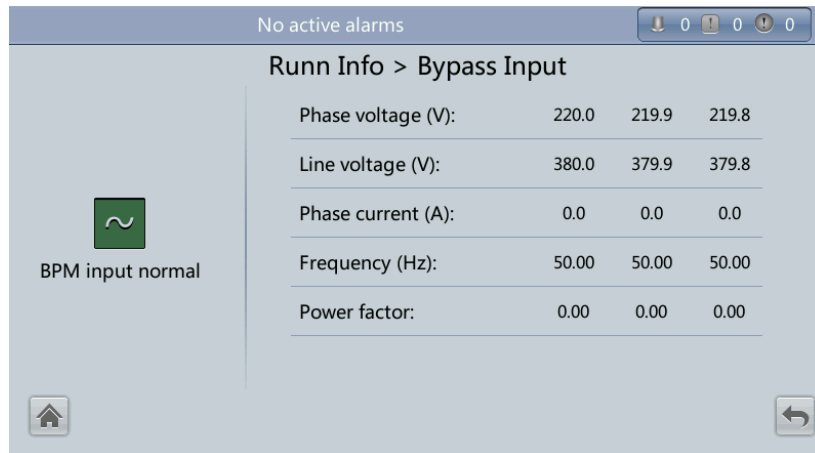
Figure 4-12 Mains Input screen



- **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 apparent power.

Bypass Input

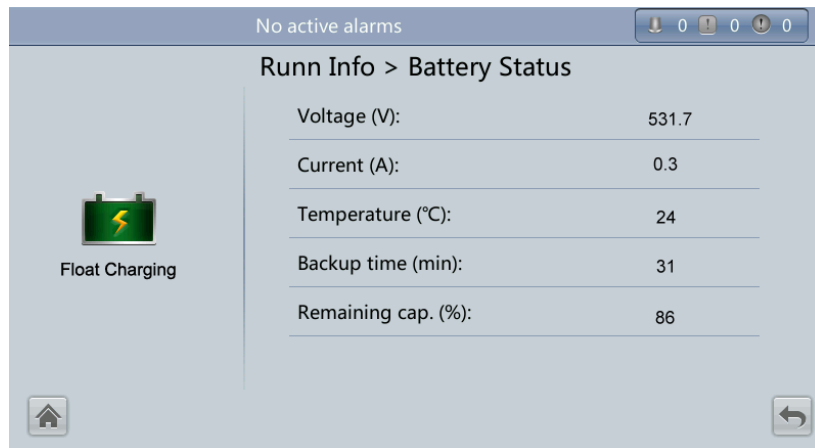
Figure 4-13 Bypass Input screen



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

Battery Status

Figure 4-14 Battery Status screen



- **Battery Status**
The value can be **Not connected, Equalized Charging, Flt. charging, Hibernating, discharging, or Not chg. or dis.**
- **Voltage (V)**
Voltage of the battery string.
- **Current (A)**

Current of the battery string. The current is + when batteries are being charged and - when discharged.

- **Temperature (°C)**
Battery operating temperature (A battery sensor is required. If 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 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.

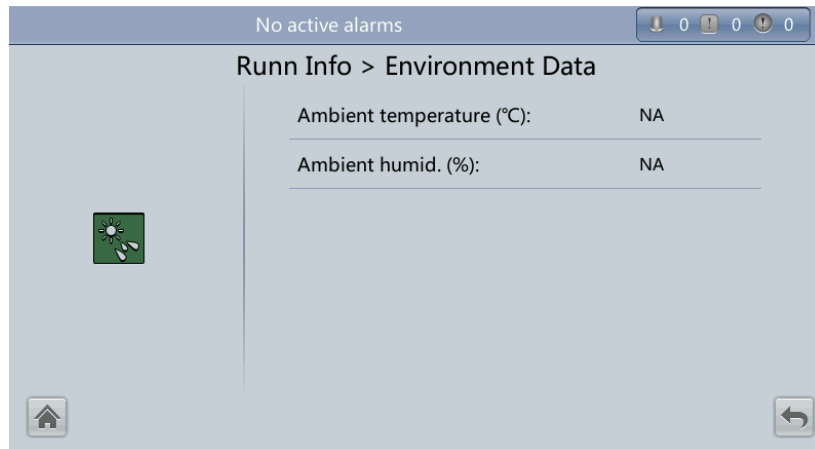
NOTE

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 Environment Data screen



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

4.1.3.3 Alarms Screen


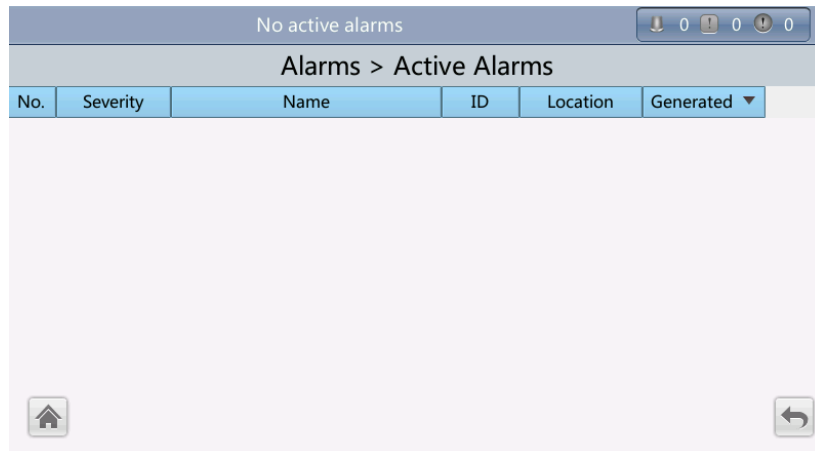
Tap  on the **System Info** screen to enter the **Alarms** screen.

Figure 4-17 Alarms screen



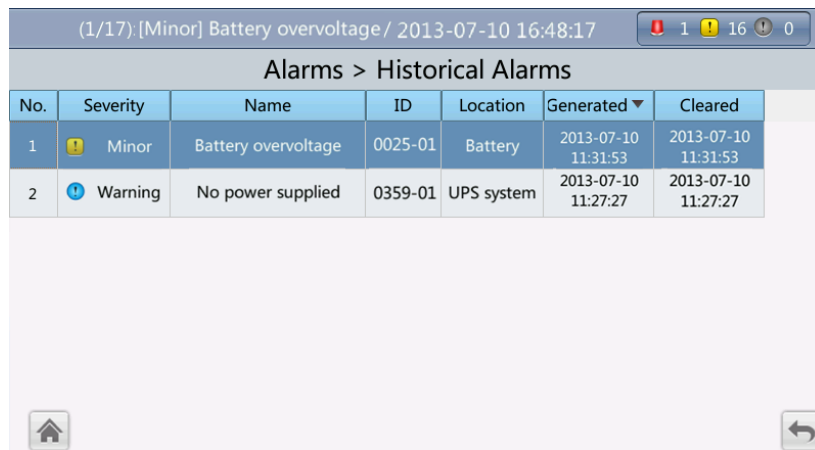
Active Alarms

Figure 4-18 Active Alarms screen



Historical Alarms

Figure 4-19 Historical Alarms screen



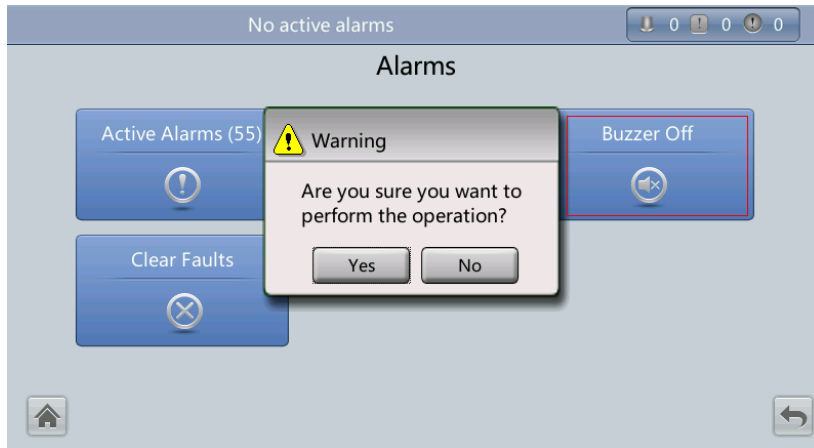
Buzzer Off

Two buzzer menus are available:

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

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

Figure 4-20 Buzzer Off screen



Clear Faults

Figure 4-21 Clear Faults screen



4.1.3.4 Settings Screen


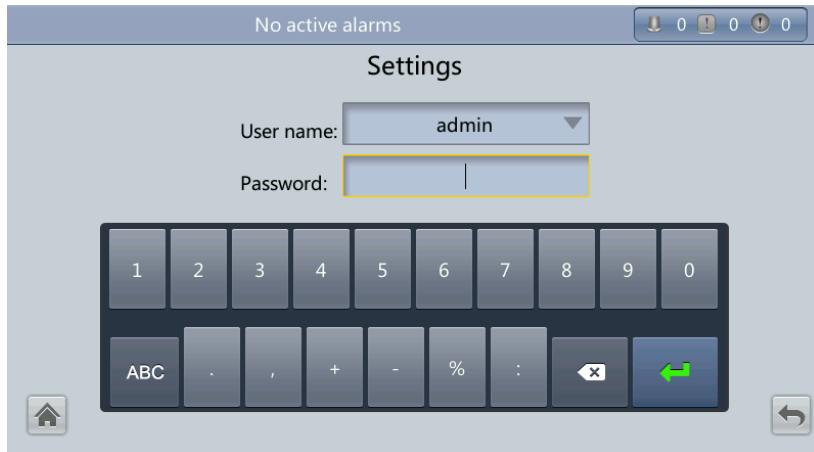
On the **System Info** screen, click . If you have not logged in, a login screen is displayed.

Figure 4-22 Login screen




On the login screen, enter a preset user name and password, and click  to login. The **Settings** screen is displayed.

Figure 4-23 Settings screen 1

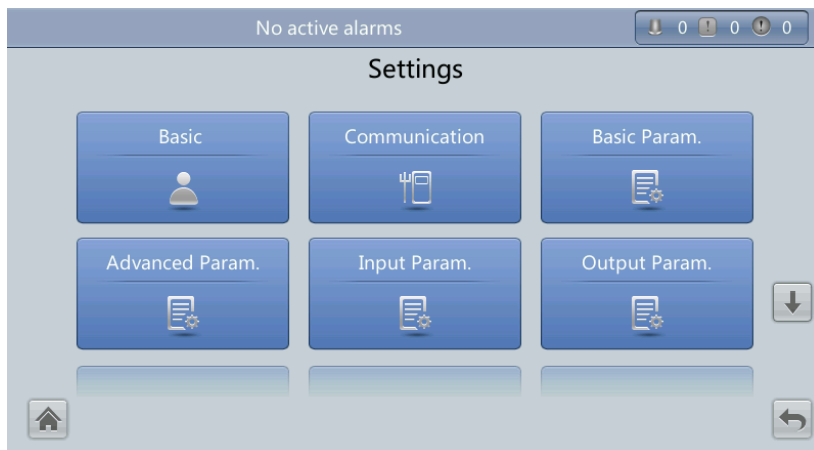
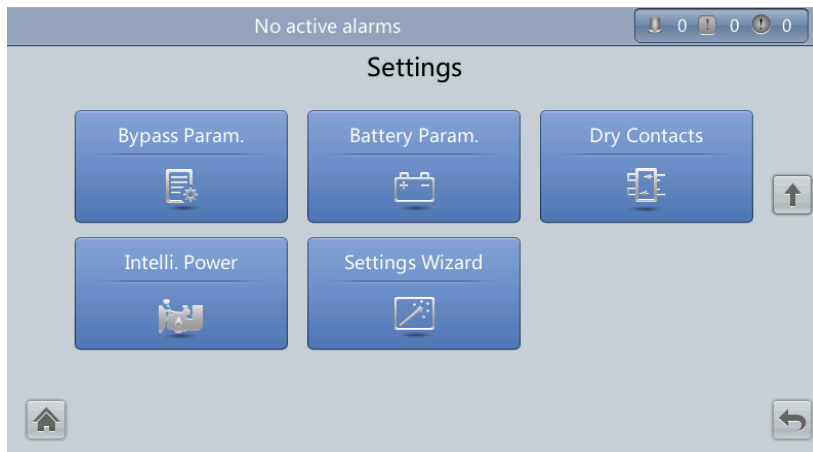


Figure 4-24 Settings screen 2



Basic

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 4-25 Basic screen 1

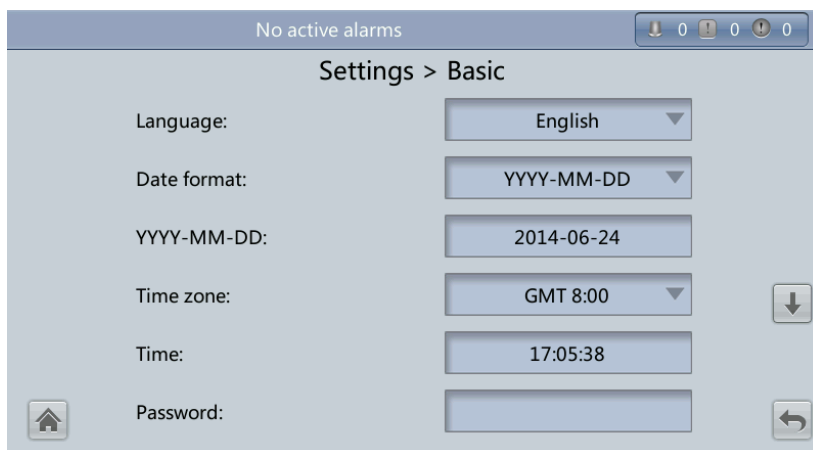
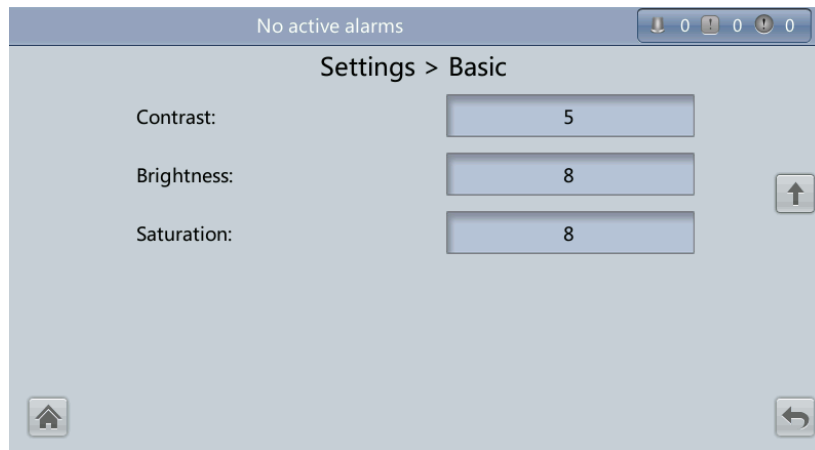


Figure 4-26 Basic screen 1



- **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.

Communication

Figure 4-27 Communication screen 1

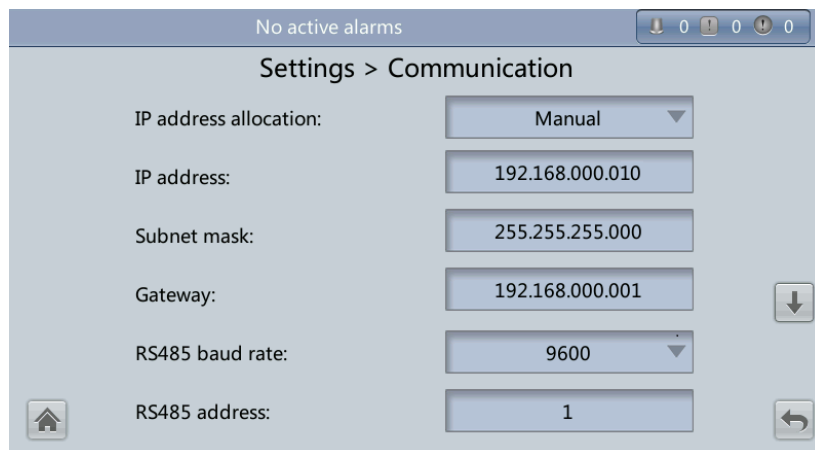


Figure 4-28 Communication screen 2

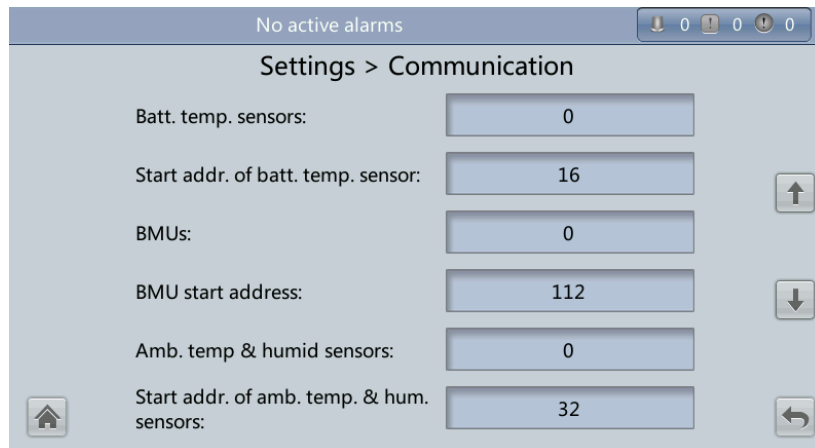
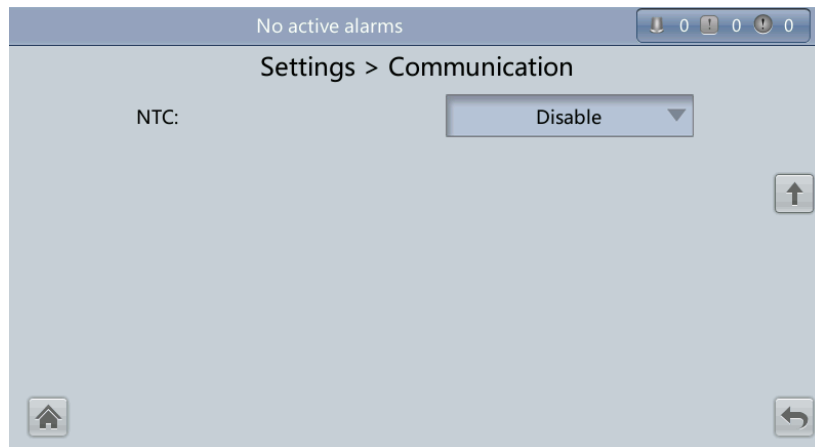


Figure 4-29 Communication screen 3



- **IP address allocation parameter**
 - If the MDU is directly connected to a computer, the IP address can only be allocated manually. The IP addresses of the MDU and computer must be in the same network segment, and must be different.
 - If the MDU is connected to a computer through a LAN switch or router with the DHCP function, the IP address can be allocated manually or automatically.
 - Manual: 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 queries 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**. When you restart the device, **IP address allocation** changes back to **Manual**. **IP address** is the IP address that you have previously set.

- **IP address**

Set an Ethernet IP address that ranges from 1.0.0.0 to 223.255.255.255. The default value is **192.168.0.10**.

NOTICE

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

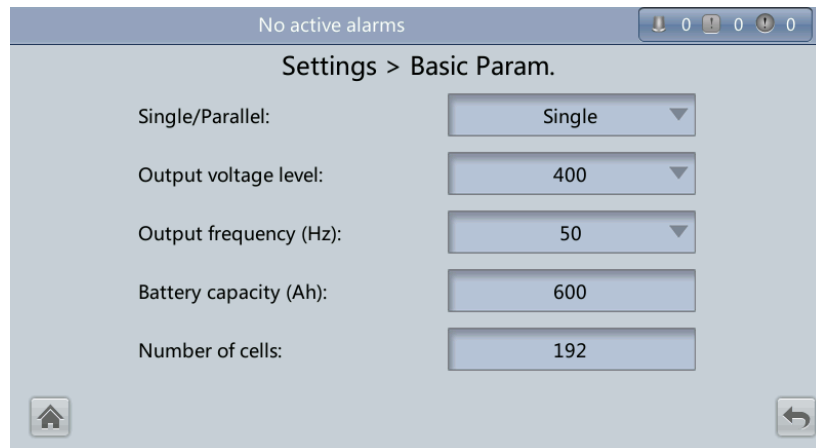
- **Subnet mask**
Set an Ethernet subnet mask that ranges from 0.0.0.0 to 255.255.255.255. The default value is **255.255.255.0**.
- **Gateway**
Set an Ethernet gateway that ranges from 1.0.0.0 to 223.255.255.255. The default value is **192.168.0.1**.
- **RS485 baud rate/RS485 address**
Set an address 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 the DIP switch on the battery temperature sensor. Ensure that the addresses that you set on the LCD are the same as the DIP switch addresses. 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 set on the MDU is consistent with that set for the DIP switch. Otherwise, communication cannot be implemented.
- **Amb. temp. & humid sensors / Start addr. of amb. temp. & hum. sensors**
The ambient temperature and humidity sensor looks the same as the battery temperature sensor. The difference is that the former has a DIP switch address range of 32 to 44. Therefore, you can use the sensor as an ambient temperature and humidity sensor or a battery temperature sensor by setting the DIP switch 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 Param.

NOTICE

- **Single/Parallel, 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.

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. If **Output voltage level** is 380 V or 400 V, the default upper limit of bypass voltage is 15% and the default lower limit of bypass voltage is 20%. If **Output voltage level** is 415 V, the default upper limit of bypass voltage is 10% and the default lower limit of bypass voltage is 20%. The parameter is configurable after the inverter shuts down.
- **Output frequency (Hz)**
Set the system output frequency level. The value can be 50 Hz (default) or 60 Hz.
- **Battery capacity (Ah)**
Battery string capacity. The value range is 5 to 3000 Ah. The default value is 600 Ah for the UPS5000-E-480 kVA.
- **Number of cells**
Number of cells. Each 12 V battery consists of six 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 Param.

NOTICE

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

Figure 4-31 Advanced Param. screen 1

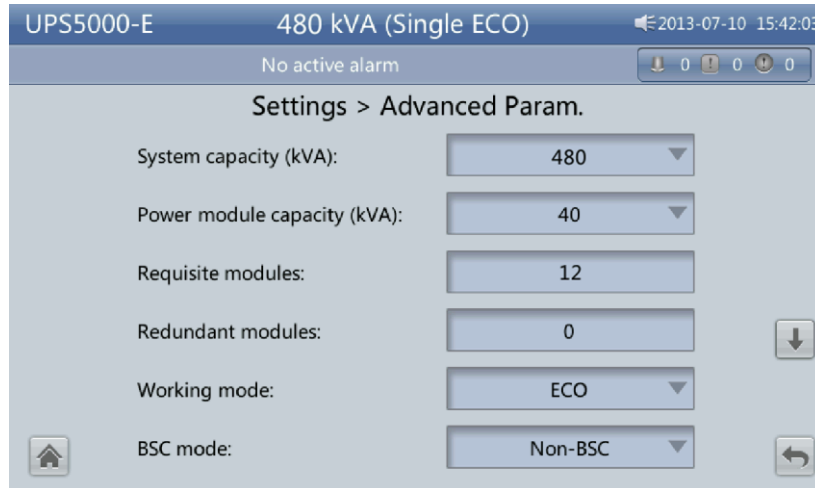


Figure 4-32 Advanced Param. screen 2

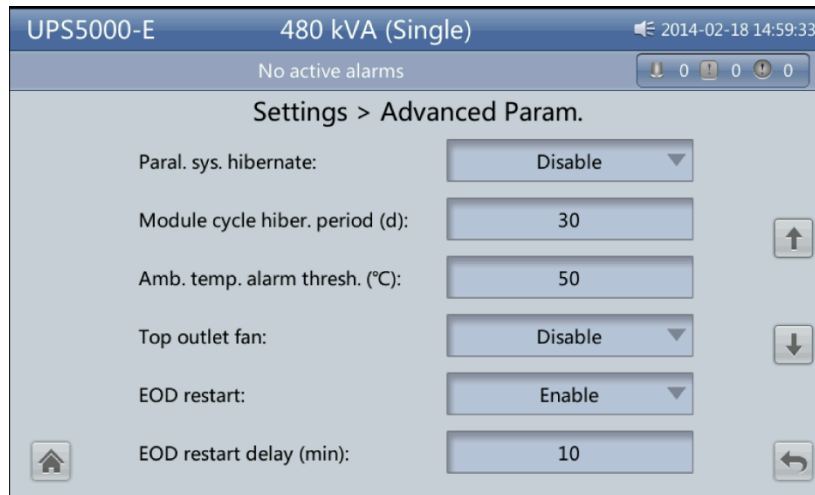


Figure 4-33 Advanced Param. screen 3

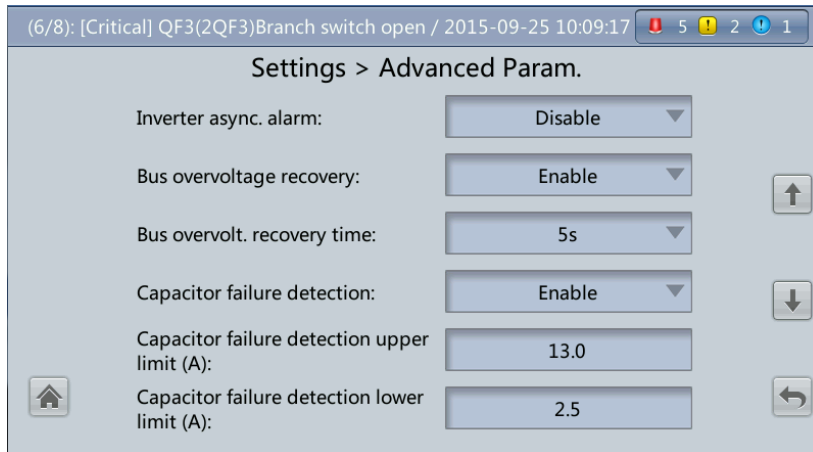
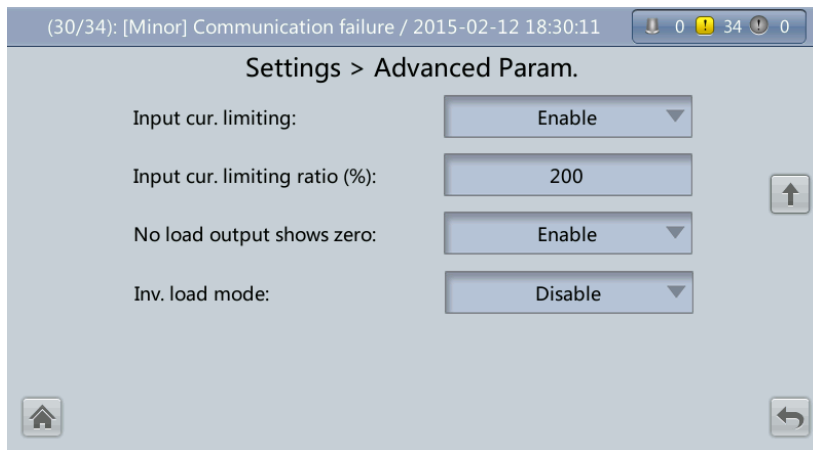


Figure 4-34 Advanced Param. screen 4



- **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 rated system capacity.
- **Redundant modules**
Set in accordance with load 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. You can specify them during initial startup and change the settings under 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.
- **Parallel hibernation**
When customer loads are 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. **30 days** is set by default.
- **Ambient temp. alarm thres. (°C)**
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 disabled, if **EOD restart** is enabled, the UPS will restart as soon as the mains resumes.
If **EOD restart** is disabled, clear the alarm manually or enable the function to restart the UPS.
- **EOD restart delay (min)**
If **EOD restart** is set to **Enabled**, 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 **Enabled** or **Disabled**.
- **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 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 (%)**

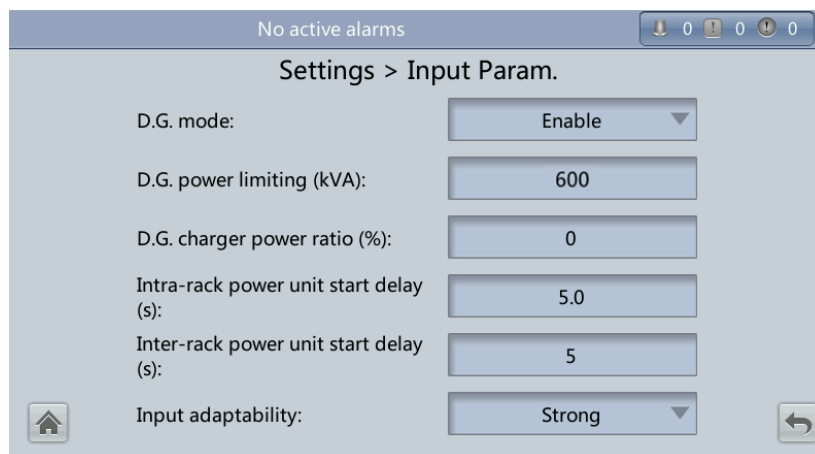
Limit the input current to protect the D.G. The value can be 50% to 200%, 200% by default.

- **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 Param.

Figure 4-35 Input Param.



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.

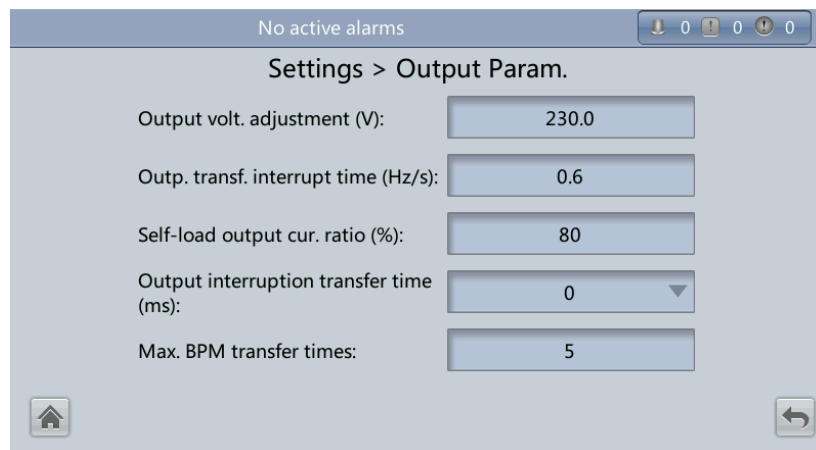
- **D.G. power limiting (kVA)** and **D.G. charger power ratio (%)**

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 600 kVA for the UPS5000-E-480 kVA. The **D.G. charger power ratio (%)** value range is 0%–100%, and the default value is 0%.

- **Intra-rack power unit start delay (s) and Inter-rack power unit start delay (s)**
Control the time interval for each rack (or unit) to transfer from battery mode to normal mode, which reduces the impact on the D.G. or power grid. In the case of battery undervoltage, the system automatically shortens the transfer delay to 1/8 of the normal delay to accelerate the transfer and prevent battery overdischarge. The value can be 2–120 seconds, 5 seconds by default. The delay depends on the rack number and unit number. Unit 1 in rack 1 has no start delay.
- **Input adaptability**
The value of Input adaptability can be Strong (default) or Weak. Strong input adaptability applies to the D.G. or input sources whose input current has high frequency oscillation. In this mode, the total distortion of the input current waveform (THDi) is poor, but the system is stable. Weak input adaptability is suitable for mains and AC input sources.

Output Param.

Figure 4-36 Output Param. screen

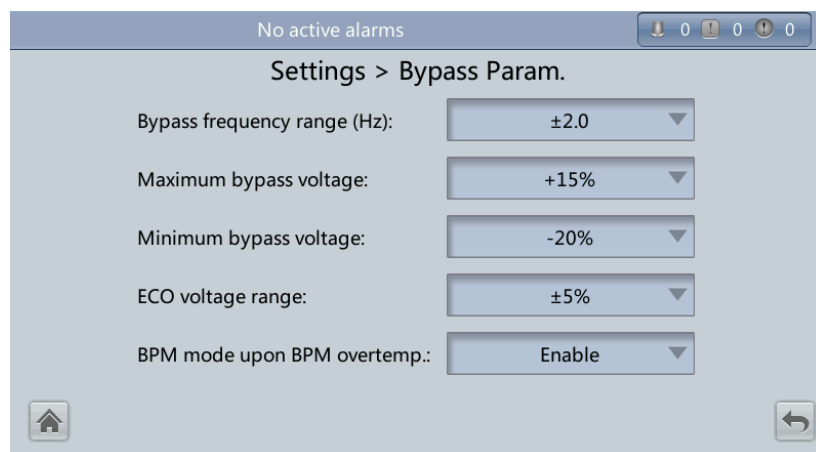


- **Output volt. adjustment (V)**
The output voltage can be slightly adjusted based on the onsite power distribution condition to ensure a minimum difference between the output voltage and the bypass voltage. The facilitates uninterruptible transfer from normal mode to bypass mode. The voltage adjustment range is $\pm 5\%$. The default value is 220.0 when the voltage is 380 V, 230.0 when 400 V, 240.0 when 415 V.
- **Output freq. track rate (Hz/s)**
 - The setting range is 0.1 Hz/s to 2.0 Hz/s. 0.6 Hz/s is set by default.
 - The value can be adjusted depending on the actual situation. If the value is small, 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 the value is large, 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% to 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 1–10, 5 by default.

Bypass Param.

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 Param.

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 $(\text{Charge/Discharge voltage} - \text{Average voltage}) / \text{Average voltage} \times 100\%$. 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.
-

Figure 4-38 Battery Param. screen 1

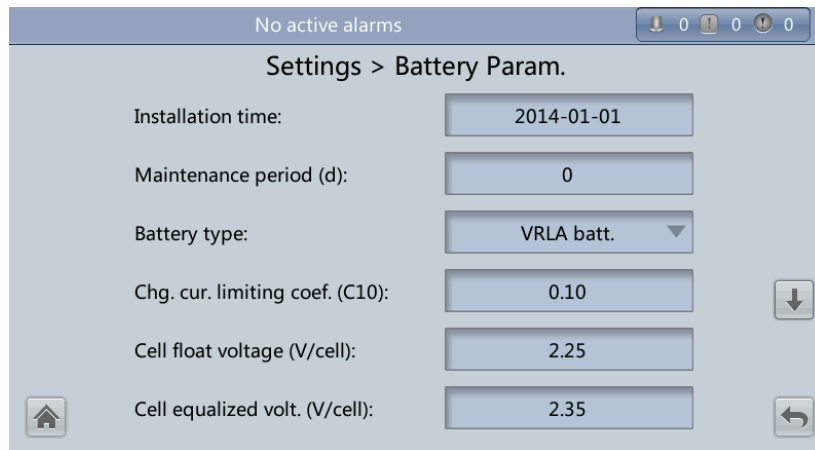


Figure 4-39 Battery Param. screen 2

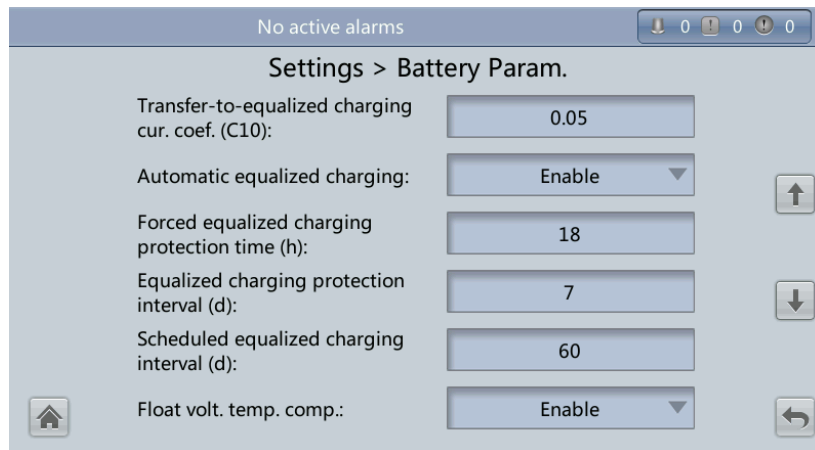


Figure 4-40 Battery Param. screen 3

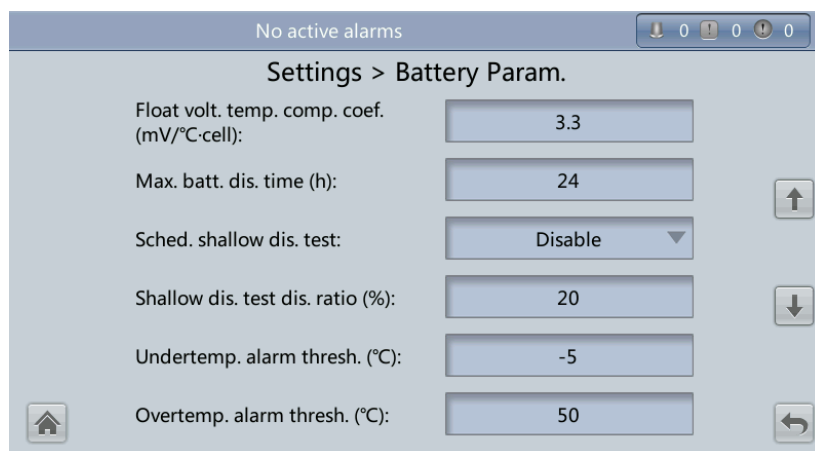


Figure 4-41 Battery Param. screen 4

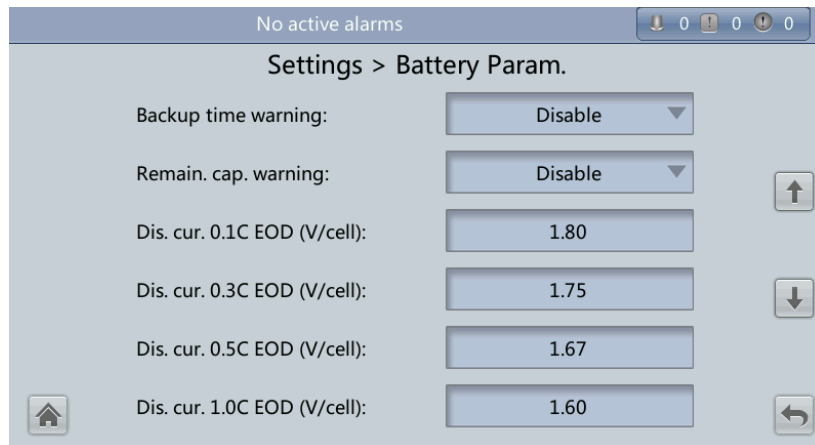
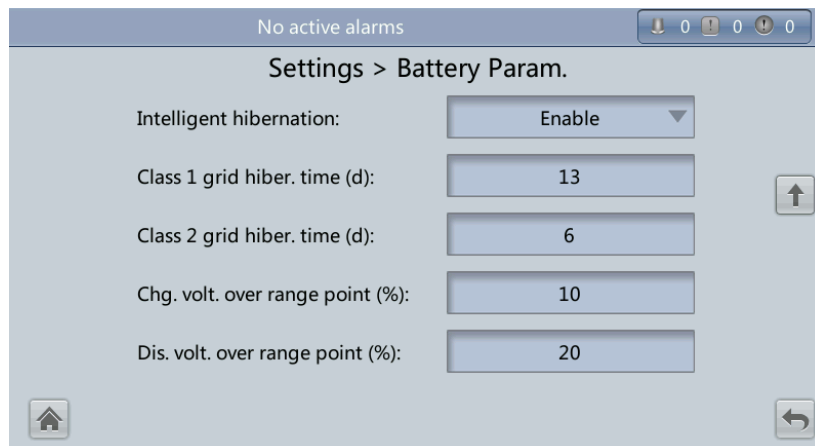


Figure 4-42 Battery Param. screen 5



- **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 charge based on the charge current and floating 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/°C·cell)**
Correction coefficient during floating voltage temperature compensation.
- **Max. batt. dis. time (h)**
Set the maximum discharge time. When the discharge time reaches the value, the UPS powers off. The value can be 16–48 hours, 24 hours by default.
- **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 thres. (°C) and Overtemp. alarm thres. (°C)**
Battery temperatures can be monitored in a timely manner. If a battery overtemperature alarm is detected, the charging current limit decreases to 0.03 CA. Battery charging stops if a battery overtemperature protection alarm (when the temperature reaches the high temperature threshold plus 3°C) is generated. The **Undertemp. alarm thres.** can be set from -20°C to +5°C and the default value is -5°C. The **Overtemp. alarm thres.** can be set from 35°C to 55°C and the default value is 50°C.
- **Backup time warning and Remain. cap. warning**
When the first two parameters are set to **Enable**, an alarm is generated when the backup time or remaining capacity is less than the alarm threshold.
- **Dis. cur. 0.1C EOD (V/cell), Dis. cur. 0.3C EOD (V/cell), Dis. cur. 0.5C EOD (V/cell), and Dis. cur. 1.0C EOD (V/cell)**

By default, **0.1C EOD (V/cell)** is set to **1.80**, **0.3C EOD (V/cell)** to **1.75**, **0.5C EOD (V/cell)** to **1.67**, and **1.0C EOD (V/cell)** to **1.60**. These values are calculated in real time based on the discharge currents.

- **Intelligent hibernation**

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

- **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 **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: $(\text{Charge/Discharge voltage} - \text{Average voltage}) / \text{Average voltage} \times 100\%$.

Dry contacts

NOTICE

- Set the dry contacts that you need to use. Otherwise, the UPS may not run properly.
- When you disable a dry contact card, its dry contact signals are disabled.
- After 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.

Figure 4-43 Dry Contacts screen 1



Figure 4-44 Dry Contacts screen 2

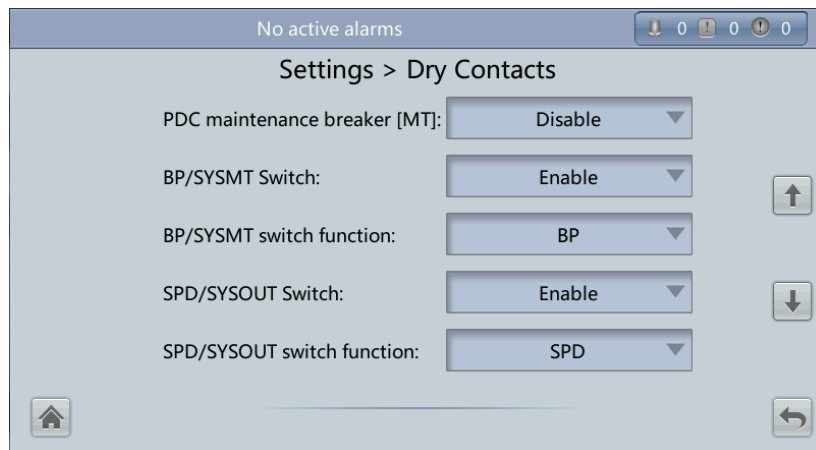


Figure 4-45 Dry Contacts screen 3

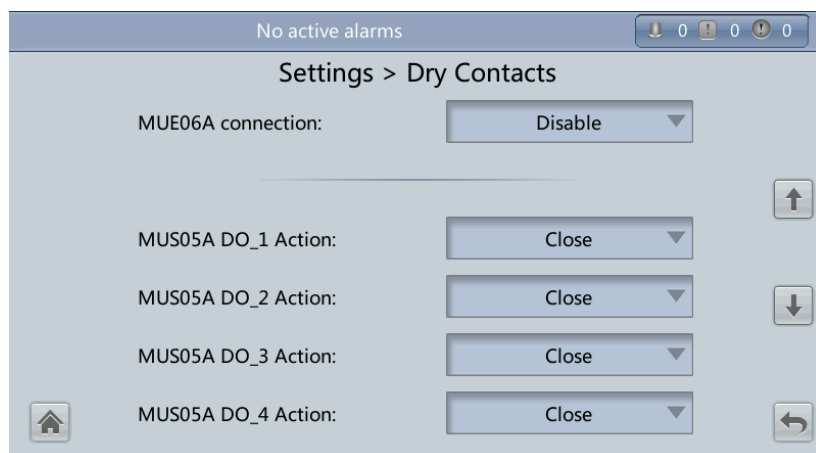


Figure 4-46 Dry Contacts screen 4



Figure 4-47 Dry Contacts screen 5

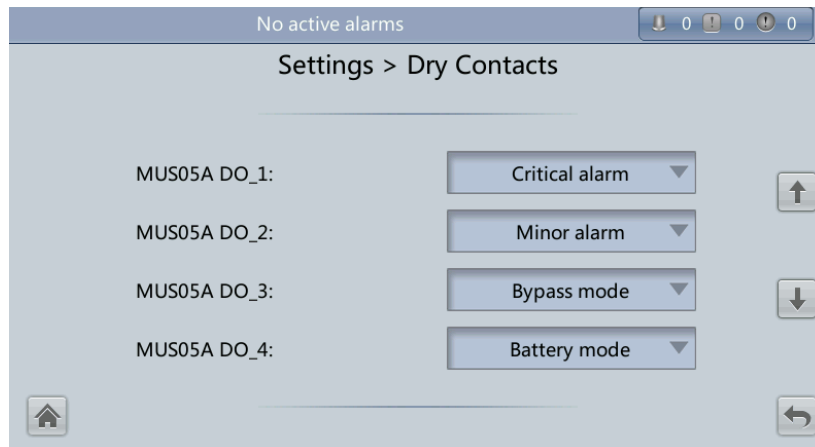


Figure 4-48 Dry Contacts screen 6

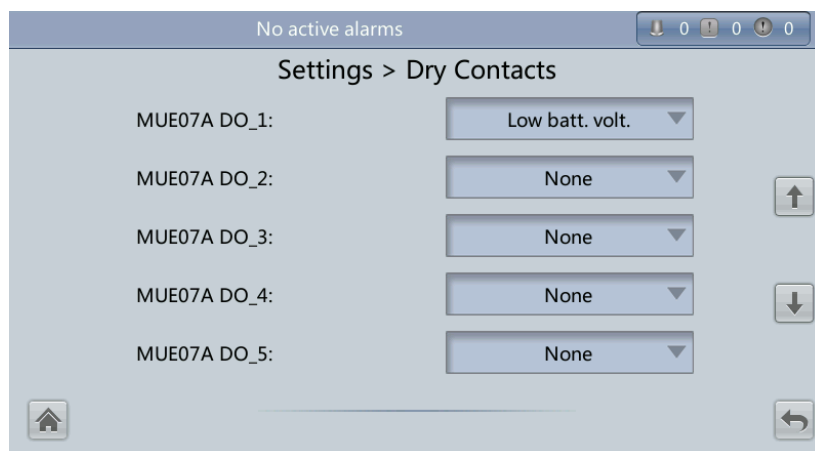


Figure 4-49 Dry Contacts screen 7



- **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**

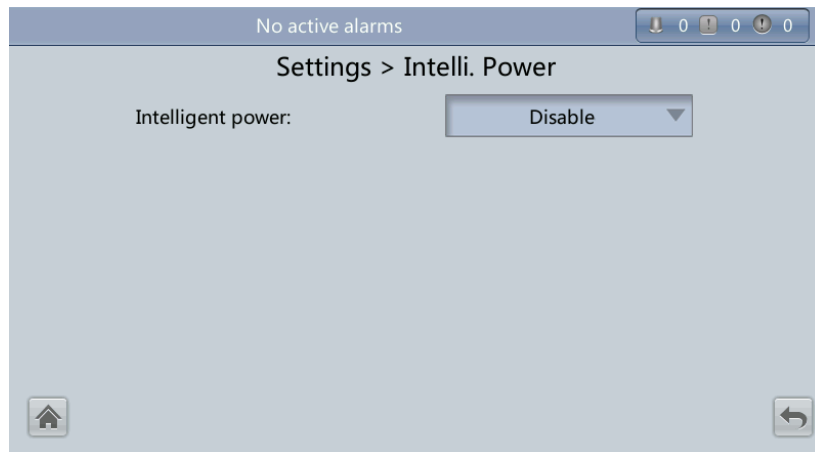
If this parameter is enabled, the mains and bypass backfeed protection is enabled.

- **MUS05A DO_1 Action**
Control the status of the DO_1 dry contact on the MUS05A dry contact card.
- **MUS05A DO_2 Action**
Control the status of the DO_2 dry contact on the MUS05A dry contact card.
- **MUS05A DO_3 Action**
Control the status of the DO_3 dry contact on the MUS05A dry contact card.
- **MUS05A DO_4 Action**
Control the status of the DO_4 dry contact on the MUS05A dry contact card.
- **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.

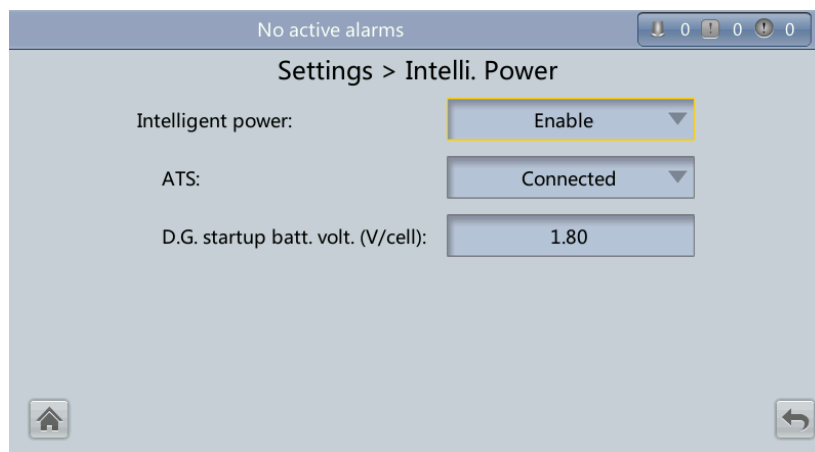
Intelli. Power

Figure 4-50 Intelli. Power screen



The default value of **Intelligent power** is **Disable**. If you select **Enable**, intelligent power supply parameters are displayed.

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


On the **System Info** screen, click . 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**, and **Inv. Off** on the **Maintenance** screen. You can also perform **Paral. Inv. ON** and **Parallel Inv. OFF** for parallel systems, as shown in [Figure 4-53](#).

Figure 4-52 Maintenance Screen (single UPS)



Figure 4-53 Maintenance Screen (parallel system)



Battery Maint. screen

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 Fault Data**, **Export E-labels**, and **Export Alarms**.

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 on the LCD. Before the inverter starts, the system asks for confirmation to prevent misoperations. [Figure 4-57](#) and [Figure 4-58](#) respectively show the **Inv. ON** and **Inv. OFF** screens.

Figure 4-57 Inv. ON screen

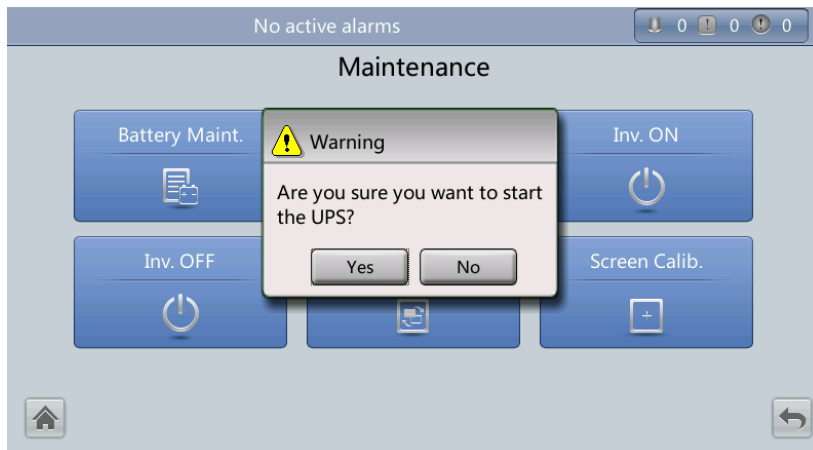
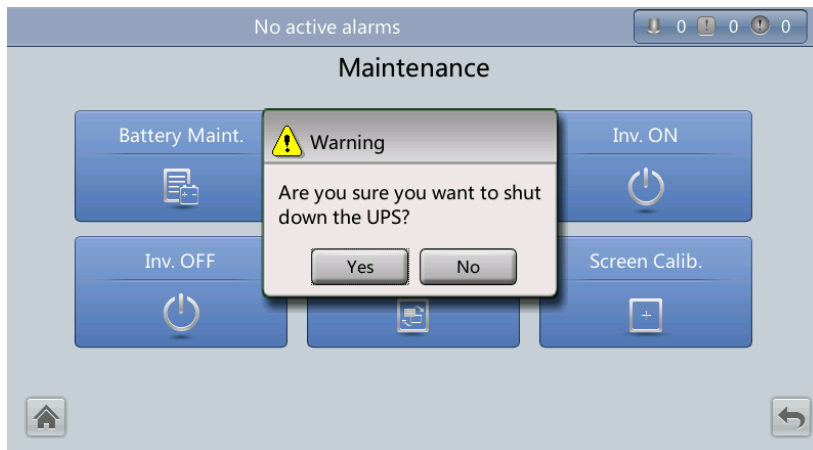


Figure 4-58 Inv. OFF screen



- **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

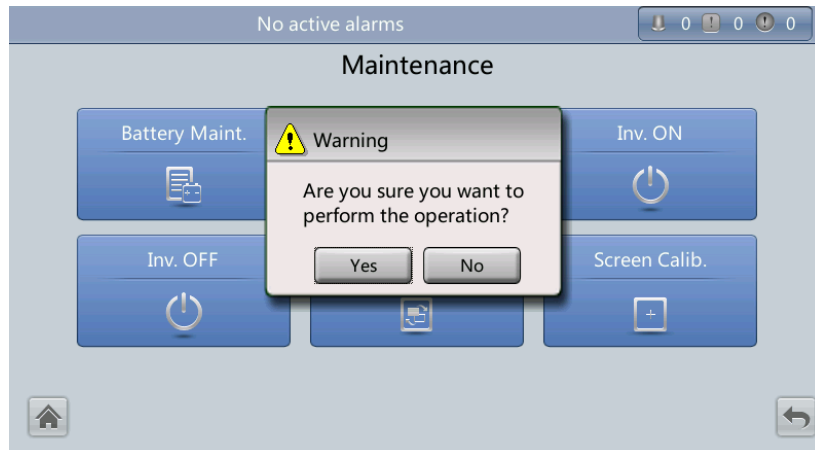
NOTICE

- Only professional personnel are allowed to use this function.
- Perform active/standby switchover (takes about 30 seconds) only after the ECM is inserted, other configurations are completed, and the ECM starts running properly.

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.

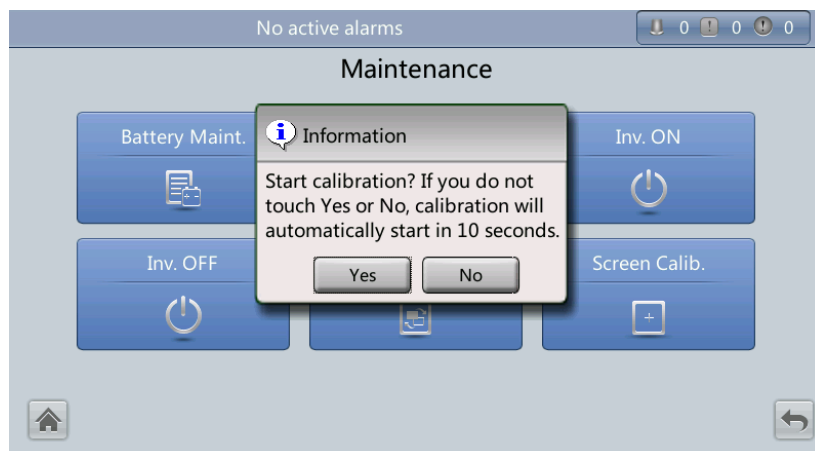
Figure 4-59 ECM switchover



Screen Calib. Menu

You can calibrate the screen, as shown in [Figure 4-60](#).

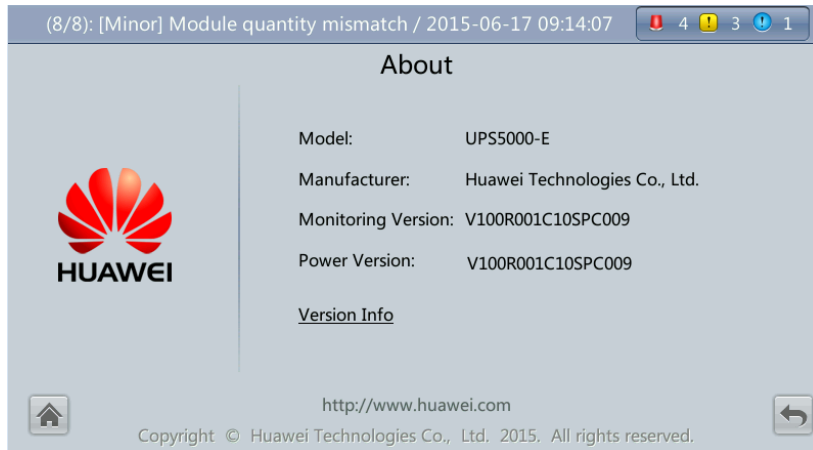
Figure 4-60 Screen Calib. screen



4.1.3.6 About Screen

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

Figure 4-61 About screen

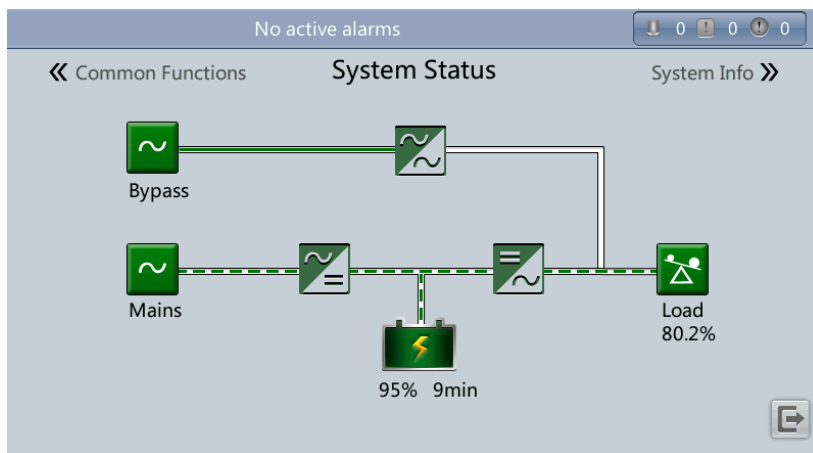


4.1.4 System Status Screen

On the main screen, select **System Status**, See [Figure 4-62](#).

On the **System Status** screen, you can view the mains input, bypass input, load, and battery information.

Figure 4-62 System Status screen



4.1.5 Common Functions Screen

On the main screen, choose **Common Functions**. The **Common Functions** screen is displayed, as shown in [Figure 4-63](#) and [Figure 4-64](#).

The **Common Functions** screen allows you to query the information about the mains input, AC output, and loads, start or shut down an inverter, control the buzzer, and query historical alarms.

Figure 4-63 Common Functions screen 1

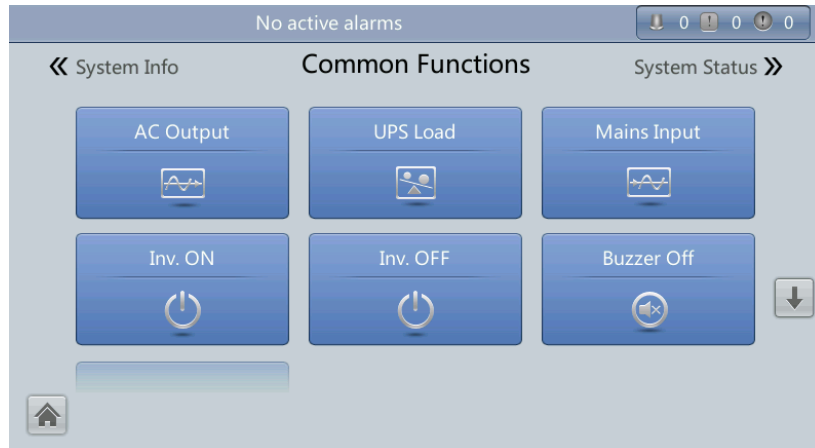
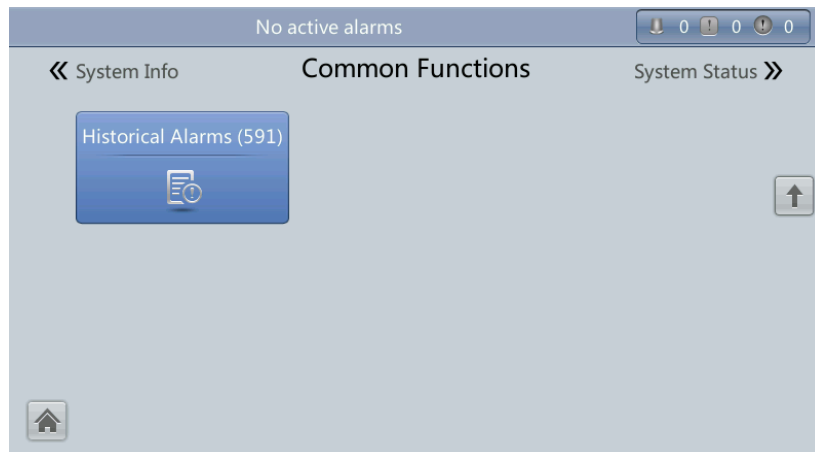


Figure 4-64 Common Functions screen 2



4.2 WebUI

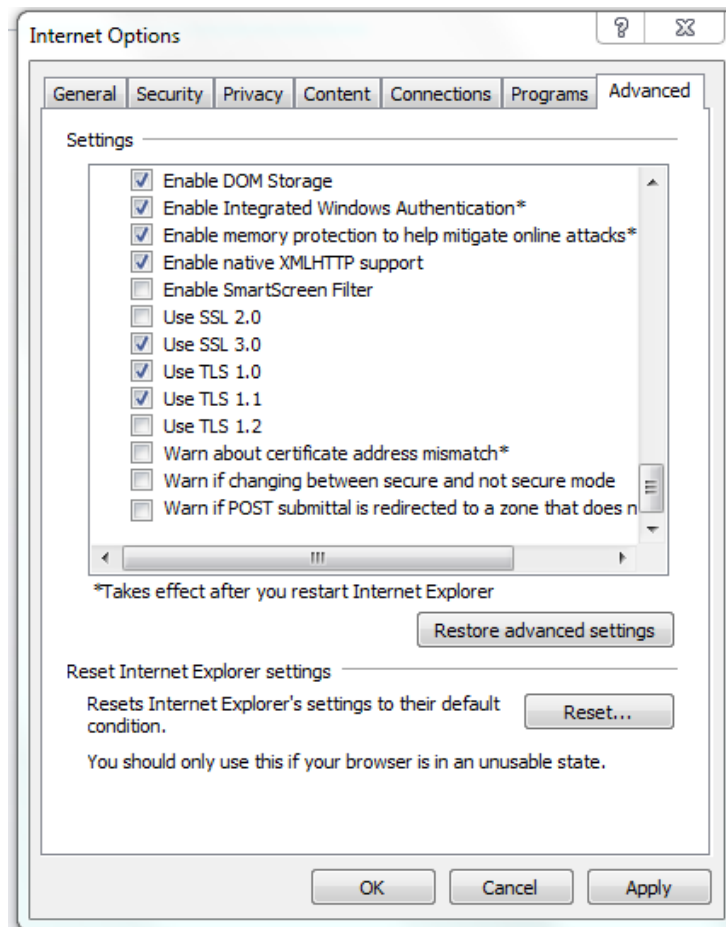
4.2.1 Login

1. Open the browser (Internet Explorer 8 as an example) and choose **Tools > Internet Options**.
2. On the **Advanced** tab page, select **Use TLS 1.0**, **Use TLS 1.1**, and click **OK**

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



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 8, and Firefox 31.0.

NOTE

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

Table 4-4 Description of default users

Default User	Preset Password		User Rights
admin (administrator)	LCD	000001	Performs all operations on the LCD and WebUI, including system running information browsing, system information (historical alarms, logs, e-labels, and fault data) exporting, parameter (system parameters and battery parameters) setting, system control (startup, shutdown, troubleshooting, runtime clearing, and battery management), system configuration (network parameters, user management, time and date, and site
	WEB	For a version earlier than UPS V100R001C10SPC008, the WebUI preset password is	

Default User	Preset Password		User Rights
		000001 ; for UPS V100R001C 10SPC008 and later, the WebUI preset password is Changeme .	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 V100R001C 10SPC008, the WebUI preset password is 000001 ; for UPS V100R001C 10SPC008 and later, the WebUI preset password is Changeme .	
browser (browser)	N/A	N/A	Only browses the system running information.

 **NOTE**

- If you enter incorrect passwords for five 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.

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

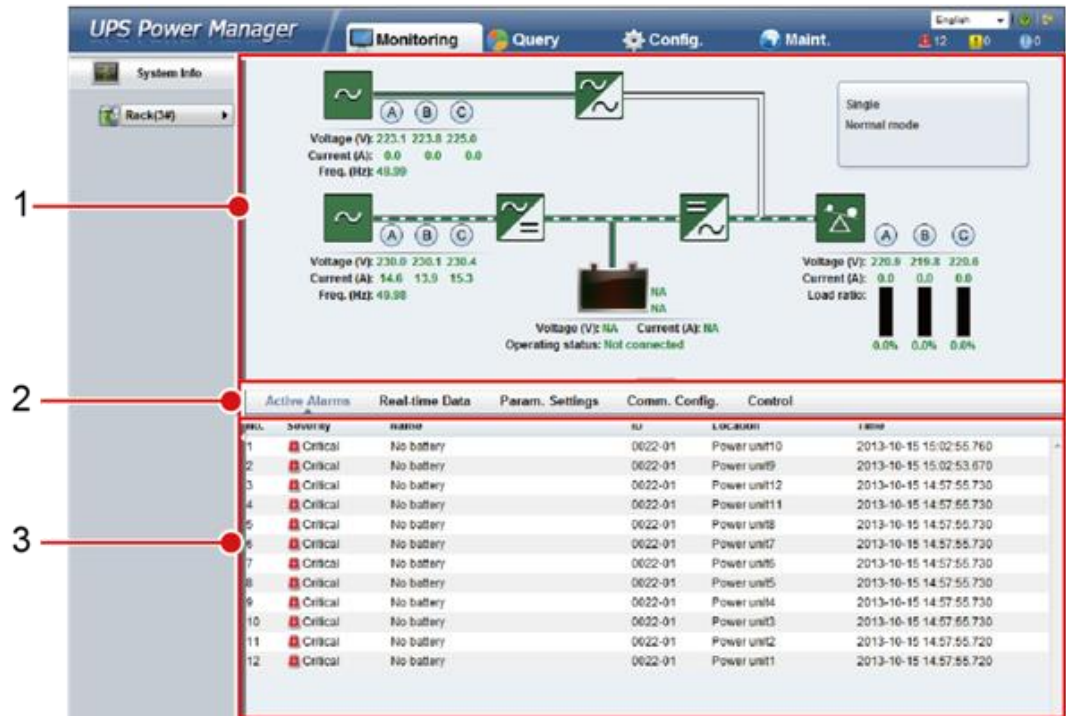


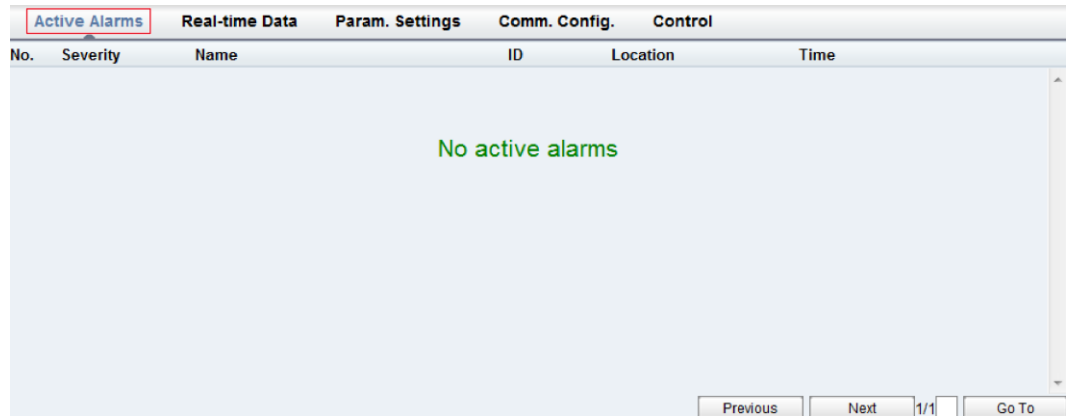
Table 4-5 Monitoring page details

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

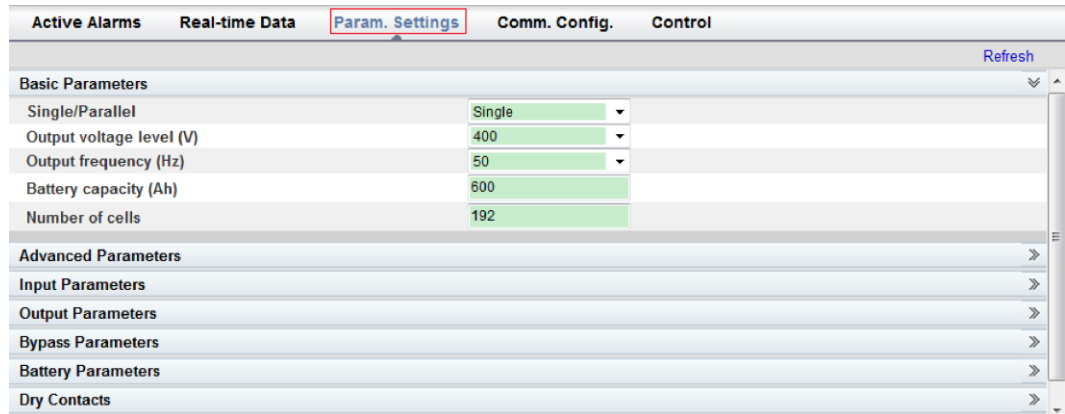
No.	Severity	Name	ID	Location	Time
No active alarms					

		Phase voltage (V)	A: 220.0	B: 219.9	C: 219.8
Input	Line voltage (V)	AB: 380.0	BC: 379.9	CA: 379.8	
	Current (A)	A: 808.3	B: 810.2	C: 812.2	
	Power factor	A: 0.98	B: 0.99	C: 0.99	
	Frequency (Hz)	50.00			
Bypass	Phase voltage (V)	A: 220.0	B: 219.9	C: 219.8	
	Line voltage (V)	AB: 380.0	BC: 379.9	CA: 379.8	
	Current (A)	A: 0.0	B: 0.0	C: 0.0	
	Power factor	A: 0.00	B: 0.00	C: 0.00	
	Frequency (Hz)	50.00			
		Phase voltage (V)	A: 220.0	B: 219.9	C: 219.8

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. See [Figure 4-69](#).

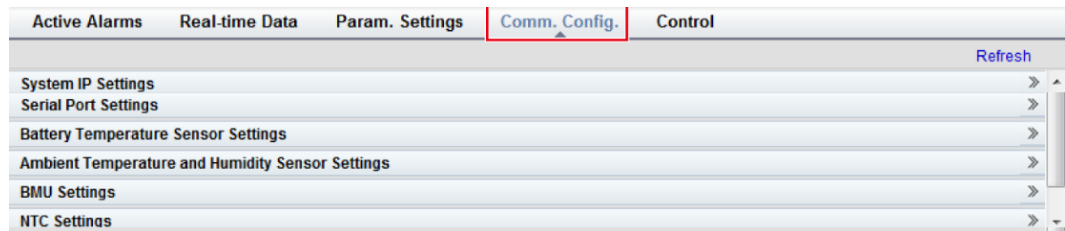
Figure 4-69 Param. Settings page



4.2.2.4 Comm. Config. Page

You can set communications information on the **Comm. Config.** page. See [Figure 4-70](#).

Figure 4-70 Comm. Config. page



4.2.2.5 Control Page

On **Control** page, you can control the system. For parallel systems, you can also perform **Parallel Inv. ON** and **Parallel Inv. OFF**.

Figure 4-71 Control page (single UPS)

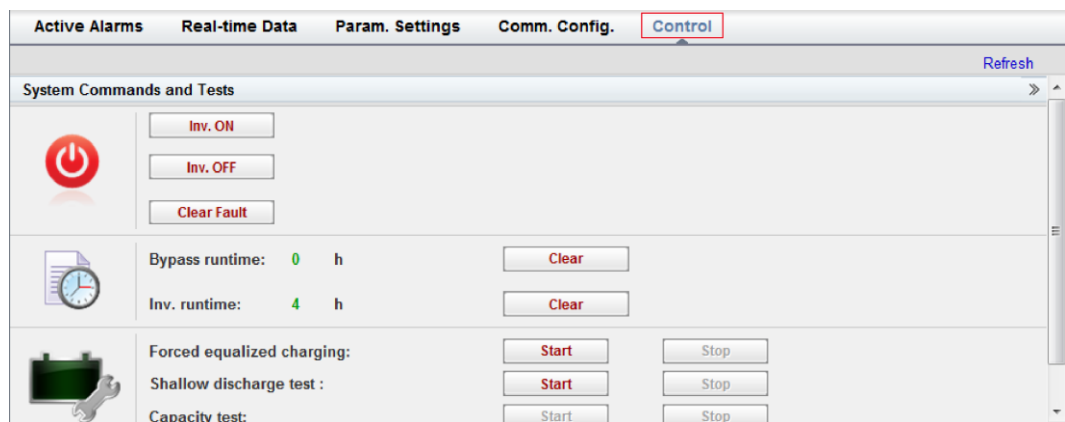
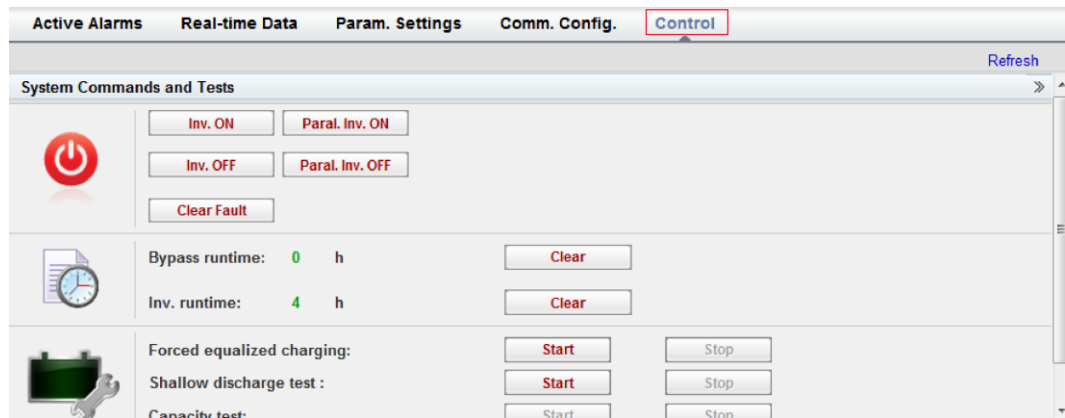


Figure 4-72 Control page (parallel system)

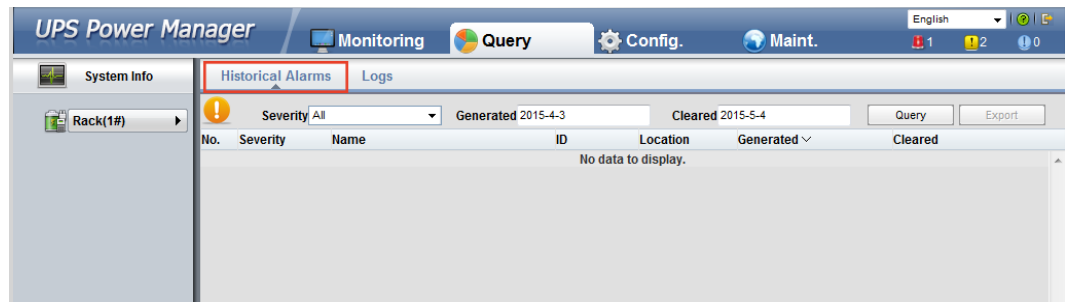


4.2.3 Query Page

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



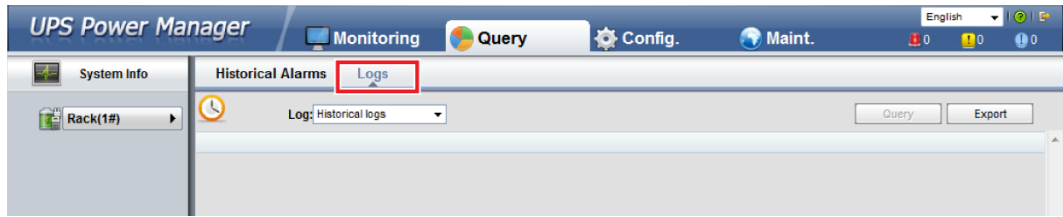
4.2.3.2 Logs Page

On the **Logs** page, you can set **Logs** 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.

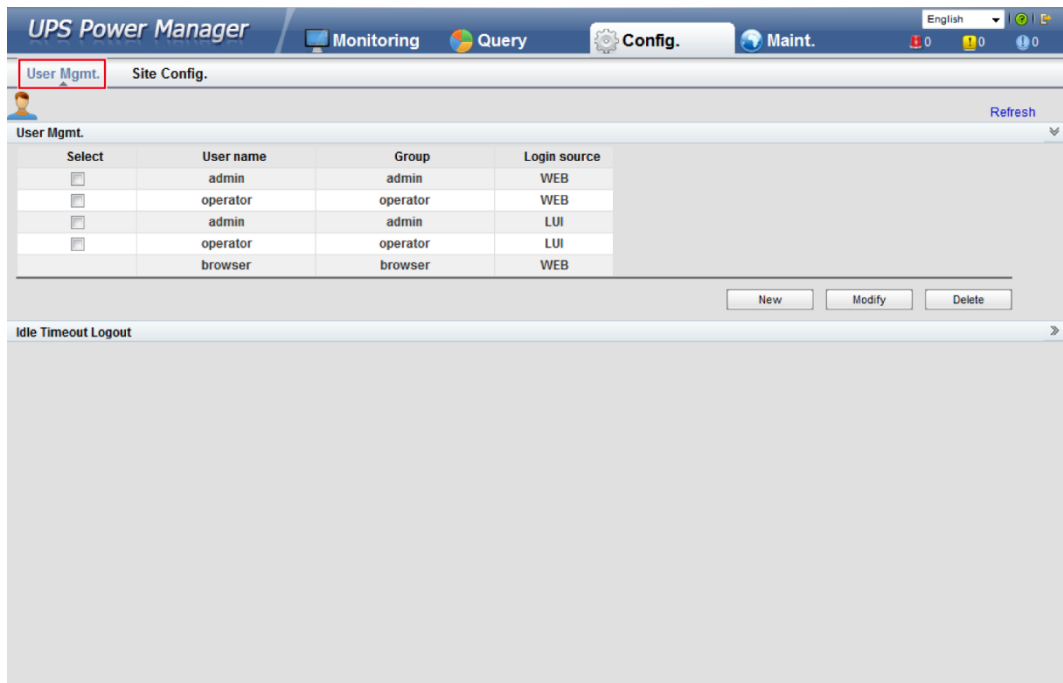
Figure 4-74 Logs Page



4.2.4 Config. Page

On the homepage, click **Config.**. On the **Config.** page, you can set the user and site information.

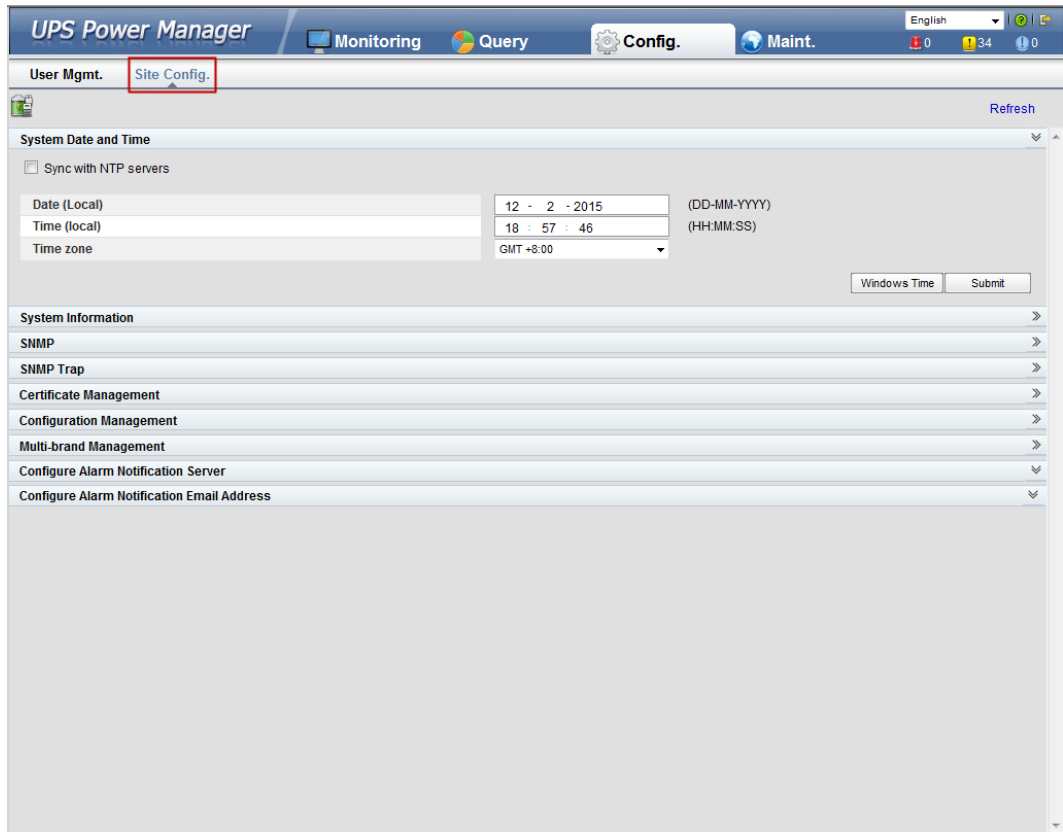
Figure 4-75 User Mgmt. Page



NOTE

On **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, the port number, and the 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.

The standard protocols SNMP V1 and SNMP V2 have security risks. You are advised to use the secure protocol SNMP V3.

The standard encryption algorithms MD5 and DES have security risks. You are advised to use the secure encryption algorithms SHA and AES.
- 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 HUAWEI_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 import the brand information of a partner to the corresponding WebUI.

- Specify **Email server IP address**, **Sender's email**, and **User account authentication required** when sending a mail and click **Test** to check whether the test email can be received. **Configure Alarm Notification Server** is used to configure a server for receiving alarm emails from the monitoring system.
- Set **Email** and **Alarm Severity** and simulate an alarm. Check that the alarm email can be received. **Configure Alarm Notification Email Address** is used to configure the email address for receiving alarm emails from the monitoring system.

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

Figure 4-77 Calib.

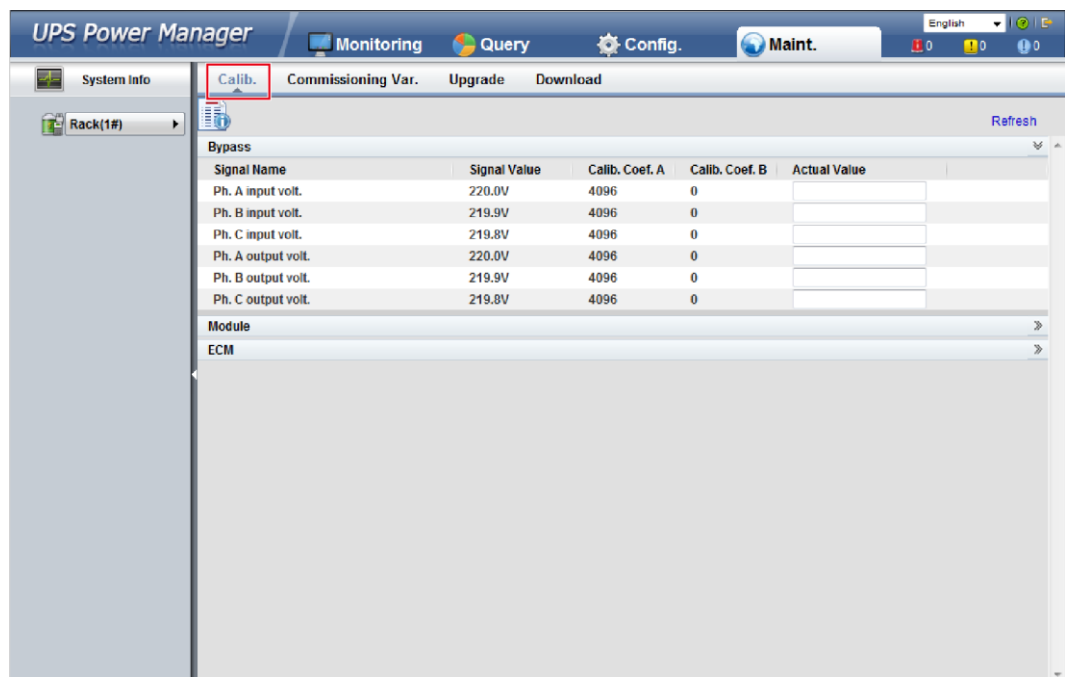


Figure 4-78 Commissioning Var.

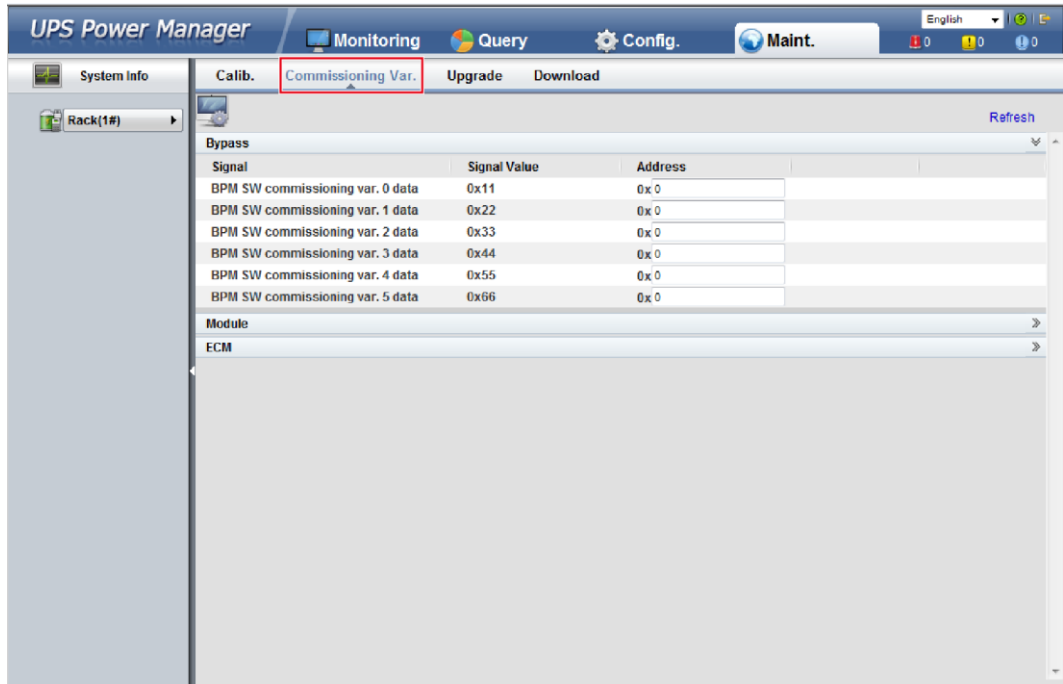


Figure 4-79 Upgrade

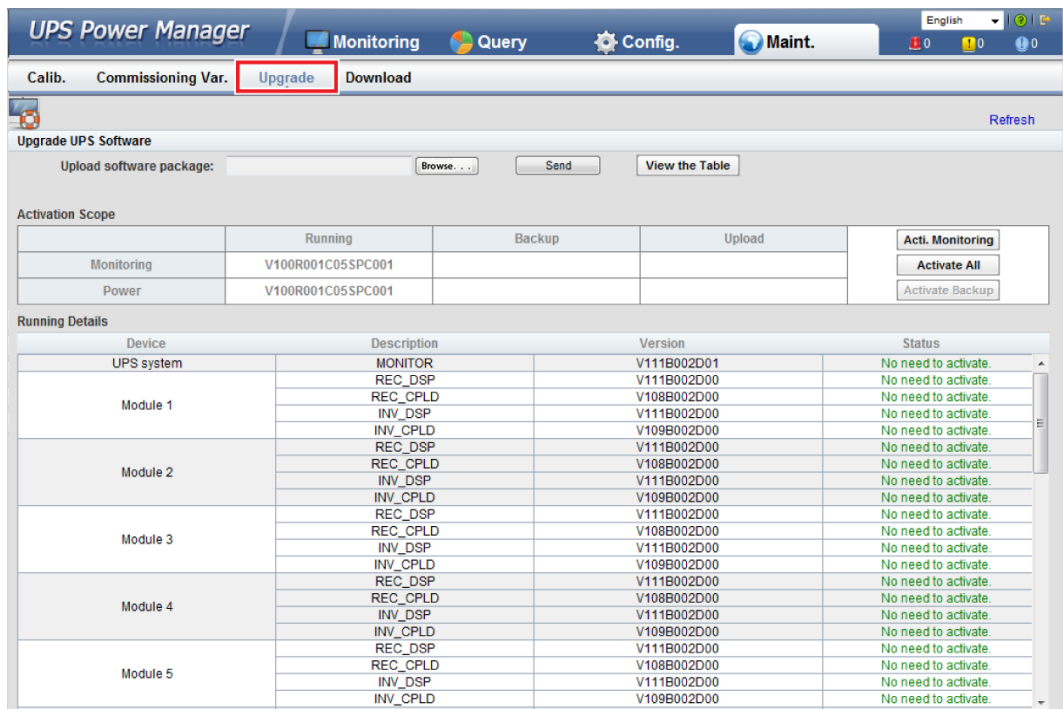
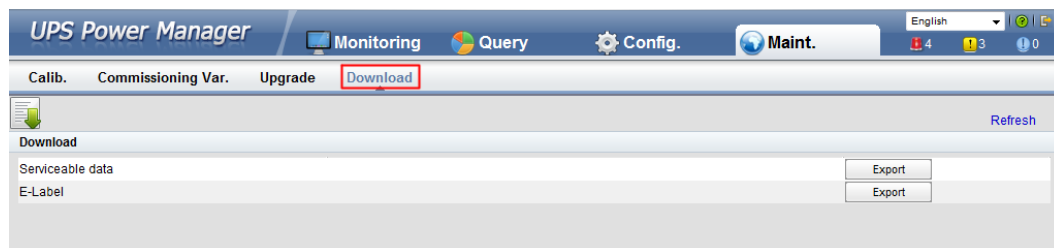


Figure 4-80 Download



5 Operations

5.1 Single UPS Operations

5.1.1 Powering On and Starting the UPS

Context

NOTICE

- Before you power on the UPS, check that the UPS has passed all check items described in section [3.4 Installation Verification](#).
- 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 Bypass module ready switch

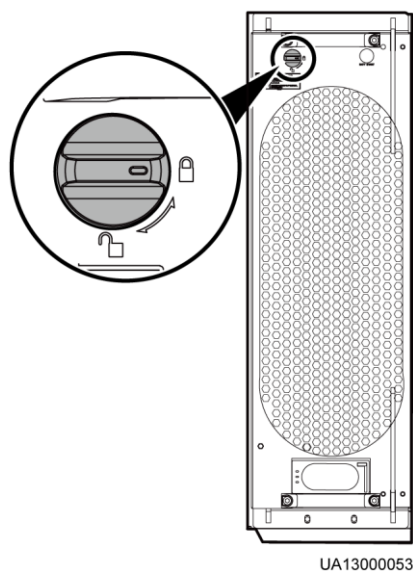
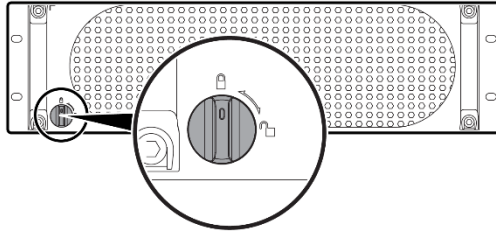


Figure 5-2 Power module ready switch



UA15000081

NOTICE

Measure the mains and bypass input voltage and frequency of the UPS bypass cabinet or measure the voltage and frequency delivered by the external input power distribution cabinet to the UPS. The voltage range is 138–485 V AC, and the frequency range is 40–70 Hz.

Procedure

Step 1 Power on the UPS. The following describes how to power on the UPS in full configuration and standard configuration.

- To power on a UPS in full configuration (configured with an internal mains input switch, internal bypass input switch, internal output switch, and internal maintenance bypass switch), perform the following operations:
 - a. Turn on the external bypass and mains input switches.
 - b. Turn on the internal bypass input switch.
 - c. Turn on the internal output switch.
 - d. Turn on the internal mains input switch.
 - e. Close the external input surge protection circuit breaker (if any).

The UPS starts initialization. The LCD displays the Huawei logo and an initialization progress bar.
- To power on a UPS in standard configuration (configured only with an internal maintenance bypass switch), perform the following operations:
 - a. Turn on the external bypass and mains input switches.
 - b. Close the external input surge protection circuit breaker (if any).

The UPS starts initialization. The LCD displays the Huawei logo and an initialization progress bar.

NOTE

If you do not close the input surge protection circuit breaker (if any on the input PDC), the system can start properly but will generate an alarm, asking you to close the input surge protection circuit breaker.

Step 2 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. You can select the display language, for example, Chinese or English, on the **Settings Wizard** screen.

Figure 5-3 Selecting language

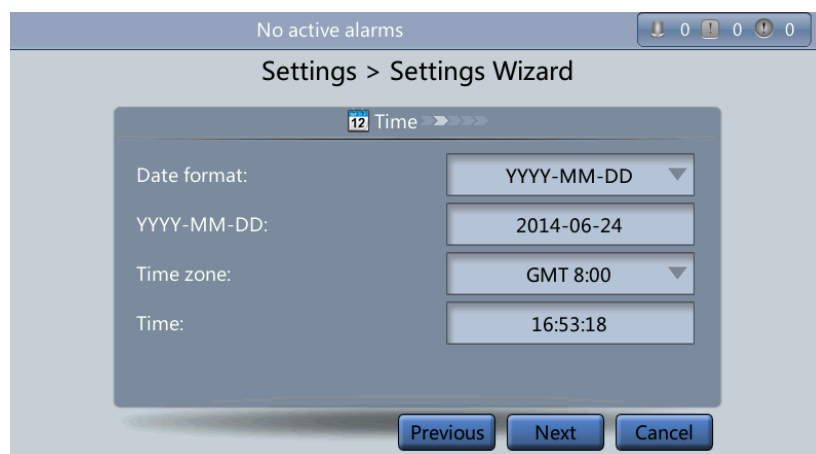


2. After selecting the language, tap **Next** to open the date and time setting page. Select the date format.

NOTICE

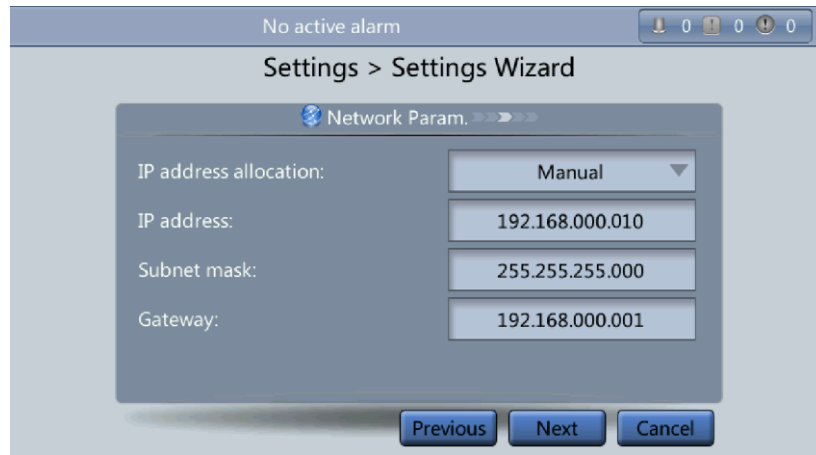
Set the date and time correctly. Incorrect time display in running and alarm information would lead to analysis errors during maintenance or repair.

Figure 5-4 Setting the date and time



3. On the **Network Param.** screen, set **IP address allocation**, **IP address**, **Subnet mask**, and **Gateway**.

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**. Set the voltage level, output frequency, battery capacity, and the number of batteries.

NOTICE

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

- Set **Single/Parallel** after confirmation. Otherwise, the UPS may not run properly.
- **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. screen 1

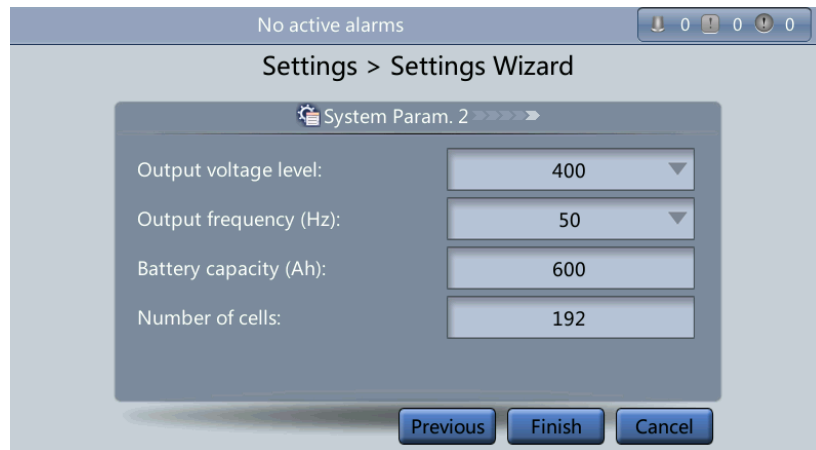


NOTICE

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. An 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. To seek help about how to determine 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, and the number of cells must be a multiple of 12 (for example, 180 and 192). 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. screen 2



Step 3 If no exception alarm is reported on the monitoring page after you specify settings on the **Settings Wizard** screen, perform subsequent steps. If exception alarms are reported on the monitoring page, clear all the alarms.

NOTE

- 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 4 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 5 Start the inverter.


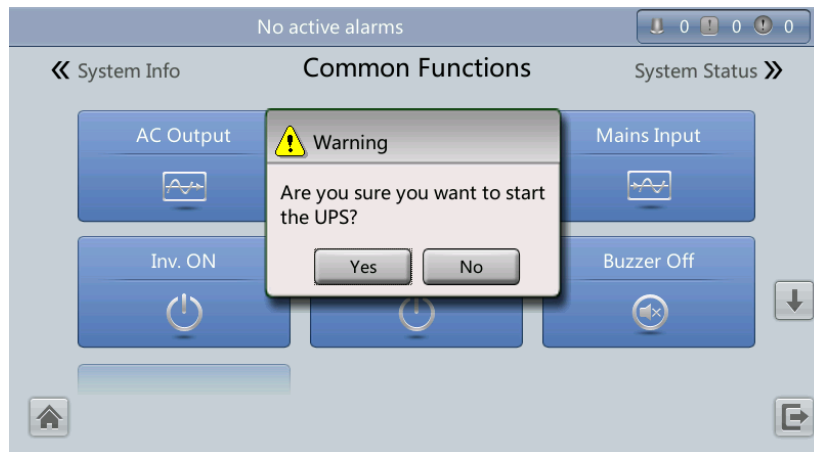
- Method for starting the inverter on the LCD
 - a. On the main screen, tap **Common Functions**. Tap **Inv. ON**.
 - b. If you have not logged in, enter a user name and password, and tap  on the login screen displayed.

Figure 5-8 Login



- c. In the displayed dialog box, tap **Yes** to start the inverter.

Figure 5-9 Inv. ON page



NOTE

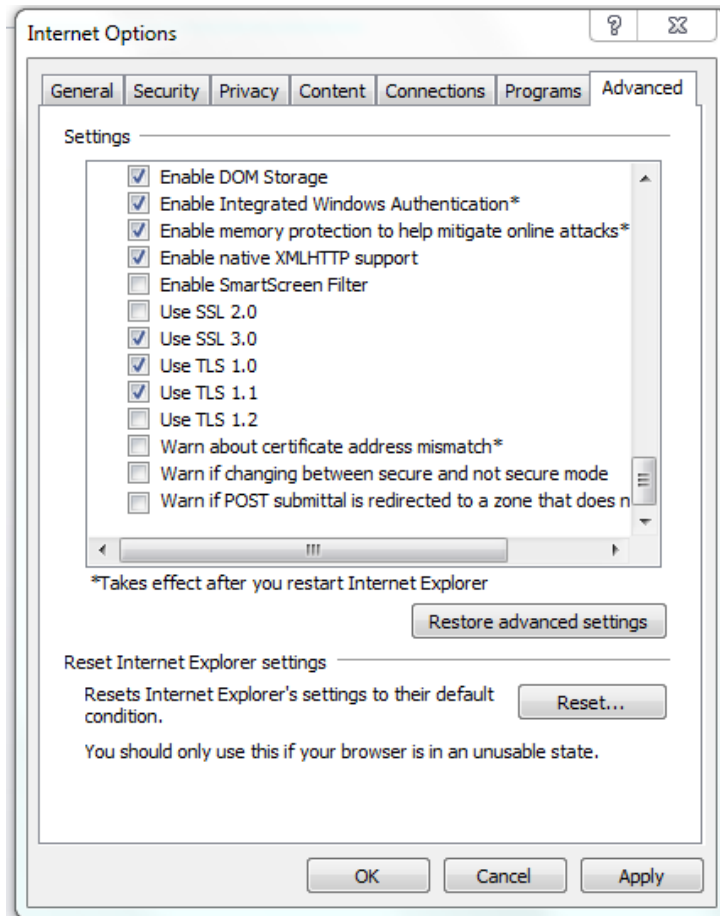
You can also tap **System Info** > **Maintenance** and start the inverter on the **Maintenance** screen.

- 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**.

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**. The UPS supports Internet Explorer 8, and Firefox 31.0.

Figure 5-11 Login

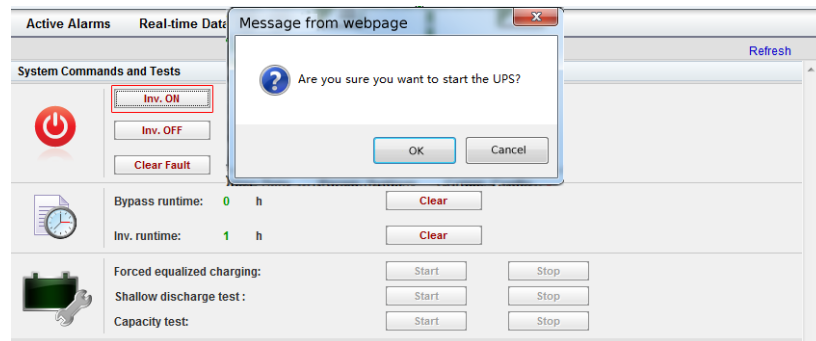


NOTE

- [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 **Inv. ON**. In the displayed dialog box, click **OK** to start the inverter.

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 6** After the inverter is started, the UPS transfers to the inverter power supply mode. You can check the system running status diagram to confirm that the active inverter supplies power to the system. During test by engineers, check whether the UPS three-phase output voltage and frequency are normal by monitoring **AC Output** on the screen, and use a multimeter to check whether the valid value of three-phase output voltage and frequency are normal.

NOTE

The three-phase output voltage should be 220 V, 230 V, or 240 V, and the frequency should be 50 Hz or 60 Hz.

- Check on the LCD

Figure 5-13 Common Functions

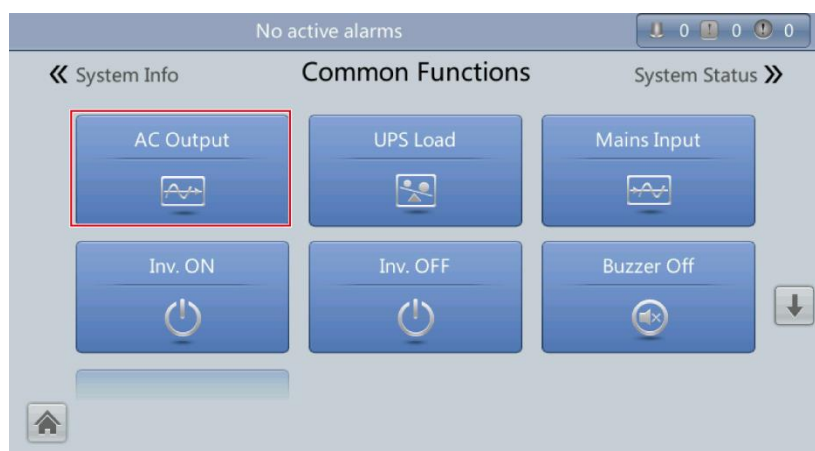
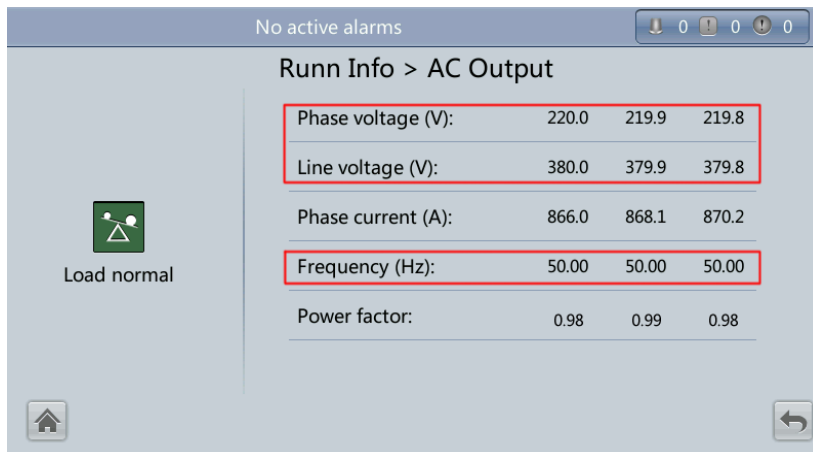
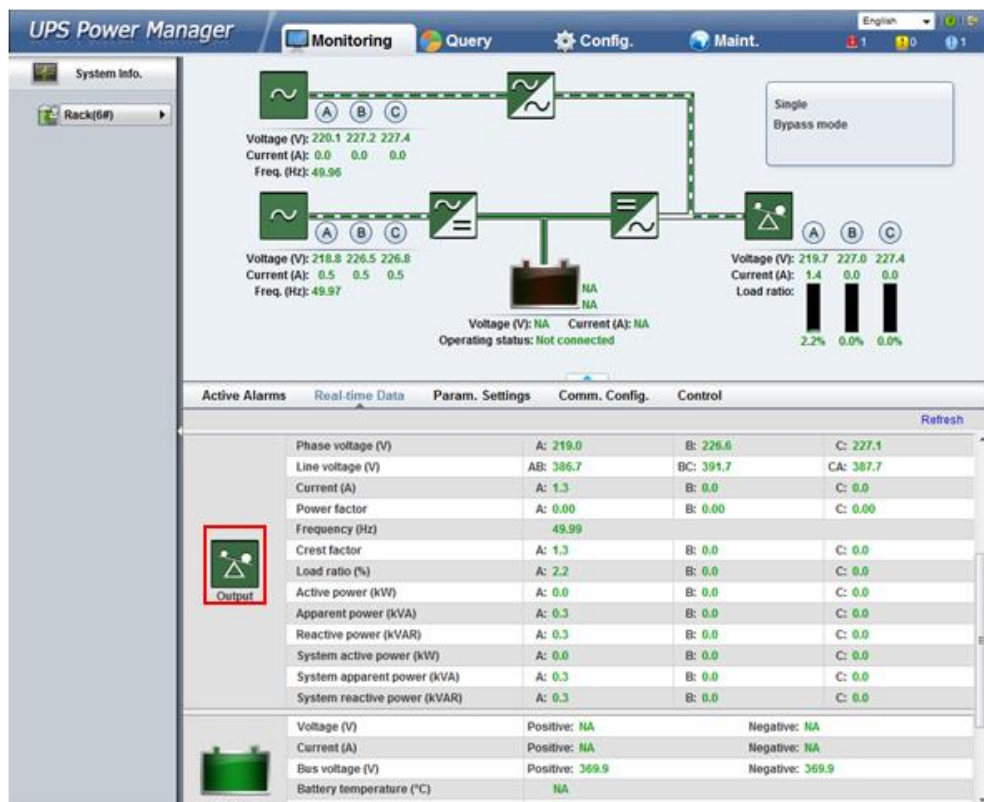


Figure 5-14 AC Output screen



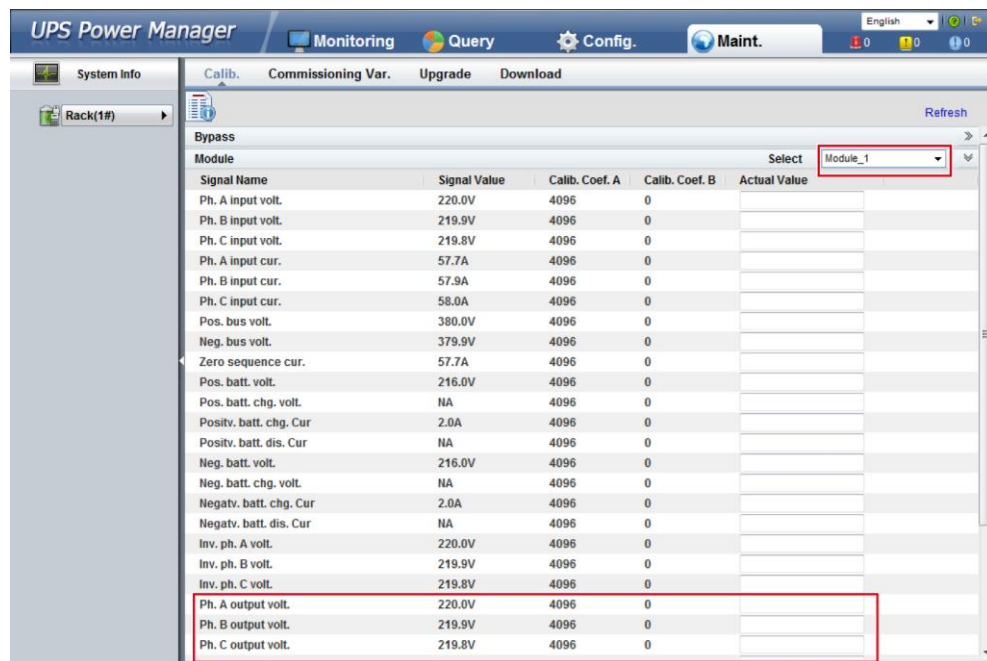
- Check on the WebUI.
 On the home page, choose **Monitoring > Real-time Data**. In the **Output** area, check the UPS three-phase output voltage and frequency.

Figure 5-15 Real-time Data page



If the measured voltages are not within the normal ranges, choose **Maint. > Calib.** on the WebUI and expand **Power unit**. Enter the measured voltages in **Ph. A output volt.**, **Ph. B output volt.**, and **Ph. C output volt.** under **Actual Value**, and click **Submit** to commission the voltages.

Figure 5-16 Commissioning the voltages



NOTE

Commission the voltages on other power units one by one.

Step 7 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. Use a multimeter to check that the sum of the absolute voltages of positive and negative battery strings are greater than a certain value (2 x Number of cells) to ensure that the battery strings are connected properly. If multiple battery strings are available, close the circuit breaker of each battery string and then close the main circuit breaker between the battery strings and the UPS.

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.

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	Two battery strings	192 x 1 = 192	300 Ah + 300 Ah

Battery Specifications	Number of Batteries	Number of Battery Strings	Number of Cells	Battery Capacity
	series	connected in parallel		= 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 8 After checking that the battery strings are properly connected, close the battery circuit breaker (if there are multiple battery strings, close the circuit breaker for each battery string and then the general circuit breaker between battery strings and the UPS).

 **NOTE**

After you turn on the battery string input switch, the **No batteries** alarm disappears on the LCD, while batteries are in the charged state.

Step 9 Turn on the external output switches to supply power to loads.

NOTICE

When the UPS is started for the first time, perform a battery capacity test to ensure that battery parameters are correctly displayed. For details, see [5.1.6.3 Capacity Test](#).

 **NOTE**

If the UPS has been powered on or is working in bypass mode and you want the UPS to transfer to normal mode, perform [Step 5](#) only if no alarm is generated. If the UPS is completely disconnected from the power supply system, perform all steps.

----End

5.1.2 Shutting Down and Powering Off the UPS

Context

NOTICE

After the inverter is shut down, the system transfers to the bypass mode if the system bypass operates properly or provides no output for loads if the system bypass becomes faulty. Before you shut down the UPS, ensure that the loads are disconnected to meet any power failure conditions.

Procedure

Step 1 Shut down the inverter.


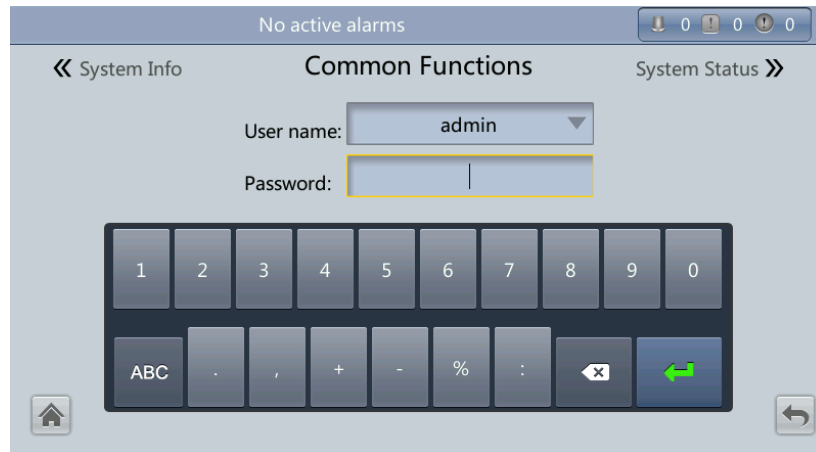
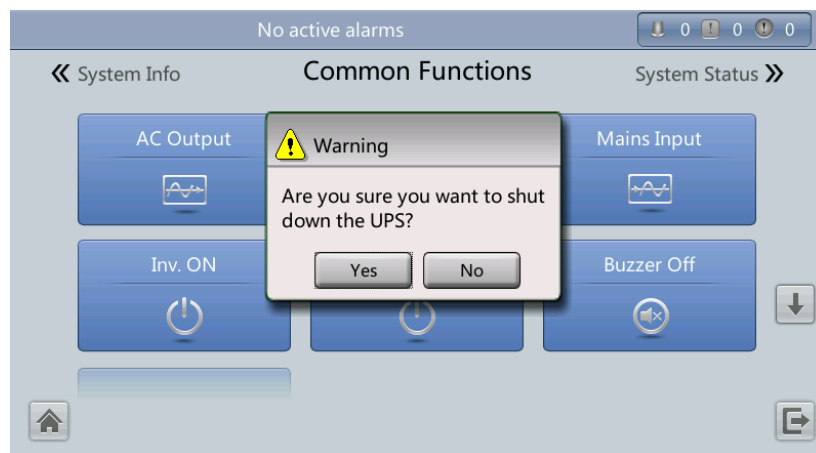
- Shutdown on the LCD
Choose **Common Functions** from the MDU main screen and click **Inv. OFF**. The login page is displayed. Enter the user name and password and click . See [Figure 5-17](#).

Figure 5-17 Login page



In the dialog box that is displayed, click **Yes**. The inverter is successfully shut down. See [Figure 5-18](#).

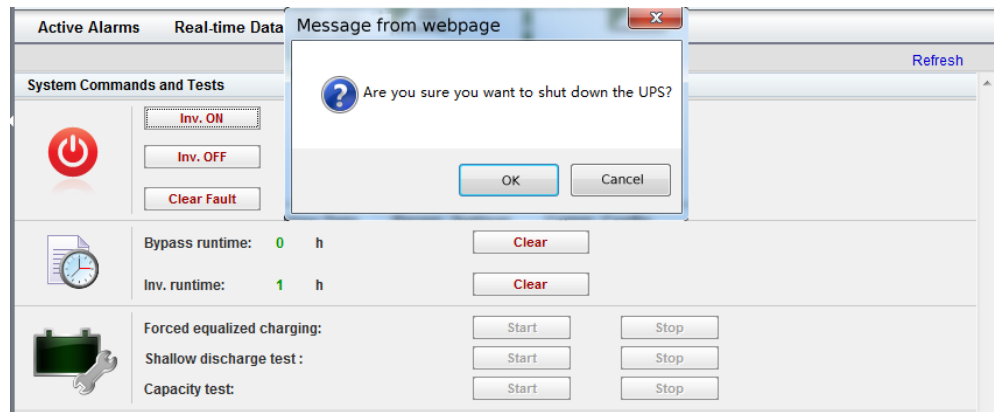
Figure 5-18 Shutting down the inverter



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

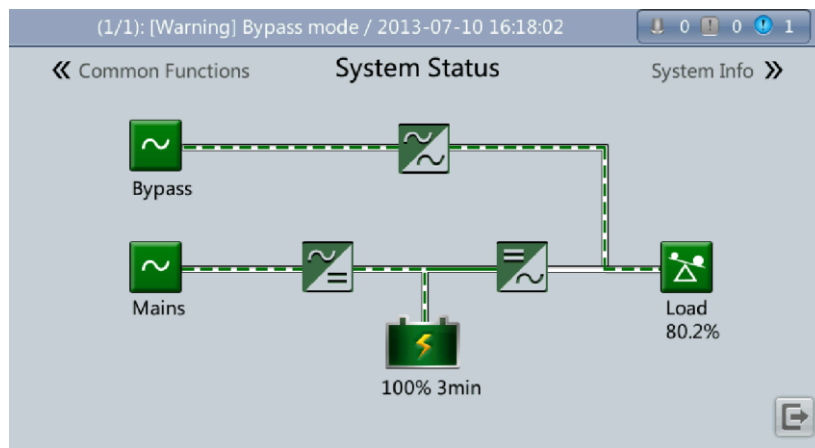
- Shutdown on the WebUI
Enter the UPS IP address in the address box, set the language, user name, and password, and click **Login**. The UPS WebUI is displayed. The system is compatible with Internet Explorer 8, and Firefox 31.0.
On the UPS WebUI, choose **Monitoring** > **Control** and click **Inv. OFF**. In the dialog box that is displayed, click **Ok**. The inverter is successfully shut down. See [Figure 5-19](#).

Figure 5-19 Shutting down the inverter



Step 2 Check the shutdown result. After the inverter is shut down, the system transfers to the bypass mode if the system bypass operates properly or provides no output for loads if the system bypass becomes faulty. See [Figure 5-20](#) and [Figure 5-21](#).

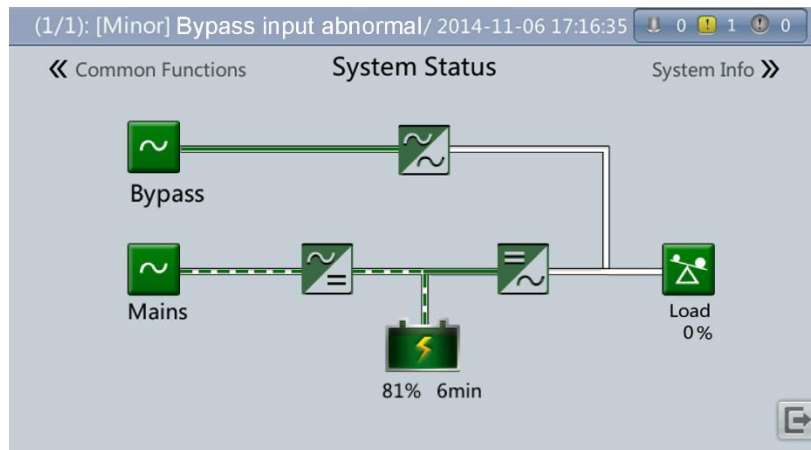
Figure 5-20 Normal bypass



NOTE

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

Figure 5-21 Abnormal bypass



Step 3 After the inverter shuts down, turn off the external output switches.

Step 4 Open the BCB. If multiple battery strings are installed, open the main circuit breaker between battery strings and the UPS and then open the circuit breaker for each battery string.

Step 5 Turn off the external input switches and the UPS internal switches. There are two types of UPS internal switches:

- To power off a UPS in full configuration (configured with an internal mains input switch, internal bypass input switch, internal output switch, and internal maintenance bypass switch), perform the following operations:
 - a. Turn off the UPS internal mains and bypass input switches.
 - b. Turn off the internal output switch.
 - c. Turn off the external mains and bypass input switches.
 - d. Open the input surge protection circuit breaker (if any) on the input PDC.
- To power off a UPS in standard configuration (configured only with an internal maintenance bypass switch), perform the following operations:
 - a. Turn off the external mains and bypass input switches.
 - b. Open the input surge protection circuit breaker (if any) on the input PDC.

NOTE

If you need only to shut down inverters to transfer the UPS to bypass mode, perform only [Step 1](#) after checking that the UPS has generated no alarm; if you need to shut down the UPS, perform all the preceding steps.

----End

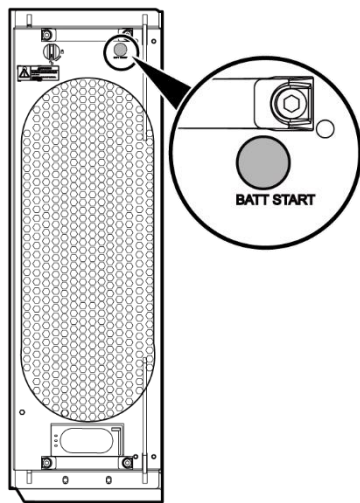
5.1.3 Starting the UPS in Battery Mode

Procedure

Step 1 Use a multimeter to check that the sum of the absolute voltage of the negative battery string and the voltage of the positive battery string is greater than a certain value ($2.0 \times$ Number of cells) to ensure that the batteries are connected properly.

- Step 2** Open the main and bypass input circuit breakers. When no main or bypass input is available, close the BCB. If multiple battery strings are installed, close the circuit breaker for each battery string and then close the main circuit breaker between battery strings and the UPS.
- Step 3** Use a multimeter to measure the positive and negative battery string voltages at the UPS battery input terminal. If the sum of the absolute voltage of the negative battery string and the voltage of the positive battery string is greater than a certain value ($2.0 \times \text{Number of cells}$), the batteries are connected properly.
- Step 4** Press the battery cold-startup button on the bypass module, Huawei logo and initialization progress are displayed on the MDU.

Figure 5-22 Battery cold-startup button



UA13000054

- Step 5** After LCD initialization, start the inverter.
----End

5.1.4 Transferring to Bypass Mode

NOTICE

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

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

NOTE

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

5.1.5 Setting ECO Mode

Context

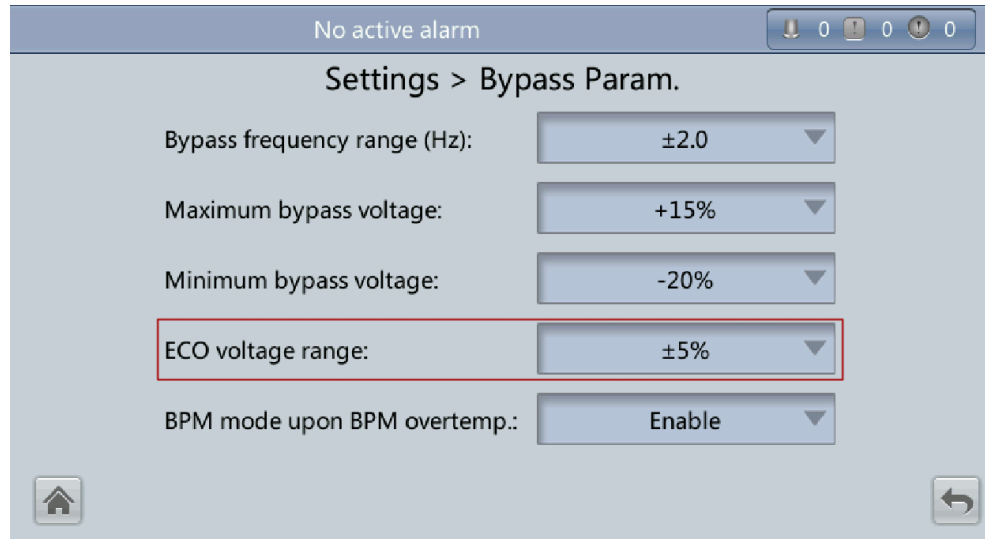
- The UPS is set to non-ECO mode by default. Set the UPS to ECO mode when energy saving is required.
- When the UPS works in ECO mode, the bypass module takes precedence over the power module in supplying power to loads. When the bypass module is disconnected, the UPS switches to the power module. The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

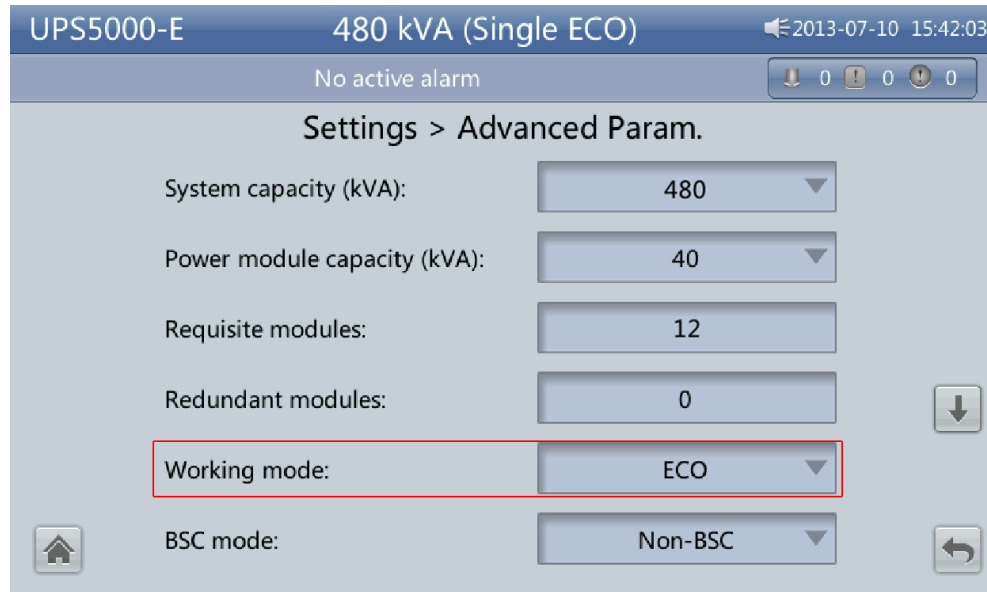
Step 2 Select a value ($\pm 5\%$, $\pm 6\%$, $\pm 7\%$, $\pm 8\%$, $\pm 9\%$, or $\pm 10\%$) from the **ECO voltage range** drop-down list box.

Figure 5-23 Setting ECO voltage range



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

Figure 5-24 Setting ECO mode

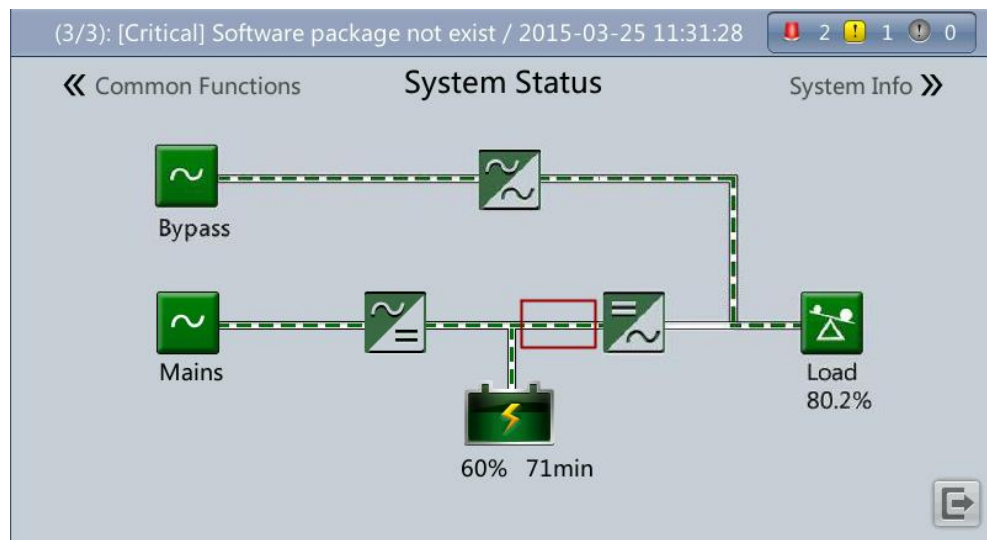


Step 4 Manually start the inverter.

NOTICE

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

Figure 5-25 System Status screen



----End

5.1.6 Testing Batteries

5.1.6.1 Forced Equalized Charging Test

Context

NOTICE

Before a forced equalized charging test, ensure that:

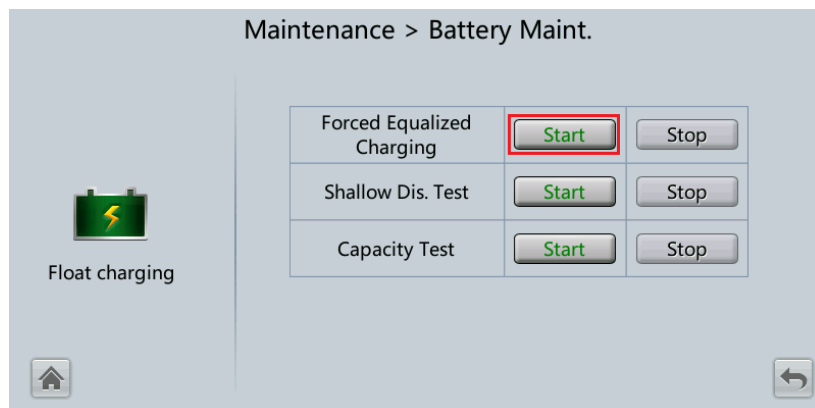
- The mains input is normal.
- Batteries are properly connected.
- Batteries are not in the equalized charging state.

Procedure

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

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

Figure 5-26 Starting a forced equalized charging test



NOTE

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

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

----End

5.1.6.2 Shallow Discharge Test

NOTICE

Before performing a shallow discharge test, ensure that:

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

Automatic Shallow Discharge Test

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

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

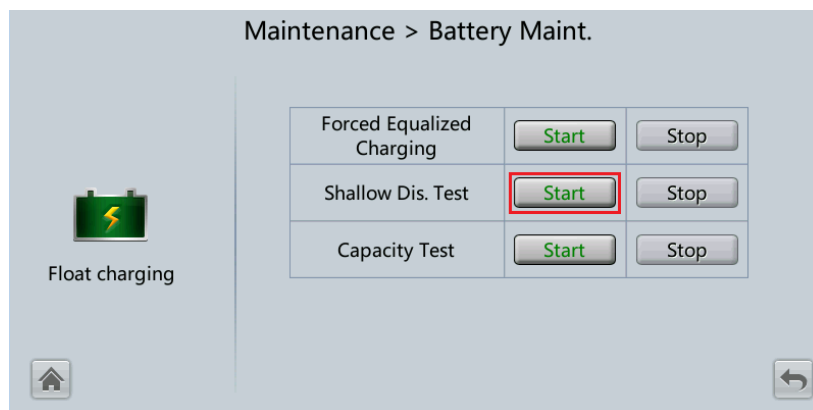
----End

Manual Shallow Discharge Test

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

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

Figure 5-27 Starting a shallow discharge test



NOTE

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

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

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

----End

5.1.6.3 Capacity Test

Context

NOTICE

Before a capacity test, ensure that:

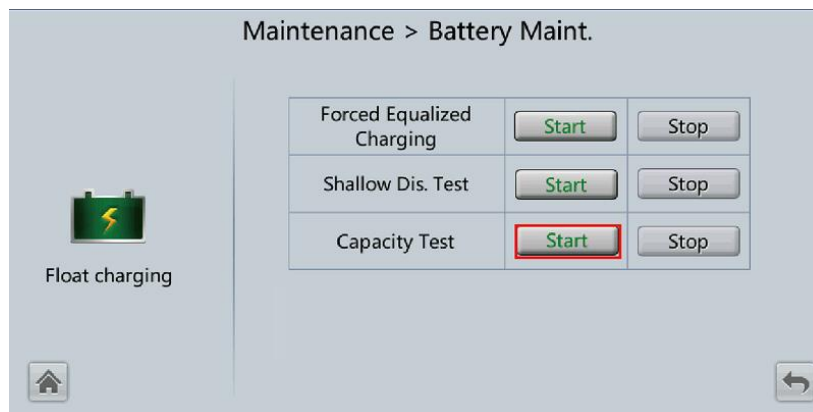
- The UPS is working in normal mode; float charging or hibernation has lasted for 2 hours after the state of charge (SOC) reaches 100%; and the load ratio fluctuation is less than 10%.
- The UPS has generated no battery overtemperature, overvoltage, or overcurrent alarm. No generator is connected to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

Procedure

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

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

Figure 5-28 Starting a capacity test



NOTE

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

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

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

----End

5.1.6.4 Test Data Download

Download over the LCD

Procedure


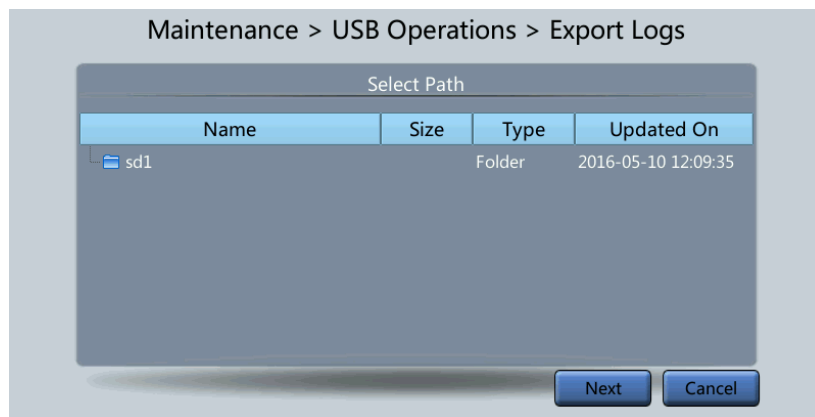
- Step 1** Insert a USB flash drive into the USB port on the MDU.
- Step 2** On the main screen of the LCD, choose **System Info**. Tap . The **Maintenance** screen is displayed.
- Step 3** Choose **USB Operations** > **Export Logs**, and select a log download path.

Figure 5-29 Downloading logs



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

Figure 5-30 Confirming the path



----End

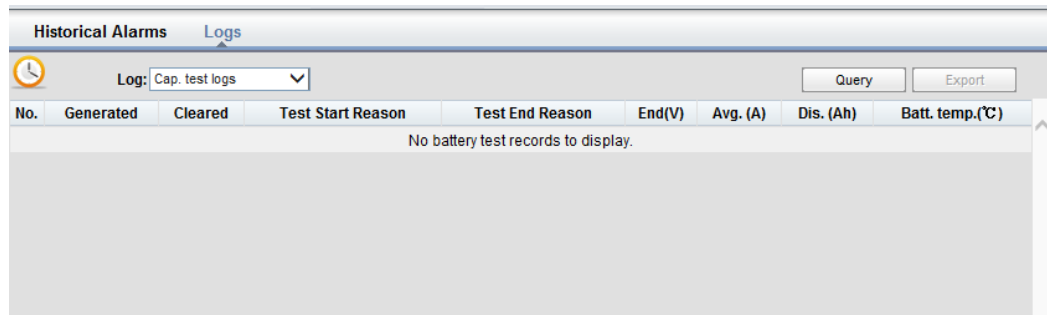
Download over the WebUI

Procedure

Step 1 Log in to the WebUI.

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

Figure 5-31 Logs



----End

5.1.7 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 through the maintenance bypass. Power supply of the loads may be disconnected if the mains fails.

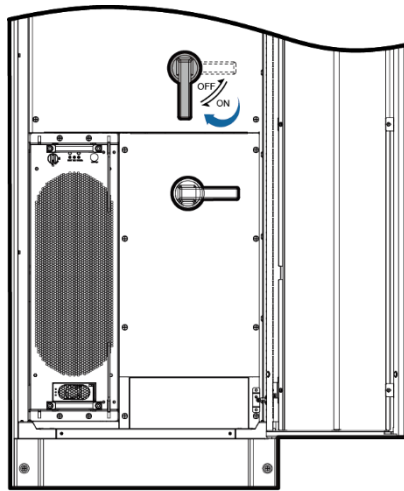
Procedure

Step 1 Switch the UPS to the bypass mode.

Step 2 Turn on the maintenance bypass switch.

If a maintenance bypass switch lock is configured, open the lock. Manually close the maintenance bypass circuit breaker for the UPS. The UPS transfers to the maintenance bypass mode. (The maintenance bypass circuit breaker is OFF by default. To close the maintenance bypass circuit breaker, manually turn it to the ON position.) The **Maint. breaker closed** alarm is displayed in the alarm list on the MDU, as shown in [Figure 5-33](#).

Figure 5-32 Turning on the maintenance bypass switch (UPS in full configurations)



UA13000047

Figure 5-33 Maint. Breaker closed

(2/2): [Warning] Bypass mode / 2013-07-10 16:18:02

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

----End

5.1.8 Transferring from Maintenance Bypass Mode to Normal Mode

Prerequisites

NOTICE

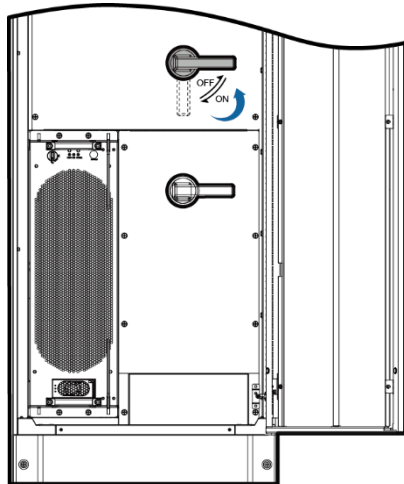
Before you switch the system from maintenance bypass mode to normal mode, ensure that the input and output of the system bypass are normal.

Procedure

Step 1 Turn off the maintenance bypass switch.

Turn the maintenance bypass circuit breaker from the ON position to the OFF position. The maintenance bypass circuit breaker is open, and the **Maint. breaker closed** alarm is cleared from the MDU. Check whether the system is operating in bypass mode by viewing the system operating status on the LCD or WebUI.

Figure 5-34 Turning off the maintenance bypass switch (UPS in full configurations)



UA13000050

Step 2 Start the inverter.

----End

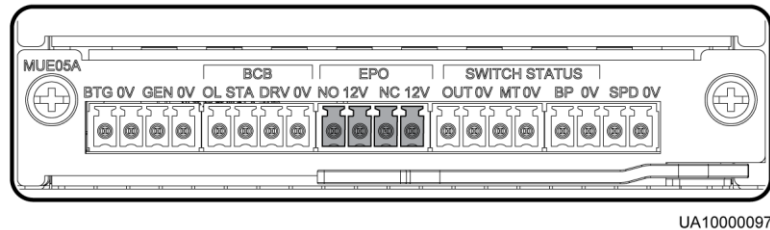
5.1.9 Performing EPO

NOTICE

- After the EPO button is turned on, the UPS supplies no power and the loads shut down.
- In maintenance bypass mode, the UPS continues to supply power even after the EPO button is turned on.

Press the external EPO switch that connects to the dry contact card or remove the 4-pin terminal on the EPO port of the dry contact card of the bypass unit.

Figure 5-35 EPO ports



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

5.1.10 Clearing the EPO State

Procedure

- Step 1** Clear the EPO state. Ensure that the EPO button connected to the dry contact is not in the EPO state.
 - Step 2** Clear the EPO alarm.
 - On the LCD
On the LCD, choose **System Info** > **Alarms** and tap **Clear Faults**. In the displayed dialog box, tap **Yes**. The EPO alarm is cleared successfully.
 - On the WebUI
Choose **Monitoring** > **Control** > **System Commands and Tests** and click **Clear Fault**. The EPO alarm is cleared successfully.
 - Step 3** Check that the EPO alarm is cleared by viewing active alarms. If the system bypass input is normal, the UPS transfers to bypass mode.
 - Viewing active alarms on the LCD
Choose **System Info** > **Alarms** > **Active Alarms** to check that the EPO alarm is cleared.
 - Viewing active alarms on the WebUI
Choose **Monitoring** > **Active Alarms** to check that the EPO alarm is cleared.
 - Step 4** Start the inverter.
- End

5.2 Setting Hibernation Mode

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

NOTICE

Before starting hibernation mode:


- Ensure that the load power is stable. If the system load power fluctuation is greater than the rated capacity of half a module (for example, the single-phase load fluctuation is greater than 6.67 kVA for a 40 kVA module), the UPS may enter and exit from hibernation mode repeatedly.
- Check that the number of redundant power modules and racks are appropriate. If the number is insufficient, the UPS may not enter hibernation mode.

5.2.1 LCD

Procedure

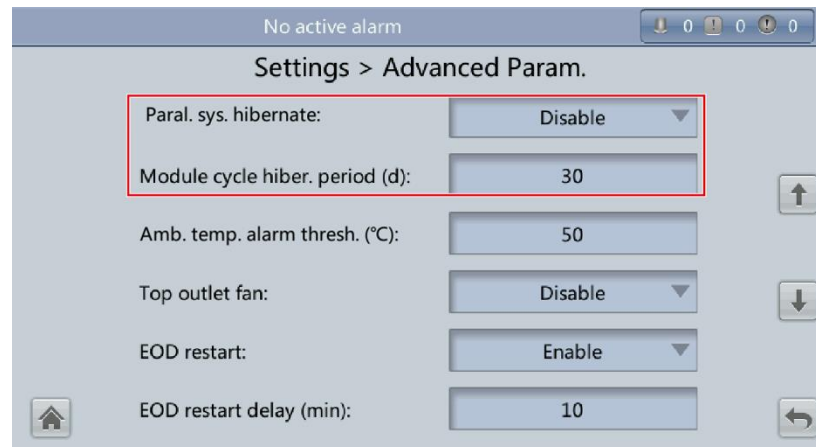
Step 1 On the main screen, tap **System Info** and . The **Settings** screen is displayed.

 **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 5-36](#).

Figure 5-36 Hibernation parameters on the LCD



Step 3 On the LCD, set **Paral. sys. hibernate** to **Enable**. A confirmation message and security warning are displayed, as shown in [Figure 5-37](#) and [Figure 5-38](#).

Figure 5-37 Confirmation message

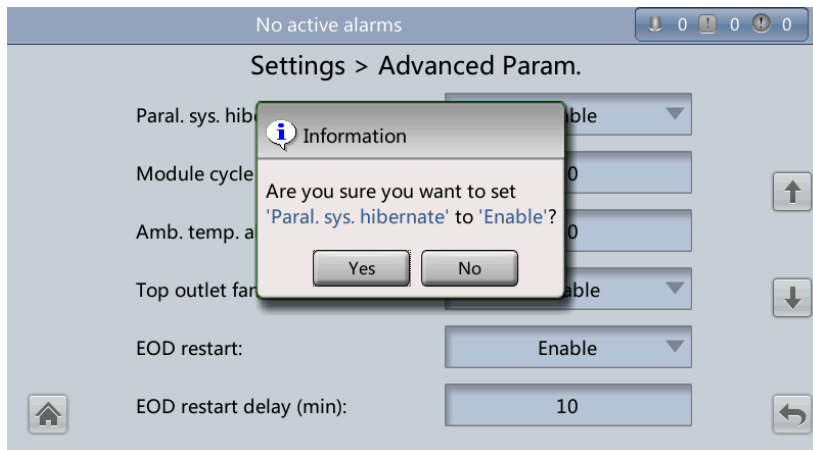
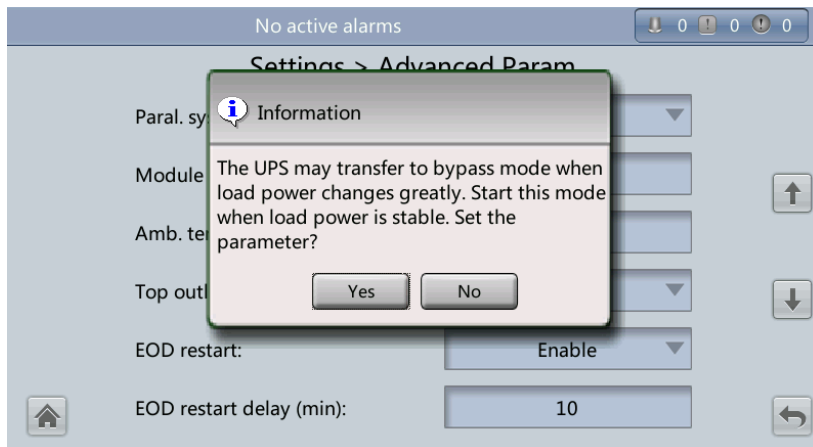


Figure 5-38 Security warning



Step 4 Check that the load power is stable (that is, no transient surge results in overload, which may cause the UPS to transfer to bypass mode), and tap **Yes**. A message is displayed, indicating that the hibernation function is set successfully.

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

----End

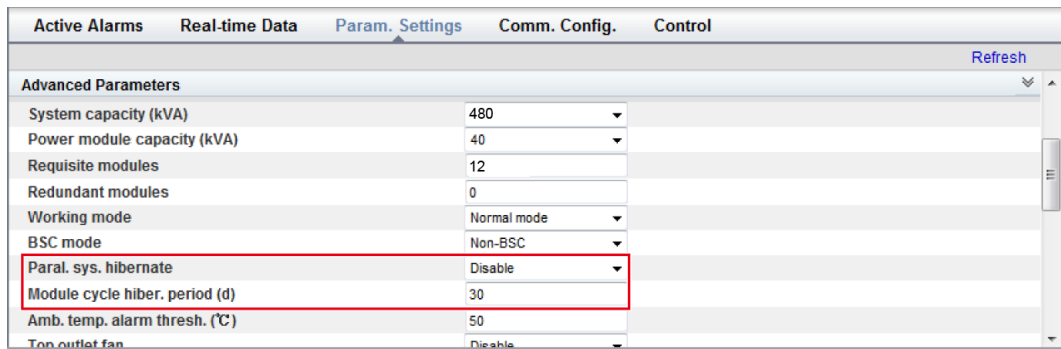
5.2.2 WebUI

Procedure

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

Step 2 Choose **Monitoring > Param. Settings > Advanced Param.**

Figure 5-39 Hibernation parameters on the WebUI



Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Refresh				
Advanced Parameters				
System capacity (kVA)	480	▼		
Power module capacity (kVA)	40	▼		
Requisite modules	12			
Redundant modules	0			
Working mode	Normal mode	▼		
BSC mode	Non-BSC	▼		
Paral. sys. hibernate	Disable	▼		
Module cycle hiber. period (d)	30			
Amb. temp. alarm thresh. (°C)	50			
Top outlet fan	Disable	▼		

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

 **NOTE**

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

----End

5.3 Setting Intelligent Power Mode


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 mains outage occurs and the battery voltage reaches the specified threshold. You can set intelligent power mode on the LCD or WebUI.

5.3.1 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.

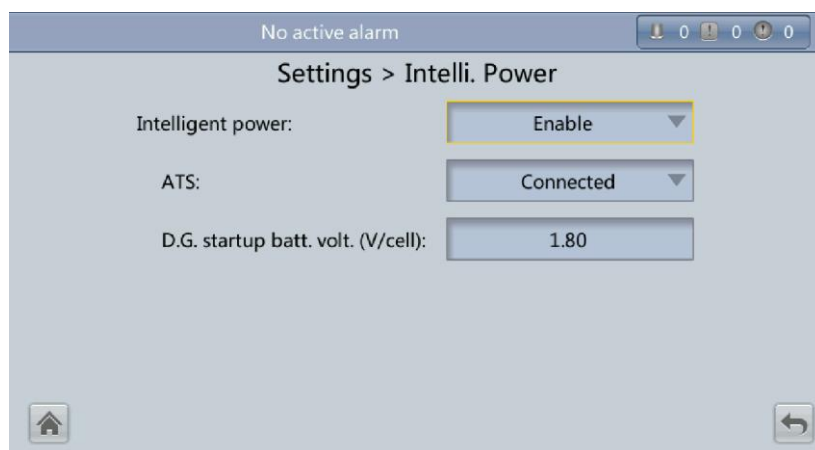
Step 2 On the **Settings** screen, tap **Intelli. Power**.

Figure 5-40 Intelli. Power screen



Step 3 Set **Intelligent power** to **Enabled**. In the warning dialog box, tap **Yes**.

Figure 5-41 Intelligent power parameters on the LCD



- **Intelligent Power**
The value can be **Enabled** or **Disabled**. The intelligent power supply function can be used only when **Intelligent power** is set to **Enable**. The default value is **Disabled**.
- **ATS**
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** to **Enabled**.
- **D.G. startup batt. volt. (V/cell)**
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** to **Enabled**.

NOTE

When the D.G. is connected, ensure that the preceding three parameters have been set so that the UPS can run properly.

Step 4 After you set **Intelligent Power** to **Enabled**, the system changes some parameter values associated with intelligent power supply.

Figure 5-42 Associated intelligent power supply parameters on the LCD 1

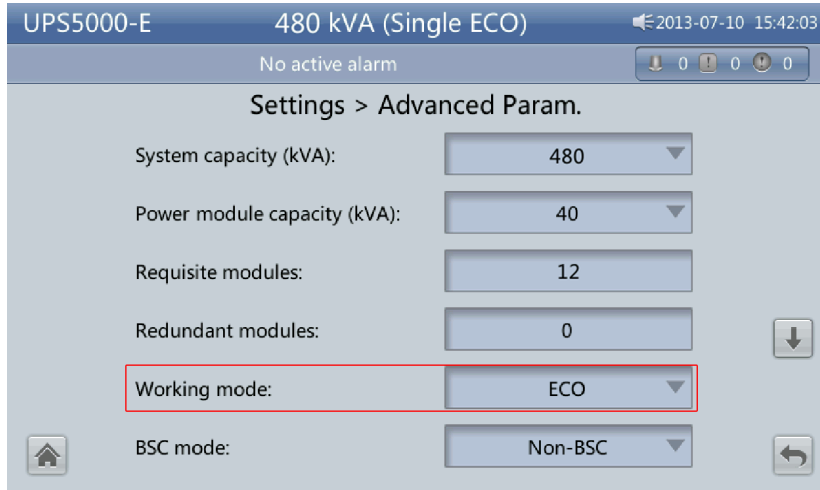


Figure 5-43 Associated intelligent power supply parameters on the LCD 2

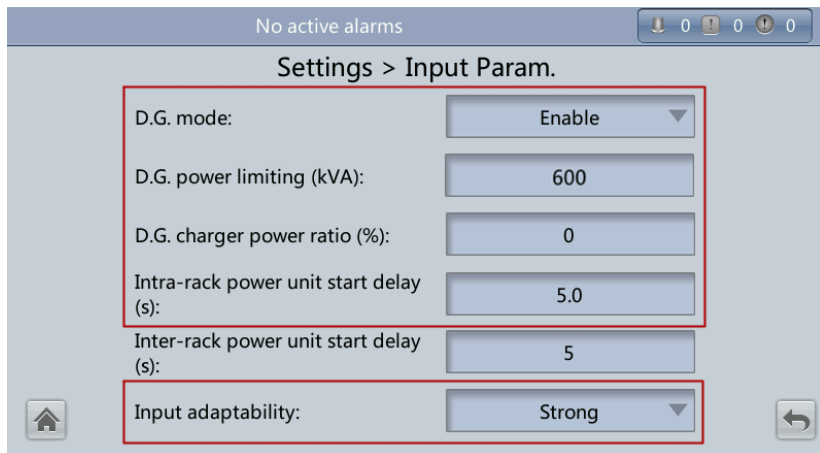


Figure 5-44 Associated intelligent power supply parameters on the LCD 3

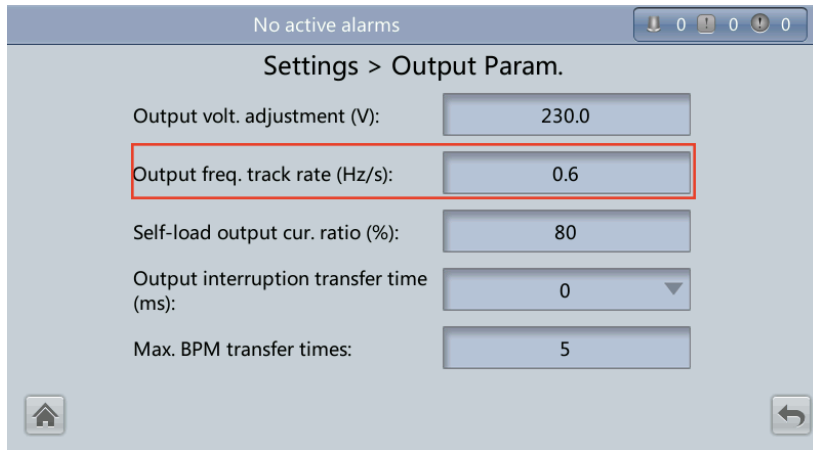


Figure 5-45 Associated intelligent power supply parameters on the LCD 4

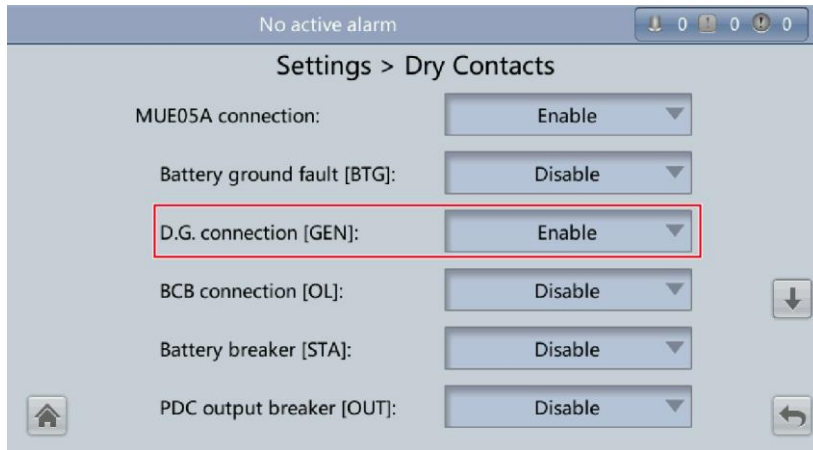


Figure 5-46 Associated intelligent power supply parameters on the LCD 5

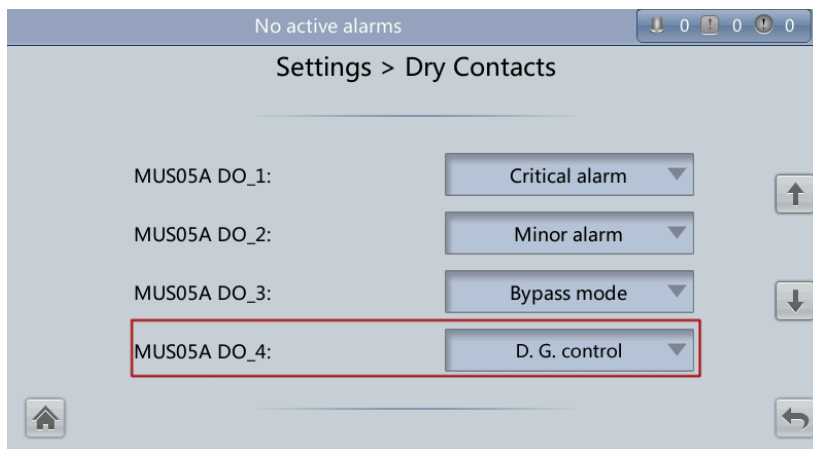


Figure 5-47 Associated intelligent power supply parameters on the LCD 6

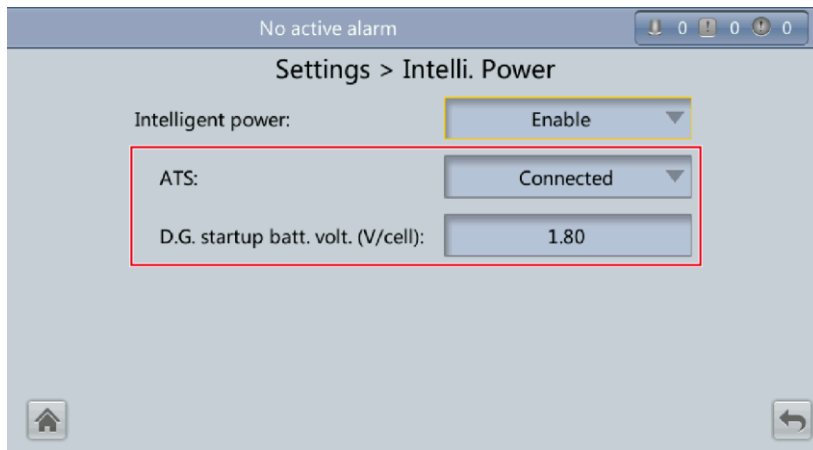


Table 5-2 Associated intelligent power supply parameters

Parameter	Automatic Settings	Remarks
Working mode	ECO	N/A
D.G. mode	Enable	You cannot modify this parameter if it is set automatically.
Intra-rack power module 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]	Enable	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	Set this parameter to the actual power of the D.G.
D.G. charger power ratio (%)	N/A	Set this parameter to the percentage of the power provided by the charger for batteries.

NOTE

- In battery mode (non-battery test), if the battery voltage reaches the value specified by **D.G. startup batt. volt.** or **Low battery voltage**, the signal for starting the D.G. is triggered.

- 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 signal for shutting down the D.G. is triggered.
- If the battery voltage is greater than **D.G. startup batt. volt.**, the UPS exits intelligent power mode and triggers the D.G. shutdown signal. 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 power mode.
- When disconnecting the D.G. from the UPS, set **Intelligent power** to **Disable**. Then the system will automatically modify the following parameters: **Working mode** is set to **Normal mode**; **Intra-rack power module start delay (s)** is set to **5**; **Output freq. track rate (Hz/s)** is set to **0.6**; **Input adaptability** is set to **Weak**; **D.G. mode** is set to **Disable**; and **D.G. connection [GEN]** is set to **Disable**. You can modify these parameters as required.

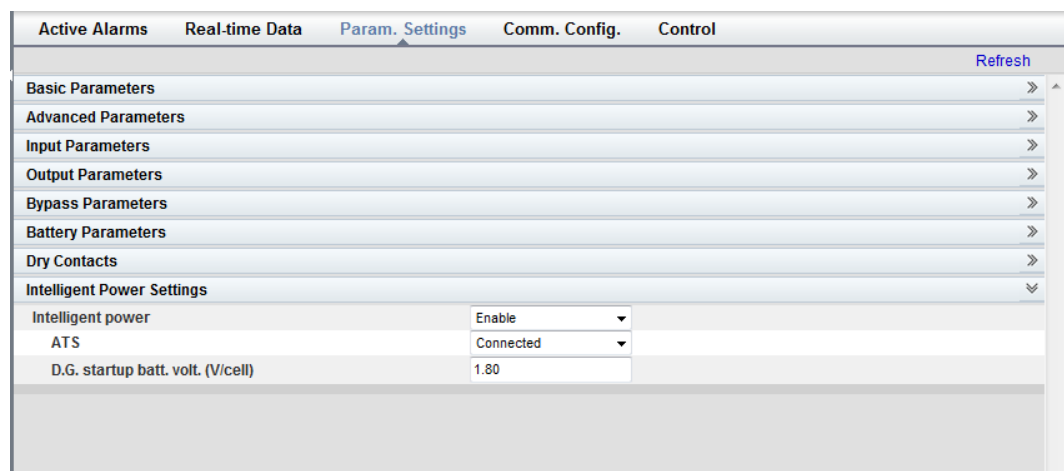
----End

5.3.2 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** to **Enable**, as shown in [Figure 5-48](#).

Figure 5-48 Intelligent power parameters on the WebUI



- **Intelligent power**
The value can be **Enable** or **Disable**. The intelligent power function is available only if the value is **Enable**. The default value is **Disable**.
- **ATS**
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 reused scenario. The default value is **Connected**. This parameter is available only after you set **Intelligent power** to **Enable**.
- **D.G. startup batt. volt. (V/cell)**
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** to **Enable**.

NOTE

Set the preceding three parameters when you connect the D.G. to the UPS to ensure that the UPS runs properly.

Step 3 After you set **Intelligent power** to **Enable**, the system automatically changes some parameters associated with intelligent power. [Figure 5-49](#) to [Figure 5-54](#) show the changed parameters on the WebUI.

Figure 5-49 Parameters associated with intelligent power on the WebUI 1

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Number of cells		192	Refresh	
Advanced Parameters				
System capacity (kVA)		480		
Power module capacity (kVA)		40		
Requisite modules		12		
Redundant modules		0		
Working mode		ECO		
BSC mode		Non-BSC		
Paral. sys. hibernate		Disable		
Module cycle hiber. period (d)		30		
Amb. temp. alarm thresh. (°C)		50		

Figure 5-50 Parameters associated with intelligent power on the WebUI 2

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Advanced Parameters		Refresh		
Input Parameters				
D.G. mode		Enable		
D.G. power limiting (kVA)		600		
D.G. charger power ratio (%)		0		
Intra-rack power unit start delay (s)		5.0		
Inter-rack power unit start delay (s)		5		
Input adaptability		Strong		
Output Parameters				
Bypass Parameters				

Figure 5-51 Parameters associated with intelligent power on the WebUI 3

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Refresh				
Basic Parameters >>				
Advanced Parameters >>				
Input Parameters >>				
Output Parameters >>				
Output volt. adjustment (V)		230.0		
Output freq. track rate (Hz/s)		0.6		
Self-load output cur. ratio (%)		80		
Output interruption transfer time (ms)		0		
Max. BPM transfer times		5		
Bypass Parameters >>				
Battery Parameters >>				
Dry Contacts >>				
Intelligent Power Settings >>				

Figure 5-52 Parameters associated with intelligent power on the WebUI 4

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Refresh				
Battery Parameters >>				
Dry Contacts >>				
MUE05A connection		Enable		
Battery ground fault [BTG]		Disable		
D.G. connection [GEN]		Enable		
BCB connection [OL]		Disable		
Battery breaker [STA]		Disable		
PDC output breaker [OUT]		Disable		
PDC maintenance breaker [MT]		Disable		
BP/SYSMT Switch		Disable		
SPD/SYSOUT Switch		Disable		
MUE06A connection		Disable		

Figure 5-53 Parameters associated with intelligent power on the WebUI 5

Active Alarms	Real-time Data	Param. Settings	Comm. Config.	Control
Refresh				
MUE07A DO_3 Action		Close		
MUE07A DO_4 Action		Close		
MUE07A DO_5 Action		Close		
MUS05A DO_1		Critical alarm		
MUS05A DO_2		Minor alarm		
MUS05A DO_3		Bypass mode		
MUS05A DO_4		D. G. control		
MUE07A DO_1		Low batt. volt.		
MUE07A DO_2		None		
MUE07A DO_3		None		
MUE07A DO_4		None		
MUE07A DO_5		None		

Figure 5-54 Parameters associated with intelligent power on the WebUI 6

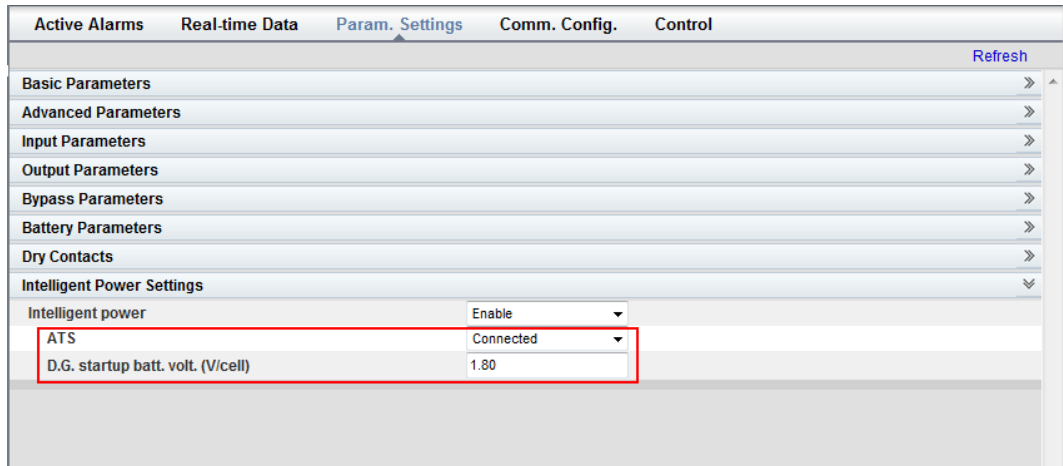


Table 5-3 lists the parameters associated with intelligent power.

Table 5-3 Parameters associated with intelligent power

Parameter	Value	Remarks
Working mode	ECO	N/A
D.G. mode	Enable	You cannot change the value.
Intra-rack power module 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]	Enable	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.

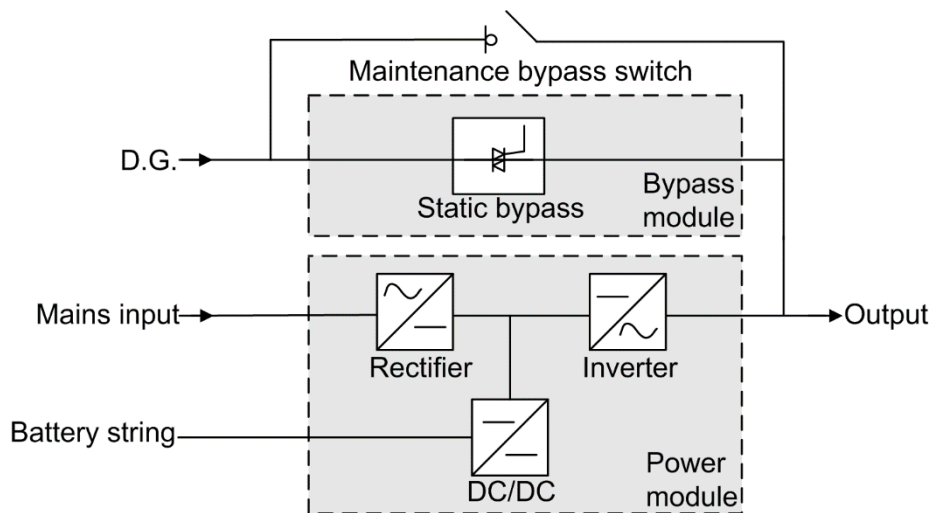
- If the battery voltage is greater than **D.G. startup batt. volt.**, the UPS exits intelligent power mode and triggers D.G. shutdown signals. If the battery voltage is less than **D.G. startup batt. volt.**, a dialog box is displayed, indicating potential risks. Tap **OK** to exit intelligent power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

----End

5.3.3 Reused Scenario

In reused scenarios, the D.G. connects to the UPS over the bypass module. Dry contacts control D.G. startup and shutdown. [Figure 5-55](#) shows the working principles.

Figure 5-55 Reused scenario

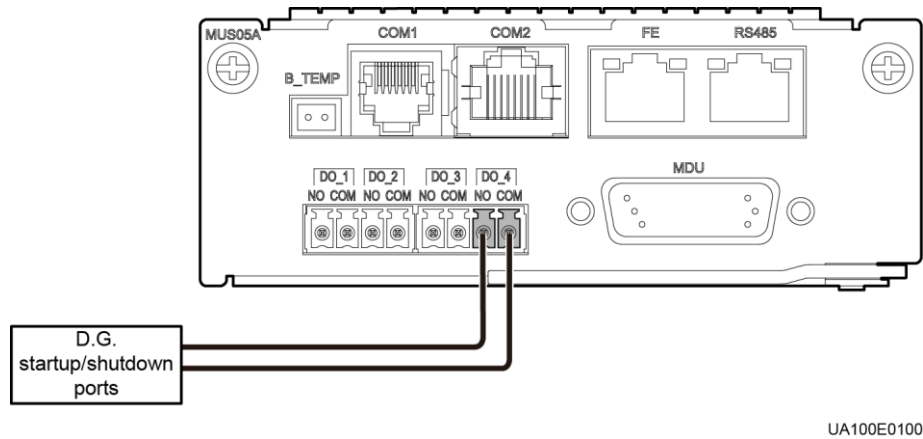


In reused scenarios, the following parameters need to be set:

- Set **ATS** to **Not connected**.
- **Working mode** is automatically set to **ECO** and cannot be changed.

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 normally open (NO). When it is closed, the D.G. starts. [Figure 5-56](#) shows the signal cable connection between the UPS and the D.G. in reused scenarios.

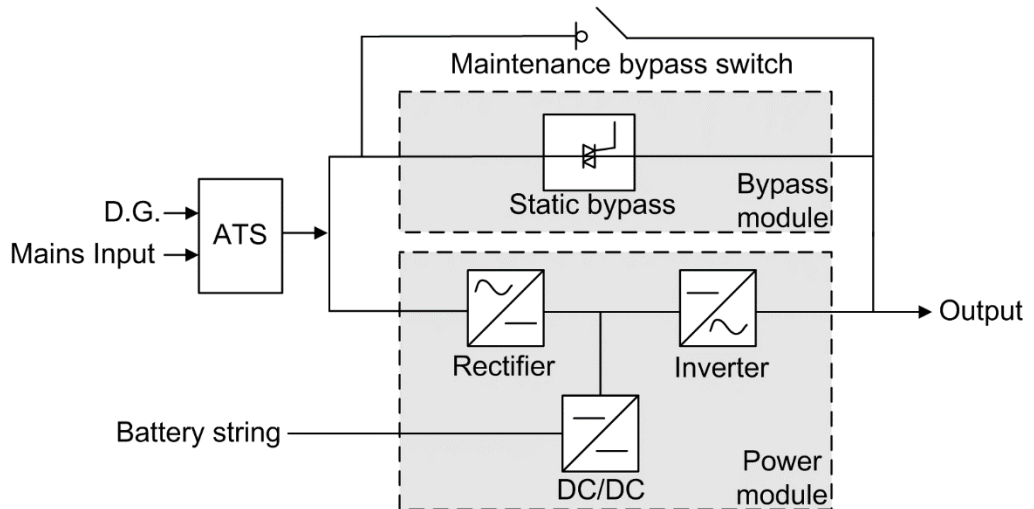
Figure 5-56 Connecting signal cables in the reused scenario



5.3.4 ATIS Scenario

The D.G. and mains connect to the UPS over an ATIS. The MDU obtains the D.G. startup/shutdown status over the dry contact signals sent from the ATIS, and controls D.G. startup/shutdown over dry contacts. [Figure 5-57](#) shows the working principles.

Figure 5-57 ATIS scenario

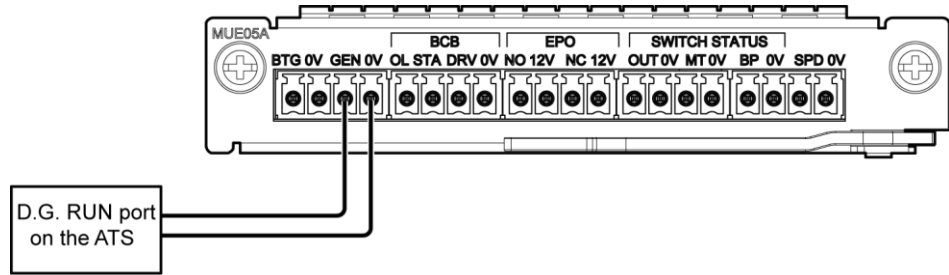


In ATIS scenarios, the default parameter settings are used. **Working mode** can be set based on the site requirements.

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 normally open (NO). When it is closed, the D.G. starts. [Figure 5-56](#) shows the signal cable connection between the UPS and the D.G.

The D.G. RUN port of the ATIS connects to the dry contact card, as shown in [Figure 5-58](#).

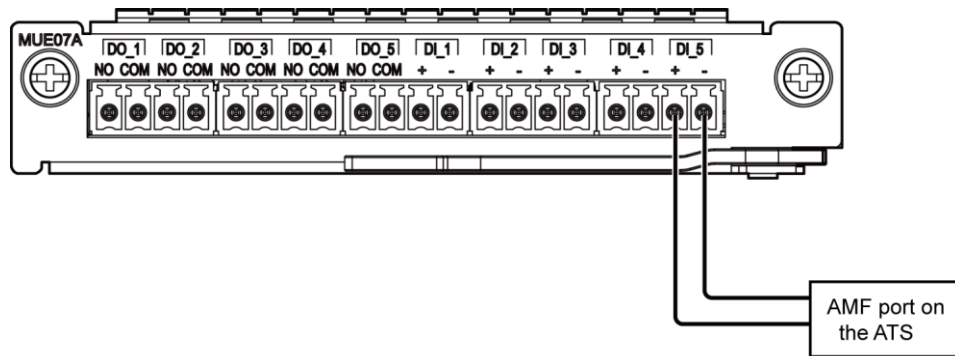
Figure 5-58 Connecting signal cables in the ATS scenario (1)



UA100E0102

The AMF port of the ATS connects to the DI_5 port on the dry contact extended card, as shown in [Figure 5-59](#).

Figure 5-59 Connecting signal cables in the ATS scenario (2)



UA100E0101

5.4 Parallel System Operations

For detailed parallel system operations, contact Huawei technical support.

6 Routine Maintenance

6.1 UPS Maintenance

NOTICE

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

6.1.1 Monthly Maintenance

Table 6-1 Monthly maintenance

Check Item	Expected Result	Troubleshooting
Operating environment	<ul style="list-style-type: none">• Ambient temperature: 0–40°C• Humidity: 0–95% RH (non-condensing)• Rodent-proof measures have been taken for the equipment room.• The equipment room is airtight.	<ul style="list-style-type: none">• If the humidity or temperature is abnormal, check the air conditioner status.• Put rodent-proof baffle plates at the door of the UPS equipment room.• Check that the equipment room is airtight and not in a direct ventilation environment.
Power grid environment	<ul style="list-style-type: none">• Input voltage: 380 V AC, 400 V AC, or 415 V AC (line voltage)	<ul style="list-style-type: none">• If the input voltage is abnormal, check the power grid status and input cable

Check Item	Expected Result	Troubleshooting
	<ul style="list-style-type: none"> Output voltage: 380 V AC, 400 V AC, or 415 V AC (tolerance $\pm 1\%$, line voltage) Frequency: 40–70 Hz 	<p>connection.</p> <ul style="list-style-type: none"> If the output voltage is abnormal, check the UPS running status and check whether an alarm is generated.
Information on the LCD	The status icons on the LCD indicate that all units are operating properly, all operating parameters are within their normal ranges, and no fault or alarm information is displayed.	If an alarm is generated, rectify the fault by checking the device status and parameters.

6.1.2 Quarterly Maintenance

Table 6-2 Quarterly maintenance

Check Item	Expected Result	Troubleshooting
Cleanliness	Wipe the cabinet surface using a white paper and the paper does not turn black.	Remove the dust, especially from the air filter on the front door, or replace the air filter.
Parameter configuration	The configuration of the output voltage grade, frequency, number of batteries, and battery capacity meets requirements.	Reset the parameters.
Status record	Record the three-phase load rate and output power factor.	If an exception occurs, check the load status.
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	If an alarm is generated, refer to the alarm list.

6.1.3 Annual Maintenance

Table 6-3 Annual maintenance

Check Item	Expected Result	Troubleshooting
Grounding	Check that the ground cables are connected securely.	Tighten the screws.
Power cables and terminals (between the UPS and the power distribution cabinet)	The insulation layer of cables is intact and terminals are free from black marks	<ul style="list-style-type: none"> Replace the cables. Secure the output terminals.

Check Item	Expected Result	Troubleshooting
	and noticeable sparks.	
Cables and circuit breaker through-current capacity	The circuit breakers and cables meet load requirements. The actual cable through-current capacity is greater than the circuit breaker specifications.	<ul style="list-style-type: none"> • Replace the circuit breaker. • Replace the cable.

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

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

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

6.2 Battery Maintenance

NOTICE

Before installing batteries, read through the battery user manuals and pay attention to safety precautions and connection methods provided by battery manufacture.

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

- Wrap tools with insulation tape to prevent electric shock.
- Protect your eyes with relevant devices and apply other protective measures.
- Wear insulated gloves and a protective coat in case of electrolyte overflow.
- When moving batteries, avoid handling the battery upside down, handle batteries gently, and pay attention to personal safety.
- Keep the battery switch off when installing or maintaining the batteries.

6.2.1 Precautions for Battery Maintenance

- Before battery maintenance, get the tools, such as handles, insulated. Do not place other objects on the top of batteries.
- Never use any organic solvent to clean batteries.
- Never try to remove the safety valve or pour anything into batteries.
- Never smoke or have an open flame around batteries.
- After battery discharge, charge the battery in time to maintain a good service life.
- Only professionals are allowed to perform the maintenance tasks.

6.2.2 Monthly Maintenance

Table 6-5 Monthly maintenance

Item	Expected Result	Troubleshooting
Battery management alarm	No battery management alarm is generated.	Identify the cause of an alarm based on the alarm information.
Battery appearance	<ol style="list-style-type: none"> 1. The surface is clean and tidy without stains. 2. The battery terminals are intact. 3. Batteries are free from damage and cracks. 4. Batteries are free from acid leakage. 5. Batteries are not deformed or bulged. 	If the battery appearance is abnormal, contact Huawei technical support.
Battery operating temperature	<ol style="list-style-type: none"> 1. The ambient battery temperature is $25\pm 5^{\circ}\text{C}$. 2. The battery operating temperature is lower than battery temperature $+20^{\circ}\text{C}$. 3. Battery charge and discharge conditions meet the requirements specified in the battery specifications. 	<ol style="list-style-type: none"> 1. Identify the cause of an abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.
Charge voltage of battery string	<ul style="list-style-type: none"> • Equalized charging voltage: $(2.35 \text{ V/cell} \pm 1\%) \times \text{number of battery cells}$ • Float charging voltage: $(2.25 \text{ V/cell} \pm 1\%) \times \text{number of battery cells}$ 	<ol style="list-style-type: none"> 1. If the voltage drop between the battery string output terminals and the battery input terminals at the UPS side is greater than 1% of the battery string voltage, check whether the cable between the battery string and the UPS is excessively long, or the cable diameter is excessively small. 2. Check whether the equalized charging voltage and float

Item	Expected Result	Troubleshooting
		<p>charging voltage are correctly set for the UPS.</p> <p>3. If the fault persists, contact Huawei technical support.</p>

6.2.3 Quarterly Maintenance

Table 6-6 Quarterly maintenance

Item	Expected Result	Troubleshooting
Battery temperature sensor measurement accuracy	The difference between the temperature measured by the temperature sensor and the temperature displayed on the MDU is less than 3°C.	<ol style="list-style-type: none"> 1. Install the temperature sensor in the correct position. 2. Replace the battery temperature sensor.
Battery management parameter settings	The settings of battery management parameters meet the requirements in the user manual.	Set parameters correctly.
Tightness of battery screws	The location of the signs marked on battery terminals indicating tight connections does not change.	Take photos from multiple angles and contact Huawei technical support.
Cables between batteries	No cable deteriorates and the insulation layer does not crack.	Replace the faulty cable.
Battery voltage	<ul style="list-style-type: none"> • Equalized charging voltage: 2.35 V/cell \pm0.02 V/cell • Float charging voltage: 2.25 V/cell \pm0.02 V/cell 	<ol style="list-style-type: none"> 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.
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	<ol style="list-style-type: none"> 1. If the batteries cannot discharge normally, locate the fault (for abnormal alarms, see the alarm list). 2. If the fault persists, contact Huawei technical support.

6.2.4 Annual Maintenance

Table 6-7 Annual maintenance

Item	Expected Result	Troubleshooting
Capacity Test	When the UPS is backed up, discharge a battery to the undervoltage alarm threshold, to refresh the capacity of the battery.	<ol style="list-style-type: none">1. Locate the cause when an exception is identified.2. If the fault persists, contact Huawei technical support.
Battery connection reliability	<ol style="list-style-type: none">1. Each battery terminal is connected reliably. (When battery strings are powered off, check the reliability of each terminal in the order from positive terminals to negative terminals.)2. The tightening torque of each battery screw meets the requirements of the battery manufacturer. (A torque wrench is used for checking the torque. After checking that the battery screws meet the requirements, mark the screws for later check.)	<ol style="list-style-type: none">1. Rectify any abnormal connection.2. If the fault persists, contact Huawei technical support.

7 Troubleshooting

CAUTION

- If the UPS is faulty, alarm information is displayed on the LCD. Clear critical alarms before powering on the UPS again. Otherwise, the fault scope expands or the UPS is damaged.
- Do not clear alarms by reseating modules.
- Remove a faulty module after it is confirmed that the module needs replacing. After removing the module, do not insert it into the UPS again.

NOTICE

- After a UPS finishes troubleshooting and is started, if the LCD continues displaying alarm information, choose **System Info > Alarms > Clear Faults** to clear the alarm and then start the inverter.
- When batteries reach EOD, the battery switch in the BCB box trips if the BCB box is configured. To restore battery discharge, close the battery switch in the BCB box (if any) first.
- To restore battery discharge after batteries reach EOD, use one of the following methods:
1. Switch to another battery string. Ensure that each battery has a voltage greater than the EOD voltage and 11.3 V/cell. 2. Restore the mains power supply to start the inverter. Close the battery switch and charge batteries until each battery has a voltage greater than the EOD voltage and 11.3 V/cell.

For details about how to rectify common faults, see [Table 7-1](#). If any unmentioned faults occur, see the alarm list chapter, or contact Huawei technical support.

Table 7-1 Troubleshooting

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

Case	Symptom	Possible Cause	Measure
	boosted.	threshold 80 V.	power company.
		PFC soft-startup fails.	Replace the power module.
		The power module is faulty.	Replace the power module.
The inverter is not normal.	The buzzer is activated, the Fault indicator is on, the inverter is faulty, and the UPS transfers to bypass mode.	The UPS is overloaded or short-circuited.	Reduce load or rectify short circuits.
		The power module is faulty.	Replace the power module.
The charger generates an alarm.	The buzzer is activated, the Fault indicator is on, and the charging function fails.	The charger fails.	Replace the power module.
		The charger experiences overcurrent.	Replace the power module.
		The charger experiences undervoltage.	Check whether the configured number of batteries is correct. If the value is correct but the alarm persists, replace the power module.
The UPS works in bypass mode and does not transfer to inverter mode.	When the mains is normal, the UPS works in bypass mode and does not transfer to inverter mode.	Set the UPS working mode to ECO mode.	Set the working mode correctly.
		The bypass transfer times reach the upper threshold.	On the LCD, choose Clear Faults .
The bypass is not normal.	The buzzer is activated, and the Fault indicator is on.	The bypass thyristor is damaged.	Replace the bypass module.
		The bypass module experiences overtemperature.	Reduce the load, or improve ventilation.

 **NOTE**

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

8 Technical Specifications

8.1 Physical Characteristics

Item	360 kVA	400 kVA	440 kVA	480 kVA
Cabling mode	Cables can be installed at the top or bottom			
Protection level	IP20 (or IP21)			
Dimensions (H x W x D)	2000 mm x 1200 mm x 850 mm			
Communication function	Supports dry contact port, serial port, FE port. Supports Simple Network Management Protocol (SNMP)			
Weight	910 kg	942 kg	974 kg	1006 kg

8.2 Environment Features

Item	360 kVA	400 kVA	440 kVA	480 kVA
Operating temperature	0–40°C			
Storage temperature	-40°C to +70°C			
Humidity	0%–95% RH (non-condensing)			
Altitude	0–1000 m When the altitude is above 1000 m, see IEC62040-3 to check how the UPS5000-E power is derated. The maximum altitude is 4000 m			
Noise	25°C and atmospheric pressure: 100% load: 70 dB			

Item	360 kVA	400 kVA	440 kVA	480 kVA
	75% load: 65 dB 50% load: 60 dB			

8.3 Safety Regulations and EMC

Safety Regulations/ EMC	360 kVA	400 kVA	440 kVA	480 kVA
Safety regulations	EN62040-1: 2008 IEC62040-1: 2008 YD/T2165: 2010 GB/T14715-93			
EMC	EN62040-2 IEC62040-2 IEC61000-2-2 IEC61000-4-2 EN61000-4-3 IEC61000-4-4 IEC61000-4-5 EN61000-4-6 IEC61000-4-8			

8.4 Mains Input Electrical Specifications

Mains Input Specifications	360 kVA	400 kVA	440 kVA	480 kVA
Input format	Three-phase, four-wire, and PE wire			
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)			
Input voltage range	138–485 V AC (line voltage) The UPS5000-E power is not derated at 305–485V AC and is linearly derated at 305–138 V AC			
Rated frequency	50 Hz or 60 Hz			
Input frequency range	40–70 Hz			

Mains Input Specifications	360 kVA	400 kVA	440 kVA	480 kVA
Input power factor	0.99 (full load); > 0.98 (50% load)			
THDi	< 3% (full linear load) or < 5% (full non-linear load)			

8.5 Bypass Input Electrical Specifications

Bypass Input Specifications	360 kVA	400 kVA	440 kVA	480 kVA
Input format	Three-phase, four-wire, and PE			
Rated input voltage	380 V AC, 400 V AC, or 415 V AC (line voltage)			
Rated frequency	50 Hz or 60 Hz			
Frequency range	(50 Hz or 60 Hz)±6 Hz (adjustable, 0.5–6 Hz, ±2 Hz by default)			
Input mode	The main and bypass inputs are supplied by one or two power sources			
Bypass current sharing	In a parallel system, control the cable length to equalize the current. The current unbalance must be less than 25%			

8.6 Battery Electrical specifications

Item	360 kVA	400 kVA	440 kVA	480 kVA
Battery voltage	360–552 V DC (30–46 batteries, 32 by default. The UPS5000-E power is derated by 6% when 30 batteries are configured).			
Battery management	Intelligent battery management.			
One-button cold-start	In the case of mains outage, batteries start the UPS5000-E, which supplies power to loads.			
Battery string sharing	Battery string sharing is supported in a parallel system. No battery string is shared by default.			
Charger output power	The maximum charging power of a module is 4.5 kW.			
Charge voltage	<ul style="list-style-type: none"> 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	360 kVA	400 kVA	440 kVA	480 kVA
Output system	Three-phase, four-wire, and PE			
Voltage	380 V AC, 400 V AC, or 415 V AC (tolerance $\pm 1\%$) (line voltage)			
Frequency	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 $\pm 0.25\%$)			
Total harmonic distortion of output voltage (THDv)	<ul style="list-style-type: none"> < 1% (full linear load) < 3% (full non-linear load) 			
Output power factor	1			
Transfer time	0 ms			
Output voltage unbalance	Voltage unbalance: $\pm 3\%$; phase unbalance: $\pm 2^\circ$			
Overload capability	Inverter overload capability: <ul style="list-style-type: none"> 105% < load \leq 110%: transfer to bypass mode after 60 min 110% < load \leq 125%: transfer to bypass mode after 10 min 125% < load \leq 150%: transfer to bypass mode after 1 min Bypass overload capability: <ul style="list-style-type: none"> Load \leq 135%: run continuously at 30°C or lower 1000% load: run for 100 ms 			

8.8 System Electrical Specifications

System Specifications	360 kVA	400 kVA	440 kVA	480 kVA
Number of the parallel UPSs	≤ 4			
Power supply reliability	The auxiliary power supplies, centralized controllers, and parallel signals use a redundancy design			
ECO	Supported			

A Menu Hierarchy

A.1 Menus on the LCD

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

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

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

A.2 Menus on the WebUI

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

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

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
				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 cells	N/A
		Advanced Param.	System capacity	N/A
			Power module capacity	N/A
			Requisite modules	N/A
			Redundant modules	N/A
			Working mode	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			BSC mode	N/A
			Paral. sys. hibernate	N/A
			Module cycle hiber. period	N/A
			Amb. temp. alarm thresh	N/A
			Top outlet fan	N/A
			EOD restart	N/A
			EOD restart delay	N/A
			Inverter async. alarm	N/A
			Bus overvoltage recovery	N/A
			Bus overvolt. recovery time	N/A
			Capacitor failure detection	N/A
			Capacitor failure detection upper limit	N/A
			Capacitor failure detection lower limit	N/A
			Input cur. limiting	N/A
			Input cur. limiting ratio	N/A
			No-load output shows zero	N/A
			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	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			(s)	
			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
			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	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			protection interval	
			Scheduled equalized charging interval	N/A
			Float volt. temp. comp.	N/A
			Float volt. temp. comp. coef.	N/A
			Max batt. dis.time	N/A
			Sched. shallow dis. test	N/A
			Sched. shallow dis. test time	N/A
			Sched. shallow dis. test interval	N/A
			Shallow dis. test dis. ratio	N/A
			Undertemp. alarm thresh.	N/A
			Overtemp. alarm thresh.	N/A
			Backup time warning	N/A
			Backup time warn. thresh.	N/A
			Remain. cap. warning	N/A
			Remain. cap. warn. thresh.	N/A
			Dis.cur.0.1C EOD	N/A
			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.	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			time	
			Chg. volt. over range point	N/A
			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 DO_1 Action	N/A	
		MUE07A DO_2 Action	N/A	
		MUE07A DO_3 Action	N/A	

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			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 Power Settings	Intelligent 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	Start Addr. of ambient temp. & H. sensor	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
		Sensor Settings	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	Inv. ON	N/A
			Inv. OFF	N/A
			Clear Fault	N/A
			Bypass runtime	N/A
			Inv. runtime	N/A
			Forced Equalized Charging	N/A
			Shallow Dis. Test	N/A
			Capacity Test	N/A
	Query	Alarm History	Query	-
Export			-	N/A
Logs		Historical log	-	N/A
		Cap. test log	-	N/A
		Common test log	-	N/A
Config.		User Mgmt.	New	-
	Modify		-	N/A
	Delete		-	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			

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
		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 Server	Email server IP address	N/A
			Sender's email	N/A
			User account authentication required when sending a mail	N/A
		Configure Alarm Notification Email Address	No.	N/A
			Email	N/A
			Language	N/A
			Alarm Severity	N/A
			Scheduled Notifi.	N/A
Query	Alarm History	Query	-	N/A
		Export	-	N/A
	Logs	Historical log	-	N/A
		Cap. test log	-	N/A
		Common test log	-	N/A
	Config.	User Mgmt.	New	-
Modify			-	N/A
Delete			-	N/A
Site Config.		System Date	Date(Local)	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
		and Time	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 Server	Email server IP address	N/A
			Sender's email	N/A
			User account authentication required when sending a mail	N/A
		Configure Alarm Notification Email Address	No.	N/A
			Email	N/A
Language	N/A			
Alarm Severity	N/A			
Scheduled Notifi.	N/A			
Query	Alarm History	Query	-	N/A
		Export	-	N/A
	Logs	Historical log	-	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu	
		Cap. test log	-	N/A	
		Common test log	-	N/A	
Config.	User Mgmt.	New	-	N/A	
		Modify	-	N/A	
		Delete	-	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 Server	Email server IP address		N/A
			Sender's email		N/A
User account authentication required when sending a mail			N/A		
Configure	No.		N/A		

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
		Alarm Notification Email Address	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
			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			

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu	
			Ph. A output volt.	N/A	
			Ph. B output volt.	N/A	
			Ph. C output volt.	N/A	
			Inv. ph. A cur.	N/A	
			Inv. ph. B cur.	N/A	
			Inv. ph. C cur.	N/A	
			Inv. ph. A induc. cur.	N/A	
			Inv. ph. B induc. cur.	N/A	
			Inv. ph. C induc. cur.	N/A	
			ECM	BPM ph. A input volt.	N/A
				BPM ph. B input volt.	N/A
				BPM ph. C input volt.	N/A
				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	N/A	

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu
			commissioning var. 2 data	
			BPM SW commissioning var. 3 data	N/A
			BPM SW commissioning var. 4 data	N/A
			BPM SW commissioning var. 5 data	N/A
		Module	Rec. SW commissioning var. 0 data	N/A
			Rec. SW commissioning var. 1 data	N/A
			Rec. SW commissioning var. 2 data	N/A
			Rec. SW commissioning var. 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	N/A

Level-1 Menu	Level-2 Menu	Level-3 Menu	Level-4 Menu	Level-5 Menu	
			commissioning var. 4 data		
			Inv. SW commissioning var. 5 data	N/A	
		ECM	ECM SW commissioning var. 0 data	N/A	
			ECM SW commissioning var. 1 data	N/A	
			ECM SW commissioning var. 2 data	N/A	
			ECM SW commissioning var. 3 data	N/A	
			ECM SW commissioning var. 4 data	N/A	
			ECM SW commissioning var. 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	<ul style="list-style-type: none"> • Cable connections are incorrect. • The mains is not normal. • The power module is faulty. • The output or battery is incorrectly grounded. 	<ol style="list-style-type: none"> 1. Check whether cables to mains are disconnected, loose, or incorrectly connected. 2. If cable connections are correct, measure the mains voltage with a multimeter. If the mains voltage exceeds 280 V, the mains input is not normal; if the mains voltage is less than 272 V, the sampling circuit of the power module is not normal. Replace the faulty module. 3. Check whether the output or battery is incorrectly grounded.
0001-2			<ul style="list-style-type: none"> • Cable connections are incorrect. • The mains is not normal. • The mains input fuse for the power module is blown. 	<ol style="list-style-type: none"> 1. Check whether cables to mains are disconnected, loose, or incorrectly connected. 2. If cable connections are correct, measure the mains voltage with a multimeter. If the mains voltage is less than 80 V, the mains voltage is not normal; if the mains voltage exceeds 88 V, the power module sampling circuit or fuse may not be working properly. Replace the faulty module.
0001-3			The mains is not normal.	Check the mains.
0004-1	Mains ph. Reversed	Minor	Cable connections are incorrect.	Verify the cable connections.

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
0005-1	Mains neutral absent	Minor	Cable connections are incorrect.	<ol style="list-style-type: none"> Secure or connect the neutral wire to the cabinet if it is loose or disconnected. Check that the neutral wire to the power distribution system is normal.
0006-1	Mains undervoltage	Minor	<ul style="list-style-type: none"> The mains is not normal. The power module sampling circuit is not normal. 	Check whether the mains voltage ranges from 80 V (excluding 80 V) to 176 V. If no, the mains monitoring circuit for the power module is faulty. Replace the faulty module.
0010-1	Abnormal bypass voltage	Minor	<ul style="list-style-type: none"> The bypass voltage range is not correctly set. The bypass input voltage is not normal. 	<ol style="list-style-type: none"> Check the bypass input voltage or cable connections with a multimeter. Check the voltage system and bypass voltage thresholds configured on the LCD.
0010-2			<ul style="list-style-type: none"> The bypass frequency range is not correctly set. The bypass input frequency is not normal. 	<ol style="list-style-type: none"> Check the bypass input voltage or cable connections with a multimeter. Check the bypass input frequency. Check the rated frequency and frequency range configured on the LCD.
0011-1	Bypass phase reversed	Minor	The phase sequence of the three-phase bypass input is reversed.	Check whether the cable phase sequence is correct using a multimeter. If no multimeter is available, exchange the positions of any two cables.
0012-1	Bypass neutral absent	Minor	The neutral wire of bypass input is not installed properly.	<ol style="list-style-type: none"> Secure or connect the neutral wire to the cabinet if it is loose or disconnected. Check that the neutral wire to the power distribution system is normal.
0020-1	Battery connected reversely	Critical	Batteries are not properly installed.	<ol style="list-style-type: none"> Check whether battery polarities are correctly installed by using a multimeter. If no, correct the installation. 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	If the BCB box is configured, check

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
			reaches the EOD voltage threshold due to continuous discharge.	whether the BCB box trips. If it trips, close the BCB box switch.
0022-1	No battery	Minor	<ul style="list-style-type: none"> There is no battery string. The battery string is not properly installed. The power module battery fuse is blown. 	<ol style="list-style-type: none"> Check that battery cables are correctly connected. Check that the battery terminal voltage is normal. Check that the battery fuse in the power module is intact.
0025-1	Battery overvoltage	Minor	<ul style="list-style-type: none"> The configured number of batteries is less than the actual number. The battery neutral wire is not installed properly. 	<ol style="list-style-type: none"> Check whether battery parameters are correctly set. If they are correctly set, certain batteries may be faulty. Check whether the battery neutral wire is correctly connected.
0026-1	Low battery voltage	Minor	<ul style="list-style-type: none"> Battery discharge results in low battery voltage. The battery neutral wire is not installed properly. The charger is faulty. 	<ol style="list-style-type: none"> If the low battery voltage alarm is generated in battery mode, check whether the mains voltage recovers. If yes, charge batteries immediately. Check whether the battery neutral wire is correctly connected. If this alarm is generated in normal mode, check whether the battery switch is ON. If yes, the charger may be faulty. Replace the related power module.
0530-1	Battery ground fault	Critical	<ul style="list-style-type: none"> The battery string is not properly grounded. The battery ground monitoring cable is faulty. The dry contact board is faulty. 	<ol style="list-style-type: none"> Check whether the positive and negative terminals of the battery string are grounded or have sufficient resistance to the ground. Check whether the battery grounding failure detector is faulty by replacing it with a new one. If no battery grounding failure detector is available, check on the dry contact board whether the battery grounding failure detector is enabled. If yes, disable it and check whether the

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
				alarm is cleared. If the alarm persists, the dry contact board may be faulty. Replace the board.
0032-1	Battery overvoltage protection	Critical	<ul style="list-style-type: none"> The battery voltage is greater than the upper threshold. The configured number of batteries is less than the actual number. The actual number of batteries does not meet requirements. 	<ol style="list-style-type: none"> Check the battery voltage. Check that the configured number of batteries matches the actual number. Check that the actual number of batteries meets requirements.
0036-2	Battery maintenance reminder	Warning	The time for maintenance arrives.	Maintain the batteries.
0037-1	Battery undervoltage	Critical	<ul style="list-style-type: none"> The UPS has worked in battery mode for an extended amount of time. The charger is faulty. 	<ol style="list-style-type: none"> Check whether the battery voltage is normal. Check whether the output is overloaded. Check whether any battery is damaged. If yes, replace the battery. Check whether any battery charger generates an alarm. If yes, replace the faulty module.
0040-7	Rectifier abnormal	Critical	<ul style="list-style-type: none"> The fan for the power module is not functioning properly. The air channel for the power module is obstructed. 	<ol style="list-style-type: none"> Check that the air channel for the module is free from blockage. Check whether the fans are functioning properly. Replace the power module if the fans are faulty.
0043-1	Fan abnormal	Critical	<ul style="list-style-type: none"> The fan for the power module is abnormal. The fan monitoring cable for the power module is not working properly. 	Replace the faulty power module.
0043-2			The fan is faulty.	Check the fan or replace the bypass module.
0043-3			<ul style="list-style-type: none"> The fan is faulty. 	<ol style="list-style-type: none"> Replace the fan.

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
0043-4			<ul style="list-style-type: none"> The fan monitoring cable is faulty. 	<ol style="list-style-type: none"> Check the fan monitoring cable.
0047-1	Not ready	Critical	The ready switch is OFF.	Close the ready switch.
0060-4	Inverter abnormal	Critical	<ul style="list-style-type: none"> A load short-circuit occurs. A short circuit occurs inside the module. (This fault seldom occurs.) The output is incorrectly grounded. 	<ol style="list-style-type: none"> Check load cable distributions. Check whether the output is grounded. If the load cable connections are normal and the output is correctly grounded, replace the power unit or module.
0061-2	Inverter alarm	Minor	<ul style="list-style-type: none"> The I2C bus is not normal. The E2PROM is faulty. 	<ol style="list-style-type: none"> Rectify the fault and check whether the alarm is cleared. If the alarm is generated again, replace the power module.
0061-7	Inverter alarm	Minor	The bypass waveform is not normal.	<ul style="list-style-type: none"> If not all modules generate the alarm, start the UPS, transfer it to normal mode, and replace the faulty module. If all modules generate the alarm, open the bypass input circuit breaker. After the inverter relay is closed, close the bypass input circuit breaker 10 seconds later.
0564-1	Overload timeout	Critical	<ul style="list-style-type: none"> The load is excessive. Derating reduces the rated system power. The module is damaged. The output is incorrectly grounded. 	<ol style="list-style-type: none"> Check that there is no overload. Check that the module power is not derated due to a fan fault. Check whether the power grid has a large asymmetric load. Check whether the output is grounded. If the alarm persists, replace the power module.
0565-1	Load impact transfer-to-bypass	Minor	<ul style="list-style-type: none"> A large-power RCD load is instantly connected, or the output load short-circuits. The inverter bridge short-circuits. 	<ol style="list-style-type: none"> Check the load. If the load is normal, replace the power module.

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
0566-1	Output overload	Minor	<ul style="list-style-type: none"> The load is excessive. Derating reduces the rated system power. The module is damaged. 	<ol style="list-style-type: none"> Check that there is no overload. Check that the module power is not derated due to a fan fault. If the alarm persists, replace the power module.
0570-4	BPM module abnormal	Critical	<ul style="list-style-type: none"> The bypass fan is not functioning properly, or the air channel is blocked. The ambient temperature exceeds the upper threshold. The load is excessive. 	<ol style="list-style-type: none"> Check the bypass fan and air channel. If the fan is faulty, replace it. Check that the ambient temperature has not exceeded 40°C. Check that there is no overload.
0583-1	Inter-rack par. cable abnormal	Critical	<ul style="list-style-type: none"> The inter-rack parallel system CAN bus is disconnected or short-circuited. Only one rack works in a parallel system. An ECM is faulty. 	<ol style="list-style-type: none"> Check the inter-rack parallel system CAN bus. Rectify the disconnection or short-circuit fault. Replace the ECM.
0583-4			The inter-rack industrial frequency synchronization cable is broken.	Replace the inter-rack parallel cable.
0583-5			The inter-rack carrier synchronization cable is broken.	
0583-6			<ul style="list-style-type: none"> The intra-rack INVBYP cable is broken. The parallel CAN bus is broken. 	
0584-2	Inter-rack par. cable alarm	Minor	The inter-rack parallel cable is faulty.	Replace the inter-rack parallel cable.
0584-4			The inter-rack industrial frequency synchronization cable	

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
			is broken.	
0085-1	EPO	Critical	The EPO button is pressed.	Restore the EPO button status. Start the UPS after the alarm is cleared.
0086-1	Max. number of BPM transfers	Minor	The system frequently transfers to bypass mode due to overload timeout or load impact.	Check the load.
0087-1	System transfer-to-bypass	Warning	The neighboring UPS is not normal, and transfers to bypass mode.	Check the reason why the neighboring UPS transfers to bypass mode.
0088-1	Rack address conflict	Critical	The configured rack address conflicts with another one.	Check the rack address setting.
0089-1	Rack output overload	Minor	<ul style="list-style-type: none"> The load is excessive. The rack capacity setting is not appropriate. 	<ul style="list-style-type: none"> Check the load and remove some loads or expand the UPS power capacity if the UPS is overloaded. Check that the configured rack capacity meets requirements.
0090-1	Dry contact board fault	Critical	I2C communication with the dry contact board MUE05A fails.	Replace the dry contact board MUE05A.
0090-2			I2C communication with the dry contact board MUE06A fails.	Replace the dry contact board MUE06A.
0356	Battery Mode	Minor	The UPS is working in battery mode.	The running status is displayed. See details about how to handle other alarms.
0359	No power supplied	Warning	No power is supplied.	The running status is displayed. See details about how to handle other alarms.
0332	Output disabled	Minor	The output is disabled.	The running status is displayed. See details about how to handle other alarms.
0337	PDC bypass input breaker open	Critical	The bypass input circuit breaker on the PDC is OFF.	The running status is displayed. No further measures are required.
0338	PDC output breaker open	Critical	The output circuit breaker on the PDC is OFF.	1. Check that all UPS output circuit breakers are ON.

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
				2. On the LCD, check that PDC output breaker open alarm has disappeared. If the alarm persists, tap the Clear Fault button to clear the alarm.
0341	PDC Maint. breaker closed	Minor	The maintenance circuit breaker on the PDC is ON.	The running status is displayed. No further measures are required.
0342	Mains input breaker open	Critical	The mains input circuit breaker is OFF.	The running status is displayed. No further measures are required.
0343	BPM input breaker open	Critical	The bypass input circuit breaker is OFF.	The running status is displayed. No further measures are required.
0340	Maint. breaker closed	Minor	The maintenance circuit breaker is ON.	The running status is displayed. No further measures are required.
0335	Generator connected	Warning	The generator is connected.	The running status is displayed. No further measures are required.
0594-1	Insufficient redundant racks	Minor	<ul style="list-style-type: none"> The load is excessive. The configured number of redundant racks is incorrect. 	<ol style="list-style-type: none"> Reduce the load. Decrease the configured number of redundant racks.
0095-1	Insuffi. redundancy	Minor	<ul style="list-style-type: none"> The load is excessive. The configured number of redundant modules is incorrect. 	<ol style="list-style-type: none"> Reduce the load. Decrease the configured number of redundant modules.
0096-1	ECO volt. Abnormal	Minor	<ul style="list-style-type: none"> The ECO bypass voltage or frequency is out of the preset range. The ECO bypass voltage or frequency range is incorrectly set. The bypass input sequence is reverse or the neutral wire is disconnected. 	<ol style="list-style-type: none"> Check the bypass input voltage and frequency. Check that the rated voltage, rated frequency, ECO bypass voltage range, and frequency range are correctly set. Check that the bypass cables and circuit breakers are correctly connected.
0098-1	Bypass current not shared	Minor	<ul style="list-style-type: none"> The output and input circuit breakers are OFF. 	<ol style="list-style-type: none"> Check that the output and bypass input circuit breakers on each rack are ON.

Alarm ID (Alarm ID- Cause ID)	Alarm Name	Severity	Cause	Solution
			<ul style="list-style-type: none"> The length of the bypass input or output cables is incorrect. The bypass SCR open-circuits. 	<ol style="list-style-type: none"> Check that bypass input and output power cables on each rack meet the length requirements. Rectify any bypass SCR open-circuit.
0150-1	Inverter asynchronous	Minor	<ul style="list-style-type: none"> The bypass frequency changes fast. The output frequency track rate is incorrectly set. 	<ol style="list-style-type: none"> Check that the bypass output frequency does not change fast. Check that the Output freq. track rate is properly set.
0101-1	BSC signal abnormal	Minor	<ul style="list-style-type: none"> The dual bus connector is loose. Parameters are set incorrectly. 	<ol style="list-style-type: none"> Check the dual bus connector. Check the parameter settings. The master BSC system is not supplying power.
0102-1	Maint. breaker misoperation	Critical	The user operation is incorrect.	<ol style="list-style-type: none"> Shut down the inverter and then close the maintenance circuit breaker. After maintenance, open the maintenance circuit breaker and then start the inverter.
0380	In self-check	Warning	The inverter is in self-check.	Wait until the inverter self-check is complete.

C Acronyms and Abbreviations

A

AC	Alternating Current
AWG	American Wire Gauge

B

BCB	Battery Circuit Breaker
BSC	Bus Sync Controller

C

CAN	Controller Area Network
CE	Conformite Europeenne

D

DC	Direct Current
D.G.	Diesel Generator
DIP	Dual In-Line Package
DSP	Digital Signal Processing

E

ECO	Economy Control Operation
EMC	Electromagnetic Compatibility
EOD	End Of Discharge
EPO	Emergency Power Off
ESN	Equipment Serial Number

F

FE Fast Ethernet

I

IDC Internet Data Center

IP Internet Protocol

IEC International Electrotechnical Commission

L

LCD Liquid Crystal Display

M

MDU Monitor Display Unit

P

PCB Printed Circuit Board

PDC Power Distribution Cabinet

PE Protective Earthing

R

RS485 Recommend Standard 485

S

SNMP Simple Network Management Protocol

SOC State Of Charge

SSL Secure Sockets Layer

STS Static Transfer Switch

T

THDi Total Distortion Of The Input Current Waveform

THDv Total Harmonic Distortion Of Output Voltage

U

UI

User Interface

UPS

Uninterruptible Power System

V

VRLA

Valve Regulated Lead Acid

W

WebUI

Web User Interface